SSRF
STUDENT RESEARCH FORUM
APRIL 1ST-5TH 2024
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Student Research Forum Schedule

Monday, April 1st

1:00PM – 3:00PM: Oral presentations technology check (Beller Conference Center)
3:00PM – 4:00PM: A.L. Chapman Keynote Lecture (Beller)
4:00PM – 4:30PM: Q/A with Dr. Jeffery Kelly

A.L. Chapman Keynote Lecture Sponsored by the Bohan Visiting Professors Program

Tuesday, April 2nd

Poster Presentations (Ad Astra – 5th Floor HEB)

Session 1
8:30AM – 9:30AM: Hang up Posters
10:00AM – 11:30AM: Presentations

Session 2
12:30PM – 1:30PM: Hang up Posters
2:00PM – 3:30PM: Presentations

Oral Presentations (Beller Conference Center)
9:00AM – 12:00PM: Session 1
2:00PM – 4:00PM: Session 2

Wednesday, April 3rd

Poster Presentations (Ad Astra – 5th Floor HEB)

Session 1
8:30AM – 9:30AM: Hang up Posters
10:00AM – 11:30AM: Presentations

Session 2
12:30PM – 1:30PM: Hang up Posters
2:00PM – 3:30PM: Presentations
Oral Presentations (Beller Conference Center)
9:00AM – 12:00PM: Session 1
1:00PM – 4:00PM: Session 2

Thursday, April 4th

3 Minute Thesis (3MT) Finals (Beller Conference Center)
9:00am – 9:30am: Light Breakfast
9:00AM – 10:30AM: 3MT Final Presentations

Career Development Panels (Beller Conference Center)
10:45AM – 12:00PM: Panel Discussion (In-person)
12:00PM – 1:30PM: Networking Lunch
2:00PM – 3:15PM: Panel Discussion (Virtual)

Friday, April 5th

5:00PM – 8:00PM: Banquet at The Loretto- 1111 W 39th St, Kansas City, MO 64111
**Student Research Forum**

The Graduate Student Council, the Faculty Assembly Research Committee, and Graduate Studies welcome you to the Student Research Forum.

The purposes of the Student Research Forum are:

1. To provide students with practical experience in oral research presentation to audiences with a general scientific background.
2. To recognize outstanding student research in the following Schools at The University of Kansas Medical Center:
   - Graduate Studies
   - Health Professionals
   - Medicine
   - Nursing
3. To assist students and faculty in keeping abreast of the various research activities in progress throughout the University of Kansas Medical Center.

**Organizing Committee**

**SRF Co-Chairs:** Natalie Eppler and Paige Minchella

**Abstract:** Clayton Mansel, Nabil Hossain, Nik Connolly

**Banquet:** Morgan Ewald, Gentry Totta-Griese, Brent Sear, Kafayat Yusuf, Mustapha Mangdow

**Booklet:** Kati Venneman, Ashley Teate, Anysja Roberts, Shwetha Sreenivasan

**Career Development:** Tara McQuillan, Riley Peterson, Nour Shraim, Sandeep Kaur, John Maina

**Fundraising:** Cara Wallingford, Colette Worcester, Lana Heslop, Alyssa Hannon

**Judging:** Emily Casteen, Emily Daniel, Chen Zhang, Kaitlyn Hinz

**Marketing:** Ashley Howard, Daniel Chen, Taylor Strope

**Platform:** Abigail Wagle, Caylie McKimens, Jared Rack, Md Saiful Islam Saif

**Poster:** Madison Shay, Aria Triska, Mumtara Jannat Oishee, Will Hauser

**Speaker:** Adam Wilson, Maryam Gholampour, Abbey Vito, Regan Konz

**Volunteers:** Juliann Leak, Juliana Ames, Sonali Choudhury, Yasaman Etemadi Shamsabadi

**3 Minute Thesis (3MT):** Allen Chen, Anu Chakraborty, Aprajita Tripathi, Nicole D’Souza

Volunteering to help plan the Forum requires commitment, flexibility, imagination, patience, resourcefulness, persistence, and, above all, passion to help fellow students succeed. Every member of the Organizational Committee has met and exceeded these qualities.

The Organizing Committee would also like to express special thanks to all the students and faculty who volunteered their time and efforts during the Forum. Their participation has made this year’s SRF a success.

5
Graduate Student Council

The Graduate Student Council (GSC), formed in 1969, is composed of representatives from each of the graduate programs on the University of Kansas Medical Center (KUMC) campus. All graduate students enrolled on the KUMC Kansas City and Wichita campuses who pay Student Activity Fees are members of the GSC.

The GSC had sponsored and organized the Graduate Student Research Day. In 1979, this was merged with the Medical Student Research Day and expanded to the annual KUMC Student Research Forum (SRF), which now includes students from the Schools of Health Professions, Medicine and Nursing.

The GSC also plans social and philanthropic activities throughout the year to promote faculty-student and multidisciplinary interaction. Most importantly, the GSC lobbies for graduate student interests at KUMC, and GSC members serve on university-wide committees concerning the Medical Center.

GSC Executive Committee

President – Sarah Crowards
Vice President – Rishav Mukherjee
Secretary – Sodiq Fakorede
Treasurer – Mustapha Mangdow

Acknowledgments

The current Chairs of the Student Research Forum, the Student Research Forum Planning Committee, and Graduate Student Council would like to express their appreciation for everyone who volunteered their time and efforts to making this annual event a success. Many students, faculty members, departments, and organizations provided support, time, and encouragement to maintain the quality and success of this program.

Special thanks are also made to Dr. Michael Werle, Dean of Postdoctoral Affairs and Graduate Studies, for his assistance, without which the coordination of Student Research Forum would have proven itself to be much more difficult. We also thank Catey Payne and Kristen Martin who provided extensive throughout, including support for the online, electronic abstract submission, and judging programs.

Our mission of education benefits from the science and scholarship of the faculty and post-doctoral fellows who agree to adjudicate student work. We are grateful first to the faculty and post-doctoral fellows who volunteer to judge our work and thereby create a learning environment for us, and equally grateful to the faculty who sponsor student research in their laboratories and clinics, which serves as the basis for our participation in the Forum.
SRF Sponsors

**Platinum Level Sponsors ($1000+)**
- Bohan Visiting Professor Program
- Graduate Student Council
- Microbiology SOM
- Student Governing Council

**Gold Level Sponsors ($500-$999)**
- Center on Aging
- School of Medicine
- School of Nursing

**Silver Level Sponsors ($300-$499)**
- Hearing and Speech

**Partner in Biomedical Science (<$300)**
- Alzheimer’s Disease Center
- Michele Pritchard and Geoff Hall

**Food/Beverage Donor**
- McLain’s Bakery

Thank you to all SRF 2024 sponsors!

Your generosity advances KUMC student success!
The A.L. Chapman Research Lecture

Dr. A.L. Chapman is a graduate of the University of Missouri Columbia and received his Ph.D. in Anatomy from the University of Nebraska. He came to the University of Kansas Medical Center in 1962 when he joined the Department of Anatomy, one of six basic science departments newly created on the Medical Center’s Campus at that time to consolidate all four years of the School of Medicine’s MD curriculum on one campus in Kansas City. Al rose through the faculty ranks in the Department of Anatomy and Cell Biology, and during that time he spent a year sabbatical in cancer research at the National Institutes of Health.

Dr. Chapman moved into administration when selected to be the first KUMC Dean of Graduate Studies in 1982, then Dean of Graduate Studies and Research from 1985 to 1996, and finally Vice Chancellor for Academic Affairs and Dean of Graduate Studies and Research from 1996 to 1999. In 1995, the Chancellor appointed him the Acting Executive Vice Chancellor for KUMC. During these years, Dr. Chapman also served as President of the University of Kansas Medical Center Research Institute from 1992 – 1999.

Throughout Dr. Chapman’s distinguished career, developing students and their research skills was always a priority, and the students were very aware of his sage commitment to their training. He mentored, coached, urged, and prodded former Ph.D., M.D/Ph.D., M.S. students, summer research medical students, and postdoctoral fellows who are now distinguished researchers across the country and here at KUMC. His research involved the identification of retroviruses in canine, murine and human cells in vitro. Dr. Chapman directed and caringly taught the Medical and the Graduate Histology/Cell Biology Course (1962 – 1983). He also established and directed the Electron Microscopy Research Center (1973 – 1991), a prominent research and teaching resource for the benefit of anyone at the medical center.

Dr. Chapman’s desire and commitment to ease the frustrating burden of conducting research within a massive state bureaucracy was so strong, he conceived and almost single-handedly nurtured and mentored the establishment of the KUMC Research Institute (RI) in 1992. The RI has streamlined research purchases, re-- additional growth in invested funds in faculty research helping to leverage NIH and other external funding, donated three acres to the University for the Landon Center on Aging, and leased five additional acres for university use, established a bioscience business incubator, as well as a technology transfer and a clinical trials office. During this time, Dr. Chapman was a highly respected representative of the University to numerous communities, city, regional and national organizations many dedicated to the transfer of biomedical technology to the private sector. As well, he was a n advocate for and instrumental in the formation of biomedical companies derived from KUMC faculty research.
A.L. Chapman Keynote Speaker
Sponsored by the Bohan Visiting Professors Program

Monday, April 1st
3-4:30 pm
Beller Conference Center

Dr. Jeffery W. Kelly

Dr. Jeffery W. Kelly will be the A.L. Chapman Keynote Speaker of this year's Student Research Forum (SRF). Dr. Kelly is the Lita Annenberg Hazen Professor and Professor of Chemistry at the Scripps Research Institute. He is a recipient of the prestigious Wolf Prize in Chemistry and a member of the National Academy of Sciences. His groundbreaking research has advanced our understanding of the molecular mechanisms and therapeutic strategies for pathological protein aggregation, which underlies many aging-associated degenerative diseases.

The title of Dr. Jeffery W. Kelly’s talk is “Pharmacological Adaptation of Proteostasis to Ameliorate Aging-associated Degenerative Diseases”. In this talk, he will share his insights on the cellular protein homeostasis network's role in regulating proteome function and maintaining cellular balance, particularly in the context of aging-associated amyloid diseases and the discovery of small molecule kinetic stabilizers, tafamidis, in his lab.

Pharmacological Adaptation of Proteostasis to Ameliorate Aging-associated Degenerative Diseases

Jeffery W. Kelly, The Scripps Research Institute, 10550 North Torrey Pines Rd., La Jolla, CA 92037

The cellular protein homeostasis, or proteostasis, network regulates proteome function by controlling ribosomal protein synthesis, chaperone- and chaperonin-mediated protein folding, protein trafficking, proteasome and lysosomal protein degradation, and related processes. Stress-responsive signaling pathways match proteostasis network capacity with demand in each subcellular compartment to maintain or alter cellular homeostasis. The beginning of the seminar will focus on how a protein homeostatic deficiency leading to organ system degeneration in a spectrum of aging-associated amyloid diseases can be stopped or slowed utilizing small molecule
kinetic stabilizers—a pharmacological approach to ameliorating neurodegeneration. The clinical efficacy of tafamidis, a transthyretin kinetic stabilizer approved for use in >50 countries for the amelioration of polyneuropathy and cardiomyopathy, will be covered in the context of what we have learned about amyloid diseases and what remains to be learned. The data strongly support the hypothesis that protein aggregation is the driver of neurodegeneration through a mechanism(s) being sought. The second half of the talk will focus on how we discovered drug candidates via high-throughput screens that adapt proteostasis by enhancing lysosomal flux. One of these compounds extends lifespan and healthspan in C. elegans (a collaboration with the Malene Hansen lab), and ameliorates Parkinson’s pathology in a neuronal model, studies carried out in collaboration with the Laushel lab. Another mTOR inhibitor-independent autophagy activator hit reduces cytotoxic axonal mutant prion protein aggregate levels within endosomes of murine primary hippocampal neurons and normalizes axonal trafficking deficiencies, studies performed in collaboration with the Encalada Lab. In addition, a subset of hits from the HTS robustly clear phosphorylated and insoluble tau, while reducing tau-mediated neuronal stress vulnerability in an iPSC-derived neuronal familial tauopathy model, studies carried out in collaboration with the Haggarty Lab. We will show data supporting the hypothesis that mTOR inhibition-independent autophagy activators will be useful for ameliorating neurodegenerative diseases.
# Oral Presentation Schedule

**Tuesday, April 2nd**

## Oral Presentations Session 1

**Beller 1005: 9:00 – 12:00 PM**

<table>
<thead>
<tr>
<th>Time</th>
<th>Presenter</th>
<th>Mentor</th>
<th>Title</th>
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<tbody>
<tr>
<td>9:00 AM</td>
<td>Diana Najera</td>
<td>Vargheese Chennathukuzhi</td>
<td>The Role of REST in Adenomyosis</td>
</tr>
<tr>
<td>9:15 AM</td>
<td>Ming Huang</td>
<td>Ning Wang</td>
<td>Loss of Stra8 Expression Drives Neuronal Aging in Adult Mouse Brains</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>Tara McQuillan</td>
<td>Julie Christianson</td>
<td>Voluntary Wheel Running Improves Hippocampal Integrity in Mice Exposed to Acute Stress following Maternal Separation</td>
</tr>
<tr>
<td>9:45 AM</td>
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<td><strong>BREAK</strong></td>
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<tr>
<td>10:00 AM</td>
<td>Michael Ponte</td>
<td>E. Matthew Morris</td>
<td>Impact of Impaired Hepatic Metabolism on Obesity Related Hypertension Development</td>
</tr>
<tr>
<td>10:15 AM</td>
<td>Dana Thalman</td>
<td>Irfan Saadi</td>
<td>Loss of Specc1 causes disorganization of Blood-CSF Barrier resulting in Congenital Hydrocephalus</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>Chelsea Johnson</td>
<td>Paige Geiger &amp; Jill Morris</td>
<td>Apolipoprotein ε genotype and sex influences skeletal muscle bioenergetic response to diet</td>
</tr>
<tr>
<td>10:45 AM</td>
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<td><strong>BREAK</strong></td>
</tr>
<tr>
<td>11:00 AM</td>
<td>Vinamratha Rao</td>
<td>Reem Mustafa</td>
<td>Tolvaptan Use and Prescribing Patterns in Patients with Autosomal Dominant Polycystic Kidney Disease: A Multicenter Real-World Experience</td>
</tr>
<tr>
<td>11:15 AM</td>
<td>Edziu Franczak</td>
<td>John Thyfault</td>
<td>Hepatocyte-specific Loss of ERα Alters Inflammatory and Antioxidant Markers Without Impairing Hepatic Mitochondrial Function or Susceptibility to NAFLD</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>Sebastian Salathe</td>
<td>John Thyfault</td>
<td>Exercise plus Time Restricted Feeding and Hepatic Ketogenesis Deficiency Upregulate Synaptogenesis Pathways in the Hippocampus of Mice</td>
</tr>
<tr>
<td>11:45 AM</td>
<td>Sean Koester</td>
<td>Neelendu Dey</td>
<td>RET is a microbiome-responsive sex-biased regulator of intestinal tumorigenesis</td>
</tr>
<tr>
<td>Time</td>
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<tr>
<td>2:00 PM</td>
<td>Trenton Wecker</td>
<td>Jeffrey Burns</td>
<td>Subjective Memory Complaints and Cognitive Decline</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>Riley Kemna</td>
<td>Jill Morris</td>
<td>Impact of Mitochondrial DNA on Alzheimer’s Disease Pathology</td>
</tr>
<tr>
<td>2:30 PM</td>
<td>Amanda Hertel</td>
<td>Radwan Ajlan</td>
<td>Impact of Surgical Technique and Timing on Pars Plana Vitrectomy Outcomes in Dropped Lens Fragment Retrieval</td>
</tr>
<tr>
<td>2:45 PM</td>
<td></td>
<td></td>
<td><strong>BREAK</strong></td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Kim Pham</td>
<td>Dennis Allin</td>
<td>Advanced Cardiopulmonary Resuscitation is Associated with Improved Return of Spontaneous Circulation</td>
</tr>
<tr>
<td>3:15 PM</td>
<td>Mark Faber</td>
<td>Allen Greiner</td>
<td>Rural Healthcare Providers’ Perceptions and Opinions of Their Own Scope of Practice: A Survey</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>Kristen Khoang</td>
<td>Matt Shoemaker</td>
<td>Providers’ Perspectives on Determinants of Health that Impact Patients’ Engagement in HIV Care</td>
</tr>
<tr>
<td>3:45 PM</td>
<td>Sandeep Kaur</td>
<td>Navneet Kaur Dhillon</td>
<td>Development and Evaluation of a &quot;Binge and Crash&quot; Rat Model for Studying Methamphetamine-Induced Pulmonary Arterial Hypertension</td>
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<tr>
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<td>Presenter</td>
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<tr>
<td>9:00 AM</td>
<td>Kaitlin DeHart</td>
<td>Bret Freudenthal</td>
<td>Single Molecule Investigation of Apurinic/Apyrimidinic Endonuclease I (APE1) DNA Damage Search and Recognition</td>
</tr>
<tr>
<td>9:15 AM</td>
<td>Mandeep Kaur</td>
<td>Jeroen Roelofs</td>
<td>Structure of Blm10-13S proteasome core particle reveals parallel assembly pathways</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>Spencer Thompson</td>
<td>Bret Freudenthal</td>
<td>Investigating XRCC1 coordination with DNA polymerase β in chromatin during BER</td>
</tr>
<tr>
<td>9:45 AM</td>
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<td>BREAK</td>
</tr>
<tr>
<td>10:00 AM</td>
<td>Kafayat Yusuf</td>
<td>Shahid Umar</td>
<td>DCLK1 isoform drives the inflammatory and mutagenic processes in the Colon</td>
</tr>
<tr>
<td>10:15 AM</td>
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<td>BREAK</td>
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<tr>
<td>10:30 AM</td>
<td>Bailey Bye</td>
<td>Michael VanSaun</td>
<td>Combined PI3K and MAPK Inhibition Synergizes to Suppress PDAC</td>
</tr>
<tr>
<td>10:45 AM</td>
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<td>BREAK</td>
</tr>
<tr>
<td>11:00 AM</td>
<td>R. McKinnon Walsh</td>
<td>Michael VanSaun</td>
<td>Investigating a non-canonical role of SHP2 in PDAC metabolic dependencies</td>
</tr>
<tr>
<td>11:15 AM</td>
<td>David Matye</td>
<td>John Taylor</td>
<td>Urinary biomarkers in muscle invasive bladder cancer</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>Debolina Dasgupta</td>
<td>Kalyani Pyaram</td>
<td>Oxidative Stress Regulator NRF2 controls Inflammatory T-helper (Th) Subset differentiation by Modulating Glycolysis and protects against Colitis progression in mice</td>
</tr>
<tr>
<td>11:45 AM</td>
<td>Austin Eades</td>
<td>Michael VanSaun</td>
<td>Thermoregulation alters adipose influence of pancreatic cancer growth</td>
</tr>
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</table>
### Oral Presentations Session 2

**Beller 1007 2:00 – 4:00 PM**

<table>
<thead>
<tr>
<th>Time</th>
<th>Presenter</th>
<th>Mentor</th>
<th>Title</th>
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<tbody>
<tr>
<td>2:00 PM</td>
<td>Peyton Huslig</td>
<td>Linda D'Silva</td>
<td>Comparing the Cognitive Workload During a Sustained Visual Search Task between Individuals with a Mild Traumatic Brain Injury and Healthy Controls</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>Liam Lynch</td>
<td>Daniel Whibley</td>
<td>Factors Associated with Satisfaction and Success in Ultra-Marathons of 200 Miles or Greater</td>
</tr>
<tr>
<td>2:30 PM</td>
<td>Michael Braman</td>
<td>Archie Heddings</td>
<td>Opioid Sparing and Analgesic Efficacy of Metamizole After Orthopedic Surgery: A Systematic Review</td>
</tr>
<tr>
<td>2:45 PM</td>
<td>BREAK</td>
<td></td>
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</tr>
<tr>
<td>3:00 PM</td>
<td>Laura Jackson</td>
<td>Archie Heddings</td>
<td>Pre- and Post- Operative Complications in Orthopedic Patients: An International Comparison Between Private and Public Run Hospitals in Zambia</td>
</tr>
<tr>
<td>3:15 PM</td>
<td>Jared Lange</td>
<td>Kirk Miller</td>
<td>Productivity in Radiology: Remote vs On-Site Work Environments</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>Jacob Adams</td>
<td>Kyle Sweeney</td>
<td>Evaluation of factors Influencing Treatment and Morbidity in Patients Diagnosed With Primary Myxofibrosarcoma</td>
</tr>
<tr>
<td>3:45 PM</td>
<td>Peter Klug</td>
<td>Brandon Carlson</td>
<td>Utilization Patterns, Outcomes &amp; Complications of 300 Consecutive Robotic-Assisted Spinal Procedures and 1454 screws by a Single Surgeon</td>
</tr>
<tr>
<td>Time</td>
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<tr>
<td>9:00 AM</td>
<td>Chen Zhang</td>
<td>Wen-Xing Ding</td>
<td>Role of VPS13D in Alcohol-Associated Liver Disease</td>
</tr>
<tr>
<td>9:15 AM</td>
<td>Cecilia (Steffie)</td>
<td>Bruno Hagenbuch</td>
<td>Does palmitoylation in the Organic Anion Transporting Polypeptides (OATP) 1B3 affect protein-protein interactions with OATP1B1?</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>Allen Chen</td>
<td>Wen-Xing Ding</td>
<td>Dissecting the Roles of the Two Homologous Phospholipid Scramblases TMEM41B and VMP1 in VLDL Secretion and MASLD/MASH</td>
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<td>9:45 AM</td>
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<tr>
<td>10:00 AM</td>
<td>Olamide Adelusi</td>
<td>Hartmut Jaeschke</td>
<td>The ferroptosis inhibitor, UAMC-3203, attenuates acetaminophen induced liver injury via an off-target reduction of mitochondrial pJNK and mitochondrial dysfunction</td>
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<td>10:15 AM</td>
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<tr>
<td>10:30 AM</td>
<td>Emily Casteen</td>
<td>Nausheen Ahmed</td>
<td>Neurocognitive Testing to Predict Post-CAR T Toxicity</td>
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<td>10:45 AM</td>
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<tr>
<td>11:00 AM</td>
<td>Juliann Leak</td>
<td>John Taylor</td>
<td>Understanding lipogenesis in bladder cancer</td>
</tr>
<tr>
<td>11:15 AM</td>
<td>Jonathan Liu</td>
<td>Ronald Chen</td>
<td>Biochemical Recurrence in Localized Prostate Cancer: Analysis of a Population-Based Cohort</td>
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<tr>
<td>2:00 PM</td>
<td>Meeli Patel</td>
<td>Kelsey Larson</td>
<td>Pathologic Node-Positive Disease in cT3N0 Patients Undergoing Mastectomy: Evaluation of Frequency, Multidisciplinary Approach to Management, and Recurrence</td>
</tr>
<tr>
<td>2:30 PM</td>
<td>Sarah Adkins</td>
<td>Lyndsey Kilgore</td>
<td>Making Surgical Education Intuitive: A Surgical Robotics Primer for Pre-Clinical Medical Students</td>
</tr>
<tr>
<td>2:45 PM</td>
<td><strong>BREAK</strong></td>
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<tr>
<td>3:00 PM</td>
<td>Erin Rauber</td>
<td>Mazin Al-Kasspooles</td>
<td>Clinicopathologic factors associated with readmissions and ED visits after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS-HIPEC).</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>Dylan Vance</td>
<td>Lyndsey Kilgore</td>
<td>Interdisciplinary Airway Management: A Surgical Primer for First- and Second-Year Medical Students</td>
</tr>
<tr>
<td>3:45 PM</td>
<td>Jalee Birney</td>
<td>Lyndsey Kilgore</td>
<td>The Future Face of Surgery - Demographics of Students Interested in Surgery at an Academic Medical Center</td>
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</tbody>
</table>
## Oral Presentation Schedule

**Wednesday, April 3rd**

<table>
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<td>9:00 AM</td>
<td><strong>Giselle Sanchez-Guerrero</strong></td>
<td>Hartmut Jaeschke</td>
<td>MLKL deficiency exacerbates early injury in a mouse model of acetaminophen hepatotoxicity</td>
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<td>9:15 AM</td>
<td><strong>Matthew Kavanaugh</strong></td>
<td>Pamela Tran</td>
<td>Downregulation of the nutrient-sensitive post-translational modification, O-GlcNAc, attenuates Autosomal Dominant Polycystic Kidney Disease</td>
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<td><strong>Jarrid Jack</strong></td>
<td>Gustavo Blanco</td>
<td>Na,K-ATPase α4 Undergoes Phosphorylation During Sperm Capacitation</td>
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<td>10:00 AM</td>
<td><strong>Sreejata Dutta</strong></td>
<td>Mihaela Sardiu</td>
<td>Identifying Persistent Biomarker Structures for Rare Events: A Case Study using an Integrative Machine Learning Approach</td>
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<td>10:15 AM</td>
<td><strong>Xiaosong Shi</strong></td>
<td>Byron Gajewski</td>
<td>Improved Mortality Analysis in Early-Phase Dose-Ranging Clinical Trials for Emergency Medical Diseases Using Bayesian Time-to-Event Models with Active Comparators</td>
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<tr>
<td>10:30 AM</td>
<td><strong>Stephan Komladzei</strong></td>
<td>Yanming Li</td>
<td>An Integrative Machine Learning Approach for Predicting Liver Cancer Incidence and Survival</td>
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<tr>
<td>11:00 AM</td>
<td><strong>Md Saiful Islam Saif</strong></td>
<td>Devin Koestler</td>
<td>Identifying Serum Proteomic Biomarkers to Predict Survival Outcomes in Patients with Head and Neck Squamous Cell Cancer</td>
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<td>11:15 AM</td>
<td><strong>Naima Alam</strong></td>
<td>Alexandra R. Brown</td>
<td>Designing, Conducting, and Analyzing the DRIVE Trial within a Collaborative Academia Working Group</td>
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<td>11:30 AM</td>
<td><strong>Alexander Gabrielli</strong></td>
<td>Russell Swerdlow</td>
<td>Alzheimer's Disease-relevant Molecular Adaptations in a Human-neuron-based Model of Primary Mitochondrial Dysfunction</td>
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<td><strong>Xin Cao</strong></td>
<td>John Thyfault</td>
<td>Inhibition of hepatic ketogenesis influences exercise and time restricted feeding induced changes in brain mitochondrial energetics</td>
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<td>1:00 PM</td>
<td>Amanda Mize</td>
<td>Cynthia Teel</td>
<td>Reviving Hope: Exploring the Efficacy of Pulmonary Rehabilitation in Long Covid Management</td>
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<td>Maryam Gholampour</td>
<td>Mohammad Haeri</td>
<td>Cell-Specific Expression Profile in AD Prefrontal Cortex</td>
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<td>Alishka Rojas-Addari</td>
<td>Johanna Finkle</td>
<td>Preconception Attitudes of Overweight and Obese Hispanic Women Towards Pharmacotherapy and Behavioral Weight Management Strategies Research</td>
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<td>2:00 PM</td>
<td>Sarah Crowards</td>
<td>Doug Wright</td>
<td>Activation of the Innate Immune Receptor Toll-Like Receptor 4 Promotes Sensory Nerve Inflammation</td>
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<td>2:15 PM</td>
<td>Gentry Totta-Griege</td>
<td>Doug Wright</td>
<td>The Reactive Dicarbonyl, Methylglyoxal, Drives Intraepidermal Nerve Fiber Loss</td>
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<td>2:30 PM</td>
<td>Sarah Lasnier</td>
<td>Maria Kalamvoki</td>
<td>The One Ring to Rule Them All: Ring Finger Domain of ICP0 and Host Protein CIN85 in Vesicular and Protein Trafficking</td>
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<td>Cindy Menjivar</td>
<td>Jeffrey Bose</td>
<td>Identification of the Staphylococcus aureus fatty acid degradation system</td>
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<td>Emma Pagella</td>
<td>Jeffrey Bose</td>
<td>Role of natural killer cells on the immune response to MRSA subcutaneous skin infection</td>
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<td>Audriana Angeles</td>
<td>Jason Glenn</td>
<td>Experiences of Women Seeking Healthcare in Prisons and Jails: A Mixed Methods Study</td>
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<td>3:45 PM</td>
<td>Jonah Elyachar</td>
<td>Carla Keirns</td>
<td>How Insurance Status Affects Where People Experiencing Homelessness Seek Out Healthcare</td>
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<td>9:00 AM</td>
<td>Isabel Epstein</td>
<td>Helena Laroche</td>
<td>Family Functioning as a Moderator for the Efficacy of a Community-Based Obesity Intervention for Low-Income Families</td>
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<td>Aprajita Tripathi</td>
<td>Kalyani Pyaram</td>
<td>Antioxidation system regulates activation-driven expansion by modulating glucose and glutamine metabolism of activated CD4 T-cells</td>
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<td>Amy Herman</td>
<td>Holly Hull</td>
<td>A High-Fiber Diet During Pregnancy: Impact on Diet Quality</td>
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<td>10:00 AM</td>
<td>Sara Fortin-Miller</td>
<td>Holly Hull</td>
<td>Added Sugars Exposure in the First 1,000 Days Predicts Offspring Body Composition at 24 Months</td>
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<td>Austin Sullivan</td>
<td>Heather Gibbs</td>
<td>Development of a Computable Phenotype to Diagnose Malnutrition in Community-Dwelling Older Adults Using Electronic Health Record Data</td>
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<td>10:30 AM</td>
<td>Aaron Smith</td>
<td>Matthew Taylor</td>
<td>Preliminary grip strength data from an 8-week pilot trial of creatine monohydrate supplementation in Alzheimer's disease patients</td>
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<td>Shera Rau</td>
<td>Heather Gibbs</td>
<td>Protein Intake and Handgrip Strength among Caregivers of Persons with Dementia</td>
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<td>1:00 PM</td>
<td>Elizabeth Steger</td>
<td>Catherine (Katie) Siengsukon</td>
<td>Shorter total sleep duration and lower sleep efficiency are associated with higher beta amyloid deposition in precuneus and cortical regions in cognitively normal older adults</td>
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<td>1:15 PM</td>
<td>Lydia Pemberton</td>
<td>Hannes Devos</td>
<td>The Impact of Aging on Cortical Activity Related to Sensory Reweighting of Postural Control</td>
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<td>Samuel Durairaj</td>
<td>Abiodun Akinwuntan</td>
<td>Variables Predicting Clinical Decision-making to Drive - A Retrospective Analysis</td>
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<td>Emma Montgomery</td>
<td>Heather Gibbs</td>
<td>Skin Carotenoid Status Among Caregivers: Does Stress Play a Role?</td>
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<tr>
<td>2:15 PM</td>
<td>Sodiq Fakorede</td>
<td>Hannes Devos</td>
<td>Cortical Activity during Sensory Reweighting of Postural Control in Older Adults with Cognitive Impairments</td>
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<td>Ashley Barry</td>
<td>Catherine Siengsukon</td>
<td>Impact of Sleep on Asthma: A Scoping Review</td>
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<tr>
<td>Poster Session 1: Tuesday (4/2/24) 10:00-11:30AM</td>
<td>Poster Session 2: Tuesday (4/2/24) 2:00-3:30PM</td>
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<td>Leena Kader</td>
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<td>Stephan Komladzei</td>
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<td>Cole Bird</td>
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# Poster Presentation Schedule

**Wednesday, April 3\(^{rd}\)**

<table>
<thead>
<tr>
<th>Poster Session 3: Wednesday (4/3/24) 10:00-11:30AM</th>
<th>Poster Session 4: Wednesday (4/3/24) 2:00-3:30PM</th>
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<td>Elizabeth Jones</td>
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<td>Andrew Luzania, Nathaneal Garcia</td>
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<td>Courtney Goetz</td>
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<td>Cameron Duello</td>
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3 MT Final Presentations

Thursday, April 4th
Beller Conference Center
9:00AM – 10:30AM

Light refreshments from 9-9:30, with presentations to follow.

Michaela O’Connor moconnor6@kumc.edu
PRAME Immunohistochemistry for Melanoma Diagnosis

Matthew Kavanaugh mkavanaugh@kumc.edu
The Role of O-GlcNAc in ADPKD and its Therapeutic Potential

Samuel Durairaj sdurairaj@kumc.edu
Behind The Wheel: Can We Decode How Specialists Decide?

Sandeep Kaur skaur4@kumc.edu
Exploring how recreational methamphetamine use leads to lung and heart problems.

Colette Worcester cworchester@kumc.edu
Targeting the "Un-targetable" Triple-Negative Breast Cancer: A role for STING and SPHK2 proteins

Debolina Dasgupta ddasgupta@kumc.edu
Protective role of an antioxidation protein NRF2 in T cell induced Colitis

Nathanael Garcia ngarcia4@kumc.edu
Case Report: Lung Cancer Mimicking Tuberculosis

Ashley Barry abarry2@kumc.edu
Impact of Sleep on Asthma Control and Inflammatory Biomarkers

Jarrid Jack jjack2@kumc.edu
Understanding Sperm Physiology is Key to Safe, Effective, and Reversible Male Contraceptive Options

Ming Huang mhuang2@kumc.edu
Stra8-deficiency Drives Neuronal Aging in Adult Mouse Brains

Diana Najera dnajera@kumc.edu
The Role of REST in Adenomyosis

Jonah Elyachar jeleyachar@kumc.edu
How Insurance Status Affects Where People Experiencing Homelessness Seek Out Healthcare

3MT Preliminary Round Judges: Robert Bagley, Lisa Brune, Valerie Freeman, Peter Johnson, Allison Moore, and Erica Williams

3MT Final Round Judges: Elizabeth Brown, Kelli Littlefield, and Kara Smith

Thank you volunteer judges!
Career Development Panel
Thursday, April 4th

Morning Session: Beller Conference Center
10:45AM – 12:00PM
Networking lunch 12:00PM-1:30PM

Ashley Cloud, Ph.D.
Dr. Ashley Cloud is an alumnus of the University of Kansas Medical Center, graduating in 2021 with her PhD in Molecular and Integrative Physiology. During her time at KUMC she was an active leader on campus as President of Cell Biology and Physiology Society, President of Graduate Student Council, and mentor to students in the Chennathukuzhi lab and physiology department. In Dr. Chennathukuzhi’s lab, her research centered around molecular mechanisms contributing to uterine leiomyoma. Upon graduation, Dr. Cloud chose to pursue a career in industry. She accepted a Senior Research Scientist position at Hennessy Research Associates. Hennessy Research Associates has a strong commitment to research, development, and manufacturing of animal health products, with a specialty in the research and development of vaccines for infectious diseases of animals. Dr. Cloud quickly rose through the ranks at Hennessy Research Associates, and now holds a position as Research and Development Manager.

Rebecca Foright, Ph.D.
Dr. Rebecca Foright graduated from UC Santa Barbara with a Bachelor’s in Neuroscience. She then obtained a master’s degree in nutrition science from Colorado State University. Dr. Foright earned her doctorate of Integrative Physiology at the University of Colorado Anschutz Medical Campus. She is currently a postdoctoral fellow at KUMC transitioning to her next career stage.

Brittni Levasseur, Ph.D.
Dr. Brittni Levasseur graduated with her BS in mathematics, double minor in biology and chemistry from Converse University in South Carolina. She earned her doctorate from KUMC in Neuroscience in 2023. Upon graduation, she started her career as a Clinical Research Coordinator at Kansas Pain Management. After a few months in that position, she transitioned to a new role as a Rheumatology Medical Science Liaison at Abbvie.
Afternoon Session: Virtual
2:00PM – 3:15PM

Carina Collins, Ph.D.
Dr. Carina Collins graduated from Missouri University in 2015 with a PhD in Biochemistry. Dr. Collins went on to be an Associate Researcher at the University of Wisconsin-Madison, where her research project successfully identified target plant protein interaction partners. Afterwards, she accepted an Assistant Professorship at Drury University, where she led a successful research project, lectured chemistry courses, and inspired her students. After three years at Drury University, Carina made the move to Marian University, Indianapolis where she maintained her tradition of creating a lasting, positive impact in the classroom and laboratory. Her valuable mentorship and dedication to students led her to accept the role of Director of Undergraduate Research at Marian University. In 2023, Dr. Collins made the exciting decision to pursue a new avenue in industry, accepting a position at Eli Lilly and Company as a manager in global scientific communications.

Jenna Frick, Ph.D.
Dr. Jenna Frick is an Assistant Professor at Cleveland University Kansas City where she teaches biochemistry and nutrition courses for the chiropractic doctoral program. She graduated in Spring 2023 with her PhD in Neuroscience. Frick studied in the Christianson lab at KUMC, and her dissertation work focused on the effects of early life stress exposure on body weight and appetite regulation throughout the lifespan. Her previous experience includes a BA in Chemistry from Washburn University and three years of chemistry education at Blue Valley North High School.

Raj Logan, Ph.D.
Dr. Raj Logan is a developmental systems biologist in the Department of Biological Sciences at Wichita State University. His lab studies the molecular and cellular mechanisms of tubular organ formation (Tubulogenesis) using the fruit fly (Drosophila) embryo as the model system. He attended the Madras Medical College, India, for undergraduate training and the University of Kansas Medical Center (Rehabilitation Science) and University of Kansas (Electrical Engineering) for graduate training. He conducted postdoctoral research (Cell and Developmental Biology) at the Johns Hopkins University School of Medicine. For more information about his research, teaching, and science outreach work, visit www.rajlogan.com.

Harrison Stierwalt, Ph.D.
Dr. Harrison Stierwalt is a scientist at Novo Nordisk, with a primary focus on early preclinical development phases for the management and treatment of obesity and related co-morbidities. Dr. Stierwalt received his M.S. from Florida State University, then pursued his Ph.D. in exercise physiology at Oregon State University. After completing his Ph.D., he came to the University of Kansas Medical Center for his post-doctoral studies.
Oral Presentation

Tuesday, April 2nd
Beller Room 1005

9:00AM Diana Najera Email: dnajera@kumc.edu Mentor: Vargheese Chennathukuzhi PhD.

The Role of REST in Adenomyosis
Adenomyosis, characterized by the presence of endometrial glands and stroma in the myometrium and associated severe morbidity, is women reproductive age. However, it is not accurately known what percentage of women are affected, or the exact cause of this devastating disease. Management of Adenomyosis include hormonal options and surgical options, including hysterectomy or an adenomyomectomy. However, hormonal treatments only help manage symptoms, do not preserve fertility, and can only be used for a limited time and not only are both surgical procedures invasive in many cases, after an adenomyomectomy there is a recurrence of the disease. RE1-silencing transcription factor (REST) is an epigenetic silencer of neuronal genes in the periphery but has been shown to act as a tumor suppressor in epithelial cells. Our results indicate that the Restfl/fl CaBP9K-iCre (Restfl/fl M-iCre) mouse model originally produced to study uterine leiomyomas produces both a uterine leiomyoma phenotype and disruption of the endometrial organization suggesting Adenomyosis. We hypothesize that the loss of REST promotes adenomyosis through two of its targets, A-disintegrin and metalloproteinase -12 (ADAM 12) and matrix metalloproteinase 24 (MMP24). In addition, the Restfl/fl Ltf+/iCre mouse model produced to study the effect of REST downregulation in the endometrial epithelium produces an adenomyosis phenotype. This mouse model shows severe adenomyosis like phenotype with epithelial migration reaching the perimetrium. Together these results and further investigation of the Restfl/fl M-iCre and Restfl/fl Ltf+/iCre mouse models can help us elucidate the molecular mechanisms responsible for Adenomyosis.

9:15AM Ming Huang Email: mhuang2@kumc.edu Mentor: Ning Wang, PhD.

Loss of Stra8 Expression Drives Neuronal Aging in Adult Mouse Brains
Stimulated by retinoic acid gene 8 (Stra8) is recognized as a germ cell-specific gene crucial for meiotic initiation, operating as a suppressor of autophagy in this context. Our study shows, for the first time, that Stra8 is expressed in mouse brains, which peaks in adult mice and declines with aging. By generating and studying neuron-specific Stra8 knockout mice, our data show that neurons in Stra8-deficient adult mouse brains exhibit premature aging features, including disrupted proteostasis, accumulation of lipofuscin pigment, and increased DNA damage. Nuclear membrane erosion, a hallmark of neuronal aging, is also observed by transmission electron microscopy (TEM) in Stra8-deficient neurons. Functionally, our data show that Stra8 deletion leads to reduced synaptic plasticity and impaired cognitive function, as evidenced by prolonged
latencies in the Barnes Maze test. In studying the regulation of Stra8 expression, our data show that Stra8 expression is promptly induced by novel environmental exposure or by treatment with kainic acid that excites neurons through kainite receptors (an ionotropic glutamate receptors) that mediate fast excitatory neurotransmission. By using primary neurons (14 DIV), our data show that Stra8 expression is induced through calcium influx and membrane depolarization. Lastly, by using RFP-GFP-LC3 fluorescence autophagy reporter, TEM, and western blot analysis, our data revealed elevated autophagy activity in Stra8-deficient neurons; thus, the role of Stra8 as a suppressor of autophagy is conserved from germline cells to neurons. Together, our data suggest that loss of Stra8 expression contributes to neuronal aging through uncontrolled constitutive activation of autophagy in mouse brains.

9:30AM Tara McQuillan  
Email: tmcquillan2@kumc.edu  
Mentor: Julie Christianson, PhD.

Voluntary Wheel Running Improves Hippocampal Integrity in Mice Exposed to Acute Stress following Maternal Separation

Early life stress (ELS) has been correlated with pain severity and neuroimaging abnormalities in patients with urologic chronic pelvic pain syndrome (UCPPS). Our lab has established an ELS mouse model using neonatal maternal separation (NMS) that recapitulates many clinical features of UCPPS. This study aimed to determine whether exercise could attenuate acute water avoidance stress (WAS)-induced hippocampal neurochemical alteration in NMS mice. NMS was performed on postnatal days 1-21. Exercise (Ex) in the form of voluntary wheel running began at 28 days of age. H-1Magnetic Resonance Spectroscopy revealed sex and hemisphere-dependent differences in hippocampal neurochemical concentrations post-WAS. In the left-female hippocampus, a WAS effect was observed on total creatine (tCr) and phosphocholine. An interaction of WAS-NMS-Ex was observed on glutamate and phosphocholine. In the right-female hippocampus, we observed a WAS effect on lactate and a WAS-NMS interaction on glutathione and aspartate. In the left-male hippocampus, a WAS effect was observed on lactate, n-acetylaspartate, glutamate, tCr, total choline (tCho), and taurine, as well as a WAS-NMS-Ex interaction on n-acetylaspartate. In the right-male hippocampus, a main effect of WAS and a WAS-NMS interaction was observed for GABA, n-acetylaspartate, tCho, and glutamate. These results confirm sex differences in acute stress response, as well as hemisphere-specific NMS-induced hippocampal dysfunction. Voluntary exercise may be beneficial for some, though not all, NMS-induced hippocampal neurochemical changes.

10:00AM Michael Ponte  
Email: mponte@kumc.edu  
Mentor: E. Matthew Morris, PhD.

Impact of Impaired Hepatic Metabolism on Obesity Related Hypertension Development

Obesity is the primary co-morbidity for cardiovascular disease risk factors, and while it is known that obesity-induced increases in sympathetic-nervous system activation results in systemic hypertension, the mechanisms that generate increased sympathetic signaling are not completely known. Recent work has shown that decreased liver ATP, seen in obese conditions, was associated with reduced hepatocyte membrane potential, and acute hepatocyte membrane depolarization resulted in reduced vagus nerve afferent firing rate. As such, we sought to investigate how altered peripheral vagal afferent signals from the liver impact obesity-induced
hypertension development following a chronic high-fat diet. Our lab has previously observed that impaired hepatocyte mitochondrial energy metabolism in (LPGC1a+/−; liver-specific, PGC1a heterozygous) mice results in increased short-term high-fat diet-induced weight gain. PGC1a is an important regulator of mitochondrial biogenesis and has been observed to be reduced in obese individuals. LPGC1a male mice have increases cFos+ cells in the NTS, suggesting maladaptive sensory signaling. In addition, LPGC1a male mice have increased blood pressure compared to WT littermates. Interestingly, female LPGC1a mice have reduced blood pressure compared to WT littermates. Together these results suggest that a reduced liver energy state, driven by reductions in PGC1a, modulates blood pressure in a sex-specific manner on a chronic high-fat diet.

10:15AM Dana Thalman Email: dthalman@kumc.edu Mentor: Irfan Saadi, PhD.

Loss of Specc1l causes disorganization of Blood-CSF Barrier resulting in Congenital Hydrocephalus

Congenital hydrocephalus is a genetically heterogeneous condition affecting 1/2000 live-births. Hydrocephalus occurs when cerebrospinal fluid (CSF) accumulates in brain ventricles, increasing intraventricular pressure and ventricular size, ventriculomegaly. This increase results in skull expansion, brain compression, and impaired brain function. SPECC1L is a cytoskeletal scaffolding protein that interacts with actin, microtubules, and junctional proteins. SPECC1L is expressed broadly, including in ependymal cells of ventricle walls and choroid plexus (CP). The most common phenotypes of patients with autosomal dominant SPECC1L mutations are cleft lip, cleft palate, and ventriculomegaly. Specc1l null mice, on homogeneous FVB/NJ or C57BL/6J background showed perinatal lethality with midgestational edema along the cranium and spine. Lateral ventricles were enlarged two-fold in mutants at E 16.5. At the same timepoint, mutant CP in the lateral ventricles was structurally disorganized, with abnormal branching and vacuolization of ependymal-endothelial interface. Staining for junctional proteins showed changes in intensity and localization of membrane-associated β-catenin (adherens junctions), ZO-1, Occludin (tight junctions), and actin in ependymal cells. These ependymal cell changes are consistent with a CSF production defect. Interestingly, on C57BL/6J;FVB/NJ F1 (50:50) mixed background, homozygous Specc1l mutants survived to develop hydrocephalus. This confirms a novel role for Specc1l deficiency in the etiology of congenital hydrocephalus and indicates genetic modulation of Specc1l deficient phenotype by the F1 mixed background. Our studies using F1 mixed background-based Specc1l mutants will serve to identify which aspects of Specc1l mutant dysfunction are ameliorated, and thus determine genetic modulation in the etiology of the human condition of ventriculomegaly and congenital hydrocephalus.

10:30AM Chelsea Johnson Email: cjohnson50@kumc.edu Mentor: Paige Geiger, PhD and Jill Morris, PhD.

Apolipoprotein ε genotype and sex influences skeletal muscle bioenergetic response to diet

Apolipoprotein ε4 (APOE4) increases the risk for developing Alzheimer's disease (AD) and is associated with altered whole-body metabolism, including increased blood glucose and insulin. Skeletal muscle plays a prominent role in regulating whole-body metabolism, yet the effects of
APOE4 on muscle and the role this may play in modulating AD susceptibility is not clear. We sought to determine the impact of APOE4 on muscle metabolism using male and female APOE3 and APOE4 targeted-replacement mice on a C57BL/6 background (n=61) from Taconic. APOE3 mice served as controls because APOE3 does not modify AD risk. Mice were fed a high (HFD, 45% fat) or low-fat diet (LFD, 10% fat) for 4 months before sacrifice. At 8-9 months old, carbohydrate-driven oxygen consumption in isolated quadriceps mitochondria was measured at basal, state 3 (ADP), state 3+glutamate, and state 3S (succinate) on the Oroboros Oxygraph-2k and the gastrocnemius proteome was analyzed on a timsTOF HT mass spectrometer. APOE4 associated with differential expression of 49 proteins in LFD females (q-value <0.05), including reduced levels of proteins involved in oxidative phosphorylation. APOE4 did not affect mitochondrial respiration. HFD altered the expression of 469 proteins in APOE4 females and between 80-101 proteins in other groups (q-value <0.05). In addition, HFD upregulated proteins involved in lipid metabolism in all groups. HFD upregulated proteins involved in carbohydrate metabolism and increased respiration (p<0.05, state 3 and state 3+glutamate) in APOE4 females. HFD-driven upregulation of proteins involved in carbohydrate metabolism in APOE4 female muscle likely supports increased carbohydrate oxidative capacity.

11:00AM Vinamratha Rao Email: vrao2@kumc.edu Mentor: Reem Mustafa, MD, PhD, MPH.

Tolvaptan Use and Prescribing Patterns in Patients with Autosomal Dominant Polycystic Kidney Disease: A Multicenter Real-World Experience
Background: Autosomal Dominant Polycystic Kidney Disease (ADPKD) is the most prevalent genetic kidney disease leading to kidney failure. Tolvaptan, a Vasopressin V2 receptor antagonist, is the only medication approved by the US Food and Drug Administration for slowing kidney growth in individuals with rapidly progressive ADPKD, but its long-term tolerability and effective implementation has yet to be studied, particularly in real-world clinical settings within the US.
Methods: This retrospective cohort study examined adults with ADPKD treated with tolvaptan at the University of Kansas Medical Center and the University of Iowa Hospitals & Clinics from May 2018 to April 2023. Data on demographics, clinical characteristics, tolvaptan dosage, and treatment duration were collected from electronic health records. The study focused on examining tolvaptan dosage trends, treatment discontinuation, and impacts of aquaretic side effects on dosage and adherence. Results: Out of 134 patients, 36% discontinued tolvaptan, significantly due to aquaretic side effects. Most patients maintained lower tolvaptan dosages (≤ 45/15 mg) than in clinical trials, with two-thirds of individuals who underwent dosage adjustment experiencing net decrease in dosage. Adverse effects influenced both treatment continuation and dosage decisions, and female patients showed higher discontinuation rates due to side effects like polyuria and polydipsia. Conclusions: The study highlights significant real-world challenges in the use of tolvaptan for ADPKD, particularly in terms of side effects leading to high discontinuation rates and dosage adjustments. These findings underscore the need for standardized management strategies to enhance tolerability and adherence, offering insights for future ADPKD clinical practice and research.
Hepatocyte-specific Loss of ERα Alters Inflammatory and Antioxidant Markers Without Impairing Hepatic Mitochondrial Function or Susceptibility to NAFLD

Female rodents and women possess intrinsic protections against the development of NAFLD, but greater risk following the loss of ovarian function. Whole-body estrogen receptor α (ER α) knockout mouse also display increased risk for NAFLD. Here we examined whether liver specific ERα knockout modulates risk for NAFLD through altered hepatic mitochondrial function and if ERα mice would have reduced response to exercise to treat NAFLD. 16-20 wk-old Female ER αfloxed/floxed mice were given an Adeno-Associated Virus (AAV-) containing a liver-specific Cre-promoter (AAV8.TBG.PI.Cre.rBG) to generate Hepatocyte-specific ERα KO mice (LERKO), reducing hepatic ERα expression by 70%. Mice were then placed on low-fat Diet (LFD) or high-fat diet with 2% cholesterol (HFD+Chol) for 30 weeks with half of mice receiving voluntary wheel running from weeks 20-30. Hepatic triglyceride levels were elevated with diet and further increased by VWR in both strains. While LERKO mice tended to have greater lipid deposition, transcriptional expression of inflammatory markers and antioxidant enzymes were reduced in these mice. Lipid-mediated maximal mitochondrial respiration and conductance was elevated with HFD+Chol in all groups. While HFD+Chol decreased basal H2O2 emissions, inhibition of glutathione redox pathway revealed greater H2O2 production regardless of strain. Analysis of mitochondrial complex expression revealed diet-induced decreases in complex II and IV expression. Overall, these data show that hepatocyte ERα does not influence diet or exercise effects on hepatic steatosis or mitochondrial function. However, alterations in transcriptional regulation of key regulators of hepatic inflammatory signaling and antioxidant suggest novel regulation of these pathways within the liver by ERα.

Exercise plus Time Restricted Feeding and Hepatic Ketogenesis Deficiency Upregulate Synaptogenesis Pathways in the Hippocampus of Mice.

Aging is a major risk factor for cognitive decline and neurodegeneration. Exercise supports healthy aging, including hippocampal neurogenesis, which leads to improved memory and cognition. There is also increasing evidence suggesting the utility of nutritional interventions (e.g., time-restricted feeding) to combat cognitive decline and neurodegeneration. Both exercise and dietary approaches independently and synergistically provoke ketogenesis, which is mediated by the hepatic fate-committing mitochondrial enzyme 3-hydroxymethylglutaryl-CoA synthase (HMGCS2). Ketones are metabolized in the brain and have potent bioactive signaling capability. These links suggest that ketone metabolism plays a central role in the neurometabolic benefits of exercise and fasting. Here we tested the hypothesis that hepatic ketogenesis modulates the benefits of exercise and fasting on changes in protein expression within the hippocampus. Male hepatocyte-specific Hmgcs2 knockout (Hmgcs2 KO) and littermate control (Con) mice, maintained on a C57BL/6NJ background, were single-housed and randomly assigned to either ad libitum-fed sedentary state (SED+AL) or time-restricted feeding with voluntary wheel running (VWR+TRF) from 8 to 12 months of age. Hippocampal brain slices were isolated for global
proteomic analysis and differential protein expression profiles followed by Ingenuity Pathway Analysis. With VWR+TRF in Con mice, synaptogenesis signaling pathways were upregulated compared to SED+AL. This effect was not present with VWR+TRF in Hmgcs2 KO mice. However, this lack of increase was due to elevated baseline differences in synaptogenesis signaling pathways in Hmgcs2 KO at baseline. In conclusion, these results suggest that exercise plus TRF is needed to enhance similar hippocampal adaptations as in sedentary mice deficient for hepatic ketogenesis.

11:45AM Sean Koester Email: skoester@kumc.edu Mentor: Neelendu Dey, MD.

RET is a microbiome-responsive sex-biased regulator of intestinal tumorigenesis
Ret, which is critical in enteric nervous system (ENS) development and signaling, is implicated in colorectal cancer (CRC) as both a proto-oncogene and a tumor suppressor. Apc encodes a tumor suppressor and is commonly mutated in CRC. We asked whether RET signaling regulates intestinal tumorigenesis in an Apc-deficient preclinical model of CRC. We assessed interactions of Apc and Ret through a crossbreeding experiment using ApcMin/+ mice and Ret+-/- mice. We administered 1.5% dextran sodium sulfate (DSS) to induce colonic tumors in ApcMin/+Ret+-/- progeny as well as littermate controls. We observed a sex-biased phenotype: ApcMin/+Ret+-/- females had significantly greater tumor burden than ApcMin/+Ret+-/- males, a phenomenon not seen in ApcMin/+ mice, which had equal distributions by sex. Dysfunctional RET signaling was associated with gene expression changes in diverse tumor signaling pathways in tumors and normal-appearing colon. Sex-biased gene expression differences mirroring tumor phenotypes were seen in 26 genes, including the Apc tumor suppressor gene and Mlst8 MTOR-associated protein. Ret and Tlr4 expression were significantly correlated in tumor samples from female but not male ApcMin/+Ret+-/- mice. Antibiotic administration resulted in reduction of tumor burden, inverting the sex-biased phenotype such that microbiota-depleted ApcMin/+Ret+-/- males had significantly more tumors than female littermates. Reconstitution of the microbiome via fecal microbiota transplantation rescued the sex-biased phenotype. Our findings suggest that RET represents a sex-biased "switch" for microbiome-responsive regulation of tumorigenesis.

2:00PM Trenton Wecker Email: twecker@kumc.edu Mentor: Jeffrey Burns, MD, MS.

Subjective Memory Complaints and Cognitive Decline
Approximately two-thirds of Americans experience some level of cognitive impairment at an average age of 70 years. This study analyzed the relationship between Subjective Memory Complaints (SMCs) and cognitive decline in a cohort at the University of Kansas Alzheimer's Disease Research Center (ADRC). We examined longitudinal data from 560 participants (average age 72.6 years), with varying levels of cognition, who underwent annual assessments (average 3.9 years). Data collection took place 2011-2022. Annual assessments included a clinical dementia rating (CDR), cognitive diagnosis, and SMC score. SMCs were assessed using two subjective questions, which were summed to determine a total SMC score (range 2-10), with higher scores indicating more cognitive complaints. At baseline, individuals with mild cognitive impairment (MCI) had the highest average SMC score of 7.9, compared to dementia (7.4) and cognitively normal (CN) (6.4) groups. 298 subjects with complete data sets were CN at baseline.
Of those, 226 (75.8%) remained CN throughout the study, while 72 (24.2%) had a decline in cognition at some point. Those who were CN throughout had a baseline SMC score of 6.28 (SD=1.24, 95% CI=6.12-6.44, p<0.001) and the decline group had a baseline SMC score of 6.93 (SD=1.08, 95% CI=0.33-0.97, p<0.001). Further analysis examined participants who at any point had a diagnosis other than CN and their likelihood of having a baseline SMC score ≥ 7 (ROC AUC=0.66, odds ratio=3.91, sensitivity=0.57, specificity=0.75). This study demonstrates the potential of utilizing SMCs to predict future cognitive decline, especially during the pre-clinical phase of disease progression.

2:15PM Riley Kemna Email: rkeuma@kumc.edu Mentor: Jill Morris, PhD.

Impact of Mitochondrial DNA on Alzheimer’s Disease Pathology

Impaired metabolic function and mitochondrial metabolism increase risk of Alzheimer’s Disease (AD), the leading form of dementia and a main cause of death in older adults. Altered mitochondrial function can impair cellular maintenance processes, leading to protein aggregation and cytotoxicity. Mitochondria differ from other organelles, as they have their own genetic component (mtDNA), which encodes proteins essential for mitochondrial translation and oxidative metabolism. To investigate the relationship between mtDNA and AD pathology, cytoplasmic hybrid (cybrid) cell lines were generated using mtDNA from clinical research volunteers (n=18 cognitively healthy (CH) older adults, n=7 MCI, n=10 AD) enrolled in the Relationship of Energetics and Cognitive Trajectory study. Groups did not differ by age and sex. Cells were analyzed for protein expression by western blot, metabolic flux by Agilent Seahorse XF Analyzer, and protein secretion by ELISA. Plasma pTau217 (AlzPATH) and Aβ42 (N4PE) were assessed by Simoa HD-X (Quanterix) to compare blood biomarker values with cellular outcomes. Cybrids from individuals with MCI and AD had elevated intracellular pTau217 (p=0.033, p=0.006) compared to CH, and intracellular pTau217 correlated significantly with plasma pTau217 across all groups (p<0.001). Cybrids from CH individuals secreted significantly more Aβ42 than those from AD individuals (p=0.002). Cybrids showed altered mitochondrial function and altered ETC complex expression (p<0.05) across diagnostic groups. These data support that mitochondrial function, specifically that which is influenced by mtDNA, plays an imperative role in AD pathology. Ongoing research in the cybrid cell model will help elucidate how altered cellular and bioenergetic function contribute to AD etiology.

2:30PM Amanda Hertel Email: ahertel@kumc.edu Mentor: Radwan Ajlan, MBBCh.

Impact of Surgical Technique and Timing on Pars Plana Vitrectomy Outcomes in Dropped Lens Fragment Retrieval

Introduction: Cataracts are a leading cause of blindness, with cataract surgery being the most commonly performed surgery worldwide. One feared complication of cataract surgery is dropping native lens fragments into the vitreous cavity of the eye. These dropped fragments are removed using standard Pars Plana Vitrectomy (PPV) or endoscopy-assisted PPV (E-PPV). E-PPV allows for earlier intervention time as hazy ocular media is less of a concern than in PPV. In this project, we compare the clinical outcomes of PPV and E-PPV in the retrieval of dropped lens fragments following complicated cataract surgery. Methods: A retrospective chart review was
performed on PPV and E-PPV procedures for dropped lens retrieval between 2013 and 2023 at a tertiary referral center. Patient demographics, ophthalmic exam findings, and surgical outcomes were recorded. Results: Of 74 patients meeting inclusion criteria, 42% had E-PPV, while 58% had PPV. The two groups had no significant differences in age, gender, and medical conditions. The average time between complicated cataract surgery and vitrectomy was 8 days for the E-PPV group and 13 days for the PPV group. There were no statistically significant differences in intraocular pressure (IOP) between the two groups at all pre-op and post-op appointments. However, the E-PPV group had lower visual acuity (VA) on the 1-day post-operative visit and 1-week post-operative visit compared to the PPV group. Conclusion: This data showed that patient outcomes were similar regardless of surgical instrumentation choice and sooner timing in collecting dropped lens fragments after complicated cataract surgery.

3:00PM Kim Pham Email: kpham5@kumc.edu Mentor: Dennis Allin, MD, FACEP, FAEMS, FAAEM.

Advanced Cardiopulmonary Resuscitation is Associated with Improved Return of Spontaneous Circulation

Intro: Advanced Cardiopulmonary Resuscitation (ACR) is a novel approach to cardiac arrest management that combines head-elevated CPR, use of an impedance threshold device, and limited epinephrine administration. This study compares the outcomes of patients treated with ACR to patients treated with Advanced Cardiac Life Support (ACLS). Method: This was a retrospective case-control study of medical cardiac arrest patients treated with ACR six months after protocol implementation compared to a matched cohort of patients treated with ACLS before ACR implementation. Traumatic and pediatric cardiac arrests, patients for whom CPR was not attempted, and patients without a documented initial rhythm or CPR start time were excluded. All patients included in this study were treated by Kansas City Kansas Fire Department Emergency Medical Services providers. The primary outcomes were return of spontaneous circulation (ROSC) and survival with a favorable neurologic outcome (Cerebral Performance Category, CPC score <2). Results: 153 ACR and 197 ACLS patients were identified. 71 ACR and 79 ACLS patients met the inclusion criteria. There were no significant differences in age (p=0.67), sex (p=0.74), ethnicity (p=0.97), initial shockable vs nonshockable rhythm (p=0.44), or time to defibrillation (p=0.18). Significantly more patients in the ACR group achieved ROSC compared to the ACLS group (31% vs 16%, respectively, p=0.02). There were no significant differences in survival with a favorable neurologic outcome between the ACR and ACLS groups (26% vs 7%, respectively, p=0.067). Conclusion: ACR was associated with a statistically significant increase in ROSC but not survival with a favorable neurologic outcome compared to ACLS.

3:15PM Mark Faber Email: mfaber@kumc.edu Mentor: Allen Greiner, MD.

Rural Healthcare Providers’ Perceptions and Opinions of Their Own Scope of Practice: A Survey

Rural healthcare providers, including physicians and Advanced Practice Providers (APPs), play a critical role in ensuring access to healthcare for individuals living in rural areas. However, their scope of practice varies widely. This study assessed rural healthcare physicians' perceptions of
their scope of practice and the impact of APPs on their practice in Kansas. A cross-sectional survey was conducted at 30 practice sites across rural areas in Kansas. Responses from 68 MDs and DOs practicing in rural areas were analyzed. Participants reported their scope of practice and perceptions regarding the independent practice of APPs and team-based care. Results indicated notable skepticism towards the independent practice of APPs, with 58% of MDs and 71% of DOs disagreeing that it would improve access to care. However, strong support for team-based care was observed, with 90% of MDs and 100% of DOs agreeing it results in the best care outcomes. No significant differences were found based on gender or years of experience. The study reveals a dichotomy in attitudes towards independent practice by APPs and team-based care among rural healthcare providers. While there is skepticism about the former, there is strong support for the latter. These findings suggest that rural healthcare providers value collaborative approaches and have reservations about the expansion of independent practice by APPs. The study highlights the need for careful consideration and dialogue when addressing the role of APPs in rural healthcare settings.

3:30PM Kristen Khoang Email: tkhoang2@kumc.edu Mentor: Matt Shoemaker, DO.

Providers' Perspectives on Determinants of Health that Impact Patients' Engagement in HIV Care
HIV infection imposes threats to physical health and psychological well-being and requires effective long-term management to achieve viral suppression. A patient's ability to seek care is largely influenced by social determinants of health (SDOH) and the provider's ability to help manage social needs. This study aims to elucidate how SDOHs impact the provider's practice and wellbeing. We also assessed how provider burnout, which is significantly associated with feeling emotional exhaustion, plays a role in the patient-provider relationship. This cross-sectional qualitative study was conducted with 86 HIV providers across the United States completing an electronic survey about their perceptions of SDOH, barriers to social needs screening, and their personal experience of burnout. We identified several unmet social needs, such as financial instability, transportation, and appointment logistics, as major barriers for the patients to engage in HIV care. Our results showed that lack of resources and insufficient time were barriers preventing clinicians from inquiring about social needs. Providers from the West and Midwest are more likely to report burnout compared with providers from other regions. These findings suggest the importance of improving provider well-being as well as optimizing practices that effectively bridge the community with social services in our quest to end the HIV epidemic.

3:45PM Sandeep Kaur Email: skaur4@kumc.edu Mentor: Navneet Kaur Dhillon, PhD.

Development and Evaluation of a "Binge and Crash" Rat Model for Studying Methamphetamine-Induced Pulmonary Arterial Hypertension
Pulmonary Arterial Hypertension (PAH) is a debilitating disease characterized by elevated pulmonary artery pressure, leading to heart failure and premature death. The recreational use of methamphetamine has been identified as a risk factor for the development of PAH, but underlying pathophysiological mechanisms remain poorly understood, partly due to lack of
suitable animal models. This study introduces a novel "Binge and Crash" model in Wistar rats to mimic human consumption pattern of methamphetamine and investigate its effects on right ventricular (RV) dysfunction. Over 21 days, rats received six intraperitoneal injections of methamphetamine or saline every 2 hours, five days a week, to simulate binge usage. We assessed hemodynamic parameters, Fulton index (RV wt./LV+Septum wt.), and vascular remodeling using immunohistochemistry for smooth muscle actin and von Willebrand Factor. We isolated rat pulmonary arterial smooth muscle cells for ex-vivo analysis of smooth muscle hyperplasia. Our findings demonstrate increase in RVSP (Right Ventricular Systolic Pressure), Fulton index and RV end diastolic area, with a decrease in RV ejection fraction in methamphetamine treated rats as compared to saline group. In addition, medial thickness associated with smooth muscle cell proliferation was also increased in pulmonary vessels of rats from methamphetamine group. Levels of HMGB1 (high mobility group box 1), an inflammatory marker associated with PAH, were also significantly elevated in the plasma from methamphetamine treated rats. In conclusion, this "Binge and Crash" model has a potential to be used as an animal model for elucidating the pathophysiological mechanisms and exploring potential therapeutic interventions for methamphetamine-associated PAH.
Tuesday, April 2nd  
Beller Room 1007

9:00AM Kaitlin DeHart  Email: kdehart@kumc.edu  Mentor: Bret Freudenthal, PhD.

**Single Molecule Investigation of Apurinic/Apyrimidinic Endonuclease I (APE1) DNA Damage Search and Recognition**

Abasic sites are common mutagenic DNA lesions that occur as products of DNA damage, spontaneously arising up to 10,000 times per cell per day. To prevent mutagenesis, the repair of abasic sites is initiated by the DNA repair enzyme Apurinic/Apyrimidinic Endonuclease I (APE1). While the mechanism used by APE1 to process abasic sites is well established, how APE1 searches for and recognizes abasic sites amongst a vast excess of undamaged DNA remains poorly understood. To address this gap in knowledge, we utilized correlated optical tweezers fluorescence microscopy (CTFM) to visualize the interaction of APE1 with a 12.6 kbp DNA substrate in the presence and absence of a single abasic site. Our initial CTFM analysis on nondamaged DNA identified that APE1 uses a complex mechanism involving both one-dimensional and three-dimensional diffusion to search for DNA damage. Furthermore, we identified that APE1 primarily uses a rapid non-rotationally coupled "hopping" mechanism for one-dimensional diffusion, as opposed to a rotationally coupled "sliding" mechanism. This combination of one- and three-dimensional diffusion allows APE1 to rapidly sample undamaged DNA for abasic sites across the genome. Additional CTFM analysis identified that APE1 exhibits a greater proportion of stationary events on abasic DNA compared to primarily motile events on nondamaged DNA. Together, our characterization of APE1 diffusivity on both nondamaged and abasic DNA are consistent with the ability of APE1 to rapidly search for and recognize abasic sites in the presence of excess undamaged DNA, supporting APE1's role as a highly efficient DNA repair enzyme.

9:15AM Mandeep Kaur  Email: mkaur@kumc.edu  Mentor: Jeroen Roelofs, PhD.

**Structure of Blm10-13S proteasome core particle reveals parallel assembly pathways**

Proteasome is responsible for the selective degradation of proteins and impacts cellular homeostasis. It consists of core particle (CP) and regulatory particle (RP). The CP has 66 subunits, and the assembly depends upon the chaperones Pba1-Pba2, Pba3-Pba4 and Ump1, and regulatory factors like proteasome activator-Blm10. Deletion of Blm10 together with proteasome assembly-mutants exacerbates growth defects. This suggests that Blm10 contributes to proteasome assembly. However, based on structural studies of Blm10 bound to mature CP, there appears to be a steric-clash with Pba1-Pba2 if Blm10 binds to immature CP complexes. To understand how Blm10 binds immature CP, we purified and solved the structure of Blm10 bound to assembly intermediate. Our data shows that Blm10 binds CP in the same location as Pba1. This suggests that their binding is mutually exclusive. Detection of Blm10 on CP assembly intermediate led us to hypothesize that Blm10 and Pba1-Pba2 drive CP assembly via two parallel pathways leading to formation of free CP (eventually resulting in RP-CP complexes) via Pba1-Pba2 and Blm10-CP via Blm10 respectively. To test this, we purified early and late-stage intermediates.
We found that Blm10 and Pba1-Pba2 are present on both early as well as late-stage complexes. This contradicts the idea that CP intermediates would bind Pba1-Pba2 and Blm10 sequentially. Also, the presence of more Blm10-CPs in Pba1 deleted strain supports our hypothesis that Blm10 mediated assembly leads to Blm10-CPs. These findings lead us to propose a model that CP assembly is routed via two distinct assembly pathways involving Pba1-Pba2 and Blm10 respectively.

9:30AM Spencer Thompson Email: s738t690@kumc.edu Mentor: Bret Freudenthal, PhD.

**Investigating XRCC1 coordination with DNA polymerase β in chromatin during BER**

Reactive oxygen species (ROS) are a constant source of DNA damage that can ultimately result in genomic instability. The primary pathway used by cells to repair oxidative DNA damage is base excision repair (BER). One of the key enzymes in BER is DNA polymerase beta (pol β), which is responsible for the insertion of a nucleotide at the site of a one-nucleotide gap. How pol β carries out this activity has been well studied using linear DNA. However, most eukaryotic DNA is organized into chromatin, where DNA is bound by nucleosomes. Within nucleosomes, x-ray repair cross-complementing 1 (XRCC1), a scaffolding protein, can increase the efficiency of BER. Additional evidence suggests XRCC1 facilitates pol β recruitment to DNA damage. However, the mechanism by which XRCC1 fulfills these roles with pol β is unclear. With more than 10,000 oxidative DNA lesions generated per cell per day, understanding how BER repairs these lesions in nucleosomes is critical to our understanding of DNA damage repair. Our goal is to establish how XRCC1 facilitates pol β DNA damage search, recognition, and repair within chromatin at the structural and mechanistic level. We are addressing these questions by studying the mechanisms pol β and XRCC1 employ to locate DNA damage and what structural changes are induced by the XRCC1/pol β complex binding DNA damage on nucleosomes. Specifically, we are using a combination of correlative-optical tweezers and cryo-EM to determine the dynamics pol β and XRCC1 use to search/recognize DNA damage and associated structural changes.

10:00AM Kafayat Yusuf Email: kyusuf@kumc.edu Mentor: Shahid Umar, PhD, AGAF.

**DCLK1 isoform drives the inflammatory and mutagenic processes in the Colon**

Inflammatory bowel disease (IBD) poses a heightened risk of colorectal cancer (CRC) due to chronic gut inflammation. Despite its increasing prevalence globally, understanding the transition from IBD to colon cancer remains limited. DCLK1 and its isoforms have emerged as pivotal players in colon biology, particularly in tuft cell identification and colon cancer progression. Notably, DCLK1-L, a tuft cell marker, safeguards against colitis, while DCLK1-S, associated with invasive tumor phenotypes, is poorly understood in colitis and colitis-associated colon cancer. Our research observed a significant elevation of DCLK1-S in IBD patient tissue samples, predominantly expressed in Ly6G+; MHCII- neutrophils concurrent with elevated inflammation and tissue damage in the colon. To delve deeper, we bred Dclk1fl/fl mice with MRP8-Cre-ires/GFP mice, yielding Dclk1fl/fl;MRP8-Cre+/- mice, which upon tamoxifen injection eliminated DCLK1-L, resulting in sustained DCLK1-S expression in granulocytes, especially neutrophils. Furthermore, MRP8;Dclk1-/- mice exhibited exacerbated colitis and colon cancer upon Citrobacter rodentium.
(CR) infection or AOM/DSS treatment compared to wild type (WT) controls. We further discovered a novel interaction between DCLK1-S and MMP13 upon unbiased docking study and between Dclk1-S and Vimentin via Imaging Mass Cytometry in CR-infected mouse colons. We posit from these observations that DCLK1-S-MMP13-Vimentin axis potentially serves as a driver of inflammatory and mutagenic processes in the colon.

10:30AM Bailey Bye  Email: bbye3@kumc.edu  Mentor: Michael VanSaun, PhD.

Combined PI3K and MAPK Inhibition Synergizes to Suppress PDAC
Pancreatic ductal adenocarcinoma (PDAC) is a particularly deadly disease, due in part to a lack of effective therapeutic options. The proto-oncogene KRAS is mutated in almost all PDAC, but attempts to directly target mutant KRAS as well as downstream MAPK pathway effectors have shown limited clinical success, in part due to the development of therapeutic resistance. While KRAS canonically drives the MAPK signaling pathway, it is also known to play a role in activation of the PI3K signaling pathway. Initially, we compared targeting of the PI3K-AKT pathway with the drug Omipalisib (p110α/β/δ/γ and mTORC1/2 inhibitor) in combination with two different MAPK pathway inhibitors, Trametinib (MEK1/2 inhibitor) or SHP099-HCL (SHP099; SHP2 inhibitor), in PDAC tumor cells. Application of Trametinib or SHP099 alone selectively blocked ERK phosphorylation (pERK) but failed to suppress phosphorylated AKT (pAKT). Conversely, Omipalisib alone successfully inhibited pAKT but failed to suppress pERK. Therefore, we hypothesized that a combination therapeutic comprised of Omipalisib with either Trametinib or SHP099 would synergize to inhibit two prominent mitogenic pathways, MEK and PI3K, and more effectively suppress PDAC growth and progression. In vitro, we found that targeting the MAPK pathway via SHP099 or Trametinib was more effective at inhibiting tumor cell proliferation while targeting the PI3K pathway via Omipalisib more effectively suppressed tumor cell migration. Additionally, we found that while combination Omipalisib/SHP099 treatment reduced tumor growth in vivo, the Omipalisib/Trametinib treatment was significantly more effective. Altogether, our data support continued consideration of dual therapeutic strategies targeting the MAPK and PI3K pathways in PDAC.

11:00AM R. McKinnon Walsh  Email: rwalsh3@kumc.edu  Mentor: Michael VanSaun, PhD.

Investigating a non-canonical role of SHP2 in PDAC metabolic dependencies
Pancreatic Ductal Adenocarcinoma (PDAC) is a lethal disease with 5-year survival of 13%, projected to be the second leading cause of US cancer deaths by 2025. Mutant KRAS drives rampant proliferation and metabolic rewiring to favor PDAC progression. Mutant KRAS has been considered undruggable, and targeting downstream of KRAS has failed clinically. Alternatively, SHP2 is a phosphatase that canonically facilitates KRAS activation; pre-clinical studies found dual suppression of SHP2 and KRAS-target agents synergize to mitigate tumor progression. Supplemental to its role in KRAS signaling, efficacy of SHP2 inhibition led us to hypothesize that SHP2 harbors KRAS-independent tumor functions. Comparing pharmacologic MEK-inhibition (downstream of KRAS) to SHP2 inhibition, RNAseq analysis revealed specific metabolic discrepancies in human PDAC cell lines. Subsequent Seahorse based metabolic flux assays demonstrated that SHP2-knockout (SHP2KO) or SHP2-inhibition, but not MEK-inhibition,
impaired respiration and forced glycolytic dependence. Comparing differences by proteomic assessment revealed further deficiencies across a range of mitochondrial associated metabolic enzymes in SHP2 deficient cells. We then predicted that SHP2-deficient PDAC cells would be unable to persist in response to dietary sugar restriction in vivo. Control tumor growth was unaffected by diet in mice fed either a ketogenic (low-carbohydrate) or high-sugar diet. SHP2KO tumor growth on high-sugar diet mimicked control tumors; yet as expected, SHP2KO tumors demonstrated suppressed growth in mice fed keto diet. Collectively, we've highlighted that impaired mitochondrial function due to SHP2 deficiency drives a dependence on carbohydrates. SHP2's role in mitochondrial maintenance acts in parallel to its contributions toward KRAS activation in PDAC.

11:15AM David Matye Email: dmatye@kumc.edu Mentor: John Taylor, MD, MS.

Urinary biomarkers in muscle invasive bladder cancer
Biomarkers are commonly used for both detection of cancer and monitoring response to treatment. Although several biomarkers have demonstrated promise in patients with bladder cancer (BCa), only urine cytology is widely utilized. Increased availability of effective biomarkers may improve clinical decision making and reduce the need for more invasive imaging. Previous studies have identified protein markers that are elevated in the urine of patients with BCa. These markers include pyruvate kinase M2 (PKM2) and several cytokines. The aim of this study was to determine whether these putative biomarkers of BCa are useful for monitoring response to cisplatin-based neoadjuvant chemotherapy in patients with muscle invasive BCa. Urine samples from patients enrolled in the Bladder Cancer Biorepository were analyzed for levels of PKM2 and a panel of ten cytokines. Patients were included if they had both T2 stage disease and had received cisplatin-based neoadjuvant chemotherapy. Patients were categorized based on their pathological response to treatment and recurrence of disease within two years of definitive surgery. Urinary cytokine and PKM2 levels were measured and evaluated for their ability to predict response to treatment and two-year disease-free survival. Patients with BCa had significantly elevated levels of urinary PKM2 compared to controls. However, urine PKM2 showed limited predictive value for disease recurrence. Of the ten cytokines measured, six were significantly elevated in BCa patients compared to controls. None were predictive of response to neoadjuvant chemotherapy, but four were significantly elevated in patients who experienced disease recurrence within two years.

11:30AM Debolina Dasgupta Email: ddasgupta@kumc.edu Mentor: Kalyani Pyaram, PhD.

Oxidative Stress Regulator NRF2 controls Inflammatory T-helper (Th) Subset differentiation by Modulating Glycolysis and protects against Colitis progression in mice
CD4 T cells are the orchestrators of adaptive immunity and a disbalance in their effector responses is implicated in multiple inflammatory diseases, like Ulcerative Colitis (UC). In this project, we aim to identify if/how Nrf2 (nuclear factor erythroid 2-related factor2), an oxidative stress regulator controlled by Keap1 (Kelch-like ECH-associated protein1), impacts the differentiation of inflammatory (Th1) or regulatory (Treg) T-cell subsets and in turn, the disease outcome of Colitis. To answer this, we used mice with T-cell specific knock outs (KO) of Nrf2 (N-
KO) or Keap1 (K-KO). We performed in vitro assays in KO mice and validated results in vivo using OTII mice (with OVA antigen specific T-cell receptor). IFN-γ and T-bet expression were measured for Th1 and Foxp3 for Tregs differentiation, respectively. To dissect metabolic mechanisms, levels of glycolysis intermediates lactate and pyruvate were measured (Th1 differentiation is Glycolysis dependent). Further, to elucidate if/how NRF2 in T cells plays a protective role in Colitis, we performed T cell specific adoptive transfer experiment in immunodeficient RAG1 KO mice and IL10KO mice. Our data overall depicts lower Th1 differentiation in vitro as well as in vivo in K-KO mice along with lower glycolysis compared to Wild type (WT) and N-KO CD4 T-cells. Conversely, we observed increased Foxp3 expression indicative of Nrf2 promoting Treg cell differentiation. We also observed better disease outcomes in RAG1 KO and IL10KO mice adoptively transferred with K-KO T cells suggesting protective role of NRF2 in UC, making it an attractive therapeutic target for the same.

11:45AM Austin Eades Email: aeades@kumc.edu Mentor: Michael VanSaun, PhD.

Thermoregulation alters adipose influence of pancreatic cancer growth
Pancreatic ductal adenocarcinoma (PDAC) is the 4th leading cause of cancer death in the United States and has an abysmal 5-year overall survival of 12%. A major risk factor for PDAC is obesity-which has increased 12% between 1999-2018 in the United States. This rise correlates with the projection that PDAC is to become the second leading cause of cancer death by 2025. Clinically, reports show obese PDAC patients have a three-month decrease in overall survival when compared to lean PDAC patients. Multiple studies have implicated obese white adipose tissue (WAT) as promoting tumor progression. Yet only one study has investigated the effects of brown adipose tissue (BAT) on PDAC, which exhibited cold-mediated BAT activation steals glucose from the tumor. Aside from potential metabolic regulation, our group discovered that cold-mediated activated BAT elicited the release of anti-tumorigenic factors. We discovered this by exposing diet-induced obese mice to a subthermal environment via a thermogenic shift (TS) from thermoneutral (TN) housing. The TS BAT-conditioned media (CM) inhibited PDAC cell proliferation (EdU) and increased apoptosis (via cleaved caspase-3). Using a cytokine array, we identified endostatin as the most upregulated molecule in TS BAT-CM compared to TN BAT-CM. Incubation of PDAC cell lines with recombinant endostatin showed increased cleaved caspase-3. A shotgun-based proteomics screen uncovered novel endostatin binding partners and signaling mediators. In conclusion, we have identified a novel anti-tumorigenic role for activated BAT that further suggests its importance in relation to PDAC progression.

2:00PM Peyton Huslig Email: phuslig@kumc.edu Mentor: Linda D'Silva, PhD, PT, NCS.

Comparing the Cognitive Workload During a Sustained Visual Search Task between Individuals with a Mild Traumatic Brain Injury and Healthy Controls
Purpose: To compare the objective and subjective cognitive workload during a visual search task in individuals with persistent symptoms three months or longer following a mild traumatic brain injury (mTBI) and healthy controls. Methods: The Dot Cancellation Task requires participants to identify clusters of 4 dots. Pupillary diameter change was collected during the task and was converted to the Index of Cognitive Activity (ICA). Subjective cognitive workload was collected
through the NASA-TLX Questionnaire. Symptom severity was measured using the Post-Concussion Symptom Scale (PCSS) and mental fatigue was assessed using the Mental Fatigue Scale (MFS).

Results: Fifty-two people, 27 with a mTBI (29.59 ± 23.1 weeks post injury) and 25 matched controls, participated in the study. Individuals with mTBI took 536.6 ± 9.93 seconds to complete the Dot Cancellation Task, while the controls took 437.2 ± 6.2 seconds (p=0.002). The ICA was not different between groups for the right eye (p=0.74) or for the left eye (p=0.71). The average NASA-TLX score for mTBI participants was 35.43 ± 18.31 while the average for the controls was 14.53 ± 12.65 (p<0.001). The NASA-TLX score correlated moderately with both the PCSS (rho=0.57) and the MFS (rho=0.59).

Conclusions: Individuals with persistent symptoms following a mTBI take longer to complete a sustained visual search task and report higher cognitive workload as well more mental fatigue than health controls. The subjective workload, measured with the NASA-TLX, was related to the mental fatigue and concussive symptoms felt by individuals following a mTBI.

2:15PM Liam Lynch Email: wlynch2@kumc.edu Mentor: Daniel Whibley, PhD.

Factors Associated with Satisfaction and Success in Ultra-Marathons of 200 Miles or Greater

Ultra-marathons encompass distances greater than the traditional 26.2 miles; often 200 miles or greater, lasting days at a time. This cross-sectional study aimed to identify factors associated with ultra-marathon performance and satisfaction. An electronic survey was distributed to 200-plus mile race competitors, including questions about demographics, ultramarathon experience, sleep-related factors, race strategies, and adverse events. Continuous variables were summarized as mean (standard deviation) and categorical variables as N (%). Logistic regression was used to quantify associations with five goal-related outcomes: finishing in the top 25%; finishing in the bottom 25%; exceeding performance expectation; underperforming against expectations; and being satisfied with performance. Of 117 respondents (mean age 47.2 (standard deviation 11.0), 67.0% male), factors significantly associated with finishing in the top 25% included having a performance-related race goal, sleeping >7 hours the night before the race (compared to <7 hours), and having a healthy BMI (compared to BMI>25). Finishing in the bottom 25% was associated with a history of smoking, experiencing a sleep-related adverse event, sustaining an injury, sleeping <7 hours during the race, and not consuming a caffeinated beverage during the race. A lower likelihood of exceeding race expectations was observed for runners screened as having subclinical/clinical insomnia. A lower likelihood of race satisfaction was associated with regularly drinking alcohol (weekly). This study has identified potentially modifiable factors related to ultramarathon outcomes. Specifically, future longitudinal research could ascertain whether optimizing sleep improves ultramarathon performance and could also help determine any causal role of caffeine or alcohol consumption on outcomes.

2:30PM Michael Braman Email: mbraman2@kumc.edu Mentor: Archie Heddings, MD.

Opioid Sparing and Analgesic Efficacy of Metamizole After Orthopedic Surgery: A Systematic Review

Postoperative pain control is critical in the setting of orthopedic surgery. While efficacious analgesics, opiates have rapid tolerance and addictive potential. Metamizole is a non-opioid
analgesic primarily working by inhibiting COX-3 commonly used in Europe and South America but banned in the US due to concerns about agranulocytosis risk, though recent reviews have not shown significant agranulocytosis. This review is to assess the analgesic efficacy of metamizole in orthopedic surgery. An electronic review was conducted of PubMed, Web of Science, Cochrane, Embase, OVID Medline in October 2023. Studies for inclusion were limited to those in which metamizole use was a primary focus and in the setting of orthopedic surgery. 1112 studies were identified and 15 (1.3%) met inclusion criteria. The use of metamizole as a single agent or in combination therapy was described to be superior or noninferior to alternative analgesics in 10 (66.7%) studies. Metamizole decreased rescue analgesia in 5 (33.3%) studies. No patients experienced agranulocytosis. In conclusion, metamizole was found to be as efficacious as other non-opioid analgesics and demonstrated an opioid sparing effect in a third of studies. Metamizole did not have significant differences in incidence or severity of side effects and no cases of agranulocytosis were seen across all studies. These results indicate the potential for metamizole’s use as part of analgesia in the setting of orthopedic surgery. Future studies should focus on larger cohorts to continue to assess efficacy and risk of agranulocytosis when using metamizole in the orthopedic setting.

3:00PM Laura Jackson Email: ljackson18@kumc.edu Mentor: Archie Heddings, MD.

Pre- and Post-Operative Complications in Orthopedic Patients: An International Comparison Between Private and Public Run Hospitals in Zambia
Orthopedic injuries pose significant challenges in low- and middle-income countries, with delayed diagnosis and treatment exacerbating risks and leading to increased complications (Haagsma et al., 2016). Within Zambia, it has been reported that there are significant differences in the quality and access to care (Bwembya et al., 2017). Due to lack of access and affordability of private healthcare, low-income patients who lack access to private healthcare remain at a higher risk for morbidity and mortality. This study aims to compare patient outcomes between privately owned and government-run hospitals in Zambia to understand the impact of healthcare system options on post-operative recovery and quality of life. The current literature suggests the importance of timely treatment in mitigating complications, especially in settings where access to care is limited. We hypothesize that there will be no significant differences in patient demographics between hospitals but anticipate more timely care and fewer complications in private hospitals. This study is a multicenter non-interventional trial conducted over six months, involving patients undergoing surgery for the most common orthopedic injuries. Data on demographics, injury characteristics, treatment, post-operative outcomes, and more will be collected. A sample size of at least 1000 patients is estimated to be included. In conclusion this study addresses a critical gap in understanding the impact of healthcare system options on orthopedic patient outcomes in Zambia. By elucidating disparities and identifying areas for improvement, findings will inform strategies to enhance healthcare equity and improve post-operative recovery for all patients, regardless of socioeconomic status.
Productivity in Radiology: Remote vs On-Site Work Environments

Background: Since the COVID-19 Pandemic, there has been a shift to hybrid work schedules in radiology. Hybrid work schedules are a key factor in recruiting new employees. Diagnostic accuracy has been shown to be preserved in remote work. However, differences in productivity between work environments within a hybrid work schedule has not been studied. Objective: To compare differences in radiologists' productivity between working at a clinical site vs working remotely over a six month period. Methods: This study included data from 22 radiologists of the body, chest, and ultrasound divisions at a single academic medical center where data was retroactively observed. Radiologists' locations (on-site vs remote) and RVU data was recorded from 7/1/22-12/31/22. A random intercept model was used to account for the correlation between productivity by the same physician. Results: Radiologists working remotely generated on average 2.31 more RVUs per day than while working on-site (p=0.0004). Observing individual divisions, for body imagers, work location was not statistically significant (p=0.6807). For chest imagers, work location was significant (p=0.0213). Chest imagers working remotely generated on average 1.58 more RVUs per day than while working on-site. For ultrasound imagers, work location was significant (p<=.0001). Ultrasound imagers working remotely generated on average 7.04 more RVUs per day than while working in person. Conclusion: Radiologists may be more productive while working remotely than on-site. Differences between individual divisions are likely due to limitations including differences in resident support between remote and on-site locations, internet connectivity issues for remote workers, and small sample size.

Evaluation of factors Influencing Treatment and Morbidity in Patients Diagnosed With Primary Myxofibrosarcoma

Myxofibrosarcoma (MFS) is a rare type of soft tissue sarcoma which is highly aggressive and exhibits high rates of recurrence and metastasis. Due to its aggressive nature, wide surgical resection coupled with either adjuvant (ART) or neoadjuvant radiation therapy (NRT) is the mainstay of MFS treatment. While NRT is typically preferred due to a lower radiation dose, NRT can cause increased tumor growth which can increase surgical morbidity. The purpose of this study is to retrospectively review the extent of tumor growth after NRT and its effect on surgical morbidity in MFS patients at KUMC. We obtained IRB approval for this study and included patients via chart review of the EMR at KUMC. Any MFS patient treated with NRT and surgical resection at KUMC from 2002-2021 were included. Tumor measurements were obtained from patient MRIs which were anonymized and exported to a 3D Slicer program for three-dimensional analysis of the tumors. Nineteen patients met our inclusion criteria. Twelve experienced tumor growth following NRT, and six experienced increased surgical morbidity because of increased tumor size. This ongoing project has the potential to inform preoperative MFS treatment at KUMC. This project also has the potential to influence the way MFS research is conducted at KUMC as the use of Slicer to volumetrically measure tumors is a novel technique as applied to MFS. A limitation of this study is its small sample size; however, given the low incidence of MFS this is consistent with other sample sizes in MFS literature.
Utilization Patterns, Outcomes & Complications of 300 Consecutive Robotic-Assisted Spinal Procedures and 1454 screws by a Single Surgeon

Current literature related to robotic spine procedures report high accuracy with low robot-abandonment, however, several are multi-center, multi-surgeon series with high variability or report on previous generation systems. The purpose of this study was to review all single-surgeon consecutive robot-assisted cases at an institution using a single robotic-platform and report utilization patterns, outcomes, and robot-related complications. Between August 2019 and July 2023, 300 consecutive robotic cases were identified. 53.3% were female with mean age 65.3yrs (range 20-92) and BMI 29.5 (19-47). Spinal pathologies included (can be more than one): Degenerative (88.7%), Deformity (16.3%), Trauma (10.0%), Tumor/neoplastic (5.7%), and Spondylodiskitis (1.7%). Cases were performed Open (10.3%), MIS (85.3%) and Hybrid (Open and MIS, 4.3%). Imaging sources included: PreOp CT-merge (84.9%) and IntraOp 3D scan (15.1%). Tracker placement was: PSIS (81.6%) and spinous process (18.4%). Spine regions and screws placed included (% cases; # screws): Cervical (0.3%; 2), Thoracic (13.7%; 137), Lumbar/sacral (96.3%; 1231), Pelvic (12.7%; 78). There were 1448 total screws placed successfully. Mean total robot time was 38.75min (range 13-97; n=228 cases). Six screws (0.4%) in 6 separate cases were malpositioned and removed intraoperatively. There was 0% robot abandonment, 0 returns to OR and 0 neurologic deficits. 4 patients (2%) had intraop durotomies and 22 (7%) had postop wound complications. Within 300 robot-assisted spinal procedures including all spinal pathologies and regions, there was 99.6% screw placement accuracy out of 1454 screws, 0% robot abandonment, zero returns to the OR, and zero neurologic deficits.
Tuesday, April 2nd
Beller Room 1009

9:00AM Chen Zhang  Email: czhang10@kumc.edu  Mentor: Wen-Xing Ding, PhD.

Role of VPS13D in Alcohol-Associated Liver Disease
Alcohol-associated liver disease (ALD) is a leading cause of liver morbidity globally, characterized by steatosis, inflammation, fibrosis, cirrhosis, and is associated with the accumulation of hepatic megamitochondria and Mallory-Denk bodies. The mechanisms underlying these pathological changes remain poorly understood. Vacuolar Protein Sorting 13 Homolog D (VPS13D) is a lipid transporter protein and plays critical roles in regulating mitochondrial size and organelle-organelle contacts. However, the role of VPS13D in the pathogenesis of ALD has not been studied. We generated liver-specific VPS13D knockout (L-VPS13D KO) mice and these KO and their matched wildtype (WT) mice were subjected to chronic plus binge alcohol model. L-VPS13D KO mice exhibited higher serum alanine aminotransferase (ALT) levels post-ethanol exposure that matched WT mice, suggesting loss of hepatic VPS13D exacerbates liver injury. Mechanistically, VPS13D deficiency disrupted endoplasmic reticulum-mitochondria and mitochondria-lipid droplet contacts, increased accumulation of megamitochondria in hepatocytes. L-VPS13D KO mice also had decreased expression of Cyp2e1 and ADH, two critical ethanol-metabolizing enzymes, resulting in impaired ethanol clearance and lipid metabolism. Interestingly, L-VPS13D KO mice also had increased adipose tissue atrophy but increased hepatic steatosis and hepatocyte death and hepatic inflammation. In conclusion, Loss of hepatic VPS13D disrupted multiple organelle contacts leading to increased hepatic steatosis and liver injury in alcohol-fed mice.

9:15AM Cecilia (Steffie) Villanueva  Email: cvillanueva@kumc.edu  Mentor: Bruno Hagenbuch, PhD.

Does palmitoylation in the Organic Anion Transporting Polypeptides (OATP) 1B3 affect protein-protein interactions with OATP1B1?
Background: The Organic Anion Transporting Polypeptides 1B1 and 1B3 (OATP1B1 & OATP1B3) are hepatic drug transporters with 80% amino acid sequence homology. They regulate each other's function and surface expression when co-expressed. S-palmitoylation, a reversible post-translational modification, adds palmitic acid (C16:0) to cysteines and can regulate a protein's function, localization, and protein-protein interactions. We previously demonstrated that OATP1B1 is S-palmitoylated. Due to the high homology to OATP1B1 and their known protein-protein interactions, we speculated that OATP1B3 is also palmitoylated. Aim: We hypothesized that OATP1B3 is palmitoylated and that palmitoylation may impact function, surface expression, and protein interaction between OATP1B1 and OATP1B3. Methods: Selected OATP1B3 cysteine residues were mutated. The acyl-resin assisted capture (RAC) assay was used to test whether the resulting mutants were palmitoylated. Uptake of cholecystokinin-8 (CCK-8) was measured to assess functional changes. Surface biotinylation assays quantified transporter expression at the plasma membrane. Results: Acyl-RAC analysis demonstrated OATP1B3 is palmitoylated. Co-
expression of OATP1B3 with a non-palmitoylated OATP1B1 (OATP1B1-C24A) as well as co-expression of non-palmitoylated OATP1B3-C24A with OATP1B1-C24A resulted in increased uptake of CCK-8. Co-expression of OATP1B1-C24A with OATP1B3, OATP1B1 with OATP1B3-C24A, and OATP1B1-C24A with OATP1B3-C24A resulted in decreased surface expression of OATP1B3 when compared to co-expression of the wild-type proteins. Summary and Conclusions: We demonstrate that OATP1B3 is palmitoylated. Co-expression of non-palmitoylated OATP1B1 or OATP1B3 with wild-type proteins or mutants results in changes in function and surface expression. These findings suggest that palmitoylation regulates protein-protein interactions in these transporters. Thus, diseases where palmitoylation is modified could impact drug disposition.

9:30AM Allen Chen Email: achen6@kumc.edu Mentor: Wen-Xing Ding, PhD.

Dissecting the Roles of the Two Homologous Phospholipid Scramblases TMEM41B and VMP1 in VLDL Secretion and MASLD/MASH

Transmembrane Protein 41B (TMEM41B) and Vacuolar Membrane Protein 1 (VMP1) are homologous endoplasmic reticulum (ER)-resident scramblases with important roles in autophagy and VLDL secretion. Hepatic loss of these proteins leads to defective autophagy and VLDL secretion resulting in rapid-onset metabolic-associated steatohepatitis (MASH) in mice. Overexpression of VMP1 alleviates MASH in mice fed with choline-deficient amino acid-defined high-fat diet (CDAHFD) (PMID:35452693). However, whether TMEM41B and VMP1 have degenerate or distinct roles autophagy and VLDL secretion regulation in mouse livers is unknown. Liver-specific TMEM41B knockout (L-TMEM41BKO), TMEM41BKO/VMP1 knockin (KI) (KOKI), TMEM41B knockin (L-TMEM41BK) and TMEM41B/VMP1 double knockout (DKO) mice were generated by crossing with Albumin-Cre mice. Serum and liver were assayed at 1, 2, and 4 months. L-TMEM41BKO mice developed massive VLDL secretion impairment-associated hepatic steatosis by 1 month with autophagy defect and changes in COP II proteins and decreased phospholipids in L-TMEM41BKO mice. Impaired VLDL secretion and hepatic steatosis was reduced in 1-month-old KOKI mice, but not autophagic markers LC3-II and p62, suggesting compensation for VLDL secretion only. DKO mice phenotype reflects L-TMEM41BKO at 1 month, though recovery from hepatic steatosis and impaired VLDL secretion but not fibrosis and inflammation still occurred by 4 months, suggesting partial adaptive response. L-TMEM41BKl alleviated MASH in CDAHFD-fed mice suggesting potential therapeutic application of TMEM41B KI. In conclusion, lack of VMP1 or TMEM41B leads to reversible VLDL secretion impairment and steatosis but not liver fibrosis and inflammation. VMP1 may partially compensate for the loss of TMEM41B with respect to lipid accumulation but not autophagy.

10:00AM Olamide Adelusi Email: oadelusi@kumc.edu Mentor: Hartmut Jaeschke, PhD.

The ferroptosis inhibitor, UAMC-3203, attenuates acetaminophen induced liver injury via an off-target reduction of mitochondrial pJNK and mitochondrial dysfunction

Acetaminophen (APAP) overdose induced liver injury (AILI) is the leading cause of acute liver failure in the Western world. AILI is caused by accumulation of the toxic metabolite, NAPQI, which leads to oxidant stress that culminates in hepatocyte death. Recent reports have implicated
ferroptosis, an iron dependent, lipid peroxidation mediated form of cell death as a mechanism of cell death after APAP. To investigate the role of ferroptosis in APAP hepatotoxicity, we utilized UAMC-3203, a ferroptosis inhibitor, in a mouse model of AILI. Fasted male C57BL/6J mice were injected with 500 mg/kg APAP and a 1-hour pre-treatment with 9.5 mg/kg UAMC-3203 or vehicle. UAMC-3203 pre-treatment significantly reduced ALT and necrosis compared to vehicle treatment, indicating a mitigating effect on liver injury. However, markers of ferroptosis including hepatic 4-hydroxynonenal and malondialdehyde, and transcriptional upregulation of PTGS2 were not significantly increased over untreated controls after APAP treatment, suggesting that ferroptosis inhibition is not responsible for the protective effect conferred by UAMC-3203. Hepatic glutathione levels, protein adduct formation and JNK activation were not affected by UAMC-3203. However, UAMC-3203 significantly reduced pJNK levels on the mitochondria and downstream mitochondrial dysfunction through downregulation of mitochondrial Sab, a scaffold protein which binds pJNK on the mitochondria and is required for sustained JNK activation and subsequent injury after APAP overdose. Thus, UAMC-3203 was found to attenuate AILI through an off-target Sab mediated reduction of mitochondrial pJNK levels, consequently leading to downstream reduction of mitochondrial dysfunction and necrosis.

10:30AM Emily Casteen Email: e869c865@kumc.edu Mentor: Nausheen Ahmed, MD.

**Neurocognitive Testing to Predict Post-CAR T Toxicity**

Chimeric antigen receptor T-cell (CAR T) therapy has gained widespread use for treating acute lymphoblastic leukemia (ALL), non-Hodgkin lymphoma (NHL), and multiple myeloma (MM). Immune effector cell-associated neurotoxicity syndrome (ICANS) is a severe complication of CAR-T therapy. Predicting ICANS can aid in identifying high-risk patients who may benefit from closer monitoring or early intervention. While existing scoring systems consider disease and comorbidity factors, none incorporate neurocognitive function. We conducted a retrospective study at the University of Kansas Medical Center to assess the correlation between pre-infusion neurocognitive testing and ICANS. We analyzed data from 360 CAR T patients, comparing incidence and severity of ICANS based on neurocognitive test results. The St. Louis University Mental Status (SLUMS) Exam and the Montreal Cognitive Assessment (MoCA) were used to evaluate cognitive function. In CD19-directed CAR T patients, a positive MoCA exam was significantly associated with higher ICANS incidence and severity, while SLUMS scores showed no correlation. BCMA-directed CAR T patients showed no significant association between neurocognitive test results and ICANS incidence. Our findings suggest that the MoCA exam may independently predict ICANS incidence and severity in CD19-directed CAR T, with higher scores indicating lower risk. Patients with normal cognition on the MoCA may be suitable for outpatient therapy, while those with cognitive impairment may require inpatient monitoring and early intervention. Incorporating neurocognitive testing into pre-infusion assessments could enhance risk stratification and improve patient care in CAR T therapy.
Understanding lipogenesis in bladder cancer
Cancers have different metabolic needs for growth and survival. While some cancers depend on lipogenesis, the role of lipogenic factors in BCa is poorly defined. We hypothesized lipogenesis is a major metabolic pathway for BCa cell growth. T24, HTB-5, and HTB-9 BCa cell lines were used. The enzyme carnitine-palmitoyltransferase-1 was inhibited with etomoxir, thiolase with trimetazidine, fatty-acid-synthase with cerulenin, and acetyl-CoA-carboxylase with TOFA. Cell viability was assessed with a hexosaminidase enzymatic activity assay to estimate cellular proliferation, and IC50 curves were calculated. At 48 hours, cerulenin-treated cells had an IC50 of 11.80µM, 13.28µM, 18.31µM for HTB-9, T24, and HTB-5 respectively; and TOFA-treated cells had an IC50 of 64.25µM, 59.29µM, 32.03µM for HTB-9, T24, and HTB-5 respectively. Adding the lipid palmitate to TOFA-treated cells, it appeared to rescue cell proliferation almost to control, although statistical significance was not achieved. Crystal violet staining was used to assess long-term cell viability. There was visible reduction in colony formation, dose-dependently, at 5µM and 10µM cerulenin in T24 cells at 14 days of culture, and HTB-9 cells had similar results at 20µM and 40µM TOFA at 17 days. In both cerulenin and TOFA-treated cells, there was elevated cleaved caspase-3 protein expression, indicating apoptosis. Finally, the Cancer Genome Atlas demonstrated elevated FASN levels in BCa tissue vs normal tissue and worse survival in these patients. In conclusion, inhibition of lipogenesis in BCa cell lines reduces cell viability by reducing proliferation and inducing apoptosis whereas inhibitors of β-oxidation did not produce the same effect at relevant concentrations.

Biochemical Recurrence in Localized Prostate Cancer: Analysis of a Population-Based Cohort
Introduction: Understanding real-world patterns of biochemical recurrence (BCR) in localized prostate cancer may inform strategies to better identify patients at increased risk of distant metastasis and prostate cancer mortality. The purpose of this study is to examine the frequency of BCR after initial treatment with radical prostatectomy (RP) or radiation therapy (RT) in a population-based cohort of men with localized prostate cancer. Methods: The North Carolina Prostate Cancer Comparative Effectiveness and Survivorship Study (NC ProCESS) enrolled a cohort of 1456 men newly diagnosed with localized prostate cancer between 2011-2013 throughout NC. Participants were enrolled prior to treatment and followed prospectively. Treatment and BCR were identified through medical record abstraction. BCR was defined per published guidelines as a PSA rise to ≥0.2 ng/mL post-RP or a PSA increase of ≥2 ng/mL above nadir post-RT. Results: A total of 740 men had complete BCR data and were initially treated with RP or RT. Median follow-up duration was 4.5 years for RP and 4.8 years for RT. BCR occurred in 11.2% (95% CI: 8.6%-14.4%) of RP and 10.9% (95% CI: 7.8%-15.1%) of RT patients. High-risk prostate cancer was associated with significantly greater risk of BCR among men treated with RP. No patient-level characteristics were associated with greater risk of BCR among RT patients. Conclusions: In this population-based cohort, 1 in 10 men experienced BCR following primary treatment with RP or RT. Men receiving RP for high-risk prostate cancer were particularly
susceptible to BCR. Additional follow-up is needed to further understand the effect of BCR on long-term outcomes.

2:00PM Meeli Patel  Email: mpatel10@kumc.edu  Mentor: Kelsey Larson, MD.

Pathologic Node-Positive Disease in cT3N0 Patients Undergoing Mastectomy: Evaluation of Frequency, Multidisciplinary Approach to Management, and Recurrence
Background: Patients undergoing surgery first with cT1-2N0 disease with 1-2 positive sentinel lymph nodes may forgo axillary lymph node dissection (ALND). The approach to cT3 tumors is not well established. We hypothesized cT3N0 mastectomy patients may have varied ALND or radiation alone for node-positive disease, without axillary management tied to adjuvant recommendations. Methods: Retrospective chart review of cT3N0 mastectomy patients (2/2016 to 7/2023). We compared sentinel lymph node biopsy (SLNB) alone versus ALND, excluding patients without axillary nodal surgery. Results: Analysis of 84 cT3N0 patients showed 50% (n=42) with node-positive disease. Thirty-five patients received ALND. Patients with positive SLNB after NACT underwent ALND. SLNB alone was performed in 9 surgery-first patients with node-positive disease. SLNB and ALND cohorts were clinicopathologically similar. Adjuvant radiation was more common in ALND (88% versus 54%, p=0.001), however, 81.6% of the SLNB cohort (n=40) was node-negative. ALND correlated with higher adjuvant chemotherapy (p=0.02) and endocrine therapy compliance (p=0.04). One patient had local regional recurrence (LRR) after SLNB with node-negative disease; no axillary recurrences occurred. Nine had metastatic recurrences (MR). Recurrence was not associated with SLNB versus ALND (p=0.27). Conclusion: Many cT3N0 patients (52%) have node-positive disease on surgical pathology, with varied axillary surgical approaches. ALND remains standard of care for node-positive disease after NACT. ALND versus SLNB alone was not associated with LRR or MR but revealed statistically significant variations in adjuvant treatment. A multidisciplinary review is recommended for cT3N0 mastectomy patients with node-positive disease on pathology to assess the value of ALND in radiation and systemic therapy planning.

2:15PM Salvador Aguirre  Email: saguirre2@kumc.edu  Mentor: Luke Selby, M.D., M.S, F.A.C.S.

Assessing Anesthetic Collaboration Between Surgeons and Anesthesiologists
Introduction: Surgeon-anesthesiologist collaboration is essential to the safe performance of surgery, but little research has investigated this interdisciplinary collaboration. Hypothesizing that surgeons were hesitant to collaborate on topics outside their training, we surveyed surgeons to assess their knowledge of anesthesia and their comfort with this interdisciplinary collaboration, including asking about comfort discussing methods of delivering general anesthesia. One safe method, total intravenous anesthesia (TIVA), is associated with improved short- and long-term patient outcomes and is under-utilized in general practice. Methods: Following IRB approval, we surveyed members of the American College of Surgeons Communities. Using Likert scales (1:Not at all comfortable;5:Very comfortable), surgeons self-reported their comfort in discussing specific anesthetic considerations applicable to a broad range of procedures and practice types and assessed knowledge of general anesthesia approaches. Informed consent was obtained from all participants. Summary statistics were
produced to describe responses for each question. Results: In total, 150 surgeons were surveyed. Comfort levels varied across topics: epidural catheter placement vs. spinal anesthesia (Mean: 4.36; Median: 5), peripheral nerve blocks (Mean: 4.43; Median: 5), arterial (Mean: 4.50; Median: 5), and central venous access (Mean: 4.54; Median: 5) but were generally high. Despite surgeons' high comfort levels with focused collaboration, surgeons reported discomfort discussing TIVA vs. volatile anesthesia (Mean: 3.58; Median: 4). Conclusion: Overall, surgeons are very comfortable collaborating with anesthesiologists on focused anesthetic decisions. However, they are less familiar with, and less comfortable discussing, differing approaches to delivering general anesthesia. Improved patient outcomes associated with TIVA adoption likely remain out of reach until surgeon comfort discussing this topic increases.

2:30PM Sarah Adkins Email: sadkins2@kumc.edu Mentor: Lyndsey Kilgore, MD.

Making Surgical Education Intuitive: A Surgical Robotics Primer for Pre-Clinical Medical Students
Introduction: In the last decade, robotic surgery has expanded with residency programs incorporating formal robotics curriculum into training; however, medical student curriculum is still lacking in exposure. With limited student engagement on robotic consoles, students have reported low educational satisfaction when on clerkship. This pilot event sought to increase student exposure and confidence in robotic surgery to ultimately improve student learning. Methods: A two-part pilot program was implemented among pre-clinical medical students at an academic institution. Part one was a surgeon-led lecture on utilization and basics of robotic surgery and part two was a hands-on robotics primer. Students operated on a robotic simulator, becoming familiar with visual haptic feedback, 3-D anatomical exposure, depth perception, and robotic instrumentation. Data was collected and analyzed for changes in student perception and confidence. Results: Thirty-two students participated in part 1. Only one student (3%) reported previous experience in a robotic case. Eleven panel participants were selected for participation in part 2. Of those that completed parts 1 and 2, 82% reported being interested or very interested in pursuing additional robotic surgery experiences and 40% of students reported improved confidence in their ability to actively assist in a robotics case (p< 0.004). Conclusion: While the sample size of this pilot project is small, the increased reported student confidence and interest in robotic surgery is notable. As robotic surgery continues to expand in both the operating room and curricular integration, students should have increased hands-on robotic exposure prior to the surgery clerkship to enhance surgical education.

3:00PM Erin Rauber Email: erauber@kumc.edu Mentor: Mazin Al-Kasspooles, MD.

Clinicopathologic factors associated with readmissions and ED visits after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS-HIPEC).
Peritoneal surface metastases (PSM) treated with systemic chemotherapy alone rarely results in long-term survival. CRS-HIPEC is important in treating PSM. It is considered the ultimate major abdominal operation, often requiring multiple peritonectomies and multi-visceral resections followed by direct application of high-dosed hyperthermic chemotherapeutic agent(s), with its own side-effects. Recovery can be difficult, often requiring readmissions and ED visits after
This study analyzes clinicopathologic factors contributing to ED visits and readmissions up to 90 days after CRS-HIPEC in 216 patients from a comprehensive HIPEC databank from 2018-2022, which included 62.5% females; average age of 56.8 years. Most patients were ASA 3, ECOG 0, with an average peritoneal cancer index (PCI) of 11.5 (0-39). Mean length of stay (LOS) was 10.6 days. Ninety-day mortality equaled 1.4%. Approximately 89% of patients went home, 10% to transition care, and 1% to hospice. Average number of organs removed were 2.6; bowel was the most common (56%). 32% of all patients required readmissions, via the ED or other means, most within 30 days, average 25.5 days. 10.6% had >1 admission. Only 16.7% visited the ED. Factors significantly (p<0.05) associated with readmissions included: LOS, discharge to transitional care facility, h/o diabetes, ASA class, high PCI, complete RUQ peritonectomy, cholecystectomy, splenectomy, and bowel resection (most notably low anterior resection). Several characteristics were also significantly associated with ED visits. Specific clinicopathologic factors need to be considered and targeted to improve readmissions and ED visits.

3:15PM Michaela O’Connor Email: moconnor6@kumc.edu Mentor: Ravi Garg, MD.

The Watch Tower Society, the main governing organization of the Jehovah's Witness (JW) faith, introduced the doctrine to refuse blood in 1945. Many craniofacial operations place patients at significant risk of blood loss. This case report describes our approach to minimizing blood loss in a JW patient undergoing jaw surgery. A 15-year-old, otherwise healthy, female presented to clinic for orthognathic evaluation. She reported difficulty chewing, biting her tongue, and some TMJ clicking and popping. On physical exam, she had class III malocclusion, transverse maxillary constriction, and a lateral open bite. She and her family are Jehovah's witnesses and object to receiving blood products. Surgery was deferred until the patient reached 18 years of age and had undergone preoperative orthodontics. A two-piece Le Fort I maxillary osteotomy was performed. Erythropoietin, oral iron, and tranexamic acid were used to minimize intraoperative blood loss. The estimated blood loss was 100 ml. Her hemoglobin on post-operative day one was 15.5 gm/dl. She was discharged home that day. She had no complications and at follow-up had a stable occlusion and an improved profile. Le Fort I osteotomies can cause significant bleeding on rare occasion. Patients undergoing this procedure who refuse blood products require additional counseling and preoperative planning.

3:30PM Dylan Vance Email: d123v309@kumc.edu Mentor: Lyndsey Kilgore, MD.

Interdisciplinary Airway Management: A Surgical Primer for First- and Second-Year Medical Students
Introduction: Airway management and risk assessment are imperative to the practices of both Anesthesiology and Otorhinolaryngology, requiring collaboration to optimize patient outcomes. With limited access to these specialties, preclinical medical students are often unaware of the overlapping responsibilities shared during airway management. This pilot event seeks to increase medical students' understanding of this interdisciplinary collaboration. Methods: Thirty first- and second-year medical students attended this IRB approved pilot event with instruction provided.
by Anesthesiology and Otorhinolaryngology residents and attendings. Students were instructed using Thiel soft-embalmed cadavers on bag mask ventilation, intubation, tracheotomy, and cricothyroidotomy along with the purpose, timing, technique, and relevant anatomy of each procedure. Pre- and post-surveys were administered, and data was analyzed for changes in student confidence and specialty collaboration during airway management. Results: Prior to the event, only 13% of students "agreed" or "strongly agreed" that they understood how Otorhinolaryngology and Anesthesiology collaborate during airway management. After the event, responses increased by 65% and 19% respectively. Additionally, student confidence in selecting airway modality increased by 48% and lack of confidence decreased by 28% (p <0.001). Student understanding of the overlap of responsibilities between ENT and Anesthesia increased by 49% (p< 0.001) following the event. Conclusion: As multidisciplinary patient care education expands for medical students, this pilot program shows the benefits of exposing pre-clinical students to a collaborative approach. This approach to multidisciplinary hands-on teaching demonstrates an effective way to engage students as programs look to incorporate hands-on surgical education opportunities in students' pre-clinical education.

3:45PM Jalee Birney Email: jbirney@kumc.edu Mentor: Lyndsey Kilgore, MD.

The Future Face of Surgery - Demographics of Students Interested in Surgery at an Academic Medical Center

Introduction: The field of surgery has historically been comprised mostly of Caucasian males. However, since 2017, the AAMC reports there have been equal rates of men and women matriculating into medical schools, with increasing numbers of underrepresented in medicine (UIM) students. It is expected that it will take time for fields chiefly dominated by Caucasian males, such as surgery, to diversify as there are known barriers that UIM students continue to face. Understanding student demographics is essential to expand the diversity of surgical fields. This study aims to identify the demographics of students considering surgical specialties upon matriculation at an academic institution. Methods: Prior to the academic year, a panel was held to explore the differences between a surgical or non-surgical career path. The panel consisted of fourth-year medical students applying to surgical and non-surgical fields, internal medicine and surgery residents, and faculty physicians. Attendee demographics and interest in career paths were collected. Differences in demographics were compared with reported interest in surgical vs. non-surgical specialties. Results: Fifty-six medical students attended the panel. Thirty-five (62.5%) students who attended the panel reported an interest in surgery, sixteen (46%) identified as female. Seven (21%) students who reported interest in surgery identified as UIM. Conclusion: In congruence with current literature, students interested in surgery at this academic institution were primarily male and did not identify as UIM. The field of surgery can continue to be more welcoming for minority students, and further research and programs should be implemented to continue these efforts.
MLKL deficiency exacerbates early injury in a mouse model of acetaminophen hepatotoxicity

Acetaminophen (APAP) overdose is the most common cause of drug-induced hepatotoxicity and acute liver failure (ALF) in the United States. Metabolization of APAP and production of its toxic metabolite NAPQI by Cyp2E1 induce mitochondrial oxidant stress and activation of the mitochondrial permeability transition pores (MPTP), resulting in release of mitochondrial proteins into the cytosol and their translocation to the nucleus with resulting DNA fragmentation and causing hepatocyte necrosis. Necroptosis have also been recognized recently, which involves interaction of RIPK1 and RIPK3 to form a complex which recruits the pseudokinase mixed lineage kinase domain-like protein (MLKL). We assessed MLKL's role in APAP-induced injury over a 6-24-hour time course, comparing C57BL/6N MLKL-/- mice to litter-mate wild type (WT) controls. Following a 16-hour fast, mice received 300 mg/Kg of APAP, and samples were collected at 6-, 12-, and 24-hour post-APAP. Interestingly, MLKL-/- mice showed an exacerbation of APAP-induced liver injury at 6 and 12h after APAP overdose compared to WT, as indicated by severe GSH depletion, higher circulating ALT and substantial areas of necrosis at these earlier time points. MLKL-/- mice also showed enhanced translocation of AIF and EndoG from mitochondria to cytosol when compared to WT mice, suggesting that MLKL deficiency enhances MPTP after APAP overdose. Deficiency of MLKL also influenced dysregulation of autophagy, unfolded protein response, and decreased neutrophil infiltration after APAP overdose. Thus, our data emphasizes the relevance of noncanonical functions of MLKL in influencing early phase of APAP induced liver injury.
fibrosis; and restores phosphorylation/activation of the energy sensor AMPK. Additionally, while Pkd1 cko mice die between postnatal day (P)14-20, Pkd1;Ogt double knockout mice survive beyond one year. Using immunoprecipitation and mass spectrometry, we determined AMPKα1 is hyper-O-GlcNAcylated in Pkd1 cko kidneys and that AMPKα1 is O-GlcNAcylated at Ser184, adjacent to its phosphorylation/activation site, Thr183. Because phosphorylation and O-GlcNAcylation are often antagonistic, we propose that O-GlcNAcylation at Ser184 restricts phosphorylation at Thr183 and thus activation of AMPK. These data indicate that hyper-O-GlcNAcylation is a driver of ADPKD progression (in part through AMPK inactivation) and that its suppression limits disease pathogenesis and increases mouse survival, suggesting therapeutic potential.

9:30AM Jarrid Jack Email: jjack2@kumc.edu Mentor: Gustavo Blanco, PhD.

**Na,K-ATPase α4 Undergoes Phosphorylation During Sperm Capacitation**

Na,K-ATPase α4 (ATP1A4) is an integral plasma membrane protein responsible for the exchange of sodium and potassium between the cell and its environment. ATP1A4 is only found in male germ cells of the testes and is abundant in the flagellum of the spermatozoa, where it is necessary for sperm motility and sperm capacitation. ATP1A4 activity is upregulated during sperm capacitation in vitro. Currently, the mechanisms involved in this regulation are unknown. Using immunoprecipitation and immunoblot analysis, we show that ATP1A4 from rat sperm is phosphorylated, both under non-capacitated and capacitated conditions. However, we found differences in the levels and the pattern of protein phosphorylation between both conditions. Specifically, ATP1A4 phosphorylation of Tyrosine and phospho-PKA levels increased in capacitated compared to non-capacitated sperm. These results were confirmed using tandem mass spectroscopy (MS/MS). These data show that ATP1A4 is post-translationally modified by phosphate addition and that the protein is subjected to a complex pattern of phosphorylation that depends on the state of the cells. In addition, this suggests that phosphate incorporation to ATP1A4 may be important to adjust its activity to the functional needs of sperm.

10:00AM Sreejata Dutta Email: sdutta3@kumc.edu Mentor: Mihaela Sardiu, PhD.

**Identifying Persistent Biomarker Structures for Rare Events: A Case Study using an Integrative Machine Learning Approach**

Omics and related fields have witnessed unprecedented growth, making machine learning (ML) indispensable for extracting insights from complex biological systems. Omics data, encompassing genomics, transcriptomics, proteomics, and metabolomics, pose challenges due to their dimensionality and non-linear structures. ML, especially valuable in high-throughput technologies, excels in revealing hidden patterns. However, analyzing rare events in omics data is intricate, given the imbalanced nature of these events. To address this, we introduce PerSEveML, a user-friendly ML tool tailored for rare event analysis. PerSEveML employs an integrative approach, combining top-performing models and introducing a persistent feature structure concept, categorizing features into persistently selected, unselected, and fluctuating. This tool allows users to predict and visualize rare events, offering flexibility through cut-point analysis. Demonstrating PerSEveML’s prowess, we showcase three diverse datasets, including
polychromatic flow cytometry, high-dimensional flow cytometry, and proteomics data. The tool's robustness in handling various dataset sizes, biomarkers, and rarity percentages is evident. The incorporation of TopS normalization, along with other techniques, enhances its adaptability to different omics datasets. PerSeveML's deviation from its precursor, focusing on faster computation and user-friendly ML implementation, has proven successful. The tool's ability to capture major findings from past articles, coupled with its versatility in exploring diverse ML methods, makes it a valuable asset in biomarker-driven research. Our study underlines PerSeveML's efficacy in unraveling complex biological phenomena, positioning it as a promising tool for researchers navigating the intricacies of rare event analysis in diverse omics datasets.

10:15AM Xiaosong Shi Email: xshi2@kumc.edu Mentor: Byron Gajewski, PhD.

Improved Mortality Analysis in Early-Phase Dose-Ranging Clinical Trials for Emergency Medical Diseases Using Bayesian Time-to-Event Models with Active Comparators

Emergency medical diseases (EMDs) are the leading cause of death worldwide. A time-to-death analysis is needed to accurately identify the risks and describe the pattern of an EMD because the mortality rate can peak early and then decline. Dose-ranging Phase II clinical trials are essential for developing new therapies for EMDs. However, most dose-finding trials do not analyze mortality as a time-to-event endpoint. We propose three Bayesian dose-response time-to-event models for a secondary mortality analysis of a clinical trial: a two-group (active treatment versus control) model, an EMAX model, and a hierarchical EMAX model. The study also incorporates one specific active treatment as an active comparator in constructing three new models. We evaluated the performance of these six models and a very popular independent model using simulated data motivated by a randomized Phase II clinical trial focused on identifying the most effective hyperbaric oxygen dose to achieve favorable functional outcomes in patients with severe traumatic brain injury. The results show that the three-group, EMAX, and EMAX model with an active comparator produce the smallest averaged mean squared errors and smallest mean absolute biases. We provide a new approach for time-to-event analysis in early-phase dose-ranging clinical trials for EMDs. The EMAX model with an active comparator can provide valuable insights into the mortality analysis of new EMDs or other conditions that have changing risks over time. The restricted mean survival time, a function of the model's hazards, is recommended for displaying treatment effects for EMD research.

10:30AM Stephan Komladzei Email: skomladzei@kumc.edu Mentor: Yanming Li, PhD.

An Integrative Machine Learning Approach for Predicting Liver Cancer Incidence and Survival.

Liver cancer (LC) is one of the most common types of cancer in the world and the third largest cause of cancer-related deaths globally. Although the precise etiology of the illness is unknown, many liver cancer cases are linked to chronic liver cirrhosis. Recent studies have also linked genetic mutations to LC. Patients who receive early diagnosis have a 5-year relative survival rate of about 36%. Most current RNAseq analysis ignores the impact of gene-gene coregulations. It only focuses on detecting marginally differentially expressed genes (DE) in predicting primary LC cases and their survival. In this study, we employed a novel machine learning technique called netLDA. Not only did it detect predictive strong DE genes, but it also used the strong genes as
hubs to identify coregulating genes that may only exhibit marginally weak DE effects. Our analysis identified 25 strong genes together with 53 coregulating weak genes, which we used to predict LC cases in a case-control study. In another survival study, we identified strong genes such as CFHR4 and ADH4 whilst GGT5 and PCK2 were among the weak coregulating genes identified. HSD171B13 and TAT were identified to be strong genes in both the case-control and survival study, and 10 ten weak genes, including TACC3 and SLC27A5, were found to be predictive in both the case-control and survival study.

11:00AM Md Saiful Islam Saif Email: msaif@kumc.edu Mentor: Devin Koestler, PhD.

Identifying Serum Proteomic Biomarkers to Predict Survival Outcomes in Patients with Head and Neck Squamous Cell Cancer

Recurrent and newly diagnosed metastatic head and neck cancers (HNSCC) are now eligible for anti-PD1/PDL1 immunotherapy, which prolongs overall (OS) and progression-free survival (PFS) but only confers a benefit in approximately 10-15% of cases. Predictive biomarkers that discriminate between responders and non-responders are urgently needed. Tumor-related changes in platelet number, volume, and function, a process termed "tumor education", have emerged as prognostic biomarkers in many solid tumors. Here, we evaluated serum proteomic targets derived from HNSCC patient platelets as markers of putative anti-PD1 response. Platelet-derived cytokines detected by proximity extension assay (PSA) clustered together and defined a subgroup of HNSCC patients with poor PFS and OS. Statistical modeling such as Cox Proportional Hazards model and machine learning approach such as Cox Elastic Net have been used to define a linear predictor of platelet-derived cytokines (i.e. HGF, VEGF, EGF, ANGPT1, CD40.L, MCP.4, Gal.1 and others) that performed well in predicting PFS and OS. Our results suggest the potential prognostic and predictive value of serum cytokine expression signatures and survival outcomes in patients with R/M HNSCC treated with anti-PD-1 therapy and underscore the potential value of on-treatment assessment of cytokine expression as a prognostic and predictive biomarker.

11:15AM Naima Alam Email: nalam2@kumc.edu Mentor: Alexandra R Brown, PhD.

Designing, Conducting, and Analyzing the DRIVE Trial within a Collaborative Academia Working Group

Clinical trial design and management experience can be challenging to demonstrate for graduate biostatistics students in the classroom. Opportunities for biostatistics students to experience designing and implementing a 'from scratch' trial design are essential for these students to succeed after graduating. The DRIVE (Daily Route Investigation Via an Efficient Bayesian Adaptive Design) Trial provided biostatistics students and the working group practical experience in Bayesian adaptive trial design and implementation. The DRIVE Trial aims to determine the optimal driving route from home to workplace using adaptive Bayesian trial design. The primary aim was to find the most efficient driving route to reduce commute time and enhance workplace productivity. The design included response adaptive randomization with interim analyses and adjusting route allocation based on performance. A maximum of 33 drives were planned across two routes and one control route, with possible early trial stopping. Beyond the immediate benefits of identifying the most efficient route, the study's significance lies in its broader
implications of biostatistics student training and Bayesian adaptive methods. The final analysis concluded with the decision to stop early (at 16 drives) for futility. Despite not identifying a faster commuting route, the trial more importantly underscored the effectiveness of statistical methodologies to everyday decision-making scenarios. This offers valuable practical training for future biostatisticians, serving as a template to tackle complex problems across various fields.

11:30AM Alexander Gabrielli Email: a228g039@kumc.edu Mentor: Russell Swerdlow, MD.

Alzheimer’s Disease-relevant Molecular Adaptations in a Human-neuron-based Model of Primary Mitochondrial Dysfunction

Alzheimer’s disease (AD) features changes in mitochondrial structure and function. Investigators debate where to position mitochondrial pathology within the chronology and context of other AD biological changes. Our objective was to determine the extent to which a specific form of primary mitochondrial dysfunction, the impaired translation of mtDNA-encoded transcripts, elicits AD-associated molecular phenomena. We treated SH-SY5Y neuronal cells and human induced pluripotent stem cell (iPSC)-generated forebrain neurons with chloramphenicol, an antibiotic that inhibits the translation of mtDNA-generated transcripts, for seven days. We characterized the general impact of the intervention through assessments of cell viability, levels of mtDNA-expressed proteins, bioenergetic flux, electron transport chain (ETC) and citrate synthase Vmax activities, mtDNA copy number and transcript levels, and the status of genes and proteins that regulate or reflect mitochondrial mass. To determine whether inhibiting the translation of mtDNA transcripts affects AD-associated phenomena we assessed the status of AD-implicated genes and proteins. The chloramphenicol-treated neurons retained viability. Reduced levels of mtDNA-encoded ETC proteins verified chloramphenicol target engagement. The chloramphenicol-generated models exhibited a presumably compensatory increase in mtDNA copy number and mtDNA-transcription. In both models, nuclear-encoded ETC transcripts increased while nuclear-encoded ETC protein levels decreased. Respiration flux decreased in the SH-SY5Y cells and increased in the neurons. SH-SY5Y and neuron amyloid precursor protein (APP), apolipoprotein E, α-synuclein, and tau RNA and protein levels increased. Enzymes that interact with APP and tau also changed. In conclusion, inhibiting mtDNA transcript translation alters the biology of AD-associated, nuclear-expressed genes and proteins.

11:45AM Xin Cao Email: xcao2@kumc.edu Mentor: John Thyfault, PhD.

Inhibition of hepatic ketogenesis influences exercise and time restricted feeding induced changes in brain mitochondrial energetics.

Ketone, as an alternative fuel, shows promises on brain metabolism particularly in the prevention/treatment of neurodegeneration. The brain predominately depends on glucose for energy, a link that becomes impaired with age. Both exercise and fasting improve cognitive function in mice. The combination of exercise and fasting stimulates ketogenesis cooperatively. Here we tested the hypothesis that suppressing hepatic ketogenesis would prevent advantageous brain mitochondrial adaptations to exercise via voluntary wheel running plus time-restricted feeding (VWR+TRF). Mature male mice with the hepatocyte-specific knockout of
mitochondrial hydroxymethylglutaryl-CoA synthase (HMGCS2 KO) or floxed littermate control mice were assigned to two groups: sedentary ad libitum fed (SED+AL) and (VWR+TRF) for 15 weeks. At completion of the intervention mitochondria were collected and mitochondrial respirations were measured using Oroboros Oxygraph-2k. HMGCS2 KO brain mitochondria displayed reduced bOHB-supported respiration compared to control mice in SED+AL condition, but this difference was not seen with AcAc. In addition, brain mitochondria from HMGCS2 KO displayed higher coupling control ratios (1-leak/state 3 respiration) both in SED and VWR+TRF compared to the control. Pyruvate supported respiration was no different between control and HMGCS2 KO. In response to chronic VWR+TRF, only control mice displayed reduced basal respiration with PCoA. These results indicate that suppression of hepatic ketogenesis increases brain mitochondrial coupling, reduces bOHB respiration, and prevents the reduction in basal respiration induced by VWR+TRF. Chronic suppression of hepatic ketogenesis provokes durable substrate-specific changes in brain mitochondrial energetics in sedentary mice and in response to exercise time-restricted feeding.

1:00PM Amanda Mize (Virtual)  Email: amize2@kumc.edu  Mentor: Cynthia Teel, PhD, RN, FAAN.

Reviving Hope: Exploring the Efficacy of Pulmonary Rehabilitation in Long Covid Management
In this project, the team is exploring the promising role of pulmonary rehabilitation (PR) in managing Long Covid, a condition that presents a formidable healthcare challenge, inundating our healthcare system with persistent symptoms following COVID-19 infection. Pulmonary rehabilitation, leveraging its established success in managing acute and chronic respiratory conditions, emerges as a beacon of hope for individuals grappling with the complexities of Long Covid. Through a comprehensive approach encompassing exercise, education, and support, PR holds the potential to significantly enhance lung function and overall well-being among persons living with Long Covid. The comprehensive literature review and analysis underscores the efficacy of PR in Long Covid treatment. Researchers have found notable improvements in lung function and symptom relief attributed to PR interventions, albeit with a caveat of limited long-term data. Despite the enduring burden of Long Covid, PR offers a tangible pathway to relief and recovery, promising respite for individuals navigating the aftermath of the pandemic. Integrating PR into provider education and clinical practice emerges as pivotal steps in addressing the multifaceted challenges posed by Long Covid. By prioritizing the incorporation of PR interventions, healthcare providers can offer Long Covid patients not only symptom relief but also a renewed sense of hope and improved quality of life. As we collectively confront the enduring repercussions of the pandemic, PR stands as a strategy of resilience and healing for those most profoundly affected by Long Covid.

1:15PM Maryam Gholampour  Email: mgholampour@kumc.edu  Mentor: Mohammad Haeri, MD, PhD.

Cell-Specific Expression Profile in AD Prefrontal Cortex
Understanding the cell-specific proteomes of the brain is crucial for elucidating the mechanisms underlying Alzheimer’s disease (AD). However, the isolation and analysis of these diverse and
low-abundance cell populations remain challenging. This study aims to assess GeoMx™ Digital Spatial Profiler (DSP) by NanoString Technologies (NanoString, Seattle, USA) capable of spatially resolving protein expression profile of AD brains extracted from formalin-fixed paraffin-embedded (FFPE) specimens. We analyzed protein expression profile of prefrontal cortices in post-mortem AD brains (n=4) and age-matched controls (n=4) using DSP. Regions of interest (ROIs) were targeted at gray matter and the DSP panel recorded the spatial expression of 76 proteins alongside three cell specific markers (GFAP for astrocytes, Iba1 for microglia, NeuN for neurons, and nuclear stain for DNA/nuclei). Protein expression was normalized to spiked-in ERCC RNA controls and pairwise comparisons used t-tests with Benjamini-Hochberg (BH) adjustment. In each ROI, an average of 774 cells were counted, consisting of 61 GFAP, 74 microglia, and 370 neurons for each case. As expected, levels of amyloid-β (Aβ) 1-42, phospho-tau (S396), and phospho-tau (S214) were significantly elevated in AD, as confirmed by immunohistochemistry (IHC). Interestingly, Neprilysin (NEP), a key regulator of Aβ levels that catalyzes its proteolysis and prevents plaque formation, exhibited increased expression in all cell types (astrocytes, microglia, and neurons). While there are still some limitations, DSP technology demonstrates a potential for analyzing the brain proteome in post-mortem tissues. Screening protein expression in larger cohorts using DSP could hold promise for identifying tissue-based biomarkers.

1:30PM Alishka Rojas-Addari Email: a802r360@kumc.edu Mentor: Johanna Finkle, MD.

**Preconception Attitudes of Overweight and Obese Hispanic Women Towards Pharmacotherapy and Behavioral Weight Management Strategies Research**

Purpose: Obesity in pregnancy is a prevalent health condition that has been strongly associated with increased risk of health issues for the mother and the baby. However, weight loss during pregnancy is contraindicated and current strategies focus on weight loss prior to conception. While there are many methods targeting weight loss, Hispanic women face unique barriers when implementing these prior to pregnancy. Our purpose is to determine the barriers for reaching Hispanic women to foster weight reduction, understand the perceptions of Hispanic women towards weight loss prior to pregnancy and assess Hispanic women's knowledge of the risk obesity poses to their future. Methods: We plan to distribute surveys to Hispanic women recruited from the University of Kansas Health System OB/GYN and Family Medicine clinics as well as two Vibrant clinics in the area. Each participant will fill out either a paper or digital version of the survey. This information will later be entered in a RedCap file after patient identifiers have been concealed. The following general data will be collected: age, ethnicity, height, weight, BMI, contraception method and timeline for desired pregnancy will be collected. Patients will be asked to rank different methods of weight loss and their acceptance of medical management of weight loss with pharmaceutical options. Expected Results: We believe participants will prefer traditional weight loss methods as opposed to pharmacotherapy for multi-factorial reasons and they will be unaware of the adverse pregnancy outcomes of obesity during pregnancy.
2:00PM Sarah Crowards Email: Sthomas23@kumc.edu Mentor: Doug Wright, PhD.

**Activation of the Innate Immune Receptor Toll-Like Receptor 4 Promotes Sensory Nerve Inflammation**

The most prevalent complication of diabetes is the development of pain, numbness, and tingling in the distal extremities due to nerve degeneration - referred to as diabetic peripheral neuropathy (DPN). Although DPN significantly decreases patients' quality of life, there have been significant challenges in understanding its pathogenesis and developing targeted interventions. Diabetes is a chronic inflammatory condition, and the innate immune system receptor toll-like receptor 4 (TLR4) is increasingly recognized as an important contributor to several complications seen in diabetes. TLR4 can be activated by various agonists present in diabetes and promotes the expression of downstream inflammatory mediators. To explore the mechanism by which TLR4 affects sensory nerves, we intraperitoneally injected the TLR4 agonist lipopolysaccharide (LPS) into wild-type mice and collected the dorsal root ganglion (DRG) and footpad tissue 6, 24, and 48 hours after injection. We found a significant increase in macrophage activation as measured by intensity within the DRG, the structure that contains the cell bodies, by 48 hours. However, we did not see a decrease in the quantity of nerve axons in the footpad at any time point. This suggests that TLR4 activation can drive an inflammatory response within peripheral sensory nerves via macrophage recruitment or activation, but this alone may not drive peripheral nerve loss in an acute setting. Using this result we will further explore the mechanism and duration of macrophage activation and test whether blocking TLR4 may be useful in preventing nerve axon loss and DPN in a chronic setting.

2:15PM Gentry Totta-Griese Email: ggriese@kumc.edu Mentor: Doug Wright, PhD.

**The Reactive Dicarbonyl, Methylglyoxal, Drives Intraepidermal Nerve Fiber Loss**

Intraepidermal nerve fiber (IENF) loss is found in many diseases and is featured prominently in diabetes patients with small fiber neuropathy. Methylglyoxal (MGO), a reactive dicarbonyl at high levels in diabetic patients, correlates with metabolic dysfunction. Glyoxalase 1 degrades MGO while SARM1 initiates axon degeneration during low NAD+ levels. Understanding MGO's role in IENF loss offers insights for therapeutic interventions and increased peripheral nerve health. We used immunohistochemistry to assess the effect of MGO (720ng) on IENF density through intraperitoneal injection (IP) or culture. We evaluated four models: 1) MGO on primary Dorsal Root Ganglion (DRG), 2) MGO time course in C57/Bl6 mice, 3) MGO in a Glyoxalase 1 (Glo1) overexpression model (Balb/Cbjy), and 4) MGO with a Ketogenic diet. In the initial experiment, MGO administered at 2hrs, 48hrs, and 72hrs showed preventive effects on neurite outgrowth. The MGO injection significantly reduced IENF density in hind paws seven days post-injection. Glo1 overexpression alleviated fiber loss, indicating GLO1's potential to prevent MGO-induced IENF loss. A seven-day ketogenic diet prevented IENF loss and stimulated regeneration of MGO-damaged axons to control levels post-IENF loss. We add new evidence that elevations in MGO contribute to epidermal axon degeneration and prevent neurite outgrowth in vitro. We also show that a ketogenic diet, overexpression of Glo1, or knockdown of SARM1 in mice can combat these effects.
The One Ring to Rule Them All: Ring Finger Domain of ICP0 and Host Protein CIN85 in Vesicular and Protein Trafficking

Herpes Simplex Virus - 1 (HSV-1) is a globally prevalent virus that primarily infects mucosal epithelial cells and establishes lifelong reservoirs in sensory neurons in peripheral ganglia. To successfully colonize the host, HSV-1 must overcome strong antiviral responses, and the Infected Cell Protein 0 (ICP0) of the virus plays a fundamental role in this process. Upon viral late gene expression ICP0 relocates to the cytoplasm where little is known about its role. ICP0 is known to associate with Cbl-interacting protein of 85 kDa (CIN85), a scaffolding protein for other factors involved in endocytosis and protein sorting. CIN85 is known to traffic through the endosomal pathways, assisting in cargo sorting to multivesicular bodies (MVBs). We have determined colocalization of ICP0 and CIN85 in vesicular structures during HSV-1 infection that have a chimeric protein profile characterized by endocytic, autophagic, and innate immune proteins such as Rab5, p62 and ATG5, and Sp100 respectively. We have recently isolated the ICP0/CIN85 structures using an Endo-IP approach. Furthermore, we discovered that the ICP0 Ring Finger (RF) domain that constitutes the E3 ubiquitin ligase plays a novel role in endosomal trafficking and promotes exocytosis of various factors through extracellular vesicles (EVs). We have determined several autophagy related proteins such as p62 and ATG5, and innate immune components such as Sp100, are exocytosis in a RF and ICP0/CIN85 interaction dependent manner. Overall, we have identified a novel function for HSV-1 ICP0 with implications in protein sorting in various subcellular compartments and cargo exocytosis.

Identification of the Staphylococcus aureus fatty acid degradation system

Staphylococcus aureus is a ubiquitous pathogen that can infect any anatomical site due to a plethora of virulence factors and metabolic diversity. While S. aureus can utilize exogenous fatty acids for phospholipid synthesis through the fatty acid kinase complex other fates for these fatty acids have not been shown. It is widely thought that S. aureus does not possess a fatty acid degradation (Fad) system; however, during an RNAseq analysis of a DfakA mutant, we discovered increased expression of a novel fad locus. To test the functionality of the S. aureus fad genes, we performed complementation assays with E. coli fad mutants using minimal media with single fatty acids. We were able to restore growth of E. coli fad mutants when providing safadBA genes on a plasmid. We then analyzed the genetic composition of the fad locus including the misannotation of the translational start site of the first protein, FadX, and potential promoters. Using b-galactosidase reporters, we identified the fadX promoter and RT-PCR showed there is a fadXDEBA operon. Similarly, we identified a putative binding site within the fadX promoter that is consistent with negative regulation by the glucose metabolism-response regulator, Carbon Catabolite Protein A. Indeed, in the absence of glucose, we saw the fadXDEBA operon was no longer repressed. These studies support our hypothesis that S. aureus possess a functional fatty acid degradation system that is under strong catabolic repression in the presence of a preferred carbon source.
Role of natural killer cells on the immune response to MRSA subcutaneous skin infection
Staphylococcus aureus is a gram-positive, opportunistic pathogen that is the leading cause of skin and soft tissue infections (SSTIs). It is important to better understand the mechanism in which the pathogen causes disease because of S. aureus' large impact on human health. Previously in the lab, a kinetic study was performed to characterize the relationship between S. aureus and the host immune system in a mouse model of the subcutaneous skin infection. One surprising observation was the influx of Natural Killer (NK) cells. NK cells were absent in healthy skin but increased in levels until 7 days post infection (d.p.i). Therefore, we hypothesized that NK cells were important for mitigating S. aureus infection. To test this, mice were treated with anti-NK1.1 antibody (NK and NKT cell depleting) or isotype control and monitored several outcomes of infection out to 5 d.p.i. Overall, NK1.1 depletion led to increased tissue damage in response to infection, indicated by larger surface lesions. The larger lesion size was not correlated to increased bacterial loads since bacterial titers 5 d.p.i was lower in NK1.1-depleted mice. Finally, a decrease in proinflammatory cytokines in the NK1.1-depleted mice was observed 5 d.pi Together this data demonstrates that NK1.1 cells are important for mitigating the host immune response to S. aureus infection but future work to understand the mechanism in which this occurs remains to be completed.

Experiences of Women Seeking Healthcare in Prisons and Jails: A Mixed Methods Study
This study dives into the healthcare experiences of incarcerated women, revealing a landscape faced with challenges and disparities. Utilizing Dr. Megha Ramaswamy's S(H)E Women's data and conducting semi-structured interviews, the research explores the nuanced perspectives of women who sought healthcare in jails and prisons. Findings highlight challenges such as financial strain of medical care, limited medication choices, and pervasive distrust and frustration with medical staff. Extended wait times for medical attention further compound the hurdles faced by incarcerated women, highlighting critical flaws in the timely delivery of healthcare within correctional facilities. Moreover, the study emphasizes the pressing need to address the unique healthcare requirements of incarcerated women through a trauma-informed approach. It becomes evident that a one-size-fits-all healthcare model is inadequate and has the potential to retraumatize individuals. Therefore, the integration of trauma-informed care principles within correctional facilities is imperative, addressing the profound impact of trauma on the health of incarcerated women. This approach is pivotal in fostering a healthcare environment attuned to their specific needs, ultimately contributing to a more equitable and compassionate system. This study encapsulates the complex dynamics of healthcare within correctional settings and emphasizes the urgency of addressing systemic issues to ensure equitable access to healthcare for all individuals, irrespective of their incarcerated status.
How Insurance Status Affects Where People Experiencing Homelessness Seek Out Healthcare

Homelessness continues to have an increasing effect around the United States, and those individuals who are experiencing homelessness often use free health clinics to receive medical care. This study assessed the free health clinic Care Beyond the Boulevard (CBB) and the population of people it serves. The authors collected survey data from 110 patients about their experiences with CBB between August 2023 and September 2023. Survey data found that two-thirds of patients seen at these clinics had some form of insurance, and half of all patients reported that they had Medicaid. The results revealed that insured patients were more likely to seek out medical care at safety-net medical centers than those who were uninsured, and the uninsured were less likely to seek out medical care at all compared to those who were insured. Safety-net clinics are intended for those who are low-income or uninsured, yet this population appears less likely to use these resources when they are uninsured compared to when they are insured. Certain barriers, such as health insurance competency, access to consistent cellphone use and transportation, and previous negative experiences in the medical system, may have an impact on the perception of and hesitation to return to the traditional health care setting. Future studies should explore the specific reasons individuals continue to use safety-net and free health clinics despite having health insurance coverage as well as how previous negative experiences impact future medical care in this population.
Wednesday, April 3rd  
Beller Room 1007

9:00AM Isabel Epstein  
Email: iepstein@kumc.edu  
Mentor: Helena Laroche, MD, DABOM.

Family Functioning as a Moderator for the Efficacy of a Community-Based Obesity Intervention for Low-Income Families
This project investigates if family functioning (FF) moderates the efficacy of an obesity intervention or correlates with baseline health measures. Data is drawn from the Living Well Together Study involving 236 families in Des Moines, Iowa. Participants were randomized to the health coaching or the education (control) group. The health coaching group was assisted in creating goals and connected to applicable resources while the control group was given educational materials and access to requested resources. Moderate to vigorous physical activity (MVPA) was measured by accelerometers and practices related to childhood obesity were measured via the family nutrition and physical activity (FNPA) scale. FF scores at baseline fell into 1 of 3 groups: most healthy (FF=1), intermediate (1<FF<2), and unhealthy (FF≥2). At baseline, the most healthy group had significantly higher FNPA scores (µ=62.48) than the intermediate group (µ=59.16) and the unhealthy group (µ=56.53). This suggests that healthy FF is related to practices that reduce a child's risk for obesity such as eating meals together, serving fruits/vegetables, having a sleep routine, and modeling physical activity. Longitudinally, the target adults of the most healthy group had a change in MVPA (µ=-12.39) significantly different from the unhealthy group (µ=+11.62). This suggests that adults in the unhealthy group improved while adults in the most healthy group decreased their MVPA over the course of the intervention. This may have been due to confounding variables including less room for improvement due to higher baseline MVPA or inaccurate imputation of missing data.

9:15AM Aprajita Tripathi  
Email: atripathi3@kumc.edu  
Mentor: Kalyani Pyaram, PhD.

Antioxidation system regulates activation-driven expansion by modulating glucose and glutamine metabolism of activated CD4 T-cells
Oxidative stress, caused by elevated levels of reactive oxygen species (ROS), have been associated with a range of metabolic, chronic diseases, and cancers. CD4 T-cells, a subset of adaptive immune cells, play a crucial role in orchestrating immune responses and maintaining host immunity. ROS (reactive oxygen species), the metabolic byproducts of cellular metabolism serve as second messengers of immune responses. ROS levels are regulated by the antioxidation pathway, composed of Keap1 and Nrf2. Nrf2 is known to regulate oxidative stress and influence immune functions. However, the role of Nrf2 in maintaining CD4 T-cells homeostasis and activation-driven expansion remains unclear. To address this, we studied the effect of Nrf2 on CD4 T-cells using mice with T-cell specific deletion of Keap1 or Nrf2. Our data indicates that high Nrf2 levels promote CD4 T-cells activation and expansion. Keap1-KO CD4 T-cells with constitutively high levels of Nrf2 showed increased proliferation, higher expression of activation markers, and upregulated TCR-mediated signaling compared to WT T-cells. We then sought to dissect the underlying metabolic mechanisms by which Nrf2 modulates T-cells activation and
clonal expansion. We found that high Nrf2 suppresses glycolysis but increases glutamine metabolism in activated CD4 T-cells. Thus, our findings identify a mechanism by which Nrf2 metabolically reprograms CD4 T-cells and modulates their metabolic dependencies to support their activation and expansion. Understanding the interplay between immunometabolism and antioxidant pathway in T-cells mediated immune response could lead to new strategies or enhance the existing T-cell immunotherapies for lymphoproliferative disorders and for treating cancer.

9:30AM Amy Herman Email: aherman3@kumc.edu Mentor: Holly Hull, PhD.

A High-Fiber Diet During Pregnancy: Impact on Diet Quality

Background: Maternal diet quality during pregnancy influences maternal and fetal health outcomes. Fiber is essential to a healthy diet and offers a simple approach to improving diet quality. While fiber intake is associated with improved diet quality in nonpregnant adults, further investigation is needed in pregnant populations. Methods: Pregnant women were randomly assigned to a high fiber diet intervention or control group for 18 weeks. The fiber group consumed 30 g/day of fiber, attended weekly group sessions, and received two provided snacks daily. Dietary intake was assessed through three 24-hour dietary recalls at baseline (BL), end of pregnancy (EP), and 2 months postpartum (2mo), and analyzed using Nutrition Data System for Research (NDS-R, version 2021, Minneapolis, MN). Diet quality was determined by the Alternative Healthy Eating Index-2010 (AHEI) using a three-day diet average (0-100 points). Differences in fiber intake and diet quality were analyzed by repeated measures ANOVA. Results: In the final sample (n=31), significant group-by-time interactions were detected for both fiber intake (p=0.001) and diet quality (p=0.008). Fiber intake increased in the fiber group from 21.8±6.0 g to 35.1±7.7 g by EP (p<0.05) and remained higher than BL at 2mo (29.7±9.0 g, p<0.05). The fiber group also improved total AHEI score from BL to EP by 7.6 points (62.5±11.0 to 70.1±12.4, p<0.05), but the improvement diminished by 2mo. No changes were observed in the control group for fiber intake or diet quality. Conclusion: A high fiber diet intervention during pregnancy led to increased fiber intake and improved diet quality.

10:00AM Sara Fortin-Miller Email: sfortinmiller@kumc.edu Mentor: Holly Hull, PhD.

Added Sugars Exposure in the First 1,000 Days Predicts Offspring Body Composition at 24 Months

Background. Studies have not examined the impact of added sugars (AS) across the first 1,000 days on measured offspring adiposity levels, and if relationships vary by sex and ethnicity. Objective. Examine the association of AS intake during pregnancy, infancy, and toddlerhood on offspring adiposity, and if results vary by biological characteristics. Methods. This secondary analysis assessed data from two NIH-funded trials, a prenatal DHA supplementation RCT (ADORE) and its follow-up (GAINS). Mother-child pairs (n=253) were followed from pregnancy to 24mo. Maternal dietary intake was collected between 12-20wk gestation and offspring 24-hour dietary recalls were collected at 2wk, 6mo, 12mo, and 24mo. To reflect AS intake during infancy and toddlerhood, relative AS intakes for the offspring were averaged between 2wk/6mo (Year 1) and 12mo/24mo (Year 2). DXA measured offspring body composition at 24mo (percentage fat mass
Adjusted multiple hierarchical linear regression was completed. Results. Higher AS intake during pregnancy predicted higher total FFM among female offspring. Higher AS intake in Year 1 predicted lower total FM, FFM, central FM, and peripheral FM among female offspring. Among Hispanic offspring, higher AS intake in Year 1 predicted higher FFM while higher AS intake in Year 2 predicted lower central FM. Lastly, among female offspring, higher AS intake in Year 2 predicted higher %fat, total FM, central FM, and peripheral FM. Conclusion. AS exposure in the first 1,000 days impacted offspring body composition and varied by sex and ethnicity.

10:15AM Austin Sullivan Email: asullivan6@kumc.edu Mentor: Heather Gibbs, PhD, RD.

Development of a Computable Phenotype to Diagnose Malnutrition in Community-Dwelling Older Adults Using Electronic Health Record Data

Background: A computable phenotype is a set of standards that allows for identification of a specific disease, condition, or clinical event using data found in the electronic health record (EHR). Currently, identification of malnutrition is limited to ICD-10 codes, and malnutrition is underdiagnosed in practice. Objective: To assess the performance of a novel computable phenotype to identify malnutrition compared to ICD-10 diagnosis code alone. Methods: A cross-sectional analysis was performed using the Healthcare Enterprise Repository for Ontological Narration (HERON) tool. Older adults ≥ 65 years with visits at outpatient clinics between October 2015 and October 2023 were included in the final analysis. Using the Global Leadership Initiative on Malnutrition (GLIM) criteria as a framework, a computable phenotype was created and compared to ICD-10 malnutrition codes. Data was acquired from the EHR up to four years after initial visits. Performance was tested by analyzing sensitivity, specificity, positive predictive value, negative predictive value, balanced accuracy, and kappa. Statistical analysis was performed using R. Results: 7,417 patients were included in the final analysis. The computable phenotype had good specificity (0.98) but poor sensitivity (0.35) and kappa (κ=0.21). The negative predictive value was 0.99. The positive predictive value was 0.35. Balanced accuracy was 0.67. Prevalence of malnutrition using ICD-10 malnutrition codes was 1.1%, while the computable phenotype was 2.5%. Conclusions: The computable phenotype performed well in identifying patients who were well-nourished. The lack of agreement between the computable phenotype and ICD-10 malnutrition codes suggests that the computable phenotype may improve upon ICD-10 identification alone.

10:30AM Aaron Smith Email: asmith71@kumc.edu Mentor: Matthew Taylor, PhD, RD.

Preliminary grip strength data from an 8-week pilot trial of creatine monohydrate supplementation in Alzheimer's disease patients

Diminished muscle function and strength are linked to an increased risk and accelerated progression of Alzheimer's disease (AD). Therefore, interventions to improve muscle strength may prevent functional decline related to AD. However, such specific interventions in AD are lacking. Creatine monohydrate (CrM), a dietary supplement that boosts muscle strength, presents a promising intervention. This pilot study explores the potential effects of an 8-week CrM supplementation on handgrip strength in AD. Data from 16 participants with AD who
completed an 8-week trial examining the feasibility of 20 g/day of CrM in AD were analyzed. Handgrip strength, a reliable measure of muscle strength, was assessed on the dominant hand at baseline and the end of the study on a calibrated hand dynamometer, measured in kilograms (kg) of force. At baseline and 8 weeks, 3 measurements were taken; the highest value was selected. We conducted a paired t-test to test for an 8-week change in mean handgrip strength. Participants were 56% male with a mean age of 72.1 ± 6.4 years at baseline. The mean hand grip strength and body mass index at baseline were 33.6 ± 11.6 kg and 25.4 ± 3.6 kg/m², respectively. After 8 weeks of CrM supplementation, mean handgrip strength improved by 2.6 kg (36.1 ± 12.1 kg, p < 0.001). 20 g/day of CrM supplementation for 8 weeks was associated with improved handgrip strength in individuals with AD. Our data suggests that CrM may be valuable for maintaining or preventing AD-related functional decline by improving muscle strength.

10:45AM Shera Rau Email: srau@kumc.edu Mentor: Heather Gibbs, PhD, RD, LD. Dietary

Protein Intake and Handgrip Strength among Caregivers of Persons with Dementia
The well-being of caregivers of persons with dementia (PWD) is often overlooked and caregivers have an increased risk of malnutrition. Poor functional status as measured by handgrip strength is an indicator of malnutrition. Protein intake plays a role in preventing muscle wasting and maintaining muscle mass and function. This secondary data analysis aims to provide insight into whether dietary protein intake is associated with higher handgrip strength and lower risk of malnutrition among caregivers of PWD. Participants were obtained from the ADMIRE study, a cross-sectional study of 50 dyads of PWD and their caregivers (52-88 y). Dietary intake was assessed using the Diet History Questionnaire III (DHQ III) in which energy, total protein, animal protein, and vegetable protein were derived. Other outcomes included handgrip strength z-score (HGS) and nutrition status (Mini Nutrition Assessment). Associations were examined using Pearson R. Vegetable protein intake was weakly associated with HGS among males (r=.274) and inversely related in females (r= -.250). There was a significant association between nutrition status and HGS among females (r=.398, p<0.05). There was a significant inverse association between nutrition status with energy intake (r= -.389, p<0.05) and vegetable protein intake (r= -.456, p<0.05) among females. Two of 47 participants met sarcopenic levels for HGS. Most participants had adequate functional status by handgrip standards. More research is needed to establish a clear relationship between protein intake and HGS and malnutrition risk among caregivers of PWD.

1:00PM Elizabeth Steger Email: esteger2@kumc.edu Mentor: Catherine (Katie) Siengsukon, PT, PhD, DBSM, CHWC.

Shorter total sleep duration and lower sleep efficiency are associated with higher beta amyloid deposition in precuneus and cortical regions in cognitively normal older adults
Introduction: Emerging evidence suggests that short sleep duration, sleep fragmentation, poor sleep quality, and presence of sleep disorders are associated with increased amyloid- β (Aβ) levels and Alzheimer’s disease. However, sleep is often assessed using self-report measures, and Aβ levels in the brain are often inferred by cerebrospinal or plasma biomarkers. It remains unclear how sleep assessed using polysomnography (PSG) is associated with Aβ assessed using positron
emission tomography (PET). The purpose of this study was to determine the association between sleep and Aβ accumulation in cognitively normal older adults using gold-standard, objective measures. Methods: Cognitively normal (MMSE ≥ 25 and AD8 < 3) older adults (60-85 years old) who have symptoms of insomnia (≥ 10 on Insomnia Severity Index) underwent baseline assessment including PET with Florbetapir and overnight PSG within a two-week period. Results: Shorter total sleep time and lower sleep efficiency was significantly associated with higher Aβ deposition in the precuneus (r = -0.335, p = 0.053 and r = -0.391, p = 0.022) and the cortical regions (r = -0.308, p = 0.076 and r = -0.367, p = .033) after controlling for age. Conclusions: Shorter total sleep duration and lower sleep efficiency are associated with higher Aβ deposition in the precuneus and the cortical brain areas while controlling for age in older adults with normal cognitive function. The results indicate the role of poor sleep as an early risk factor for the accumulation of Aβ and a potential target for lifestyle interventions targeting sleep enhancement.

1:15PM Lydia Pemberton Email: ldeboer@kumc.edu Mentor: Hannes Devos, PhD, PT, DRS, FACRM.

The Impact of Aging on Cortical Activity Related to Sensory Reweighting of Postural Control
Introduction: Postural control requires the constant reweighting of visual, somatosensory, and vestibular inputs to maintain balance. It is unclear how aging affects the cortical processes associated with sensory reweighting of postural control. This cross-sectional study aimed to compare cortical activity during sensory reweighting of postural control between older and younger adults. Methods: 27 older adults (age: 72 ± 5 years; MOCA: 28.56 ± 1.03) and 16 younger adults (age: 25.31 ± 2.86 years; MOCA: 28.56 ± 0.81) completed a Virtual Reality Sensory Organization Test. Conditions 1 to 3 involved standing on a firm platform with and without visual input and with visual conflict, respectively. Conditions 4 to 6 mirrored 1 to 3, but on an unstable platform. The P3a event-related-potential extracted from electroencephalography was used to measure cortical activity in response to an auditory-oddball task. Linear mixed models were employed to analyze the group*condition effect. Result: Older adults showed a group*condition effect for P3a latency (F = 5.55; p < 0.0001). Relative to the control condition (1), older adults showed prolonged P3a latency compared to younger adults when standing on a stable platform with no visual input (25.47 ± 135.81ms vs 20.77 ± 127.19ms; p = 0.0001) and on an unstable platform with visual input (21.19 ± 144.33ms vs 13.6 ± 133.80ms; p = 0.02). Conclusion: Older adults exhibit prolonged P3a latency when relying predominantly on somatosensory or visual inputs to maintain balance. This delayed response may reflect insufficient cognitive resources to cope with sensory reweighting of postural response.

1:30PM Samuel Durairaj Email: sdurairaj@kumc.edu Mentor: Abiodun Akinwuntan, PhD, MPH, MBA, MIH, FASAHP, FACRM, FAMedS.

Variables Predicting Clinical Decision-making to Drive - A Retrospective Analysis
Background and objective: Driving is a dynamic activity involving physical, visuo-perceptual, and cognitive functions. There are multiple domains to assess in persons returning to drive - physical, visual, cognitive, motor, and practical driving assessments. It is recommended to base the clinical
decision-making on a battery of tests than on a single test. Our objective was to identify the most important factors to predict our clinical decision-making to drive in our Driving and Mobility Services (DMS) Clinic. Methods: We conducted a retrospective analysis of our driving service data gathered from 2017 to 2019. We analyzed data from 98 patients (65 men; mean age 68.8±14.2 years). The patients were referred to the DMS by different clinical departments in the University of Kansas Health System. The four key functions that were extracted from the dataset were: vision, motor function, cognition, and simulated driving assessments. Results: A backward linear regression was used to identify possible predictors of the outcome, the clinical decision to drive. The analysis showed that our model was significant, p=<0.05. The parameters that influenced our decision-making to drive were Montreal Cognitive Test (OR=1.17, p=0.01), break reaction time (OR=0.12, p=0.002), history of at-fault collision in the past 5 years (OR=0.16, p=<0.001), Trail Making Test A (OR=0.96, p=0.01), Road Sign Recognition Test (1.42, p=0.005), Dot Cancellation Test (OR=0.97, p=0.03). Conclusion: Among several physical, visual, cognitive, and simulator-based assessments, we were able to identify the top six variables that were predictive of clinical decision-making to permit driving.

2:00PM Emma Montgomery Email: emontgomery6@kumc.edu Mentor: Heather Gibbs, PhD, RD, LD.

Skin Carotenoid Status Among Caregivers: Does Stress Play a Role?
Caregivers of individuals with dementia may experience high levels of stress from their demanding role. Caregiving has been associated with both anxiety and depression, as well as poor dietary habits. Poor dietary habits often include inadequate fruit and vegetable intake, which is associated with low skin carotenoid status. Thus, we hypothesized that caregiver stress is negatively related to skin carotenoid status. A secondary data analysis was performed from the results of the Assessment of Dementia Nutrition Intervention Needs Among Care Recipients and Caregivers (ADMIRE) study. Adult caregivers were included in this study if their care recipient was an adult (≥55 y) diagnosed with Alzheimer's dementia, other dementia, or mild cognitive impairment. Caregiver stress was self-reported via the Modified Caregiver Strain Index (MCSI), and number of poor mental health days per month was self-reported by the CDC’s Healthy Days measure. Skin carotenoid status was measured using an optoelectronic device known as the Veggie Meter. Caregivers (n=48) reported an average of 5.6 days per month of poor mental health and 56% reported high stress. The results of the study indicate a weak correlation between MCSI and Veggie Meter (r=0.241, p=.10). Little to no relationship was found between poor mental health and Veggie Meter (r=0.181, p=.22). These findings suggest caregivers may have adequate fruit and vegetable intake while experiencing stress.

2:15PM Sodiq Fakorede Email: sfakorede@kumc.edu Mentor: Hannes Devos, PhD.

Cortical Activity during Sensory Reweighting of Postural Control in Older Adults with Cognitive Impairments
Introduction: Cognitive impairment (CI) affects the processing of visual, somatosensory, and vestibular inputs to maintain postural control. Yet, the underlying cortical processes are not well understood. This cross-sectional study seeks to compare cortical activity during sensory reweighting of postural control between older adults with and without CI. Methods: Thirty-five
participants (8 with CI and 27 age-matched controls) completed the Virtual Reality Sensory Organization Test (VR-SOT). The VR-SOT evaluates the sensory reweighting of visual, somatosensory, and vestibular inputs relative to a control condition where all senses can be used. The P3a event-related potential (ERP) latency in response to an auditory oddball task was extracted from continuous electroencephalography recording. A group*condition interaction was analyzed using linear mixed models. Result: No age (72 ± 5 vs 73 ± 6 years; p = 0.78) or sex differences (75% vs 70%; p = 0.80) were found between participants with CI and controls. Significant group*condition effects were observed for P3a latency (p = 0.0002). Relative to the control condition, older adults with CI showed prolonged P3 latency when on an unstable platform with visual input (54.86 ± 131.79ms vs 33.88 ±161.17ms; p = 0.0001) and on an unstable platform without visual input (18.24 ± 218.27ms vs 17.33 ± 154.35ms; p = 0.0002) compared to controls. Conclusion: Older adults with CI show delayed cortical activity while relying predominantly on visual and vestibular inputs to maintain postural control. Further research is warranted to evaluate if these electrophysiological changes predict balance and fall risk.

2:30PM Ashley Barry Email: abarry2@kumc.edu Mentor: Catherine Siengsukon, PhD, PT.

Impact of Sleep on Asthma: A Scoping Review

Introduction: While the impact asthma has on sleep disturbances is well-described, the impact that sleep can have on asthma is less understood. Therefore, the purpose of this review was to examine the evidence surrounding how sleep impacts asthma. Methods: A literature search was performed from August 17 to September 5, 2023, in four databases following the Preferred Reporting Items for Systematic Review and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines. Inclusion criteria included cross-sectional, cohort, and observational studies published in English that evaluated adult populations with clear directionality of sleep impacting asthma. Two independent reviewers used an iterative process for abstract and full-text review. Study quality was assessed using the Joanna Briggs Institute (JBI) critical appraisal tool for each study type. Results: Of 919 studies, 15 met inclusion criteria and were analyzed. Sleep was assessed through the Pittsburgh Sleep Quality Index (n=8), self-reported sleep duration (n=4), and actigraphy (n=2). Asthma was assessed through asthma control surveys (n=11), inflammatory biomarkers (n=3), and a quality-of-life survey (n=1). Fourteen studies (93%) determined that sleep quality and/or duration impacted asthma control, quality of life, and healthcare utilization. One study (7%) found no association between sleep parameters and asthma control in individuals with well-controlled asthma. Conclusion: Poor sleep quality is associated with poorer asthma control, more frequent asthma exacerbations, and reduced quality of life. Further research using valid and reliable self-report and objective measures is needed to characterize sleep disturbances in individuals with asthma and to assess the impact that sleep disturbances have on asthma.
Poster Presentation
Tuesday, April 2\textsuperscript{nd}
Ad Astra Room (HEB 5\textsuperscript{th} floor)
\textbf{10:00AM – 11:30AM}

#1 Peyton Kavanagh Email: pkavanagh@kumc.edu Mentor: Marie Brubacher, MD.

**Understanding Physician Characteristics of Cervical Screening Rates at TUKHS Division of General Internal Medicine**

The cervical cancer screening rate at The University of Kansas Health System (TUKHS) Division of General, Geriatric, & Hospital Medicine was 72.73\% in October 2022, falling short of the goal threshold of 79\%. We hypothesized that there are differences in cervical screening rates between physician resident or attending status, and between physician gender. Data was collected from the records of every patient within eligibility criteria of the U.S. Preventative Services Task Force screening recommendations. This includes patients with a cervix from ages 21-64. Cervical screening rate was defined as number of patients not due for cervical screening/total number of eligible patients. Outcome variables include adherent, non-adherent, or no record. Significance was determined with chi-square calculations. The alpha level was set at 0.05. Data was collected from 10704 patients fitting criteria. To minimize margin of error, a sample size of at least 371 was needed. Data from 500 patients were randomly selected and analyzed. Due to hysterectomy history, 63 were excluded. There was no significant difference in screening adherence based on physician gender (P=0.22). Of the physicians adherent to screening guidelines, 43\% were attendings and 57\% were residents. Of the physicians who were non-adherent, 82\% were attendings, and 18\% were residents. Overall, the rate of screening adherence between attending vs. resident physicians was significant (P= 0.015). There is a significant difference in the screening adherence of resident physicians compared to attending physicians. This identifies future intervention areas for efforts to improve physician cervical cancer screening compliance at TUKHS.

#2 Yuchen Dai Email: y665d686@kumc.edu Mentor: Ann Davis PhD, mPH, ABPP.

**iAmHealthy's Effects on Stigma and Bullying Perpetration**

Youth with overweight and obesity experience increased rates of peer victimization and are more likely to engage in bullying perpetration. Within rural areas, there is minimal research examining the impact of pediatric obesity interventions on bullying and the stigma associated with obesity interventions. This study aims to fill that gap by evaluating if iAmHealthy, a pediatric obesity intervention delivered virtually to youth in rural Kansas, results in any stigma for participants and if iAmHealthy resulted in improvements in perceived stigma and bullying perpetration when compared to a Newsletter Control. At baseline, post (8 months), and follow-up (20 months), participants completed questionnaires assessing weight stigma (Teasing subscale of "Sizing Me Up)," bullying perpetration ("Schwartz Peer Victimization Scale)," and a question regarding any
stigma experienced as a result of the intervention. Children (n=148) from 2nd-4th grade were randomized at the school level to either iAmHealthy (n=64) or Newsletter Control (n=84). Repeated measures ANOVAs revealed no significant interactions between treatment group and time for weight stigma, (F(2,232)=.07, p=.931), or bullying perpetration, (F(2,232)=.15, p=.863). Very few participants in the iAmHealthy cohort (n=1) and the Newsletter Control (n=3) reported intervention-related stigma. It is noteworthy that baseline amounts of bullying perpetration and stigma were low in the study population. Future research should explore the impact of pediatric obesity interventions on youth who initially report higher levels of stigma and bullying perpetration.

#3 Delaney Bredehoeft Email: dbredehoeft@kumc.edu Mentor: Spencer McClure, MD.

**Access to Mohs Surgery: How Distance Traveled Affects Cancer Severity**

It has been well established that access to dermatology care is often limited in rural communities leading to delays in seeking specialized dermatological care. However, limited research has been done to analyze the specific factors that may be affected by the potential delay in treatment. This study is designed to assess the impact of distance traveled and insurance status in relation to disease severity of common keratinocyte carcinomas while undergoing Mohs surgery. A retrospective analysis was performed of the medical charts of all patients who underwent Mohs surgery at KUMC for removal of basal cell or squamous cell carcinomas from July 1st, 2022 - December 31st, 2022. The primary outcome of interest was the severity of carcinoma at the time of surgery, as indicated by the number of surgical stages needed for clear margins. The results presented include 224 patients from July 1st, 2022 - September 30th, 2022; review of remaining charts is ongoing. Preliminary analysis of the correlation between distance traveled to KUMC and number of stages in surgery revealed a correlation that was not statistically significant (p = 0.5048). Analysis of the relationship between insurance status and cancer severity revealed no difference in the median cancer severity between each insurance classification (p = 0.9224). Though data collection and analysis are incomplete, these preliminary results indicate that neither distance traveled or insurance status are factors that are contributing to a higher degree of severity of basal and squamous cell carcinoma when patients present for Mohs surgery.

#4 Danica Dodd Email: ddodd2@kumc.edu Mentor: Kourtney Bettinger, MD, MPH.

**Infant safe sleep spaces following free portable crib provision**

Sudden infant death syndrome (SIDS) remains a leading cause of infant death in the United States, even after implementation of safe sleep recommendations in the 1990s led to a significant decrease in SIDS. Further understanding of parental implementation of safe sleep recommendations is crucial. Previous investigation by this team using structured interview with 11 parents who received a free portable crib revealed that parents could recall safe sleep counseling in detail, but described habits that did not comply with recommendations1. For this project, parents were invited to participate in a videotaped evaluation of the sleep space via direct observation using a structured checklist, which was created by adaptation from the AAP Safe Sleep Recommendations with input from content experts. Team members separately viewed video recordings and completed checklists for each sleep space; then checklist results
were compared. Results were obtained from 5 sleep spaces which all consisted of a firm and flat safety-approved crib. Consistent with recommendations, 4/5 sleep spaces were in the same room and next to where the parent(s) sleep. The majority (3/5) of sleep spaces had a blanket or pillow in the sleep area, which is explicitly prohibited by recommendations; 2 participants reported the pillow or blanket is removed when the infant uses the sleep space. This study was limited by only 5/11 (45%) participants agreeing to a visual assessment of the sleep space and that sleep spaces were visualized without the infant. Further research is necessary to overcome the disconnect between safe sleep knowledge and practice.

#5 Amanda Nguyen Email: a980n126@kumc.edu Mentor: Anna Gorczyca, PhD.

Hormone replacement therapy usage among midlife women after hysterectomy and response to a multicomponent lifestyle intervention

Background: Hysterectomy is associated with increased abdominal adiposity, cardiovascular disease risk, and metabolic dysfunction. Hormone replacement therapy (HRT) may reduce abdominal adiposity and cardiovascular disease risk. It is unknown how HRT usage impacts weight change and body composition in response to a multicomponent lifestyle intervention in midlife women after hysterectomy. Methods: A secondary analysis was conducted in obese/overweight women (N=30), with hysterectomies, participating in a 3-mo. behavioral weight-loss intervention including behavioral counseling, reduced energy intake (~1200-1500kcal/d), and increased exercise (100 min/wk.). After the 3-mo. intervention and ≥ 5% weight loss, women completed a 12-mo. weight maintenance intervention (150, 225, or 300min/wk.) of moderate-intensity exercise. HRT use was self-reported. Anthropometrics and body composition were measured. Comparisons of weight loss, weight regain and body composition by HRT status were analyzed with Kruskal-Wallis test and SAS 9.4. Results: In 30 women reporting a hysterectomy, 23 were HRT- (age=46.7 yrs.; BMI=36.3 kg/m2) and 7 were HRT+ (age= 49.3 yrs.; BMI= 35.0 kg/m2). There were no differences in weight loss (-3-0mo.) in HRT- (-8.51±3.14 kg) compared to HRT+ (-7.55±1.89 kg) (p=0.405) or weight regain (0-12mo.) in HRT- (2.05±6.61 kg) compared to HRT+ (3.59±4.49 kg) (p=0.750). There were no differences in changes in body composition across the intervention by HRT usage. Conclusion: No differences were found in response to a multicomponent lifestyle intervention in midlife women after hysterectomy by HRT usage. Further exploration of HRT administration should be explored to determine impacts on weight change and body composition in midlife women.

#6 Kyle Hsiao Email: khsiao@kumc.edu Mentor: Timothy Smith, MD.

Analysis of Pediatric Mail Order Pharmacy Usage Throughout the COVID19 Pandemic

Despite the benefits for mail order pharmacy of increased convenience, higher rates of patient compliance and lower costs to both patients and the health care system, their usage has been declining from 2005 to 2018 in the US adult population. Additionally, there are differences in populations which utilize this resource which include but are not limited to financial difficulty, language, ethnicity, education, health insurance, or age. Our cross-sectional study investigates the trends of pediatric patients who utilize mail order over the course of the pandemic (2020-2022) to see if they differ from the adult population. We examined patient charts from KU clinics
during a 6 month period in both 2020 and 2022 to compare, implementing chi squared and linear regression analysis. By better understanding which populations are underutilizing this resource, there is an opportunity for improvement in health care. Similar to the current trend of adult patients, our initial analysis shows a continued decrease in mail order pharmacy usage. Additionally, there is an increase in proportion of the patients who speak Spanish, are non-religious and are black over the course of the pandemic, suggesting lower proportions of these patients using mail order pharmacy at the peak of the pandemic. Lastly, our study conducted regression analysis, determining which of these variables have the most impact on utilization of mail order pharmacy. Future studies could investigate the effects of encouraging mail order to more patients which could address health disparities, correlate with better health outcomes, and save money.

#7 Camryn Martinez Email: cmartinez6@kumc.edu Mentor: Austin Findley, MD.

Racial disparities in medical management of uterine fibroids prior to myomectomy or hysterectomy
The symptomatic burden of uterine fibroids has been demonstrated to disproportionately affect Black and Hispanic women. The primary aim of this study was to evaluate if racial disparities seen in disease severity and surgical management also applied to presurgical medical management. A retrospective chart review evaluated women aged 18-50 with the diagnosis of fibroids who underwent a myomectomy or hysterectomy between 2012 and 2021. Black women utilized the highest number of medications before excisional procedures, followed by Hispanic women. Asian women reported the lowest average (p=0.037). Black and Hispanic women were more likely to have preoperative hemoglobin values under 10 mg/dL (p<0.001) and had higher rates of preoperative blood transfusions than Caucasian women (p=0.001). There was no preferential use of GnRH analogues, intrauterine devices, or oral hormonal therapies between races. Minor procedures were infrequently utilized without statistically significant variations among races. This study confirms previous evidence that Black and Hispanic women are more severely affected by uterine fibroids. This severity is mirrored in increased utilization of medications, but patients continue to be under optimized prior to surgery. Further research should identify factors preventing these groups from achieving better symptom control preoperatively.

#8 Mumtarin Oishee Email: moishee@kumc.edu Mentor: Gustavo Blanco, MD, PhD.

Deletion of the Sodium Glucose Cotransporter 1 (SGLT-1) Impairs Mouse Sperm Movement
The Sodium Glucose Cotransporter Isoform 1 (Sglt-1) is a symporter that moves Na+ and glucose into the cell. While most studies have focused on the role of Sglt-1 in the small intestine and kidney, little is known about this transporter's expression and function in other tissues. We have previously shown that Sglt-1 is expressed in the mouse sperm flagellum and that its inhibition interferes with sperm metabolism and function. Here, we further investigated the importance of Sglt-1 in sperm, using a Sglt-1 knockout mouse (Sglt-1 KO). RNA, immunocytochemistry, and glucose uptake analysis confirmed the ablation of Sglt-1 in sperm. Sglt-1 KO male mice are fertile and exhibit normal sperm counts and morphology. However, Sglt-1 null sperm displayed a significant reduction in total, progressive and other parameters of sperm motility compared to
wild type (WT) sperm. The reduction in motility was exacerbated when sperm were challenged to swim in media with higher viscosity. Parameters of capacitation, namely protein tyrosine phosphorylation and acrosomal reaction, were similar in Sglt-1 KO and WT sperm. However, Sglt-1 KO sperm displayed a significant decrease in hyperactivation. The impaired motility of Sglt-1 null sperm was observed in media containing glucose as the only energy substrate. Interestingly, the addition of pyruvate and lactate to the media partially recovered sperm motility of Sglt-1 KO sperm, both in the low and high viscosity media. Altogether, these results support an important role for Sglt-1 in sperm energetics and function, providing sperm with a higher capacity for glucose uptake.

#9 Lauren Ellis Email: lellis7@kumc.edu Mentor: Duncan Nickerson, MD, FRCSC, FACS, FABA.

Medical student awareness of burn surgery as a subspecialty
Several studies have highlighted the decrease in the number of burn surgeons throughout the country and the anticipated hiring difficulty amongst burn centers. The difficulty with hiring burn surgeons, coupled with many burn related hospitalizations, contributes to the need for recruitment and retention of burn surgeons. One hypothesis for the decline in the number of burn surgeons is the lack of understanding, and awareness, of the field amongst medical students. The aim of this project is to determine the amount of knowledge students at our institution possess about burn surgery. The intent behind determining this level of knowledge is to implement changes to reinforce the growing need for burn surgeons and enable medical students to make informed decisions about their future careers. An anonymous survey was distributed via email to first through fourth year medical students at our institution, which is associated with a hospital that contains an ABA accredited burn center. The survey utilized a 5-point Likert scale in which respondents were able to choose their level of understanding with responses ranging from strongly disagree to strongly agree and included questions from a separate study in addition to questions unique to this paper. The collected data will be described as mode of the responses, chi-square tests will be used to compare the categorical measures, and the Mann Whitney U test will be utilized to compare some variables to outcomes, such as year in school of students compared to knowledge of burn surgery.

#10 Austin Gartner Email: agartner2@kumc.edu Mentor: Bernard Hearon, MD.

Physical Therapist-Supervised Versus Doctor-Directed At-Home Exercise Regimens for Adhesive Capsulitis: A Retrospective Cohort Study
Adhesive capsulitis (AC) is a prevalent shoulder pathology that is often idiopathic and affects 1-5% in the general population. Current treatment strategies vary among providers, consisting of nonoperative and operative approaches. However, few studies exist directly comparing nonoperative treatment modalities. This study compares outcomes and disease progression in patients who performed an at-home exercise program (HEP) to those treated with a formal physical therapist-guided program (PT) for initial nonoperative management of AC. Patients diagnosed with idiopathic AC and treated with shoulder exercises by formal PT or by HEP were included in the retrospective cohort study. Outcomes of shoulder range of motion (ROM) were obtained at multiple follow up appointments. 173 patients met inclusion criteria, with 85 in the
PT cohort and 88 in the HEP cohort, with similar demographics. At baseline, no statistically significant differences in ROM were observed between the cohorts. At follow-up within 6 weeks, the PT cohort demonstrated significantly higher abduction and flexion compared to the HEP cohort. At 6-12 weeks follow-up, no significant difference in range of motion existed between the two cohorts. At 18+ weeks there were no significant differences between the two cohorts. Although formal PT resulted in early improvements in shoulder ROM during the first few weeks of therapy, long-term outcomes suggest that both physical therapist-guided regimens and at-home exercise programs can be effective treatment modalities for non-operative management of idiopathic adhesive capsulitis.

#11 Christopher Fisher  Email: cfisher11@kumc.edu  Mentor: Liskin Swint-Kruse, PhD.
DDmut predictive power on larger proteins structures
The human population exhibits vast diversity in their protein sequences. These amino acid substitutions can influence protein structure, stability, and function and can give rise to disease. Amino acid changes that impact protein stability alter a protein's ability to maintain proper folding and thus functionality and can lead to protein misfolding diseases, such as cystic fibrosis, amyloidosis, and certain cancers. Understanding genetic variation and protein stability is essential to understanding drug development for improving personalized medicine. However, not all amino acid changes are detrimental, and there are more than can be tested in the lab. Computational tools aim to enhance identification of which amino acid substitutions alter protein folding. However, most computational tools were typically trained on small proteins due to the well-mapped structure/stability studies available. A new computational tool called DDmut was recently published. This method performs better on small proteins, and its efficacy in large proteins is unknown. Our study sought to investigate whether DDmut could reliably predict the effects of amino acid substitutions on the stability of larger proteins, using ZmPZK as a model system. The results of our study revealed limitations in DDmut's effectiveness in predicting stability for larger proteins, indicating the need for further refinement and optimization to address errors in the system. Hopefully with better techniques in evaluating protein structure, more data be available for computational models to better predict stability effects from substitution in larger proteins.

#12 Cooper Root  Email: c740r578@kumc.edu  Mentor: Bryan Vopat, MD.
Burnout in National Collegiate Athletic Association Physicians: A Cross-Sectional Study
Burnout has been associated with decreased quality of patient care, and results in an estimated cost of $5 billion per year. With a growing awareness of burnout prevalence in high-level athletes, the physicians working for the athletic departments of the National Collegiate Athletic Association (NCAA) institutions can be forgotten. The purpose of this study is to assess burnout among physicians of NCAA-funded athletic teams and predictors leading to burnout. A cross-sectional survey using the Professional Fulfillment Index (PFI) scale with demographic data was sent to multiple Division I NCAA conferences. Eligible participants included any physicians who care directly for Division I NCAA-funded athletic teams. Each item was assessed on a five-point Likert scale and group comparisons were made across demographic data between those who had and had not achieved burnout. Of the 89 completed responses, 79 (89%) participants qualified
as having achieved burnout. No significant differences were identified in burnout achievement based on patient demographics. Specifically, there was no difference in burnout achievement based on specialty (p=0.161), taking call (p=0.053), or years in practice (p=0.120). A linear regression model showed specialty significantly predicted score, with "Family Medicine-Sports Medicine (FMSM)" and "Other" associated with greater burnout scores compared to Orthopedics (p<0.001 and p=0.002 respectively). The prevalence of burnout in physicians caring for NCAA Division I athletes is extremely high, multi-factorial. Further studies need to be conducted with larger sample sizes, as well as isolating historical factors of burnout to better improve the health of this unique physician population.

#13 Hannah Judd Email: h776j834@kumc.edu Mentor: Patrick Landazuri, MD.

Cognitive Effects After Right vs Left Anterior Temporal Lobectomy for Drug Resistant Temporal Lobe Epilepsy

Drug resistant epilepsy (DRE) is defined as continued seizures following treatment with two different anti-seizure medications. In patients with DRE, surgery can be considered to obtain seizure control; however, associated risks can hinder utilization of epilepsy surgery. The temporal lobe and hippocampus are involved in memory function. Therefore, anterior temporal lobectomy (ATL) involves a risk to cognitive function. We sought to measure potential cognitive changes found following ATL. We performed a retrospective chart review of Comprehensive Epilepsy Center patients undergoing epilepsy surgery at The University of Kansas Medical Center. We abstracted neuropsychology testing results as well as pertinent epilepsy characteristics. Changes from preoperative to postoperative neuropsychology tests were analyzed. We found significant changes in verbal memory as well as changes approaching significance in executive function and visual memory. However, there was no significance found after Bonferroni correction. A right ATL was associated with visuospatial memory and complex attention decline while a left ATL was associated verbal memory decline. Our outcomes are consistent with current literature findings of neuropsychological outcomes after anterior temporal lobectomies for epilepsy. This data can further be used to inform cognitive risks associated with anterior temporal lobectomy.

#14 Saniya Waghmare Email: swaghmare@kumc.edu Mentor: Sandra Billinger PT, PhD, FAHA.

High Intensity Interval Exercise on Blood Pressure Variability: Age Differences

Introduction: With aging, elevated beat-to-beat blood pressure variability (BTB BPV) is linked to negative cardiovascular health. BTB BPV measures autonomic and cardiovascular systems interaction. The aim was to characterize BTB BPV response during high intensity interval exercise (HIIE) and determine effect of aging on sympathetic nervous activity. Methods: We conducted a secondary analysis on datasets of 25 young adults (24.9 ± 1.6) and 25 older adults (60.8 ± 13.8). HIIE involved 10-minute alternating bouts of high-intensity and active recovery at 70% and 10% estimated Wattmax. Blood pressure, measured using finger photoplethysmography, collected at 500 Hz was resampled at 10 Hz. High-intensity and active recovery bouts were separated, we concatenated 5 minutes of data for each intensity. Low frequency power spectral density (LF PSD) of BTB BPV, indicating sympathetic activity, was calculated using Fast Fourier transform and cross spectral density, 100-s Hanning window, 50% superposition, summed within range of 0.04 - 0.15
Hz. Normality and sphericity were tested, and the Mann-Whitney U test compared age groups. Results: During high-intensity HIIE, LF PSD (mm2Hg/Hz) for young adults and for older adults was 1177.5 ± 662.3, 1274.4 ± 1348.2 (p = 0.3). However, during HIIE recovery, LF PSD for young adults and for older adults was 1743.2 ± 1145.5, 1226.3 ± 1064.4 (p < 0.05). Conclusion: Sympathetic activity remained unchanged between age groups during high-intensity bouts but reduced in older adults during recovery bouts of HIIE. Future studies should examine the relationship between sympathetic activity and vascular health, baroreflex and adrenergic sensitivity with aging.

#15 Bria Bartsch Email: bbartsch@kumc.edu Mentor: Sandra Billinger, PT, PhD, FAHA.

**HIIT'Ing Intensity Targets: Feasibility of Low Volume, Short Interval, High Intensity Interval Exercise in Stroke**

Purpose: The purpose of this study was to examine the feasibility of an acute bout of high-intensity interval exercise (HIIE), performed on a recumbent stepper, in chronic stroke. We defined feasibility as 1) completion of exercise, 2) attainment of ≥77% heart rate max (HRmax) during high-intensity intervals, and 3) no study-related cardiac or serious adverse events (SAEs).

Methods: Participants, 6 months-5 years post-stroke, 40-85 years of age, completed two visits. Visit 1: A submaximal exercise test was performed to predict peak power output (PPO). Visit 2: Participants completed a 10-minute, HIIE bout with continuous heart rate (HR) and blood pressure (BP) monitoring. One-minute high-intensity intervals (60-80% PPO) were interspersed with 1-minute recovery intervals (10% PPO). HR and BP data were sampled at 500Hz, interpolated to 10Hz for standardization, and divided by R-to-R cardiac intervals. Peak HR was extracted for each high-intensity interval, and minimum HR for each recovery interval. Data are reported as mean (standard deviation). Results: Participants (n=28) were 61% male, 61(12) years of age, and 32(17) months post-stroke. All participants completed HIIE with no study-related cardiac/SAEs. Average percent HRmax across high-intensity intervals reached 77(11)%, and average systolic and diastolic BP were 164(23) and 69(12) mmHg, respectively. During recovery intervals, average percent HRmax was 68(11)%, systolic BP, 158(24) mmHg, and diastolic BP, 66(12) mmHg. Conclusion: In chronic stroke, recumbent stepper HIIE was feasible. Our work provides critical data regarding HR and BP response during HIIE and provides a strong foundation for future interventional studies using recumbent stepper HIIE.

#16 Garrett Black Email: garrett.black@ku.edu Mentor: Jordan Borrell, PhD.

**Integrating Transcranial Magnetic Stimulation with Functional Near-Infrared Spectroscopy to Determine Cortical Representation of Cortical Activity Recorded**

Functional near infrared spectroscopy (fNIRS) is a noninvasive neural imaging technique that uses light in the near infrared range to gather information about neural activity in the brain. The methodology involves placing light-sensitive sources and detectors on the scalp in pairs to analyze the brain's hemodynamic responses. These sensors are arranged according to the standard 10-20 coordinate system from which general cortical structure location may be inferred. However, we sometimes desire to know the exact cortical representation of the cortical activity recorded via fNIRS. Transcranial magnetic stimulation (TMS) is a noninvasive form of neural
stimulation that has a much finer resolution than fNIRS, which can provide the cortical representation under each fNIRS sensor. This study merges TMS and fNIRS to identify the cortical representations that lie beneath the fNIRS sensors of the 10-20 fNIRS coordinate system. Brainsight neuronavigation software will be used to superimpose a stimulation grid over the fNIRS sensor locations. TMS will be applied to stimulate the sensorimotor cortex at suprathreshold intensities, evoking muscle movements and/or sensations. Movements and sensations will be identified through both researcher observation and subject feedback. We hypothesize that there will be consistency in the cortical representations across subjects, leading to high reliability and low variability. Successful completion of this study will provide valuable data for refining the analysis of fNIRS recordings. The data will enable researchers to identify the cortical sources of fNIRS signals more accurately.

#17 Caroline St. Peter Email: c527s208@kumc.edu Mentor: Merlin Butler, MD, PhD.

Mowat-Wilson Syndrome: Case Report and Review of ZEB2 Gene Variant Types, Protein Defects and Molecular Interactions

Mowat-Wilson syndrome (MWS) is a rare genetic neurodevelopmental congenital disorder associated with various defects of Zinc Finger E-Box Binding Homeobox 2 (ZEB2) gene. The ZEB2 gene is autosomal dominant and encodes six protein domains including SMAD-binding protein, which functions as a transcriptional corepressor involved in the conversion of neuroepithelial cells in early brain development and as a mediator of trophoblast differentiation. This review summarizes reported ZEB2 gene variants, their types, and frequencies among the 10 exons of ZEB2. Additionally, we summarized their corresponding encoded protein defects including the most common variant, c.2083 C>T in exon 8, which directly impacts the homeodomain (HD) protein domain. This single defect was found in 11% of the 298 reported patients with MWS. This review demonstrates that exon 8 encodes at least three of the six protein domains and accounts for 66% (198/298) of the variants identified. More than 90% of the defects were due to nonsense or frameshift changes. We show examples of protein modeling changes that occurred as a result of ZEB2 gene defects. We also report a novel pathogenic variant in exon 8 in a 5-year-old female proband with MWS. This review further explores other genes predicted to be interacting with the ZEB2 gene and their predicted gene-gene molecular interactions with protein binding effects on embryonic multi-system development such as craniofacial, spine, brain, kidney, cardiovascular and hematopoiesis.

#18 Kayla Wozniak Email: kwozniak3@kumc.edu Mentor: Ryan Fagan, PhD.

Dissecting the Impact of Anatomy Lab Policies on Pregnant Medical Students

Purpose: There is a current lack of research surrounding the unique occupational hazards facing pregnant medical students. One concern is students' exposure to formaldehyde during cadaveric dissection. Formaldehyde is potentially teratogenic and mutagenic as it has been associated with spontaneous abortion and birth defects. This project investigated the prevalence and content of policies at United States medical schools concerning pregnant students' participation in gross anatomy lab. Methods: The top fifty medical schools were systematically reviewed for policies pertaining to pregnant students' participation in gross anatomy lab. Email contact was made with
each school to confirm the policy or to inquire whether non-publicly available policies or guidance existed instead. Results: Twelve out of fifty schools (24%) had written policies, six of which were publicly available (12%) and six (12%) of which were obtained via email. Seven additional schools (14%) responded with unofficial policies or internal guidance used by their anatomy departments. Twenty-nine schools (58%) were categorized as having no policies, of which sixteen (32%) were unresponsive to email, one declined participation, and one was excluded. The content of both written and unofficial policies varied widely. Conclusion: The lack of codified policies at most medical schools regarding safety considerations for pregnant students in gross anatomy lab indicates that more can be done to accommodate this group of students. Creating official, publicly available policies would promote a more inclusive environment for these trainees and signal to students that the institution is prepared to adequately support them should they become pregnant during medical school.

#19 Shem Oloyede Email: soloyede2@kumc.edu Mentor: Sandra Billinger, PhD, PT, FAHA.

Use of Middle Cerebral Artery Blood Velocity Metrics to Differentiate Healthy Adults and Dementia
Background: Over 6 million individuals have Alzheimer's Disease/Alzheimer's Disease Related Dementia (AD/ADR) and data project this number will double in 30 years. Major efforts have been made towards the prevention of or delaying dementia onset. Objective: To analyze MCA (Middle cerebral artery) waveform metrics in order to identify differences in individuals across age groups and in healthy individuals and in the presence of disease. We hypothesize that individuals with known disease such as stroke or Alzheimer's disease (AD) will have higher mean absolute errors in estimating age than healthy patients. Our secondary hypothesis is that people with stroke will demonstrate advanced vascular aging. Methods: In a collaboration with Emory University, we used Morphological Clustering and Analysis of Intracranial Pressure (MOCAIP) algorithm to characterize individual waveforms from compiled data sets which consisted of characteristics such as disease status, risk factors, age, sex. We analyzed these waveforms and compared the differences in cerebral blood flow velocities (CBFV) between participants with disease status and those of healthy participants across age groups. Discussion: Our preliminary results show a negative correlation in CBFV with age; as individuals age, CBVF is relatively reduced. This reduction in CBFV is more prominent in those with disease. The reduction in CBFV in those with disease is emphasized by a rise in the reflective waveform indicating potential signs of arterial stiffness and cerebrovascular dysfunction. Patients with AD showed the highest mean absolute error across all participants. Those with stroke showed advanced vascular aging.

#20 Sadie Revell Email: srevell@kumc.edu, Adam Wilson Email: awilson31@kumc.edu Mentor: Shelley Bhattacharya, DO, MPH.

Comparison of Driving Simulator and Visuo-Cognitive Test Performance Between CDL and Non-CDL Drivers
This cross-sectional study investigated driving simulator and visuo-cognitive test performance in commercial driver license (CDL) participants and non-CDL participants to examine what differences exist between the two populations. CDL participant performance data was acquired
from a separate longitudinal study that examined factors predicting CDL simulator performance. Non-CDL participants were recruited through printed flyers, an online website, and word of mouth. The performance of 31 CDL participants (average age 52.58±12.20, 28 men (90.3%)) and 25 non-CDL participants (average age 48.36±21.90, 11 men (44.0%)) were analyzed. The assessed parameters included demographics, visuo-cognitive testing, and simulator performance. Demographic analysis via independent t-tests demonstrated that CDL drivers had significantly higher BMI and increased annual driving mileage, yet no significant difference in prescription medications. Analysis of cognitive variables via independent t-test showed statistically significant lower scores in MoCA (p=0.001) and Dot cancellation (p=0.02) when compared to non-CDL drivers. Analysis of driving performance demonstrated significantly higher brake reaction time (p=0.042), less off-road accidents (p<0.001), and less road edge excursions in the CDL population. Overall, when compared to the general population, CDL drivers exhibited better driving performance, despite decreased cognitive test parameters. Based on the results, future research should investigate any causal links that could explain the statistically significant difference in reaction times between non-CDL and CDL drivers. Additional research should also examine potential undertreatment of comorbidities within the CDL population.

#21 Eric Karney Email: ekarney2@kumc.edu Mentor: Chelsea Gorsline, MD.

**CMV Status and Rejection in SOT Patients**

Cytomegalovirus (CMV) is one of the most common infections in organ transplantation. The primary risk factor for infection is the serostatus of the donor and recipient, especially if the donor is positive and recipient is negative. CMV status is designated into the following risk categories: high risk (CMV D+/R-), intermediate risk (CMV R+), low risk (CMV D-/R-). The role of CMV infection and graft rejection remains under investigation. In this retrospective cohort study, we sought to compare CMV status and the rate of rejection in solid organ transplant patients who received a transplant between January 1st, 2018, and December 31st, 2021, at the University of Kansas Health System (n=500). Preliminary data identified 32 patients who had evidence of rejection within the first year after transplant. Of these 32 patients, the majority were men (n=19), heart transplants were the most common organ transplanted (n=17) and deceased donors were the most common donor type (n=31). The highest rate of rejection occurred in patients with intermediate CMV risk, (n=19) followed by high-risk patients (n=10). The majority of patients developed acute cellular rejection (n=26) while only 4 patients developed acute antibody mediated rejection. Of all patients treated for rejection, the majority received corticosteroids (n=15), 3 received a combination of corticosteroids with other agents, and 7 received other therapies without corticosteroids. Of the 32 patients treated for rejection, 17 developed CMV infection within 1 year following transplant. Data collection is ongoing and will be followed by additional statistical analysis.
Conservative Management of Medial Femoral Condyle Osteochondritis Dissecans in the Pediatric Knee

Background: Osteochondritis Dissecans (OCD) is osteonecrosis of the sub-chondral bone frequently found in active pediatric knees. While surgical intervention is successful, nonoperative options are still utilized. It is unclear which non-operative treatment of medial femoral condyle (MFC) OCD lesions is most effective. Methods: Patients with MFC OCDS, treated conservatively with activity modification, cylinder casting, or knee ranger brace immobilization at a single academic pediatric center, were retrospectively analyzed. Treatment effectiveness was evaluated by radiographic healing, symptom resolution, and return to activities, with failure defined as progression to surgery. Results: 151 patients with 165 MFC OCDS of the knee were identified. Median age of presentation was 11 years old, 65.5% male, average BMI was 18.1 with 77.2% of patients participating in sports. A total of 74(45%) lesions were treated in a knee ranger brace with 51 (31%) lesions casted in a cylinder cast and 40 (24%) received activity modification alone. 21.6% of knee ranger and 21.6% of casted MFC OCD lesions progressed to surgery while 15% of activity modified MFC OCD lesions progressed to surgery. At 6 months, 74.3% of the knee ranger brace group, 70.9% of the cylinder cast group, and 71.4% of the activity modification group had complete resolution of symptoms. Conclusions: MFC OCD lesions of the knee can be appropriately treated with a knee ranger brace or cast with a 78.4% success rate. This study provides practical evidence regarding conservative management of MFC OCD lesions.

Season of Delivery and Postpartum Depression Symptom Severity

Previous meta-analyses suggest that the season in which a patient gives birth impacts the likelihood they are to develop postpartum depression. These studies find that patients who deliver in warmer seasons are less likely to develop postpartum depression (PPD) than those who give birth in cooler seasons. This study aimed to determine if the season of delivery has an impact on PPD symptom severity. A retrospective chart review was conducted on all deliveries at a single large academic medical center between 2020 and 2022 including data on demographics, details of delivery, and PPD symptom severity quantified by the Edinburgh Perinatal Depression Scale (EPDS) conducted at 6-week postpartum visits. Patients who had multiple gestation pregnancies, fetal demise, and patients without EPDS scores were excluded. Among the 2364 included patients, approximately 30% of patients experienced symptoms of PPD (EPDS score >7); there was no statistically significant difference in symptom severity by season of delivery (summer: 27.6%, spring: 28.9%, fall: 30.8%, winter: 30.5%, p=0.59). In a multivariate model controlling for age, smoking status, drug use, insurance, race, ethnicity, and preexisting mental health conditions, patients who delivered in winter months were approximately 16% more likely to experience symptoms of PPD compared to those who delivered in summer months; however, this finding was not statistically significant (aOR 1.16, 95% CI 0.89-1.50). The season in which a patient delivers does not impact their PPD symptom severity. However, the high prevalence of PPD throughout the year demonstrates the need to prioritize PPD symptom recognition and treatment.
#25 Faith Manickam  Email: fmanickam@kumc.edu  Mentor: Joseph LeMaster, MD, MPH.

Perceptions of Mechanical Massage Chair and Mindfulness for Stress Relief: A Qualitative Study

Objectives: Evidence has shown that individually, massage and mindfulness exercises impact systolic blood pressure. What has not been studied is how these compare to each other, and what effect the order of presentation (mindfulness first or massage first) has on outcomes. This study sought to determine participants' perceptions regarding participation either in first massage, then mindfulness, or first mindfulness, then massage. Methods: Twenty participants with prehypertension were selected to participate in this study, and each spent six sessions doing one of the interventions (massage chair or mindfulness) then six sessions doing the other intervention. The order in which they did these was randomized. After completion of all 12 sessions, each participant did an interview about their experience with the study, which we will report in this presentation. Results: Six themes were identified regarding participant experience with this study. Many participants enjoyed it and had a positive change in their opinions of massage chairs and mindfulness. They spoke about the relaxation they experienced, plans to incorporate these methods into their daily routines, and suggested improvements to the study design. Participants did not report differences in their experiences comparing between groups. Conclusions: Qualitative data suggest that participants are eager to participate in studies that have potential to impact themselves or others and learn new methods for managing stressors in their daily lives. They found their participation to be beneficial to them and appreciated being provided with tools that they can continue to use even after completion of the study.

#26 Emma Beason  Email: e848b369@kumc.edu  Mentor: Lauren Ptomey, PhD, RD, LD.

The Impact of Caregiver Physical Activity on Caregiver Burden and Quality of Life

Introduction: Caregivers of individuals with Alzheimer's Disease and related Dementia (ADRD) report high levels of burden and poor quality of life. We examined the associations between caregiver’s daily minutes of moderate to vigorous physical activity (MVPA) and caregiver burden and quality of life. Methods: A cross sectional analysis was conducted using baseline data from a longitudinal physical activity trial in adults with ADRD and their caregivers. Caregivers of adults with ADRD wore accelerometers (ActiGraph GT3X) over a 7-day period to monitor physical activity. Caregiver burden (Zarit Burden Interview) and 8 domains of quality of life (SF-36) data was collected from self-reported questionnaires. Pearson correlations and linear regressions were used to examine the relationship of MVPA on caregiver burden, and each of the 8 quality of life domains. Results: Valid data was obtained from 98 caregivers (~69 years of age, 70% female, 11% non-Hispanic white). Caregivers obtained ~18.6 mins/day of MVPA. MVPA was positively correlated with 6 out of 8 domains of quality of life: physical functioning, physical health, emotional problems, energy/fatigue, pain, and general health (all p<0.05). When controlling for age, sex, and BMI there was evidence that MVPA was still positively associated with physical functioning (b=0.26, p= 0.011), physical health (b=0.15 p= 0.009), and pain (b=0.18, p= 0.05). MVPA was not associated with caregiver burden. Conclusion: There is evidence that caregiver MVPA is positively associated with some aspects of quality of life. Future research
should investigate if interventions targeting increased caregiver MVPA can effectively increase quality of life.

**#27 Olivia Federico** Email: ofederico@kumc.edu Mentor: Kimberly Templeton, MD.

**A systemic review of sex-related differences in response to post-operative orthopaedic pain management protocols**

Background: The current literature in the realm of sex as a biological variable (SABV) suggest that the sexes differ in their responses to pain. Not including SABV when researching treatments places female patients at higher risk of suboptimal outcomes from standard protocols. For example, the use of opioids in postoperative orthopaedic pain management treatments has a different risk: benefit ratio between the sexes. Purpose: To review current literature concerning orthopaedic surgery post operative pain management and whether SABV should be considered

Methods: Initial literature searches were conducted using PubMed, Science Direct, ClinicalKey, and CINAHL Complete. Articles published between January 25, 2016 - April 30, 2022, were included. The data abstracted included study type, sex of patient, type of pain management, and presence of sex-based reporting. Results: Of the 8,610 article abstracts reviewed, 48 articles were included: 9 (19%) included and discussed differences between sexes in opioid consumption. 37 (77%) of the articles mentioned sex in the demographics but stated "no difference in response" between sexes in the results, without providing additional information, preventing further interpretation of results. Two (4%) articles did not report the sex of participants. Conclusion: Clinical research suffers from underrepresentation of female participants. When female participants are included, results based on sex are inconsistently and insufficiently evaluated. The incorporation of SABV when designing treatment regimens is critical for optimal care for patients and for future research. Further research is needed to fully understand how sex affects opioid pharmacology and the impact on the pain experience.

**#28 Sarah Wilson** Email: swilson34@kumc.edu Mentor: Lyndsey Kilgore, MD, FACS.

**Holding the Knife on Perceptions of Surgery**

Background: Negative stereotypes associated with surgery by medical students are well documented in literature. Many cite long hours, poor work-life balance, pessimism, mean personalities, and cynicism as pervasive among surgeons and operating room culture. If allowed to persist, these negative perceptions can deter otherwise interested students from pursuing surgical subspecialties. Methods: Incorporation of peer-teaching in the third-year clerkship to not only illuminate the hidden curriculum in surgery but adequately prepare students to participate in the operating room is paramount to taking steps to improve student perception as well as success as clerkship students. Results: One-hundred and forty-three third year clerkship students were surveyed with pre- and post- instruments. Students who participated in these pre clerkship peer-teaching sessions reported significant improvements in their ability to identify surgical anatomy (p<0.001), an increased confidence in answering questions from attendings about anatomy and function as well as in identifying anatomical abnormalities (all p<0.001). Students also reported significantly improved perceptions about surgeons as teachers and their willingness to support students pursuing surgery. Conclusion: This study demonstrates that the
incorporation of an immersive orientation prior to the start of the surgery clerkship has significantly positive impacts on the learning experience and confidence of medical students. Increased efforts should be made to introduce students to surgeons, surgical careers, and the operating room prior to the surgery clerkship, being sure to incorporate aspects of the hidden curriculum, to address the negative perceptions that continue to exist regarding surgical fields.

#29 Collin Freking Email: cfreking@kumc.edu Mentor: William Messamore, MD.

Olecranon Stress Fracture Treated with Headless Compression Screws and Bone Marrow Aspirate Concentrate Augmentation: A Case Report
A twenty-one-year-old collegiate baseball player presented with an olecranon stress fracture resistant to conservative therapy. Olecranon stress fractures (OSFs) are uncommon in the context of sports injuries, with a prevalence of 5.4% among baseball-related elbow disorders. A variety of surgical techniques for treatment of OSFs have been described, most commonly involving the use of cannulated screws perpendicular to the fracture line. However, high rates of mechanical failure, infection and pain following surgical management implore more research surrounding effective surgical interventions. In this patient, a novel surgical approach consisting of an open reduction internal fixation (ORIF) using headless compression screws augmented with bone marrow aspirate concentrate (BMAC) and cancellous allograft bone was performed. At final follow up, the patient had radiographic and clinical evidence of fracture union, full range of motion, and was able to resume full baseball activities. This is a novel surgical approach to treating olecranon stress fractures resistant to conservative management and may assist in minimizing known complications associated with prominent olecranon hardware.

#30 Elana Goldenberg Email: egoldenberg@kumc.edu Mentor: Ann Davis, PhD, MPH, ABPP.

The Effect of iAmHealthy, a Family-based Telehealth Pediatric Obesity Intervention, on Child Depressive Symptoms
Previous obesity treatments have demonstrated improvement in depressive symptoms in children; this relationship is underexplored among children living in rural communities, who are disproportionately impacted by obesity. This study examines the impact of iAmHealthy, a telehealth pediatric obesity intervention, on depressive symptoms, and evaluates the impact of depressive symptoms on treatment success. 148 children from rural Kansas (43.2% male; 87.1% White; Mage=8.93, SD=.86) were randomized to iAmHealthy (n=64) or Newsletter Control (n=84). Height, weight, and depressive symptoms (measured by the Children's Depression Inventory; CDI) were measured at baseline, post (8 months), and follow-up (20 months). One sample t-tests showed no significant ΔCDI at any time interval for the iAmHealthy group; the Newsletter group had significant CDI score increases from baseline to post (t(73)=3.11, p=.001) and baseline to follow-up (t(69)=4.75, p<.001). Independent samples t-tests showed no significant difference in ΔCDI between iAmHealthy and Newsletter for all time intervals: baseline to post (t(123)=.87, p=.192); baseline to follow-up (t(75.84)=-1.46, p=.074); post to follow-up (t(113)=.73, p=.233). Hierarchical multiple regression models demonstrated that baseline depressive symptoms, condition, and the interaction between condition and depressive symptoms were not predictors of ΔBMIz from baseline to post or baseline to follow-up; however,
Depressive symptoms post-treatment predicted post to follow-up ΔBMIz (β=.27, p=.019). Treatment condition and the interaction between condition and post-depressive symptoms did not predict follow-up ΔBMIz. Overall, iAmHealthy did not result in depressive symptom changes, however post-intervention depression appeared to influence post-intervention weight gain. Practitioners may consider supporting children with depression seeking obesity treatment for longer periods.

#31 Ariana Coker Email: acoker3@kumc.edu Mentor: Caitlin Linscheid, MD, PhD.

**The correlation between postpartum hemorrhage and postpartum depression: a retrospective cohort study**

Postpartum depression is a major cause of maternal morbidity and mortality that affects an estimated 10-15% of people within one year of delivery. As postpartum depression can have detrimental effects on both the mother and the child, the identification of potential risk factors is crucial. Several previous studies have had varying results when investigating the potential connection between postpartum hemorrhage and postpartum depression. This study sought to further investigate if postpartum hemorrhage increases the risk for the development of postpartum depression. Data was analyzed from women who delivered and received postpartum care at KU in the years 2020-2022. Multivariable logistic regression was used to determine if there is an association between postpartum hemorrhage (blood loss greater than 1000ml at the time of delivery) and postpartum depression (EPDS of 7 or greater) while controlling for pre-existing mental health diagnoses. Of the 2,338 women included in the study, 17% experienced a postpartum hemorrhage and 30% met criteria for postpartum depression. There was no statistically significant difference in the prevalence of postpartum depression between those with and without postpartum hemorrhage (29.8% vs 29.6%, respectively, p=0.93). There was also no association found between postpartum depression and postpartum hemorrhage in a multivariable model controlling for age, smoking status, drug use, insurance, race, ethnicity, and preexisting mental health conditions (aOR 0.98, 95% CI 0.76-1.25). In conclusion, women who experience a postpartum hemorrhage are not at an increased risk for the development of postpartum depression.

#32 Kirsten Kent Email: kkent3@kumc.edu Mentor: Melanie Meister, MD.

**Apical Support Procedure at Time of Hysterectomy**

Objective: To investigate The University of Kansas Health System's (TUKHS) compliance with current recommendations to perform Apical Support Procedures (ASP) at the time of hysterectomies performed for uterovaginal prolapse. Background: Hysterectomy is one of the most common surgical procedures in the United States, 17% of which are performed for prolapse. Hysterectomy alone is an ineffective treatment for prolapse as it does not restore Level 1 support, therefore, performance of an ASP is crucial to prevent future and recurrent prolapse. Methods: This was a retrospective cohort study of patients who underwent benign hysterectomy at TUKHS identified by ICD and CPT codes. Results: 388 patients underwent benign hysterectomy. The mean age was 58; most were white, non-Hispanic, with private insurance. 259 (66.7%) had uterovaginal prolapse and 289 (74.5%) underwent an ASP. On multivariable analysis, patients...
were nearly 3-fold more likely to undergo an ASP if they held a diagnosis of uterovaginal prolapse and nearly 70% less likely to undergo an ASP if their procedure was performed only by a general gynecologist. Conclusion: At our institution, approximately 75% of hysterectomies performed for prolapse incorporate an ASP. Although this is better than the rates in other regions, ongoing efforts to educate surgeons, particularly non-subspecialists, on the importance of re-establishing apical vaginal support at time of hysterectomy for prolapse is needed.

#33 Megan Vorhies Email: mvorhies@kumc.edu Mentor: Joseph LeMaster, MD, MPH.

**Universal Mental Health Screening in Teens at BullDoc Health Clinic - A Quality Improvement Project**

Wyandotte county is ranked 104th out of 104 counties in Kansas with regards to health outcomes. Student health is the leading factor impacting attendance, mental stability, and school-wide success for high schoolers in Wyandotte county. BullDoc Health Clinic is a free clinic embedded within Wyandotte High School. Our goal is to improve access to healthcare for students so they can be healthier, happier, and more successful in school. The purpose of this project was to implement a structured mental health screening process at BullDoc to increase identification of teenagers with mental health disorders and refer them to the school's social workers for treatment. We conducted an observation period of 5 weeks and then began screening every patient with the Patient Health Questionnaire- Modified for Teens (PHQ-A) for several weeks. After 9 weeks, we began screening patients with a history of a traumatic event with the UCLA 9-Item Trauma Screen in addition to the PHQ-A. Data was collected via a RedCap survey completed by student-physicians and did not include patient identifiers. Results revealed that patients who scored higher on these screening tools were more often referred to social workers. Additionally, this project pointed out other reasons for elevated PHQ-A scores, aside from underlying depression, such as lack of access to corrective lenses or housing insecurity. This realization led to the development of a new leadership position, Director of Community Resources. Future directions include improving optometry resources, providing patients with hygiene products to take home, and continuing to screen for mental illness.

#35 Cecile Hermanns Email: chermanns2@kumc.edu Mentor: Aditi Gupta, MD.

**Depression and Quality of Life Following Kidney Transplantation**

Background: Depression and diminished quality of life (QOL) are common in kidney failure. In this study we investigate whether kidney transplant (KT) improves depression and QOL across lifespan and whether this effect is sustained. Methods: In this study, we assessed depression and QOL in patients on the KT waitlist and again after KT. We measured depression using the Beck Depression Inventory-II (BDI-II) and QOL using the Kidney Disease Quality of Life Short Form Version 1.3 (KDQOL-SF) physical health composite score (PCS) and mental health composite score (MCS). We used linear mixed effect models with random intercepts to evaluate the effect of time, age, and KT status on BDI-II score, PCS, and MCS. For models with significant age interactions, we estimated this effect for baseline age groups. Results: We analyzed 239 BDI-II assessments and 143 KDQOL-SF assessments. The BDI-II scores improved pre- to post-KT (10 pre-KT vs 5 post-KT, p<0.001). Overall, PCS did not change pre- to post-KT (42 pre-KT vs 49 post-KT, p=0.11). There...
were interactions between KT status and age and years since baseline assessment. The magnitude of change in PCS post-KT decreased with older age (p=0.01). In the sub-group analysis by age, PCS improved post-KT in patients <60 years. The MCS improved from 47 pre-KT to 51 post-KT (p<0.001), and the magnitude of improvement decreased with older age (p=0.03). Conclusions: Depression and QOL improve with KT. This improvement is sustained at 1-year post-KT. While depression improves in all age groups, the improvement in QOL is more evident in younger patients.

#36 Hannah Coggeshall  Email: hccoggeshall@kumc.edu  Mentor: Brian Brost, MD, FACS.

Innovative Intrauterine Device Training Model as Dynamic New Teaching Tool
Traditional Intrauterine Device (IUD) insertion trainers are made of hard plastic and while useful for initial practice, lack the ability to accurately represent the variations found in uterine anatomy. To address this, we developed and tested an IUD model which would simulate uterus/cervix haptics, could be positioned in anterograde/retrograde flexion, and could simulate uterine perforation. 3-D models were created using ballistic gelatin. Models were utilized in resident workshops and compared to device manufacturer supplied trainers. Residents used various IUD types in each task trainer. Ultrasound guided placement was also performed with gelatin model. Anonymous surveys compared the three models. 16 Residents ranked device parameters on a scale of 1 (Low) to 5 (High). The average results of the gelatin model included realistic feel (4.6), adaptability (4.0), ability to grasp the cervix (3.6), realistic teaching tool (4.5) and useful in teaching (4.6). When evaluated for usefulness in level of self-assigned training/skill (Novice, Mid-level and Competent), the gelatin model ranked 88% and above for each category. The manufactured models dropped in usefulness after novice level. The three models were ranked on a scale of 1 (Low) to 3 (High) in personal practice, teaching and competency. The gelatin model ranked at least 1 point on average above the other IUD trainers for each parameter. The ballistic gelatin model provides a new dynamic learning tool for IUD insertion training. Incorporating this model into training can increase the preparedness of providers. Future direction includes strengthening cervix and testing different grasping tools with models.

#37 Leena Kader  Email: lkader@kumc.edu  Mentor: Erin Young, PhD.

The bidirectional impact of arginine-vasopressin receptor 1a (Avpr1a/AVPR1A) and the gut microbiome on visceral hypersensitivity (VH).
Visceral hypersensitivity (VH) is commonly cited as a driver of chronic abdominal pain in disorders of gut-brain interactions (DGBI) where persistent and/or recurrent abdominal pain is a primary symptom regardless of any alterations in bowel habits. Development of VH is influenced by genetic, environmental, and gut microbial colonization factors, yet specific mechanisms that generate VH are incompletely understood. Unfortunately, current treatments primarily focus on symptom management rather than targeting physiological mechanisms responsible for generating VH. We have begun to examine the role of genetic susceptibility and microbiome response dynamics in VH development using a preclinical model of intracolonic zymosan (ZYM) administration. Preliminary data reveal differential susceptibility to ZYM-induced VH between the closely related C57BL/6NTac (Taconic) and C57BL/6J (Jackson Labs) substrains. Comparing
whole genome sequencing between strains, we have identified Avpr1a, encoding the arginine-vasopressin receptor 1A (AVPR1A) protein, as our highest priority VH candidate gene based on a differential SNP within the 5' flanking sequence. We have subsequently identified alterations in Avpr1a expression as well as enteric neuron responsiveness that covary with VH. Dynamic strain differences in the location and composition of the gut microbiome correspond to increased enteric neuronal responses to fecal supernatants in VH susceptible mice, implicating these neurons in the interaction between genetic risk and the microbiome. We will present data on the efficacy of targeting Avpr1a overexpression using specific-antisense oligonucleotide (ASO) and on the role of the microbiome in risk for developing VH independently and through regulation of Avpr1a in host tissues.

#38 Mustapha Mangdow Email: mmangdow@kumc.edu Mentor: Yvonne Colgrove, PhD.

Adaptability in Health Professions Education: A Scoping Review
Purpose: Physical therapists work in high-stress, dynamic environments where successful adaptation is important. This review aims to deepen our understanding of adaptability, and adaptive performance within health profession education (HPE) literature. Data Sources: A systematic search across databases like PUBMED, EMBASE, WEB OF SCIENCE, and CINAHL using appropriate MeSH terms and keywords related to adaptability was conducted. Study Selection: Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), two independent reviewers conducted initial screening of titles and abstracts of retrieved studies. 13 met the inclusion criteria from 2815 studies. Data Extraction: Data charting involved extracting author name(s), publication year, country of origin, study design, study's aim, concept studied, definition of concepts, outcome measure(s) used, and target population studied. Results: Studies ranged from 2011 - 2022, originating from Europe (9), United States (3), and Australia (1). Adaptability was defined as proficient response to change, encompassing cognitive, behavioral, and affective adjustments. Adaptive performance emphasized behaviors aligned with organizational goals, responding to changing task demands. Conceptual frameworks identified include work performance, task performance, contextual performance, and counterproductive work behavior frameworks. Nine assessment scales were self-assessments, with one allowing supervisor ratings. Conclusions: Adaptability and adaptive performance are different concepts. Tailored frameworks are needed in HPE and healthcare to address challenges among professionals. Several limitations, however, exist in how these concepts are measured. Clinical relevance: Physical therapists must demonstrate adaptability in rapidly changing healthcare environments. Educating master adaptive learners equipped with problem-solving, critical thinking, and reflective skills is essential for quality healthcare delivery.

#39 Anna Trofimoff Email: atrofimoff@kumc.edu Mentor: Scott Matson, MD.

Socioeconomic Barriers to Referral for Patients with Idiopathic Pulmonary Fibrosis
Socioeconomic status (SES) has been shown to impact treatment decisions and outcomes for patients with idiopathic pulmonary fibrosis (IPF) globally. In this study, we hypothesized that SES would negatively impact IPF patient referrals to subspecialty care at KUMC. Using mixed methods, we investigated KUMC electronic medical records utilizing a HERON search to identify
patients with IPF who were seen in primary care practices at KUMC in the last 10 years. 841 subjects fit the search inclusion criteria. We defined SES status by Area Deprivation Index using the Wisconsin Neighborhood Atlas. We identified a weakly negative correlation (-0.06) between lower SES and pulmonary referral, but this was not significant (p = 0.08) adjusting for age. There was no significant association between SES, age, and gender with referral to IPF specialty care. This analysis may be underpowered given the non-significant result and the method used to determine SES, while validated previously as a surrogate variable. However, the results are reassuring. Next, a qualitative survey instrument was administered to patients in the ILD clinic (n=18: 47.1% male, 65 ± 17.5 years old, median ADI 63). The general theme was: overall, patients viewed their referral experience positively. Physician communication was the main contributor to a patient feeling well taken care of in their diagnostic process independent of time to diagnosis. Globally, IPF is under-recognized and undertreated in low SES individuals, however, our data indicate that referral bias for patients in the KUMC system likely is not a significant contributor.

#40 Kareem Hamadah Email: khamadah@kumc.edu Mentor: Andrew Pirotte, MD.

Paramedic Student Perspectives Toward Evidence-Based Medicine and Research Methods

There is a growing push for students in all fields of medicine to become familiar with and engage in research. Although medical and nursing schools in the United States have begun implementing robust curriculum changes to reflect this, paramedic schools are lagging behind. This study aims to better understand how paramedic students view research and determine potential barriers to entry for Emergency Medical Services (EMS) providers in the research process. A survey was sent to four midwestern paramedic schools that have started implementing research methods education. Nineteen responses were obtained. Respondents were 26.6 years old (SD 9.8) and mostly White (N=15, 79%) men (N=10, 53%) with an average of five years (SD 8.4) of EMS experience. Although every respondent agreed that prehospital Emergency Medicine research is important, 95% (N=18) had no previous research experience and most participants (N=10, 53%) only read research a couple of times per year. Asked about barriers to participating in research, most (N=11, 58%) identified a lack of time; others identified not knowing how to find or understand research (N=8, 42%), and discomfort with involving a patient in a clinical trial, even after proper training (N=10, 53%). These data suggest that significant barriers to understanding and participating in research continue to exist for paramedic students. Given the rapidly changing landscape of medical practice, it is imperative that EMS providers are included in research education.

#41 Cole Bird Email: cbird4@kumc.edu Mentor: Dhaval Bhavsar, MD.

Our experience with Enzymatic Debriding Agent - Anacaulase - for burn injuries - A 14 patient case series.

Enzymatic debridement of burn wounds facilitates early removal of eschar. It has shown to improve healing time and decrease surgical intervention. We wanted to review our results of use of an enzymatic debriding agent (EDA - Anacaulase) in deep partial and full thickness burns. We undertook a retrospective review of consecutive 14 adult patients treated with EDA at our Burn Center. These patients received therapy with Anacaulase, a novel enzymatic debriding agent,
spanning from the year 2020 to the present day. Burn characteristics, EDA applications details, surgical interventions if any, time of heal, scar assessments were noted. We used Microsoft Excel for a descriptive analysis of the data. We examined continuous variables within specific ranges and provided summaries including median, minimum, maximum values, and percentages. Patients demographics and burn injury characteristics are included in table 1. We were able to achieve >95% eschar removal with single application in all 14 patients. 57% patients required subsequent skin grafts. The time to achieve 95% wound closure averaged 35.5 days. Scars improved substantially over the study period, as indicated by mean Vancouver Scar Scale scores of 3.8 to 0.5 at 3 and 12 months, respectively. Only 2 patients required scar release surgery due to contracture. Our review highlights potential benefits of early eschar removal with EDA. 43% patients were able to avoid autologous skin graft closure of deep partial and full thickness burn wounds. EDA (Anacaulase) may add value in care of select patients with deep partial and full thickness burn wounds.
Tuesday, April 2\textsuperscript{nd}
Ad Astra Room (HEB 5\textsuperscript{th} floor)
2:00PM – 3:30PM

**#1 Sangita Bhattacharyya** Email: sbhattacharyya@kumc.edu Mentor: Prasad Dandawate, PhD.

**The Role of bitter Taste Receptor TAS2R38 in Esophageal Adenocarcinoma**

Esophageal cancer (EC) is a digestive cancer with a poor five-year survival rate of <20%. EC incidence is projected to increase by 35% in the US by 2025. EC is divided into two histological subtypes (squamous cell carcinoma [ESCC] and adenocarcinoma [EAC]), which have diverse etiologies. EAC accounts for roughly two-thirds of EC cases in Western countries due to excess body weight, an increase in gastroesophageal reflux disease (GERD), and Barrett's esophagus (BE). BE (the pre-cancerous condition for EAC) carries a 30-125 times greater risk of developing EAC. Hence, there is a need to study EAC biology to identify future targets for drug discovery. While evaluating the mechanism of taste perception in GERD patients, we serendipitously identified that bitter taste receptor TAS2R38 is uniquely upregulated in EAC. Taste is recognized by taste receptors (Type 1-sweet and Type 2-bitter) on the tongue. There are 25 Bitter TRs (TAS2R1-60) that belong to the G-protein coupled receptor that activates the IP3-mediated release of Ca2+ from intracellular stores upon activation. We identified that TAS2R38 is overexpressed in BE and EAC cells and tissues using immunohistochemistry and western blot. Moreover, we observed calcium mobilization and increased ERK phosphorylation in EAC cells treated with TAS2R38 agonist N-(3-oxododecanoyl)-L-homoserine lactone (OdDHL), suggesting its functionality. Further, shRNA-mediated knockdown of TAS2R38 in EAC cells (SK-GT-4 and OE33) reduced proliferation, colony and spheroid formation. These data indicate that TAS2R38 is critical for EAC progression and further studies are needed to establish it as a novel target for future drug discovery.

**#2 Parker Holloway** Email: pholloway@kumc.edu Mentor: Aditi Gupta, MD.

**Changes in Olfactory and Cognitive Function after Kidney Transplantation**

Introduction: Olfactory and cognitive function are impaired in patients with kidney disease. Cognitive impairment is often associated with olfactory dysfunction. It is however not clear if olfactory impairment in kidney failure reverses with improvement in cognitive function. In this study, we assess olfaction before and after kidney transplantation (KT) and its association with cognitive function. Methods: In this single center prospective longitudinal observational cohort study, we assessed olfactory and cognitive function pre- and post-KT. We tested olfactory function using Sniffin' sticks-12 (SST-12) for odor identification and Affordable Rapid Olfaction Measurement Array (AROMA) for combined odor identification and threshold measurement. These were compared to the Sino-Nasal Outcome Test-22 (SNOT-22) as a subjective measure of sino-nasal disease burden. We measured cognitive function using the Montreal Cognitive Assessment (MoCA). Results: There were 24 participants with kidney failure that completed the testing. The mean age of participants was 52.2 ± 13.5 years. There was no difference between pre- to post-KT scores for Sniffin' Sticks (p-value = 0.440) or AROMA (p-value = 0.367).
no difference between pre- to post-KT SNOT-22 scores in the Rhinologic Symptoms (p-value = 0.222) or Extra-Nasal Rhinologic Symptoms (p-value = 0.396) either; however other subdomains of SNOT-22 showed improvements in Ear/Facial Symptoms (p-value = 0.033), Psychological Dysfunction (p-value = 0.018), and Sleep Dysfunction (p-value = 0.010). MoCA scores improved pre- to post- KT (p-value = 0.023). Conclusion: Olfactory function did not improve with the improvement in cognitive function pre- to post-KT.

#3 Sheridan Scott Email: sscott17@kumc.edu Mentor: Brent Wise, MD.

Treatment of Complex Pilon Fractures: Pilot Study Comparing Primary Arthrodesis (PA) to Open Reduction and Internal Fixation (ORIF)

Open Reduction and Internal Fixation (ORIF) is the preferred procedure following acute pilon fractures despite high complication rates, including the need for arthrodesis as a secondary procedure. This study investigates patient outcomes following either ORIF or primary arthrodesis (PA), the latter performed via a novel surgical technique. 21 patients treated for pilon fracture, 14 with ORIF and 7 with PA, will be evaluated with the ORIF group serving as the control. Patient reported outcomes are assessed using the Foot and Ankle Outcome Score (FAOS) and 12 Item Short Form Survey score (SF-12). Patient physical functionality, using Opal sensor data, records timed-up-and-go (TUG) time (s), manual ROM (dorsiflexion-plantarflexion and inversion-eversion)(degrees from neutral position), walking cadence (steps/min), walking speed (m/s), double support (% gait cycle), stride length (m), and walking ankle ROM (dorsiflexion-plantarflexion and inversion-eversion)(degrees from neutral position). Preliminary data for 5 ORIF patients (1 female, 4 males) with a mean age of 49.8 ± 12.01 and 3 PA patients (all males) with a mean age of 50 ± 6.24 showed no statistical difference between groups for FAOS and SF-12 scores, TUG time, manual ROM, walking cadence, walking speed, double support, stride length, and walking dorsiflexion-plantarflexion. The ORIF group demonstrated significantly higher inversion-eversion while walking (p=0.010). Preliminary data indicates minimal patient-reported and functional differences between ORIF and PA groups, although additional samples are needed to improve statistical power. This ongoing pilot study serves as a basis for future investigations and improves future treatment recommendations for patients with complex pilon fractures.

#4 Shamir Khan Email: skhan5@kumc.edu Mentor: Roopa Sethi, MD.

Xylazine on the rise: An overview of Xylazine abuse in the US

Xylazine hydrochloride is an addictive drug that has been increasing in popularity over the last several years, particularly in combination with opioids such as fentanyl and heroin. Xylazine has gone from a drug that was hardly seen in US drug markets in 2018, to one of the commonly abused additive drugs. Xylazine added to these drugs is thought to increase their duration of action, potentially leading to the increased popularity of the mixture. This is of concern due to its increasing involvement of xylazine mixed fentanyl in drug overdose deaths. The dangers of the increasing popularity of xylazine are seen in the case of a 43 year old man who presented to a methadone program. He described taking xylazine mixed with fentanyl and erroneously referred to it as "carfentanil." The patient's misnomer may seem insignificant at first glance, but it
indicates a deeper misunderstanding of the dangers that underlie xylazine abuse. Ill-education of the use and risks of xylazine can be deadly, particularly due to a lack of a reversal agent. Naloxone exists for opiates, but no such drug exists for xylazine. As xylazine becomes more popular in the US population for its use, awareness of the drug and its effects should progress in a similar manner. Our goal is to discuss the disconnect between the patient and which drug he was taking, what the possible risks of this lack of knowledge can be, and how to best combat the increasing popularity of xylazine in drug markets going forward.

#5 Annika Aurora Email: aaurora@kumc.edu Mentor: Moya Peterson, PhD, RN, APRN, FNP-BC.

Specialty care for adults with Down syndrome: An assessment of financial profitability and institutional implications
The increase in the life span of individuals with Down syndrome (DS) has necessitated the implementation of specialized care for adults with DS. Although proven beneficial for health outcomes, specialty clinics for adults with DS are not considered financially valuable to their institutions. The purpose of this study is to determine the financial profitability of a clinic for adults with DS by considering the referrals made and the subsequent downstream revenue generated. Donabedian’s Structure, Process, Outcome model for quality of care will be considered. The structure is the physical and organizational characteristics of the facility, the process is the care delivered to the patients and the outcome is the revenue generated by that process. This study has been determined as a quality improvement project by the University of Kansas Medical Center Institutional Review Board. A retrospective chart review will be performed for adults with DS seen by the specialty clinic in the calendar year 2023. Data will be collected manually from patient charts on all referrals and diagnostic tests given within this timeframe and stored in a secure REDCap server. Additionally, revenue will be calculated on the average cost of an office visit/referral/diagnostic test. The data will be analyzed, and revenue generated will be estimated. The results of this study are pending. If DS clinics can be proven to be profitable entities, more resources will be allocated to these clinics. Greater funding for DS specialty care will ultimately increase clinic outreach and improve health outcomes for this population.

#6 Kavya Nataraj Email: knataraj@kumc.edu Mentor: Carla Keirns, MD, PhD.

Analyzing Approaches to Treatment of Irregular Menses due to PCOS in Biomedicine versus Siddha Medicine
Polycystic ovary syndrome (PCOS) is a common endocrinopathy in women of childbearing age that is often overlooked or misdiagnosed due to the lack of research and publications about the syndrome. It is a chronic disorder that currently has no known cure. The objective of this project was to gather and compare qualitative data through interviews regarding the treatment of irregular menses caused by PCOS in two different medical disciplines: Biomedicine and Siddha medicine, a traditional form of medicine originating in South India. The study population consisted of Siddha practitioners based in Chennai, India and Biomedical physicians consisting of family medicine physicians, OB/GYNs and endocrinologists practicing at KUMC. The interview questions were divided into the following 10 categories: physical exam, labs and imaging, etiology, diagnostic criteria for PCOS, treatment regimen, contraindications and side effects,
importance of lifestyle, recovery, prevalence and mixed medical approach to health. This project was able to highlight the role of traditional medicine in the "gray areas" of biomedicine. Incorporating the ideology of traditional medicine and the emphasis of holistic medicine and balance can be implemented in biomedicine. In addition, the importance and role of lifestyle in health was highlighted through interviews. Moving forward, we would like to speak to patients who have undergone Siddha treatment for irregular menstruation to gather information regarding their experience, side effects and progress. In addition, we are interested in delving deeper into the role of culture in the treatment goals of patients and any stigma surrounding cultural/traditional medicine.

#7 Alice Azzun Email: aazzun@kumc.edu Mentor: Jennifer McRae, MD.

Factors Contributing to Antidepressant Noncompliance in Patients of General Medicine Clinics with a Diagnosis of Depression: A Retrospective Study

Current research proposed by the World Health Organization suggests that only half of those prescribed pharmacologic or nonpharmacologic treatment regimens for a chronic disease are adherent. The intent of this project was to identify the potential factors that contribute to the discontinuation of or noncompliance to an antidepressant within 6 months of initiation in those who have a diagnosis of depression or a related disorder. Patients who were seen at KUMC internal and family medicine clinics for primary care were examined. A retrospective chart review of eligible patients of general medicine clinics at the University of Kansas Medical Center was conducted. Patients were eligible for review if they had a documented diagnosis of a depression disorder, defined as any of those detailed in the contemporary DSM-5-TR (n=76) and were at least 18 years of age who received at least one antidepressant prescription within a 13-month period. An analysis to compare and describe the populations of compliant versus noncompliant relative to age, sex, marital status, race, language, zip code, additional comorbidities, referrals, and related ED visits was performed. Results suggest that younger age, single status, non-English speaking, nonaffluent zip code, and the specific antidepressant prescribed may contribute to noncompliance. Specifically, of the antidepressants represented, escitalopram was the most prescribed antidepressant in the compliant group (38%) compared to sertraline in the noncompliant group (25%). The findings will facilitate quality improvement initiatives in the KUMC internal and family medicine clinics aimed at improving outcomes in the ambulatory management of depression.

#8 Dominique Williams Email: dwilliams26@kumc.edu Mentor: Andrew Pirotte, MD.

Central Venous Thrombosis: a case report

Introduction: Central venous thrombosis (CVT) is an uncommon disease accounting for less than 1% of strokes with a mortality rate near 15%. We present a patient with non-specific findings and was diagnosed with CVT using computerized tomography (CT) venogram. Case report: The patient is a 43-year-old woman in relatively good health from the Midwest with a three-day history of waxing/waning headache nausea and vomiting. The pain was in the left frontal area and associated with photophobia and phonophobia. She has had ocular migraines in the past, though the current is different. There had been mild relief with Tylenol and ibuprofen before
coming to the ED. History was notable for recent suspected viral illness contact from her ill children. Physical exam was remarkable for a BP 177/111 (no history of HTN) with normal neurological exam, GCS 15. Viral panel negative for COVID and influenza. CT venogram showed an acute dural venous thrombosis extending from the sinus confluence through the left transverse and sigmoid sinuses and jugular bulb that extended inferiorly into the left upper internal jugular vein and a small nearby thrombosed left occipital cortical vein. Treatment with heparin was initiated and the patient was discharged the following day. Conclusion: The signs and symptoms of this CVT were not as severe as the extent of thrombus. CVT often occurs in the presence of hypercoagulability. A thorough hypercoagulable workup was initiated, though no positive results were found. Etiology of this CVT is unknown but is suspected to be related to viral illness.

#9 Arianna Fallahian Email: a635f602@kumc.edu Mentor: Jill Hamilton-Reeves, PhD, RD, CSO.

Comparing the Effects of Preoperative UCAN® and Gatorade® Administration on Metabolic Responses to Surgical Stress and Secondary Clinical Outcomes After Urological Surgery

Background: The increased release of hormones and catecholamines during longer duration surgeries diminishes the body's response to insulin, leading to acute insulin resistance. Although insulin resistance resolves within weeks of surgery, the associated metabolic stress during this time increases patients' susceptibility to infection and tissue catabolism. This trial will compare the impact of consuming a preoperative novel starch drink (UCAN®) to a standard sports drink (Gatorade®) on metabolic responses to surgical stress and secondary clinical outcomes after surgery. Methods: Thirty patients undergoing major urologic surgery will be randomized in a 1:1 fashion to one of two arms. Patients with diabetes will not be included in the study. Patients will either receive UCAN® or Gatorade® and will be instructed to consume a 100g dose the night before surgery and a 50g dose 2-3 hours before surgery. A continuous glucose monitor (CGM) will also be placed on patients' triceps brachii before surgery, and blood tests will be obtained preoperatively, during surgery (30 minutes post incision and upon site closure), and postoperatively to evaluate perioperative glycemic variability, the primary outcome of the study. The CGM will be removed on post-operative day four or upon discharge, whichever takes place first. Secondary outcomes will include length of hospital stay, post-operative infections, patient comfort level, and number of patients needing intraoperative or postoperative insulin treatment. Results: Ten of thirty patients have been enrolled. The CGM data are available for 9/10 patients. No adverse events related to the intervention have been reported.

#10 John DuBois Email: j138d462@kumc.edu Mentor: Seth Holwerda, PhD.

Oxidative Stress-related Impairment of Endothelial Function

It has been reported that ascorbic acid (vitamin C) is effective in increasing a patient's ability to modulate blood pressure. The mechanism of this effect has been assumed to be due to ascorbic acid's antioxidant properties. This project serves as a study of the effect of ascorbic acid on Nitric Oxide Synthase (NOS), which produces Nitric Oxide (NO) a potent vasodilator, in cultured endothelial cells. Additionally, oxidative stress proteins were measured to determine the oxidative stress the endothelial cells were subjected to. To do this, endothelial cells were cultured
and plated under various conditions including with culture medium, with culture medium and fatty acids, and with culture medium, fatty acids, and ascorbic acid. Then, NOS and oxidative stress proteins were tagged and viewed under a microscope to determine their respective protein expressions. It was determined that the addition of ascorbic acid increased the expression of NOS, confirming the idea that ascorbic acid increases endothelial cell's ability to modulate blood pressure. It was also determined that in the cells cultured with ascorbic acid, oxidative stress was seen to increase. This is in contrast to what was expected. These results indicate that while ascorbic acid does increase an endothelial cells ability to modulate blood pressure by way of NOS, it has a mechanism other than its antioxidant effect that it has previously been attributed to.

#11 Janae Pauly Email: jpauly3@kumc.edu Mentor: Courtney Marsh, MD.

Improving Education Materials for Ovulation Induction, In-Vitro Fertilization, and Frozen Embryo Transfer Through Short-Form Video Content on Social Media Applications

Because procedures and processes in Reproductive Endocrinology and Infertility (REI) are complex and multifaceted, improving patient understanding is paramount. The rise of social media applications and short-form video content has provided an opportunity to educate patients about what to expect when seeking fertility treatment. This project aims to identify whether the addition of accessible, short videos on social media about REI topics improves patient satisfaction surrounding educational materials at the University of Kansas Advanced Reproductive Medicine (KUMC ARM) clinic. This study utilizes a survey to assess patients' confidence in their understanding of fertility treatments. With our convenience sample model, the first group of patients enrolled received standard patient education provided to all patients at the KUMC ARM clinic. These patients' responses will be compared to those who have watched the educational videos under the official KUMC ARM TikTok account @ku_fertility. Our group has developed, filmed, and edited these educational short-form videos in collaboration with the physicians, nurses, and pharmacists at KUMC ARM. Of the 21 patients who received the standard patient education booklet at KUMC ARM, the number of patients who felt very informed increased from 2 to 10 after receiving the booklet. However, 11 felt somewhat informed after receiving the booklet. The control arm demonstrates that patient understanding can increase following educational materials provided at the office, but there is room for improvement. We look forward to continuing the project and better ascertaining whether including videos enhances patient knowledge.

#12 Peyton Kelly Email: pkelly3@kumc.edu Mentor: Jordan Borrell, PhD.

The Unique Role of Occupational Therapy in Meeting the Needs of Individuals with Limb Loss

Introduction: Each year, 185,000 people undergo amputation procedures, with two million of them residing in the United States. Presently, there are gaps in identifying patient needs and in accessing resources and specialized services that can be provided by occupational therapists. Purpose: Identify themes of patient needs via qualitative assessment and begin constructing resources based off any gaps identified within this population. Education is a pertinent form of occupational therapy (OT) intervention that can be provided for patients and their families.
Methods: Patients at the Hanger Clinic will engage in informal interview questions, based on the Patient Specific Functional Scale (PSFS), with given consent to record and present the findings. The informal interviewing will take place while their CPO (certified prosthetist/orthotist) makes adjustments to their prosthetics. Their answers will then be recorded and used to inform the educational resources created and placed on a free and accessible website. Hypothesis: Through patient interviews, needs will be identified and addressed thus contributing to enhancing an individual's functional independence and overall well-being post-amputation and prosthetic placement. Conclusion: A continuation of research and assessment through an OT lens can help recognize and address the unique needs of individuals. This discernment will enhance current OT assessments and lay a foundation for OTs, in collaboration with researchers, to adapt and excel in meeting the evolving needs identified directly by patients.

#13 Emma Francis Email: efrancis@kumc.edu Mentor: Melanie Meister, MD.

Retrograde Voiding Trial: Advantages over Natural Fill?
BACKGROUND: The rate of urinary retention after pelvic reconstructive surgery approaches 30%. As such, patients routinely undergo a voiding trial prior to discharge home. Previously at our institution, providers utilized a natural fill voiding trial, in which the foley catheter is removed at a set point after surgery, the bladder is allowed to fill naturally, and the patient has 6 hours to spontaneously void. Another type of voiding trial, retrograde voiding trial, or RVT, has been recently implemented at this institution. RVT involves backfilling the bladder with saline prior to foley removal and patient voiding within 30 minutes of foley removal, allowing for more rapid voiding trial results. OBJECTIVES: The present research seeks to assess provider and patient satisfaction with the voiding trial method and determine if one voiding trial shows improved patient outcomes (e.g., length of stay, rate of post-operative UTI, and rates of prolonged urinary retention). METHODS: Patients >18 years admitted and undergoing voiding trials after pelvic reconstructive surgery at The University of Kansas Health System from 2022-2024 are eligible for inclusion. Cases were identified by CPT codes for the relevant surgeries, and retrospective chart review is being performed to collect data. Surveys of patients and staff involved in the voiding trials were collected to measure patient and provider satisfaction. Demographic and surgical data will be analyzed and outcomes compared between patients undergoing natural fill and retrograde voiding trials. RESULTS/CONCLUSION: The research is ongoing. These results will help to guide selection of voiding trial method at TUKHS.

#14 Lauren St. Peter Email: lstpeter@kumc.edu Mentor: Bethany Forseth, PhD.

Healthy Lifestyle Behaviors in Youth with Severe Obesity
Purpose: There is limited research examining health behaviors (i.e., physical activity, screen time, fruit/vegetable and dairy consumption) among youth with severe obesity (i.e. classes II and III). Our objective is to determine the prevalence of health behaviors in youth with obesity class I, II, and III using a healthy lifestyle assessment within electronic medical records (EMR).METHODS: This study is a retrospective cross-sectional analysis reviewing EMR in youth ages 2 to 17 years (N=11,525) with severe obesity who had a well-child visit between 01/2013-12/2019 at Children's Mercy. Binary logistic regressions were used to examine odds of meeting recommendations.
Results: Youth were most likely to meet recommendations for physical activity (78.6%, n=9,064), followed by screen time (55%), dairy consumption (30%), and fruit/vegetable consumption (8%). Youth with obesity class I were 37% more likely than youth with obesity class II and 40% more likely than youth with obesity class III to meet the physical activity recommendations. Youth with obesity class I were more likely to meet screen time recommendations compared to youth with obesity class II (by 17%) and youth with obesity class III (by 22%). Youth with obesity class I were 28% more likely to meet dairy recommendations than youth with obesity class II. Fruit and vegetable consumption was similarly low among all youth with obesity. Conclusion: This study identifies the prevalence of, and differences in, health behaviors that exist between youth of severe obesity classes and can help guide primary care providers when counseling their patients on health behaviors.

#15 Avleen Grewal Email: agrewal@kumc.edu Mentor: Shin Hye Park, PhD, RN.

The Effect of Unit-Level Patient Turnover on RN Staffing
Purpose and Background/Significance: High patient turnover, such as fluctuations in patient volume due to admissions, discharges, and transfers (ADTs), has increased the nursing workload. Nursing responsibilities associated with patient turnover are demanding and time-consuming, in addition to other nursing tasks. The increased workload would require additional staffing, but there is a lack of evidence on the impact of patient turnover on RN staffing. The purpose of this study is to examine RN staffing associated with unit-level patient turnover.
Theoretical/Conceptual Framework: Based on Donabedian’s structure-process-outcomes model, this study will examine structural characteristics (patient turnover rates and nurse staffing on units) that may impact the nursing care process and patient outcomes. Method: This descriptive study will analyze unit-level data from the 2018 National Database of Nursing Quality Indicators. The sample size will include 438 units (medical, surgical, and medical-surgical combined) from 104 hospitals. Patient turnover will be measured as the volume of ADTs divided by patient days. RN staffing will be measured as RN hours per patient day. This study will include linear regression to examine the effect of patient turnover on RN staffing, adjusting for hospital and unit characteristics, as well as patient acuity measured by the Case Mix Index. Results: This study expects to find an association between patient turnover and RN staffing. Conclusions: High patient turnover places increased stress and workload on nurses and can lead to nurse burnout. Study findings could draw attention to the influence of patient turnover on RN staffing demands.

#17 Ravali Reddy Email: rreddy3@kumc.edu Mentor: Archie Heddings, MD.

Pelvic Fracture Fixation and Reduction Quality: A Radiographic Analysis of Pelvic Fracture Fixation at an Ethiopian Hospital
Introduction: Trauma, a global health crisis, disproportionately affects low-to-middle-income countries, with Africa heavily burdened due to rapid industrialization. Ethiopia saw a doubling of road traffic deaths from 2007 to 2018, with musculoskeletal trauma accounting for 67% of injury-related deaths. This study analyzes radiographic imaging for pelvic fractures at a hospital in Addis Ababa and explores the complexities of orthopedic trauma abroad. The primary objective is to assess the operative resource limitations present at this hospital through radiographic evaluation.
that would affect patient outcomes. Methods: Ethical approval was obtained for secondary research involving 84 pelvic fracture patients treated by an orthopedic traumatologist in Ethiopia, aged 18-90, with available imaging data. Descriptive statistics, including mean, standard deviation, and frequency distributions, characterize categorical data, with subgroup analysis by fracture type. Results: The study included 84 patients with an average age at injury of 33.18 years, predominantly males (63.1%). The treatment timeline averaged 9.87 days from accident to healthcare presentation. Road traffic accidents were predominant (75%), followed by fall-down accidents (11.90%). Perceived surgical deficits included inappropriate screw lengths (59.52%), problems with plating (35.71%), anterior fixation omission (23.81%), lack of washers (20.24%), and inappropriately threaded screws (9.52%). Conclusion: The Addis Ababa hospital, despite resource limitations, exhibits commendable efficiency in pelvic fracture surgeries. Analysis of cases unveils specific challenges and strengths, offering valuable insights for optimizing diagnosis and treatment in resource-constrained settings. This research contributes to the literature on Ethiopian orthopedic procedures, emphasizing the need for tailored interventions and international support to alleviate the trauma burden. The findings inform strategies for optimizing surgical outcomes, addressing orthopedic resource scarcity challenges, and contributing to the trauma care discourse in developing countries.

#18 Bethany Bengs Email: bbengs@kumc.edu Mentor: Mihaela Sardiu, PhD.

Predicting Protein Interaction Network Perturbation from the Topology of Biological Networks

Protein interaction networks are complex systems that have essential roles in cellular function. In particular, the relationship dynamics between proteins in a network indicate the necessity of certain protein interactions for specific biological functions. Perturbing networks through genetic deletion has become an effective way to study the dynamics of protein interactions, providing new understanding of both the structure and function of biological networks. Here, we aim to predict perturbed protein interaction networks of the INO80 complex from its biological network using an integrative machine learning approach. We first use a topological scoring method to investigate the interactions between proteins in the INO80 biological complex. Furthermore, we use the statistical framework QPROT to calculate the differential protein expression between the biological and perturbed networks. Finally, we use an integrative machine learning approach to predict perturbation patterns based on the topology of the biological network and the observed differential expression patterns. Our analysis not only provides insight into protein complex dynamics but also demonstrates the implications of network perturbation analysis in areas such as medicine and disease.

#19 Haylie Yost Email: hyost2@kumc.edu Mentor: Dorothy Hughes, PhD, MSHA.

A Needs Assessment of Contraception Prescription in Rural Kansas

Approximately 40% of pregnancies in the United States are unintended, often due to inconsistent or absent contraception use, despite efforts to enhance accessibility to contraceptive options. Discrepancies in access persist, leaving a need for contraceptive services. The CDC prioritizes long-acting reducible contraception (LARC), but past studies have shown that in Kansas, LARC
usage was found to be the lowest of all contraception methods. The scarcity of LARC services is particularly pronounced in rural areas, where 27.7% of the Kansas population resides. Previous research has found that rural physicians provide LARC less frequently due to training gaps, low demand, cost considerations, and personal beliefs. This study aimed to assess the contraception prescription patterns among rural providers, recognize barriers to providing LARC, and identify intervention opportunities. In this cross-sectional, descriptive study, the research team administered surveys through REDCap at Summer Training Options in Rural Medicine (STORM) sites. Inclusion criteria were: providers who practice in a rural or frontier county based on the Rural-Urban Continuum Codes and were STORM preceptors. Results revealed a positive correlation between increased comfortability and the number of IUDs and implants inserted annually. A significant difference was observed in the comfort with IUD insertions observed between physicians and non-physicians (p=0.050). To increase LARC utilization, continuing medical education could provide hands-on training for IUD and implant insertion to interested providers. Further studies could assess the impact of such education on LARC use, with the goal of contributing to improved contraceptive access and a reduction in unintended pregnancies in rural areas.

#20 Grant Colvin Email: gcolvin@kumc.edu Mentor: Barbara Polivka, PhD, RN, FAAN.

Indoor Air PM AIR PM2.5 Concentration, Motor Vehicle Traffic Exposure, and Perceived Stress Among Adults with Asthma

Among U.S. adults living with poorly controlled asthma, are there: (1) differences in perceived stress based on self-reported motor vehicle traffic exposure (MVTE), (2) differences in residential indoor fine particulate matter (PM2.5) and MVTE, and (3) associations between residential indoor PM2.5 and perceived stress. While PM2.5 can decrease respiratory function, research on the impact of PM2.5 and MVTE on perceived stress, and on the association of MVTE with indoor PM2.5 concentrations, is lacking. The NIH Symptom Science Model (NIH-SSM) for Environmental Health forms the theoretical basis for this study. This secondary analysis of the Home Air and Asthma Study included baseline survey data (N = 40) and indoor PM2.5 data collected continuously over 14 days. Baseline survey data included the Perceived Stress Scale (PSS) and self-reported MVTE (low vs. medium/high). Participants were primarily female (90.0%), white (82.9%), college-educated (78.0%), inhabited single-family homes (73.2%), aged 26-77 years, and lived in low MVTE areas (70.7%). PSS scores ranged from 0 to 14. Although not statistically significant, those reporting higher MVTE had higher mean PSS scores (M = 6.5 vs. 5.3 respectively, p = 0.267) and higher average PM2.5 levels (M = 26.8 vs. 6.8 respectively, p = 0.111). Higher PSS scores were significantly correlated with higher PM2.5 levels (r = 0.38, p = 0.018). Indoor PM2.5 reduction has important implications for stress management among adults with asthma. Further research is needed to clarify associations between MVTE and indoor pollution.
The GLAMM1 Study - Global Access to Myeloma Medications: Potential Barriers to Chimeric Antigen Receptors (CART) and T-Cell-Engaging Bispecific Antibodies (TCE) Globally

Access to Novel B cell maturation antigen (BCMA) directed therapies including chimeric antigen receptor-T (CART) appears to be a major challenge worldwide. This study aims to gain insight into the variation in access to these therapies. This study was a survey of 176 oncologists in centers across the globe outside the USA in April-June 2023. Globally for CART, only 3 of the 33 (9%) countries had access to idecel, cilta-cel or both (France, Morocco, Saudi Arabia). For T cell engaging bispecific antibody treatment (TCE), 7 of the 33 (21%) countries had adequate access (Switzerland, Netherlands, France, Portugal, Czech Republic, Morocco, Saudi Arabia). All continents including high healthcare investing nations had limited access to CART and TCE. Noticeably, CART is less accessible than TCE. The main barrier to CART and TCE is reported as financial burden for patients. Financial burden for patients as a top barrier for each of the products by continent was as follows: Asia (83%), South America (64%), Africa (71%), Australia (100%), and North America (100%). By collaborating with oncologists worldwide, global and regulatory agencies, policymakers and industry partners, we plan to further explore restrictions to access to CART and TCE and strategies to overcome these barriers.

Investigating the Role of TGFβ-Receptor 2 Mutation in Enhanced Malignancy of Pancreatic Ductal Adenocarcinoma with Concomitant KRAS Activation

Pancreatic cancer is currently the tenth most common cancer in the United States, but third in the number of cancer-related deaths. Exocrine adenocarcinoma accounts for 90% of pancreatic malignancy. There have been very few pharmacologic treatments available for pancreatic ductal adenocarcinoma (PDAC). Development of novel therapeutics and combination treatments specific to PDAC with specific genetic mutations is crucial in decreasing the morbidity and mortality of this disease. This project seeks to understand how TGFβR2 loss increases aggressiveness of PDAC as well as increases the resistance to current therapeutics. The authors hypothesized that RNAseq pathway analysis of mouse-derived PDAC cell lines harboring either KRAS, TGFβR2, or TP53 mutations would identify unique pathway mediators that drive resistance during loss of TGFβR2 signaling. PDAC cell lines were maintained in DMEM with 5% FBS and antibiotic-antimycotic. Each of these cell lines contained one of the genetic mutations previously mentioned. MTT assays were conducted on these cell lines in the presence of gemcitabine and novel KRAS inhibitor MRTX1133 to generate dose response curves. The remainder of this project has yet to be continued. This includes using the Ingenuity Pathway Analysis to identify specific pathways/proteins that confer a survival advantage in KRAS/ TGFβR2 combination mutation lines, and targeting specific pathways with novel therapeutics.
Rural Patients' Perceptions and Opinions of Scope of Practice

Primary care shortages pose a challenge to healthcare access in rural communities. In April 2022, Kansas granted "full practice authority," permitting APRNs to manage treatments and prescribe medication without supervision or collaboration with a physician. Minimal literature exists exploring the outcomes of these changes. This study investigated patients' perceptions and opinions surrounding scope of practice and healthcare accessibility. Researchers conducted a cross-sectional survey of rural patients seen in clinics participating in the Summer Training Option in Rural Medicine (STORM) in Kansas between June and July 2023. Chi-square tests of independence were employed to test differences between age groups, education level, and years rural. Respondents (n= 272) reported feeling familiar with scope of practice and understanding differences in training, licensure, or oversight, but often answered "I am not sure" when asked about provider-specific practice settings and oversight. Many respondents (42.0%) felt neutral towards preferring a physician PCP, whereas 50.2% reported they prefer a physician. Statistically significant differences were found based on age but not education. Most patients felt independent practice by APPs would lead to improved access to care for rural patients, though many reported not knowing about the new law. Results of this study imply that patients in rural settings have mixed understanding of their healthcare provider's scope of practice and how to apply their understanding in provider preference. Additional studies examining actual access increases and patient experiences with healthcare providers would provide more detail surrounding the efficacy of legislation that expands scope of practice for non-physicians.

The Glass Wall: Gendered authorship disparities in in CD19 and BCMA CAR-T Clinical Trials for lymphoma and myeloma.

Introduction: Existing literature suggests that women are significantly underrepresented in the field of hematology oncology. Data from 2021 suggests that women make up 35.6% of hematologists. Minorities including women receive fewer awards, deliver fewer board review lectures, and hold fewer professorships and leadership positions in clinical departments and professional organizations. To further investigate this issue, we assessed the gender gap in authorship across 13 pivotal clinical trials leading to approvals of CD19 and BCMA Chimeric antigen receptor T cell (CAR-T) therapies: ELIANA, ZUMA-1, JULIET, ZUMA-2, KarMMa, TRANSCEND, ZUMA-5, CARTITUDE-1, ZUMA-7, ZUMA-3, TRANSFORM, PILOT, and ELARA.

Methods: We examined the number of female authors, the number of lead female authors as defined as first, second, or last author, and the ratio of all authors to female authors in the 13 studies (published between 2017-2022). In all, 367 authors were included in the analysis. Results: Of the 367 authors assessed, 109 were female, correlating to 28.9% female authorship. Seven of the 13 studies had females as lead authors, and all except one were after 2021. Conclusion: Gender disparities persist in medical research authorship, notably in immune effector cell therapy. While pediatric hematology oncology exhibits less disparity, male dominance prevails in publications broadly. The recent increase in female lead authors signals potential progress, aligning with shifting gender demographics in higher education. Future
studies should monitor this trend closely. Recognizing and addressing these barriers is vital for achieving gender equity in transplant and cellular therapy, supporting underrepresented groups' advancement past the glass wall.

#25 Abigail Censky-Kieklak  Email: Acensky@kumc.edu  Mentor: Jill Peltzer, PhD, APRN-CNS.

Describing the Impact of a Toxic Chemical Spill through Photovoice
Purpose and Background/Significance: African Americans are disproportionately exposed to pollution and environmental hazards that are linked to poor health outcomes. Following a spill of Trichloroethylene in a Midwestern urban city, the state health department reported increased rates of liver and biliary tree cancers. Concurrently, residents were not notified about the consequences of the spill, and little has been done to address their concerns. The purpose of this study is to illuminate the impact of the spill on residents' health and wellbeing. Theoretical/conceptual framework: Rooted in feminist inquiry and critical social theory, photovoice is a form of community-based participatory research. Critical dialogue generated by the photos is designed to be emancipatory and part of a liberatory design that fosters shared power between the community and researchers. Method: Current or former adult residents of the exposure area will be recruited at community listening sessions. Participants will take 10-15 photos, using personal cellular devices, capturing images that depict the impact of living in a neighborhood where the chemical spill occurred and health concerns they believe are related to the spill. In-depth interviews will be conducted to explore the significance of the photos. Narratives of the interviews will be analyzed using thematic analysis. Results: Results will be reported at the conference. Conclusions: Understanding the impact of the TCE spill from the perspective of the residents of the chemical spill exposure area is critical to ensuring their voices are centered in any ongoing health advocacy, mitigation efforts, and public policy decisions.

#26 Murshalina Akhter  Email: makhter@kumc.edu  Mentor: Yanming Li, PhD.

Navigating the genomic landscape of Lung Cancer: Identifying prognostic Genes and Network structures using a Novel Machine Learning Approach
Motivation: Lung cancer is the second most prevalent cancer globally. It is the leading cause of cancer-related deaths among men and the second among women. Understanding the gene expression patterns can reveal the molecular mechanism that drives lung cancer and by targeting those specific genes, treatments can be improved.  Methods: This case-control study leveraged a new machine learning model, netLDA to identify strong genes, weak genes, and the predictive gene networks (PGNs). Then these networks were used for the prediction of lung cancer. We also used Gene set enrichment analysis (GSEA) to find top pathways that have biological evidence that they are associated with lung cancer outcomes.  Results: netLDA achieved an accuracy of 99.23%, sensitivity of 99.01%, and specificity of 100% in predicting lung cancer occurrence. For most of those strong genes such as IL1RL1, ABCA12, FAM83A, CST1, MMP12, TMPRSS4, and GJB2, and all the weak genes such as TCF21, A2M, INMT, and SCN7A, we found literature evidence of association with lung cancer. There were two novel strong genes: DES, and ALDH3B2. DES also existed as a leading gene in GSEA-identified top pathways KEGG dilated cardiomyopathy and hypertrophic cardiomyopathy hcm. The two weak genes D7 and A2M overlapped as a leading
gene in KEGG complement and coagulation cascades pathway. Conclusion: The novel genes DES and ALDH3B2 can be new targets for lung cancer diagnosis and thus improve existing treatments. Additionally, the predictive gene network containing strong and weak genes can be used for the prediction of lung cancer outcomes.

#27 Jayna Schwartz Email: jschwartz5@kumc.edu Mentor: Lisa Guthrie, PhD, RN.

**Self-Efficacy Variance Between Male and Female Nurse Preceptors**

**Purpose:** Explore differences between male and female nurse’s self-perceived preceptor preparedness. **Background/Significance:** Male nurses are historically understudied within the female-dominated field of nursing. With more male nurses, it is important to identify their level of preceptor confidence and performance. **Theoretical Framework:** Literature suggests that males have higher self-efficacy within general social structures. However, same-gender camaraderie and mentorship opportunities, more available to female nurses, may contribute to female self-efficacy in nursing. Bandura's social cognitive theory suggests behaviors and thoughts, leading to self-efficacy, are derived from peers, mentors, and guardians across the lifespan. This study focuses on gender differences in self-perceived confidence performing precepting behaviors. **Methods:** A secondary analysis used data from a needs assessment examining preceptor preparedness among N = 218 nurse preceptors in a large Midwest academic medical center, summer 2023, using the Prep-ExPresS tool. Sample included 6.4% male (n = 14) and 93.6% female (n = 204) preceptors. Descriptive statistics and differences between genders in levels of confidence to perform 22 items were analyzed. **Results:** Male nurses were older, with more experience. Independent sample t-tests grouped by gender demonstrated statistically significant differences in demonstrating passion (p = 0.04), getting to know preceptees as individuals (p = 0.03), and demonstrating empathy (p = 0.01), with mean scores of male preceptors lower on all 22 items. **Conclusions:** Male nurses tended to score lower on preceptor preparedness, regardless of greater nursing experience. Further research on male nurse preceptors is indicated to identify their needs.

#28 Elaine Pope Email: epope3@kumc.edu Mentor: Cara Busenhart, PhD, APRN, CNM, FACNM.

"Less like a patient... More like a person": A qualitative analysis of women’s desires in the midwife-mother relationship

Midwifery care is on the rise. From 2003 to 2018, midwife-assisted deliveries in the United States increased 11.83%, while physician-assisted hospital births witnessed a 9.73% decrease. It is evident that women perceive benefits in the midwife-mother relationship. This project addressed the questions: During perinatal care, what is the desired role of a woman’s midwife in the midwife-mother relationship? How do midwives fulfill this role according to patient desires? Interviews were conducted with fifteen women who chose midwifery care at the University of Kansas Hospital. Data was analyzed in the context of a study entitled, "Four Models of the Physician-Patient Relationship". The midwife’s role aligned with the "Interpretive" model because she acted as counselor, capable of elucidating and interpreting patient desires. Patient desires had a compounding effect. Once foundational desires were met, further desires could be addressed. Foundational desires included calm and slow-paced appointments, respect for
patient values, and an options-based approach to decision-making. These desires, once fulfilled, culminated in a relationship that was personal, flexible, and trusting. Trust was a reciprocal value in the midwife-mother relationship. Midwives expressed trust in mothers by viewing birth as an un-hurried, physiologic process. In return, mothers trusted midwives who supported their autonomy and built a personal relationship. This was apparent in the delivery room, where patients adopted a flexible approach to labor plans because they trusted their midwife to accurately interpret patient values. As midwifery grows in popularity, these findings contribute to a greater understanding of women's desires when choosing a perinatal care provider.

#29 Hayden Nevills Email: hnevills@kumc.edu Mentor: Jordan Borrell, PhD.

**Enhancing Functional Independence: Prosthetic Use with Occupational Therapy**

Occupational therapy plays a pivotal role in facilitating independence and improving quality of life for individuals across diverse abilities. However, the current assessment frameworks often lack specificity when addressing the unique challenges faced by prosthetic users. Unlike traditional assessments, the complexities of prosthetic use require tailored interventions for optimal rehabilitation outcomes. In this proposed study, we aim to address this gap by analyzing a range of assessments and interventions tailored specifically for prosthetic users based on their needs within the occupational therapy framework. By identifying and evaluating specialized assessment tools and interventions, we seek to enhance the rehabilitation process and empower prosthetic users to regain functional independence in their daily lives. Through a comprehensive review and analysis of existing literature, coupled with input from experienced occupational therapists, this study aims to provide valuable insights into effective strategies for optimizing prosthetic rehabilitation within the occupational therapy domain. Ultimately, our research endeavors to contribute to the advancement of personalized and holistic care for individuals navigating the challenges of prosthetic use, fostering greater independence and well-being. This work is currently in the developmental stages.

#30 Libby Frye Email: lfrye2@kumc.edu Mentor: Lisa Vopat, MD.

**Auditing the Representation of Female Athletes in Sports Medicine Research: Hip Labral Repair**

Purpose: Female athletes have historically been underrepresented in sports science/sports medicine (SSSM) research. Currently it is unknown if female athletes have adequate representation in hip labral repair research. This paper seeks to systematically review and audit the current literature regarding the representation of female athletes in studies examining arthroscopic hip labral repair procedures. Methods: The audit presented was performed according to the methods thoroughly outlined by Smith et al. Factors analyzed: study population, athletic caliber, menstrual status, research theme, sample of males and females, journal impact factor, and paper Altmetric score. Results: We identified 62 studies to be included in this audit. Females made up 55% of the population of participants. Female-only studies represented 5% of studies investigated. No studies investigated outcomes of female participants at the highest athletic caliber, Tier 5. Menstrual status was not considered as a variable in any study. Participants within athletic performance, indirect association, and health research theme had
32.8%, 61.1%, and 58.6% female representation, respectively. Median impact factor was similar among study population classifications. Study Altmetric score was highest among male-only studies and studies of Tier 5 athletic caliber. Conclusions: Overall, there was a similar prevalence of female to male participants in hip labral repair research. Despite this, there is a lack of female-only studies, inclusion of menstrual status, high-level female athletes, and female participants evaluated for performance outcomes. Future research in hip labral repair surgery should be focused on high-level female athlete populations following hip labral repair.

#31 Benjamin Ose Email: bose@kumc.edu Mentor: Bryan Vopat, MD.

Lateral Femoral Condyle Pathology: A Systematic Review
Knee trauma affecting the lateral femoral condyle (LFC), may result in the radiographic indentation or bone bruise/contusion findings, indicating an impaction injury with potential damage to cartilage or bone. Despite historical associations with anterior cruciate ligament (ACL) tear, a comprehensive review is needed to explore LFC pathology associations with other injuries, long-term outcomes, and treatment options. A systematic review following PRISMA guidelines was conducted. We searched PubMed, CINAHL, and Cochrane databases using specified keywords related to LFC pathology. This review encompassed 54 studies, 5 case reports, and one surgical technique paper. Diagnostic investigations revealed lateral femoral notch sign (LFNS) depth (1.0mm) as a reliable predictor of ACL injury. Different populations of ACL/non-ACL injured, pediatric and sport specific participants had varied rates of findings with a central anterior location being the most common site of pathology. Cartilage generally healed, while severe lesions may persist past 2 years. Residual knee stability and patient-reported outcomes saw varying results. Concomitant injuries were explored in 19 studies, revealing relationships with meniscus, anterolateral ligament, and medial collateral ligament injury. Four case studies demonstrated effective surgical treatment for LFNS (>5mm), while one technique proposed a three-step surgical approach for posttraumatic LFC osteochondral compression fractures. Various LFC pathologies serve as diagnostic tools for ACL injury, exhibiting different rates among different populations, and can be a useful risk factor of future knee recovery. Cartilage damage negatively impacts outcomes and while surgical treatments for extreme cases show positive results, more research needs to be done to guide appropriate treatment.

#32 Mitchell Walters Email: mwalters6@kumc.edu Mentor: Brian Everist MD, MBA.

Gross Photos: Do They Help Radiologists' Diagnosis of Acute Pedal Osteomyelitis?
Imaging plays a critical role in the evaluation of acute osteomyelitis. Magnetic resonance imaging (MRI) is the most accurate imaging test with meta-analysis demonstrating a 90% sensitivity and 79% specificity for this diagnosis. At our institution, clinical photographs of wounds are routinely viewed with imaging at the time of interpretation. The purpose of this study is to determine the value of clinical photography as an adjunct to MRI in the radiologists' assessment of acute pedal osteomyelitis. A single-center, retrospective analysis was conducted using an internal database of patients with suspected acute pedal osteomyelitis between November 2019 and August 2023, who underwent gold standard histopathologic analysis. A pre-procedural MRI within 2 months of biopsy/tissue sampling, and clinical photos taken within three weeks of imaging were required.
for inclusion. Blinded to history and diagnosis, seven readers (three fellowship trained MSK radiologists, three MSK radiology fellows, and two infectious disease fellows) reviewed clinical photographs of foot wounds. Each reader recorded the presence or absence of osteomyelitis. Diagnostic accuracy using clinical photos alone was determined. 96 images from 93 patients were included. The sensitivity was 78% (95% confidence interval, 0.68-0.87) and specificity 44% (95% confidence interval 0.19-0.68) for the diagnosis of acute osteomyelitis based on clinical photos alone. Interreader agreement was fair (Fleiss’ κ = 0.24, 95% confidence interval 0.18-0.32). Clinical photos are a useful tool for radiologists in their assessment of acute pedal osteomyelitis. While sensitivity of clinical photography alone to diagnose acute osteomyelitis rivals that of MRI, MRI remains the superior technique.

#33 Devan Crow Email: d921c052@kumc.edu Mentor: Jesalyn Tate, MD.

Incidence of Residual Squamous Cell Carcinoma In Situ on Excision Specimens following Shave Biopsy

Background: Squamous cell carcinoma (SCC) is the second most common skin cancer in the US, and its incidence and treatment costs are rising. Previous work remains unclear on the incidence of residual SCC in situ (SCCis) and of SCCis upstaging to invasive SCC on excision specimens. The present investigation aimed to understand the incidences of residual SCCis, upstaging to invasive SCC, and residual positive margins on excision specimens following an initial positive SCCis shave biopsy. Methods: A retrospective chart review was conducted using charts obtained from the University of Kansas Health System to include those with an initial positive SCCis shave biopsy and subsequent treatment with excision. Statistical analysis was performed utilizing a 95% confidence interval to evaluate rates. A chi square test was also performed for bivariate analysis. Results: The chart review yielded 665 patients (age, [mean ± SD] 69.8 ± 9.73; male, 401 (60.3%); tumor size, 1.01 ± 0.65 cm²). Following an initial positive SCCis shave biopsy, 244 (36.7%) cases had residual tumor, 1 (0.2%) was upstaged to invasive SCC; and 11 (1.7%) had residual positive margins after excision. Bivariate analysis revealed both older age (z=-2.1, p<0.05 years) and larger tumor dimension (χ² = 19.2, p<0.001) were associated with residual tumor. Those with residual tumor were 70.9 ± 9.31 years old and 54.5% had a largest tumor dimension of >1.0 cm. Conclusion: The present study aids patients and physicians with decision making regarding treatment following a shave biopsy for SCCis.

#34 Jisu Kang Email: jkang2@kumc.edu Mentor: Michael VanSaun, PhD.

Inhibition of Mcl-1 increases gemcitabine sensitivity in Pancreatic Ductal Adenocarcinoma (PDAC)
Mcl-1 is an anti-apoptotic factor in the Bcl-2 family. Mcl-1 expression is upregulated during cell division and downregulated during apoptosis. Numerous cancers have high Mcl-1 which correlates with the higher tumor grade as well as the development of therapeutic resistance. The Cancer Genome Atlas dataset analysis revealed that high Mcl-1 expression in PDAC was associated with poor outcome. Importantly, genetic ablation of Mcl-1 improved the radiosensitivity of PDAC cells and siRNA mediated knockdown of Mcl-1 was additive with gemcitabine. Yet, targeted delivery of siRNA in vitro can be problematic. We hypothesized that
a plectin targeting peptide (PTP) AAV based delivery of shRNA for Mcl-1 would overcome these difficulties and reduce off-target effects. We wanted to further compare our approach to a recently developed small molecular inhibitor of Mcl-1 (S63845). To test this, various mouse PDAC cell lines were first assessed for gemcitabine sensitivity. Then, we measured Mcl-1 protein levels via western blot, which showed high Mcl-1 in DT8082, MVPM2, SW1990 and low in K8484, Panc1, and MiaPaCa2. Cell lines with high Mcl-1 will be used to analyze the effect of Mcl-1 inhibition on PDAC viability with and without gemcitabine. Currently, we are generating PTP-AAV-shMcl-1 particles to test targeted delivery to PDAC cell lines. In conclusion, targeting the anti-apoptotic mechanism with Mcl-1 inhibition is expected to improve sensitivity to gemcitabine and overcome therapeutic resistance. Additional studies can be done comparing the efficiency of chemotherapeutic drugs other than gemcitabine when combined with Mcl-1 inhibition.

#35 Mallory Keech Email: mkeech@kumc.edu Mentor: Ericka Sanner-Stiehr, PhD, RN, COI.

Exploring the Relationships Between Clinical Nurse Preceptors’ Confidence and the Theoretical Dimensions of Self-Efficacy

Purpose and Background: Sustainability of the nursing workforce is a growing concern, particularly regarding retention. Nurses are more satisfied with their jobs leading to increased retention and deliver more competent care when they have positive experiences in their preceptorship. Thus, preceptors must be prepared and confident in their role and duties. The purpose of this study was to explore relationships between preceptors' confidence to precept and theoretical dimensions of confidence. Theoretical Framework: Three dimensions of self-efficacy/confidence from Social Cognitive Theory were measured: domain-specific previous experience measured by amount of experience and preceptee roles; motivation measured by enjoyment of precepting; and knowledge about precepting measured by prior preceptor training. 

Methods: Data were collected from 224 nurse preceptors using the Capxpress on four domains of preceptor-specific competencies: clinical competence, nurse professionalism, pedagogic competence, and student-centeredness. Bivariate correlations were used to explore relationships between domains of the Capxpress and the three dimensions of self-efficacy.

Results: Motivation was significantly correlated to the four domains of preceptor confidence (p<0.01). In-person and mandatory training modalities of previous training were significantly correlated to knowledge about training (p<0.05). Having no precepting experience was negatively correlated to their confidence on all preceptor-competencies (p<0.001) and precepting experienced RNs was most correlated to all competencies (p<0.01). Conclusion: Receiving formal training in preceptor competencies can positively impact preceptor confidence. Moreover, having experience precepting experienced RNs positively impacts their confidence on all measures of competencies. Future research should explore enhanced in-person training and leverage the expertise of preceptors with experience precepting experienced RNs.
NUDGE - mHealth Intervention to Promote Physical Activity and Reduce Hba1c in Adolescents and Young Adults with Type 1 Diabetes

Purpose: This study examines the efficacy of NUDGE - mHealth intervention to increase physical activity (PA) in adolescents and young adults (YA) diagnosed with type-1 diabetes (T1D) and improve HbA1c. Studies suggest that adolescents and YA with T1D do not meet physical activity targets, despite the established link between moderate-to-vigorous PA and reduced HbA1c to decrease cardiovascular risk. Research question: Does the NUDGE intervention (a) increase PA, and (b) promote decreased HbA1c levels in individuals with T1D? Framework NUDGE - mHealth intervention is based on cybernetic control theory describing self-regulated behavior based on performance goals with self-monitoring feedback to meet goals.

Method: An mHealth pilot feasibility intervention (NUDGE) employing tailored mobile text-messaging was conducted with 50 individuals (13-21 years) diagnosed with T1D. The NUDGE intervention includes PA goal-setting, reminders, and feedback delivered daily for approximately 90 days. Physical activity was measured continuously during one-week daytime periods via GT3X-actigraph and Garmin Vivosmart-actiwatch (baseline,1-month, 3-months); HbA1c every 90 days (chart review-standard care); treatment effect of PA on HbA1c was calculated. An online REDCap survey was used to measure PA attitudes and self-efficacy. Descriptive statistics will examine the feasibility of daily text messages, device wear and completion of PA. Multilevel analyses will determine effect size of NUDGE intervention for PA and HbA1c. Results: Pending. Conclusions: The NUDGE intervention will improve PA and enhance diabetes self-management for adolescents and YA with T1D and decrease cardiovascular risk. Low-cost, evidence-based PA interventions promote lifelong health benefits during a crucial time in diabetes self-management and improve quality of life.
Qualitative Analysis of Symptoms in Patients with Post-COVID-19 Syndrome Before and After Consuming Active Hexose Correlated Compound

Background: Individuals who have been infected with the virus that causes COVID-19 can experience long-term adverse symptoms called Post-COVID-19 Syndrome (PCS). Patients with PCS have persistent symptoms, possibly due to immune dysfunction involving natural killer cells (NK cells). One potential treatment being explored for the treatment of PCS is a mushroom supplement called active hexose correlated compound (AHCC®) that improves NK cell function.

Purpose: To determine if consuming AHCC® for one month can reduce symptoms in patients experiencing PCS.

Methods: Patients with PCS consumed four AHCC® capsules daily for 30 days (total of 3 g/day). We interviewed each participant about their PCS symptoms at baseline and after taking AHCC® for 30 days. The Dedoose software program was used to analyze qualitative data.

Results: In this study, 12 participants with a median age of 52.5 years were enrolled. All participants identified as White, and the majority (83.3%) of participants had received the COVID-19 vaccine. They all consumed greater than 80% of the prescribed mushroom supplement. Four themes were identified: (1) Various symptoms experienced by patients with PCS, (2) Unable to perform daily activities due to symptom burden, (3) The AHCC supplement helped reduce symptoms and improve quality of life, and (4) Symptom improvement resulted in doing too much and crashing.

Conclusions: Patients with PCS often experience debilitating symptoms perhaps from dysfunctional NK cells. This pilot study provides insight on the symptoms experienced and a potential treatment to improve the quality of life for individuals with PCS.

Assessing Factors That Determine High Inpatient Utilization in the University of Kansas General Internal Medicine Clinic (KUMC GIMC) - A Quality Improvement Needs Assessment

Many hospitalizations may be considered ambulatory care sensitive conditions (ACSC) - which could be treated on an outpatient rather than inpatient basis with high quality and accessible primary care services. At the KUMC GIMC, our patients utilize inpatient services at a rate that is well above national benchmarks. We sought to better understand this problem by performing a QI quantitative descriptive, which analyzed retrospective chart reviews of patients with at least 2 inpatient admissions within the last 12 months. Variables analyzed included patient's route of admission, presenting complaint, discharge diagnosis, comorbidities, and ACSC case classification among others. Data was collected from 239 patients. The most common ACSC related admissions were determined to be complications of congestive heart failure (10.5% of total cases), hypertension (5.44%), diabetes and chronic obstructive pulmonary disorder (COPD) (5.02%). Most patients were admitted through the ED (74.1%) with only 20.5% admitted directly from clinic. Patients had multiple comorbidities with hypertension (73.6%), heart disease (52.8%), and CKD (40.3%) as the top three. Essentially, we found that approximately 38% of the total admissions within the last 12 months were from an ACSC complication which can be avoided through high quality, accessible primary care. As the next cycle in this quality improvement
project, we plan to create comprehensive care plans for the most common ACSC: CHF, Hypertension, Diabetes, and COPD with the goal of improving care outcomes and reducing unnecessary inpatient care that increases the risk to iatrogenic harm and excessive financial costs.

#40 Quinn Krause Email: qkrause@kumc.edu Mentor: David Naylor, MD.

Functional Evaluation using Enhanced Techniques for Precision Imaging in Climbing Shoes
Climbing shoes are associated with increased rates of foot pathologies. However, intracorporeal imaging of feet in climbing shoes is limited, and no imaging of feet engaged in rock climbing exists. Thus, we developed a novel imaging technique using weight-bearing CT (WBCT) to compare joint angle differences in weight-bearing standing and weight-bearing climbing position. Recreational rock climbers (n=24) from the Midwest were recruited. Survey data was collected on climbing habits and street/climbing shoe usage. Participants were scanned using the Planmed XFI WBCT in a standing position with climbing shoes and while engaged on a small, gym-style rock climbing wall placed inside the CT scanner. Joint angle was measured for hallux valgus angle (HVA), interphalangeal angle (IMA), and first intermetatarsal angle (IPA). HVA and IMA were selected due to clinical correlation with hallux valgus deformity, common among rock climbers. Participants' mean age was 36 (SD=11). Median measured climbing shoe size was smaller than reported street shoe size (EU 41 vs 42.5, p<0.001). Participants reported climbing 2.8 times per week for 6.8 hours per week. In the standing position, the mean HVA=20.2° (SD=6.92), IPA=15.3° (SD=6.64), and IMA=9.9° (SD=1.60). In the climbing position, the mean HVA=20.5° (SD=7.84), IPA=18.7° (SD=6.69), and IMA=11.6° (SD=2.17). Both IPA and IMA were estimated to be significantly greater in the climbing position than in the standing position (p<0.001 for each). This novel approach allowed an inside examination of foot architecture while standing and engaged on rock-climbing footholds. Climbing shoes were found to cause more excessive joint angulation while climbing.

#41 Nicholas Drosos Email: ndrosos@kumc.edu Mentor: Arun George, MD.
Anesthesiology Considerations and Management of Venous Air Embolism in Patients in the Semi-Sitting Position: A Single-Center Review
This review presents a comprehensive analysis of semisitting craniotomies performed at The University of Kansas Medical Center, with an emphasis on anesthesia management and the complications associated with the semisitting position. Semisitting craniotomies are favored for providing optimal surgical exposure and minimizing intracranial pressure. However, the position is associated with a variety of risks, most notably venous air embolism (VAE). Reducing the risk of these complications and optimizing management when they occur is imperative. The review includes information from 93 semisitting craniotomy patients from the years of 2018-2023. It focuses on the anesthesia protocols employed, intraoperative monitoring techniques, and the incidence and management of VAE. The data reveal that while the semisitting position offers significant surgical advantages, it requires rigorous adherence to specialized anesthesia practices to mitigate the risks of VAE. These include preoperative assessment for patent foramen ovale, intraoperative transesophageal echocardiography for VAE detection, and specific air embolism management protocols. The findings underscore the importance of a multidisciplinary approach,
involving neurosurgeons, anesthesiologists, and nursing staff, to optimize patient outcomes. The review also highlights the need for continuous education and training in the recognition and management of position-related complications. Our experience suggests that with appropriate precautions and expert care, the semisitting position can be safely utilized, offering considerable benefits in semisitting craniotomy cases.
Targeting HuR-mediated mRNA decay protects mice against diethylnitrosamine-induced liver carcinogenesis

Hepatocellular carcinoma (HCC) ranks as the fifth most prevalent cancer globally and is the third leading cause of cancer-related mortality, boasting a dismal 5-year survival rate below 20%. Recognizing the urgency for innovative therapeutic approaches, this study delves into the role of the RNA-binding protein, human antigen R (HuR), known for influencing mRNA decay and impacting cancer survival outcomes. Our focus is to elucidate the link between HuR and the activation of oncogenic pathways, with the goal of identifying HuR as a potential target for HCC treatment. To induce HCC, 14-day-old HuRflox/flox and Shpflox/flox male mice were injected with carcinogen diethylnitrosamine (DEN) followed by AAV8-Tbg-Cre or AAV8-Tbg-Null at 2-months-old to create hepatocyte-specific HuR and Shp knockouts (HKO represents Tbg-Cre positive) or wildtype controls (WT represents Tbg-Cre negative). Results demonstrated a reduction in liver tumor formation and proliferation in HuR-HKO mice. RNA-sequencing revealed downregulated oncogenic pathways and upregulated pathways related to drug metabolism in HuR-HKO compared to controls. Notably, Shp-HKO increased tumor development, with downregulation observed in the tumor suppressor p53 signaling pathway. Furthermore, we introduced KH3 (50mg/kg, 5x/week, PO), a newly synthesized HuR inhibitor, into our study to treat Shp-HKO and Shp-WT mice. Treating mice with KH3 showed a significant reduction in tumor formation and pro-inflammatory markers, irrespective of genotype. In conclusion, our research highlights HuR as a key facilitator of pro-oncogenic pathway activation in HCC. The targeted inhibition of HuR with KH3 emerges as a promising strategy, effectively mitigating tumor development and offering novel avenues for HCC treatment.

JayDoc Free Clinic: ACE Scores and Pregnancy Outcomes

JayDoc Free Clinic offers a Women's Health Initiative Program (WHIP) Night that aims to provide quality obstetrics and gynecological care to underserved populations in the greater Kansas City area. Significant stressors before the antepartum period and adverse childhood experiences (ACEs) have been associated with adverse maternal health outcomes. Here, we investigated the relationship between ACE scores associated with adverse pregnancy outcomes at a free clinic compared to The University of Kansas Health System, a large academic hospital. Participants were 14 antepartum patients receiving care through WHIP Night. ACEs were self-reported during the patient's appointment and pregnancy outcomes and demographics were collected following
birth via a chart review. ACE scores were correlated with adverse pregnancy outcomes. WHIP Night participants' demographics, ACEs, and adverse pregnancy outcomes were cross-analyzed against those collected from The University of Kansas Health System (371 participants). Preliminary data suggests fewer individuals who marked at least one adverse child experience at WHIP Night (28.57% with at least one ACE) compared to The University of Kansas Health Systems (36.68% with at least one ACE). Of participants who reported Hispanic ethnicity, 30.77% reported at least one ACE at WHIP Night compared to 24.49% who reported at least one ACE at The University of Kansas Health System. These differences were not statistically significant. Preliminary data suggests that patients receiving prenatal care at a student-run free clinic do not have higher ACE scores compared to those receiving care at a large academic medical center.

#3 Joseph Pyle Email: jpyle3@kumc.edu Mentor: Peter Niedbalski, PhD.

**Repeatability of Hyperpolarized Xenon MRI in Stable Pulmonary Artery Hypertension**

Pulmonary artery hypertension (PAH) is a disease of pulmonary vasculature, leading to right heart failure and death. Right heart catheterization is the gold standard for diagnosis of PAH, but other methods of evaluating disease status are limited. Xenon MRI (XeMRI) is an imaging method enabling measurement of lung function, including gas uptake by red cells (RBC) and pulmonary tissue/blood plasma (membrane). Additionally, oscillations in RBC signal from XeMRI provide a measure of microvascular health. Patients with PAH exhibit reduced oscillation amplitude versus healthy individuals. This imaging method may provide a non-invasive measure of microvascular dysfunction; however, short- and long-term repeatability has not been assessed. This study examines same-day and 6-week repeatability of XeMRI in patients with stable PAH. 7 participants with PAH were imaged at baseline and 6-week timepoints. At baseline, imaging was repeated twice over 10 minutes. Standard gas exchange metrics were calculated, including RBC/Membrane, Membrane/Gas, and RBC/Gas ratios. RBC oscillation amplitude was calculated. 6 participants completed same-day imaging. 7 completed 6-week repeatability imaging. Same-day imaging showed strong correlation between RBC/Membrane (R=0.996, P<0.001), Membrane/Gas (R=0.92, P=0.009), and RBC/Gas (R=0.94, P=0.005) ratios, but poor repeatability for RBC oscillation (R=0.38, P=0.45). 6-week imaging showed strong correlation between RBC/Membrane (R=0.93, P=0.003), Membrane/Gas (R=0.95, P=0.001), and RBC/Gas (R=0.89, P=0.007) ratios, but poor repeatability for RBC oscillation (R=0.24, P=0.6). Gas exchange metrics are highly repeatable in patients with PAH in both same-day and 6-week XeMRI imaging, but RBC oscillation demonstrated poor repeatability at both timepoints, highlighting the need for further research in this area.

#4 Nicholas Dombrowski Email: ndombrowski@kumc.edu Mentor: Vafa Behzadpour, MD.

**Baseline Hip Internal Rotation Measurements in Asymptomatic Baseball Athletes: A Systematic Review with Implications for Training and Rehabilitation**

Deficits in hip range of motion (ROM), particularly internal rotation (IR) of the nondominant leg, have previously been shown to be associated with increased risk of injuries. Prevention programs aimed at increasing hip ROM have been proposed to reduce injury in baseball athletes, but the ideal target population is unknown. The aim of this systematic review was to examine hip IR ROM...
of different-aged baseball athletes to assess which group has the greatest risk of injury. The systematic review was conducted through September 2023. Key words in the search included: "hip" AND "baseball" AND "internal rotation" OR "medial rotation." For data analysis, studies were grouped into four categories based on the mean age of the participants within the study. College-aged and professional populations were stratified to pitchers and position players, and measurements were compared bilaterally. A total of 23 articles and 2196 bilateral hip IR ROM measurements met inclusion criteria. A substantial decrease in bilateral hip IR ROM was seen between the youth and high-school-aged populations and a substantial increase in bilateral hip IR ROM was seen between the college-aged and professional populations. The findings suggest a successful intervention for increasing hip IR ROM in professional populations. There may be a lack of effective injury prevention programs at the high school and collegiate levels. Future research should be conducted into professional injury prevention programs, and how to modify them for lower-level populations where resources are less readily available due to time and budget constraints.

#5 Kinsley Ochsner Email: kochsner@kumc.edu Mentor: Jordan Keys, MD.

Puppies and PICCs: A Rare Development of Infantile Pasteurella Multocida Bacteremia, Empyema, and Nosocomial Stenotrophomonas Maltophilia Septicemia

Introduction: Pasteurella multocida (PM) classically presents as local cellulitis or abscess inoculated via animal bite. Most patients recover; however, rarely some patients develop life threatening complications due to hematogenous spread. Case Presentation: An eight-month-old infant living with two dogs presented to an outside hospital after developing a fever of 103°F. Pain was localized to left-lower-extremity with an MRI concerning for cellulitis. Blood cultures were obtained, and broad-spectrum antibiotics started at the outside hospital prior to transfer. Culture results were positive for PM. A lumbar puncture demonstrated pleocytosis, concerning for meningitis. The head MRI depicted bifrontal subdural empyemas requiring craniotomy for washout. Patient was discharged with a PICC-line on IV ceftriaxone based upon culture susceptibility. The repeat brain MRI revealed near-complete resolution of the bifrontal subdural collections. Despite initial improvement, the patient was re-admitted for sepsis rule-out due to a fever in the setting of a central-line. The central-line and peripheral blood cultures revealed Stenotrophomonas maltophilia septicemia. Treatment included a two-week TMP/SMX course and removal of the compromised PICC-line. Discussion: Classic cases of PM present with local cutaneous manifestations, with only 7.8-11% disseminating to blood. Few cases of hematogenous spread resulting in subdural empyemas are reported. Patients with severe manifestations of PM should be vigilantly monitored for further complications caused by Stenotrophomonas maltophilia, a multi-drug resistant and morbid bacterium, which takes advantage of immunocompromised and patients with central venous lines. This case highlights the importance of understanding the potentially life-threatening complications of PM and complications from having a central line placed.
**Variability of Rehabilitation Protocols for Ulnar Collateral Ligament Repair with Suture Tape Augmentation**

Background: The ulnar collateral ligament (UCL) is frequently injured in overhead throwing athletes, leading to elbow instability, pain, and decreased performance. Augmenting with suture tape provides a novel approach to UCL repair, offering stability while preserving native anatomy, proprioception, and minimizing bone loss, with the added benefit of a faster rehabilitation and return to sport (RTS) compared to traditional reconstruction. The purpose of this study is to assess the variability of the rehabilitation protocols for UCL repair with suture tape augmentation. Methods: A systematic review of Google and PubMed was performed to find rehabilitation protocols for UCL repair with suture tape augmentation. 209 orthopedic surgery residency programs were identified and an additional literature search of journal databases for suture tape augmentation rehabilitation protocols was conducted. Results: 15 rehabilitation protocols met the inclusion criteria. 13 protocols outlined the use of an articulating brace at varying settings for the first 4-6 weeks following surgery. Return to throwing was included in all 15 protocols and began between 10-12 weeks following surgery. RTS was included in 14 protocols and projected athletes competing as early as 16 weeks with most protocols recommending RTS at 20 weeks. Conclusions: Rehabilitation protocols for UCL repair with suture tape augmentation were often structured around a 5-phase program with RTS around 20 weeks. They utilized immobilization as well as strengthening and gradual return to sport procedures. Overall, the included protocols had mild variability with initiation of throwing and RTS 12 to 24 weeks faster than traditional UCL reconstruction.

**Enhancing Peripartum Education in Expectant Adolescents: A Quality Improvement Project**

Information received throughout the peripartum period is often overwhelming and difficult to understand for newly expecting mothers. Improving patient understanding of this time-period is important for patient well-being. This project aims to measure improvement in patient understanding of breastfeeding, infant sleep, postpartum depression, and pain control within pregnant teens attending monthly group-learning sessions at Prenatal Access for Teens in High School (PATH) clinic. Methods: This study consists of a pretest survey obtaining demographic information about education level, experience caring for newborns, and baseline knowledge surrounding the planned education topics. Survey data will be recorded in RedCap with the patient’s name and DOB as identifiers. After delivery, a Likert-style post-test survey will be given to evaluate the improvement in knowledge and confidence levels, as well as evaluate patient satisfaction. Results: This is a Quality Improvement study specific to the PATH clinic. A convenience sample will be calculated, as well as a post-hoc power calculator to determine study power at the end of data collection. A series of t-tests will compare average levels of understanding and confidence from pre-test to post-test. There is currently not enough data to support a statistical analysis. This study will continue until enough data has been collected. Conclusion: In conclusion, it is expected that patient understanding of components of the perinatal period will improve following six group-based education sessions. Additionally, the
results may show that patient confidence in their ability to care for themselves and their child will improve following six group-based education sessions.

#8 Colette Worcester Email: cworcester@kumc.edu Mentor: Shane Stecklein, MD, PhD.

**Sphingosine kinase 2 modulates interferon pathways in triple-negative breast cancer cells**

Triple-negative breast cancer (TNBC) is aggressive and lacks targeted therapies. Radiation treatment damages DNA in tumor cells, which can elicit type I interferon immune responses through the stimulator of interferon genes (STING) protein. Enhancing STING can improve the effect of radiation on tumors, but the biolipid sphingosine-1-phosphate (S1P) produced by sphingosine kinase 2 (SphK2) was recently shown to inhibit STING in a non-cancer model. SphK2 is elevated in TNBC, but crosstalk between SphK2 and STING has not been studied in a TNBC context. In this study, we show that human and mouse TNBC cell lines have varying levels of SphK2 and STING. We engineered mouse TNBC cells to overexpress SphK2 (SphK2-OE), and proteomic analysis detected 4,726 proteins total. 435 proteins were significantly increased and 303 were significantly decreased in SphK2-OE compared to control cells. Proteins increased in SphK2-OE were enriched for pathways including protein localization, chromatin remodeling, positive cell cycle regulation, and autophagy. In addition, immune pathways were enriched, including tumor necrosis factor receptor signaling and regulation of interferon beta production. Additionally, we found a blunted response when human SphK2-OE cells were treated with a STING agonist. Compared to control cells, human SphK2-OE cells had decreased phosphorylated interferon regulatory factor 3, a protein downstream of STING activation. Overall, SphK2 may modulate DNA damage immune responses, and further study is warranted to understand SphK2 and STING crosstalk for therapeutic potential in TNBC.

#9 Bergen Mauerhan Email: b654m122@kumc.edu Mentor: Courtney Marsh, MD, MPH.

**Wearable Devices and Fertility: Investigating Sleep Parameters as Ovulatory Predictors**

The purpose of this project is to investigate the use of wearable devices as a tool for fertility tracking. Our aim is to determine whether sleep parameters could predict ovulation in healthy ovulatory individuals. Participants were invited to wear Garmin VivoSmart 4 devices for at least 3 complete menstrual cycles and report on a series of menstrual parameters, including an ovulatory test to confirm ovulation. Data was collected from N = 73 total individuals that met criteria for inclusion in the study. Sleep parameters were estimated directly from the Garmin devices and mobile application and included wake after sleep onset (WASO), total sleep time (TST), rapid eye movement (REM) sleep, light sleep, and deep sleep. Linear mixed-effect models adjusted for the nested structure of the data were used to assess associations between sleep parameters and menstrual cycle phases, including ovulatory window. A significant increase in deep sleep was observed during the ovulatory window compared to the follicular phase ($\beta = 0.49$, 95% CI [0.16, 0.81], $p = 0.003$), and a significant decrease in REM sleep duration was observed during the ovulatory window in comparison to the follicular phase ($\beta = -0.24$, 95% CI [-0.49, 0.00], $p = 0.046$). No significant differences in WASO, TST, or light sleep duration were observed across cycle phases. Sleep parameters including REM and deep sleep stages have potential as ovulation...
predictors and may be of use, among other variables, towards the development of a multifactorial 'bio-profile' to predict ovulation.

#10 Phoebe Fyffe Email: pfyffe@kumc.edu Mentor: Courtney Marsh, MD, MPH.

A Case-Control Study on the Impact of Progesterone Support Protocol Change for Frozen Embryo Transfers (FET)
The purpose of conducting this study is to evaluate the impact of progesterone support procedure change (patients with <10 vs <15 ng/mL) at the time of beta-human chorionic gonadotropin (β-hCG) pregnancy confirmation appointment 9-12 days post-frozen embryo transfer (FET). We hypothesize increasing the cut-off will lead to greater rates of positive pregnancy tests and positive birth outcomes (live vaginal or cesarean birth of term fetus). The main studied outcome is pregnancy outcome, and the accessory outcomes measured are chemical pregnancy, miscarriage, and ectopic pregnancy. We collected data on pregnancy risk factors, chronic medical conditions, lab tests, and other medical and demographic factors to obtain a comprehensive summary and assess risk factors. Preliminary analysis may be biased as we have not completed data collection yet and many of the tests have been run with a pre-protocol change-heavy data population. A current chi-square test indicates that 72.2% of women had a successful pregnancy in the pre-period compared to 43.8% of women in the post-period (p<0.001). A multivariable logistic regression that adjusts for risk factors found women were less likely to experience an outcome of live birth in the post-period compared to pre-period (aOR 0.3, 95% CI 0.17-0.51). We will complete data collection by April and then we will conduct another analysis. With this research, we intend to find a goal level of serum progesterone support cut-off to best assist future FET patients in improving their chance of chemical pregnancy and successful term delivery.

#11 Sunita Varghese Email: svarghese3@kumc.edu Mentor: Kyle Baumbauer, PhD.

Spinal Cord Injury-Induced Chronic Pain is Driven by a Central to Peripheral IL-1 Mediated Signaling Pathway
Spinal cord injury (SCI) is associated with the development of treatment-resistant chronic pain that most commonly presents below the level of injury. Novel therapeutics are essential to reduce risk of chronic pain development and improve functional recovery. We and others have shown that SCI causes an increase in below-level nociceptor hyperactivity that is associated with the development and persistence of below-level pain. The mechanism responsible for this increase in below-level nociceptor activity is not well understood, but whole transcriptome RNA sequencing of the spinal cord and DRG has suggested that SCI increases expression and release proinflammatory cytokine, IL-1β, at the site of injury, while its expression of its receptor, IL-1R1, is increased in below-level DRG. To test our hypothesis that spinal release of IL-1β causes below-level nociceptor hyperactivity and pain via activation of IL-1R1, we quantified SCI-induced changes in IL-1β and IL-1R1 protein expression in the spinal cord, DRG, and hind paw glabrous skin, DRG over time, and whether treatment with IL-1β neutralizing antibody (nAb) attenuates IL-1R1 expression in female mice with moderate thoracic contusion injuries. Immunohistochemical (IHC) analysis showed that nAb treatment at the time of SCI reduces IL-1R1 expression in below-level DRG neurons. However, nAb treatment did not significantly reduce
spontaneous pain as measured by facial grimace. Interestingly, conditional deletion of Il1r1 from sensory neurons reduced spontaneous pain in male, but not female, mice. Collectively, our data suggest attenuating afferent-specific IL-1β signaling reduces SCI pain in male mice.

#12 Christopher Park Email: cpark4@kumc.edu Mentor: Adam Rouse, MD, PhD.

Examining the Relationship between DTI Tractography and Epilepsy Localization

Epilepsy localization is critical in surgical intervention for patients with drug resistant epilepsy (DRE). Current presurgical workup includes scalp EEG and stereo EEG, brain MRI, PET, neuropsychological examination, and more to establish localization. However, information from these studies sometimes provides equivocal conclusions. We aim to provide additional predictive power by using DTI tractography as a tool to establish epilepsy laterality. We used fractional anisotropy (FA) values as a proxy for white matter tract organization. We hypothesized abnormal white matter tracts (low FA values) can lateralize a patient's epilepsy. We obtained and retrospectively analyzed FA values for 17 white matter tracts from the bilateral hemispheres of 73 patients undergoing pre-surgical workup for DRE. We found the hemisphere with smaller FA values corresponded with the determined localization of the epileptic hemisphere 76.8% of the time. Furthermore, when FA value differences between hemispheres were >2.5 standard deviations, the localization accuracy increased to 86.7% of the time. This study suggests FA values may provide evidence for epilepsy laterality localization with higher specificity as differences between FA values increase.

#13 Vinay Thiagarajan Email: vthiagarajan@kumc.edu Mentor: Timothy Smith, MD.

Analyzing the Effectiveness of Mobile Text Messaging Campaigns on Health Outcomes of Vulnerable Populations

Amidst the rise of mobile health interventions like telehealth and texting, patients have gained tools for remote health management. However, this rapid rise has also widened the technological gap in access among various demographics, potentially impacting healthcare management and result in poorer outcomes for those with less access. While prior research recognizes the benefits of such interventions, understanding their impact on vulnerable populations remains critical. To further investigate this area, this study examines KUMC patients' utilization of the Well Health texting service and its relationship with social determinants of health. A retrospective cross-sectional study design will be employed to measure the completion of well child visits before and after the text messaging health intervention was introduced. We are currently working with Artera to gather the appropriate data from KUMC's well child texting campaign before moving forward with analysis. We have also conversed with KUMC's HERON team to extract KUMC pediatric patient data, supplementing the Artera data. Once data is collected, it will be stratified based on demographic indicators (e.g. race, socioeconomic status, primary language). Chi Square tests will be used to analyze categorical variables, t-tests for continuous variables, and regression analyses to identify demographic factors influencing well child completion and their correlation strength. Based on the conclusions made, a major implication would be to expand these text messaging interventions to other specialties at KUMC. Overall, this study holds promise for
advancing our understanding of the interplay between texting interventions and different populations and its effect on appointment attendance.

#14 Ethan Hunt Email: ehunt4@kumc.edu Mentor: Jennifer McRae, MD.

**Depression Screening at KUMC: Examining PHQ2/9 Positivity and Intervention**
The US Preventative Services Task Force recommends universal depression screening in primary care, often using tools like the Patient Health Questionnaire (PHQ2/9). This study assesses intervention frequency for screened, depressed patients and frequency of missed positive screens. A retrospective QI project at KUMC Internal Medicine Clinic examined adult patients diagnosed with depression from January 1 to December 31, 2022. It focused on individuals with PHQ2/9+ screening tests that lacked appropriately documented interventions or referrals. Provider notes were reviewed for those not meeting intervention criteria to identify false negatives. Significant differences were determined through qualitative analysis of the different outcome groups. Of 492 patient encounters, 35%(n=174) were PHQ2/9+, with 61%(n=107) receiving referrals or interventions correctly documented in the PHQ2/9 flowsheet tool. Chart review of the 39%(n=67) encounters that lacked Electronic Medical Record trackable interventions found that every patient had an appropriate intervention within the provider’s notes. Between groups, 75%(n=50) of the false negative intervention group and 14%(n=15) of the true positive intervention group started or continued medications. No significant differences were observed between common patient identifiers or raw PHQ2/9 scores. The 100% intervention rate challenged ideas that automatic screening would increase the rate of missed diagnosis in patients with positive PHQ2/9 scores. Evaluating trackable interventions suggested that 39% of patients did not receive adequate care; however, the issue was related to non-standardized documentation that could not be tracked by the EMR. A call for improved, standardized documentation is necessary for better analysis and ensuring quality care of the depressed patient population.

#15 Gwendolyn Schwein Email: gschwein2@kumc.edu Mentor: Chelsea Gorsline, MD.

**Induction Immune Suppression Therapy as a Predictor of CMV Reactivation in Solid Organ Transplant Patients**
Induction immune suppression therapy is a critical component of transplantation for solid organ transplant (SOT) patients. It serves to reduce the risk of allograft rejection by inhibiting the recipient’s immune system. Cytomegalovirus (CMV) is a herpesvirus and once infected, it lives latent in the host and can become reactivated in states of immune suppression. CMV is a common infection seen among SOT patients and may cause significant morbidity. In this retrospective cohort study, we reviewed adults who were transplanted at The University of Kansas Health System between January 1st, 2018, and December 31st, 2021, to determine predictors of CMV reactivation within one-year post-transplant (n=500). We reviewed demographics, comorbidities, immunosuppression, prophylaxis, and whether patients developed CMV reactivation. Specifically, we were interested in whether the type of induction immunosuppression was associated with CMV reactivation status. Preliminary data shows that of the 112 patients that developed CMV, the majority were men, the most common type of organ
transplanted was kidney, and the most common donor type was deceased donor. 65 patients received induction immunosuppression with thymoglobulin, 20 received basiliximab, 17 received methylprednisolone, and 7 received combination of basiliximab and methylprednisolone. Surprisingly, there were 2 patients in whom both the donor and recipient had never been exposed to CMV, yet the patient developed CMV within 1 year post transplant. Both patients received methylprednisolone for their induction and acyclovir for prophylaxis. Data collection is ongoing and will be followed by univariate and multivariate analysis to determine if these factors predict CMV reactivation.

#16 Jessica Keller Email: kkali17@kumc.edu Mentor: Debra Sullivan, PhD, RD.

Impact of an 8-Week Well-Formulated Ketogenic Diet on Advanced Lipid Biomarkers Associated with Atherosclerotic Cardiovascular Disease Risk

Atherosclerotic cardiovascular disease (ASCVD) is a subcategory of cardiovascular disease—the leading cause of death in America. Ketogenic diets (KDs)-high fat, low carbohydrate diets-are popular eating patterns, but results are mixed regarding KDs impact on ASCVD risk. Advanced lipid biomarkers better identify ASCVD risk than standard panels, though many KD studies report standard results. This 8-week, single-arm pilot study investigated how a nutrient-dense, well-formulated KD (WFKD) impacted advanced lipid measures. We analyzed data from 19 non-smoking, healthy adults. We compared baseline and 8-week measures of total cholesterol (TC), LDL cholesterol (LDL-C), small-LDL cholesterol (LDL-small), HDL cholesterol (HDL-C), apolipoprotein B100 (ApoB), triglycerides (TGs), and non-HDL-cholesterol (non-HDL-C) using paired t-tests. Within the total sample (n=19; 43.3 ± 7.8 years; 73.7% females), ApoB (12.7 ± 14.72, p=0.001), TC (20.1 ± 38.89, p=0.04), and LDL-C (25.2 ± 27.29, p<0.001) increased. LDL-small (16.6 ± 98.44, p=0.47), HDL-C (-4.3 ± 13.20, p=0.17), TGs (-12.3 ± 38.48, p=0.18), and non-HDL-C (27.8 ± 36.09, p=0.18) did not change. Among compliant (serum beta-hydroxybutyrate level ≥0.5mmol/L) participants (n=16; 43.2 ± 8.5 years; 68.8% females), ApoB (14.4 ± 15.14, p=0.002), TC (24.6 ± 40.09, p=0.03), LDL-C (26.9 ± 29.20, p=0.002), and non-HDL-C (30.7 ± 38.64, p<0.001) increased. LDL-small (19.6 ± 106.21, p=0.47), HDL-C (-4.2 ± 12.95, p=0.22), and TGs (-7.9 ± 38.68, p=0.43) did not change. This suggests a WFKD may increase LDL-C and ApoB without increasing highly atherogenic LDL-small and TGs. Larger, longer KD interventions should explore advanced lipid results while considering diet quality and genetic factors.

#17 Riley Peterson Email: rpeterson6@kumc.edu Mentor: Warren Nothnick, PhD.

Investigating Potential Risk Factors Associated with Adenomyosis Pathophysiology.

Adenomyosis is a non-neoplastic uterine disease characterized by the invasion and migration of endometrial glands and stroma into the myometrial layer of the uterus. Gaps in knowledge of adenomyosis pathophysiology stem from a lack of standardized diagnostic criteria, animal models, and a lack of mechanistic understanding. Aware of these critical gaps in knowledge, us and our collaborators identified a transcription factor, Re1 Silencing Transcription Factor (REST), as a potential regulator of a tissue remodeling cascade contributing to adenomyosis pathophysiology. In preliminary immunohistochemistry stains, REST was shown to be significantly reduced in endometrial and myometrial cell types. To begin further addressing these
gaps in knowledge, our lab has created a novel, conditional Rest knockout mouse model, Restfl/flPgrCre/+, to investigate a hypothesized tissue remodeling pathway. Using this mouse model, we are also investigating risk factors associated with adenomyosis development such as age and uterine surgery. Our studies demonstrate that with age, downstream targets of Rest, Mmp-24 and Reck, are significantly mis-expressed in our conditional knockout model compared to our controls. Restfl/flPgrCre/+ mice demonstrate an increase in Mmp-24 at 6-, 9-, and 12-months of age. This has been further confirmed through immunohistochemical analysis with H-Score. While investigating the effects of surgical uterine trauma on adenomyosis development, we made the critical observation that regardless of genotype, mice develop adenomyosis-like uteri post-surgery. Further analysis is currently being conducted in our novel conditional knockout mouse model to investigate the effects of our hypothesized Rest-mediated tissue remodeling cascade in connection to uterine trauma on adenomyosis pathophysiology.

#18 Levi Cohen  Email: lcohen3@kumc.edu  Mentor: Selina Gierer, DO.

Alpha-gal IgE in risk assessment for predicting cetuximab induced hypersensitivity reactions

Anaphylaxis is a severe life-threatening immunoglobulin E (IgE) mediated type I hypersensitivity reaction. Galactose-α-1,3-galactose (alpha-gal) is a carbohydrate moiety on mammalian meat products responsible for delayed severe allergic reactions, including anaphylaxis, after mammalian meat consumption due to IgE antibodies directed against alpha-gal. Cetuximab, a monoclonal antibody to epidermal growth factor used as adjunctive treatment of metastatic cancers, has been associated with severe reactions, including anaphylaxis, that may be mediated by pre-existing IgE antibodies cross-reactive with cetuximab. Studies have shown that the antibodies are specific for alpha-gal, and there is data to suggest that alpha-gal IgE can predict cetuximab induced anaphylaxis. However, using alpha-gal IgE as a screening tool to identify at-risk patients prior to their initial dose of cetuximab is evolving. Our aim was to determine rates of testing alpha-gal IgE in patients receiving cetuximab who had documented adverse reactions within our tertiary care center. We conducted a retrospective chart review to determine if testing alpha-gal IgE was obtained on patients who had an adverse reaction to cetuximab between 2015 and 2023. We collected data on reaction characteristics and evaluated the practices and policies for preventing reactions. Of 3598 patients who received cetuximab, 33 patients had documented adverse reactions (0.92%). Documentation of reaction characteristics varied. No patients had alpha-gal IgE testing recorded. Testing alpha-gal IgE prior to cetuximab use may be of utility in identifying patients at higher risk of adverse reactions, and we are now exploring implementing an alpha-gal IgE screening protocol for patients who require cetuximab treatment.

#19 Stephen Douglas  Email: sdouglas5@kumc.edu  Mentor: Chris Jehle, MD.

Understanding the Utility of 3D Printed Models when Teaching Scaphoid Fracture Repair

The introduction of duty hour restrictions has decreased operative experience for surgical residents and has created a need for new training techniques. Anatomic models created using 3D printing have already proven useful in healthcare for patient education and preoperative planning, and there is a growing body of evidence suggesting their utility in surgical education. To date, most studies have been focused on craniomaxillofacial surgery. However, few studies
demonstrate the use of 3D printed models for the training of hand surgery and none involve reduction or fixation of carpal bones. Our study aims to demonstrate the utility of 3D printed models for training surgical residents on reduction and fixation of scaphoid fractures. We created a training model using CT data of a carpus and hand with a scaphoid fracture that consists of 3D printed bones encased in silicone, constructed using a 3D printed mold. The model was designed to be easily replicated with little technical expertise. We plan on running an educational pilot where plastic surgery residents will perform a mini-open reduction and internal fixation of a scaphoid fracture four times. They will have access to standard surgical instruments and fluoroscopy. We hypothesize that each time a resident trains on the model they will improve their screw placement as measured by its relation to the scaphoid axis and decrease the time spent performing the procedure, demonstrating an accelerated learning curve.

#20 Henrietta Ehirim  Email: hehirim@kumc.edu  Mentor: Madhulika Sharma, PhD.

Targeting cognitive decline in chronic kidney disease (CKD)
Cognitive impairment is a common sequela in chronic kidney disease (CKD), yet therapies targeting both cognitive decline and CKD progression are currently lacking. Nephrin, a podocyte protein crucial for maintaining the integrity of the glomerular filtration barrier (GFB) in diabetic nephropathy, is also expressed in brain cells near the blood-brain barrier (BBB), suggesting potential shared molecular events that have not been thoroughly investigated. Building on the diabetic nephropathy model, we hypothesize that disruptions in the GFB and BBB stem from common, targetable molecular pathways, and that aldosterone inhibition with spironolactone, known to ameliorate CKD, may also mitigate cognitive decline. Utilizing the db/db mouse model of diabetes, which exhibits both CKD and cognitive decline, we treated mice with spironolactone for 3 months and evaluated disease progression. Spatial transcriptomics of brain and kidney tissues from db/db and wildtype (WT) control mice were conducted to identify shared cellular pathways disrupted in both organs. Our findings indicate that spironolactone treatment improves histological features of both kidney and brain tissues in db/db mice, and affects nephrin levels. Spatial transcriptomics reveal common genes in cells adjacent to the BBB and GFB in both kidneys and brains. Preliminary conclusions: 1. Spironolactone may treat both CKD and cognitive decline concurrently in diabetes. 2. Common cellular pathways near the BBB and GFB may be disrupted in diabetic nephropathy, leading to molecular leakage through both barriers, causing cognitive decline and proteinuria, respectively. Thus, drugs that target these pathways may simultaneously improve both CKD and cognitive decline.

#21 Helena Szymborski  Email: h54027@kumc.edu  Mentor: Jill Hamilton-Reeves, PhD, RD.

Changes in IL-6 Signaling in Periprostatic Adipose Tissue Following Weight Loss Intervention
Interleukin 6 (IL-6) production by periprostatic adipose tissue (PPAT) may help explain the higher morbidity/mortality among obese men with prostate cancer compared to men of normal weight. 40 men with newly diagnosed prostate cancer, scheduled for radical prostatectomy enrolled in a prospective randomized controlled trial, were randomly assigned to the intervention (coaching by a registered dietitian, dietary education, meal replacements, an accelerometer, and a wireless body scale connected to a mobile app) or control (standard diet and exercise information) group.
Beginning 4-16 weeks pre-op to 6 months post radical prostatectomy. Biomarkers including IL-6 were measured in peripheral blood at baseline, 1 week before surgery, and 6 months post-op. PPAT collected at the time of surgery was digested, filtered, and adipose stromal cells (ASCs) were isolated and cultured for 5 passages, the 3rd passage was used for RNA analysis. An RNeasy kit (Qiagen) was used to extract RNA, and a NanoDrop Eight Spectrophotometer (Thermo Scientific) was used to quantify the RNA. RNA analysis was performed using a NanoString PanCancer Immune Profiling Panel. Changes in gene expression were compared between study groups using Ingenuity Pathway Analysis (IPA) (Qiagen). There was not a statistically significant difference in peripheral IL-6 levels between control and intervention (p=.8519). IPA analysis predicted decreased IL-6 would inhibit SOCS3, and activate SHC1. Weight loss may correlate with lower morbidity/mortality from prostate cancer due to lower levels of paracrine proinflammatory and tumorigenic cytokines such as IL-6 leading to fewer downstream effects.

#22 Anna Carlson Email: acarlson11@kumc.edu, Brenda Aguirre Apodaca Email: baguirreapodaca@kumc.edu Mentor: Laurel Witt, MD.

Obstetrical Services Offered in Nonurban Kansas Counties
Access to obstetrical care is vital for optimal pregnancy outcomes. Poor access to obstetrical care is associated with pregnancy complications and higher costs of care. A previous study conducted by the University of Kansas in 2015 showed a decline in obstetrical services in nonurban Kansas Counties. The current project sought to reinvestigate obstetrical services in nonurban Kansas Counties and compare how these services have changed since 2015. Data was collected by survey, and all 93 non-urban hospitals in Kansas were included. The response rate was 86%. Variables measured included the number of providers with privileges to deliver babies, providers that have expressed plans to retire in the next 1-5 years, providers that have stopped offering obstetrical services since 2015, and explanations of why the institution anticipated continuing or discontinuing obstetrical services in the next 10 years. Participants had the opportunity to provide additional narrative comments. Since 2015, rates of obstetrical service provision in nonurban Kansas counties have declined from 86% to 79%, a change that demonstrated statistical significance (p=0.003). Birth rates in non-urban Kansas counties have also declined (p=0.002). The decline of obstetrical services provision in rural Kansas may impact pregnancy and birth outcomes, increase costs of care, and increase the distance women must travel for care. This finding, along with declining birth rates, may impact rural hospitals' ability to maintain obstetrical units.

#23 Muriel Lund Email: m370l535@kumc.edu, Hannah Coggeshall Email: hcoggeshall@kumc.edu Mentor: Sarah Dreibelbis, MD.

The Impact of the Dobbs Decision on Access to Gender Diverse Care at a Midwest Academic Health Center
Abortion care in the Midwest occurs mainly at free-standing family planning clinics (FPCs), who often also provide gender diverse care. The 2022 Dobbs decision allowed states to ban abortions, resulting in FPCs treating higher volumes of patients seeking abortion care, which impacted
clinics' ability to provide non-abortion care. This study evaluates how laws restricting abortion care impacted access to gender-affirming care. A retrospective chart review was performed of electronic medical records of patients 18 years/older seen at a single academic health center's gender diversity clinic (GDC) and general gynecology clinic between July 1, 2021, to June 30, 2023. We summarized patient characteristics descriptively. For patients seeking a gender diverse care appointment, we compared the time from calling to schedule an appointment to the appointment date in the 12 months pre vs post Dobbs decision. We collected and compared differences in distance traveled for patients pre- and post-Dobbs using repeated measures linear regression models. Preliminary analysis was performed on 580 charts (280 of charts pre-Dobbs, 300 post-Dobbs). Most (477/580, 82%) had private insurance, and 93% (538/580) identified as Caucasian. Most (337/580, 58%) of the population reported marital status as single. Wait times were shorter post-Dobbs for patients to be seen in the GDC (52 days pre-Dobbs vs 35 days post-Dobbs, p = 0.0002). Laws restricting abortion care have not impacted access to gender-affirming care, evidenced shorter wait times. This may be related to the use of telemedicine. Ongoing analysis will show if patients traveled farther post-Dobbs for gender diverse care.

#24 Amelia Cooper Email: acooper13@kumc.edu Mentor: Joseph Pleen, DO.

Effects of insulin on mitochondrial dynamics in neuronal stem cells
Variants of the apolipoprotein E (APOE) gene impact the risk of developing late onset Alzheimer's disease (AD) and influence mitochondrial dynamics. Proper mitochondrial dynamics is essential for mitochondrial functioning and neuronal survival. Moreover, there is an established association between insulin deficiency and resistance with neurodegeneration. Yet there is little data on the impact of insulin on mitochondrial functioning in the setting of different APOE genotypes. This study aims to show that there are significant differences in mitochondrial dynamic protein expression levels in induced pluripotent stem cells (iPSCs) with different APOE genotypes. Utilizing Crispr edited iPSCs from the same cell line and changing only APOE genotype, we compare mitochondrial dynamic protein level purely on insulin response. We predict that all iPSCs will respond to insulin through an increase in mitochondrial fusion, which is thought to be protective in neurodegeneration, and that protective APOE mutations, namely APOE Christchurch (Ch/Ch), will produce more fusion proteins. Proteomic analysis of liquid chromatography tandem mass spectrometry (LC-MS-MS) data showed that insulin increased mitochondrial fusion protein OPA1 in APOE Ch/Ch iPSCs, decreased OPA1 in APOE 3/3s, and had no effect on APOE 4/4s. Regardless of insulin treatment, the APOE 4/4s expressed higher levels of fission protein Drp-1 compared to APOE 3/3s, indicating that APOE 4/4s tend to fission. This data suggests that APOE genotype differentially impacts both mitochondrial dynamics and responses to insulin treatment. Additionally, the protective effects of APOE Ch/Ch may be mediated through mitochondrial dynamics. Further studies need to be conducted in differentiated neurons.
Spectrum of Cardiovascular Disease in an Urban Medical Student-Run Free Cardiology Clinic

Introduction: The monthly JayDoc Free Cardiology Clinic launched in October 2022 and offers patients access to free medical care, cardiac-specific medications, echocardiograms, device interrogations, event monitoring, and more. This clinic’s goals are to decrease the use of the emergency room as a source of primary care, minimize cardiovascular re-admissions, and decrease the financial burdens of cardiovascular disease management. This research was conducted to better understand the demographics and clinical characteristics of the population the clinic served in its first year, so as to define the cardiovascular disease spectrum in the urban underserved community in Kansas City.

Methods: A retrospective analysis was conducted over the 17 cardiology clinics from October 2022 to January 2024. Demographics, medications, medical diagnoses, and symptoms were collected from patient charts and recorded into REDCap. Patients under 18 years old were excluded.

Results: Of the 116 unique patients, 62% were male, 57% were English speakers, 38% were Spanish speakers, 42% were Hispanic, 26% were Black, and 24% were White. Patients were most frequently referred from The University of Kansas Health System (75%). The most common diagnoses were heart failure with reduced ejection fraction (24%), heart failure with preserved ejection fraction (8%), and hypertension (7%). The most prescribed medications were statins (66%), beta-blockers (62%), and loop diuretics (46%).

Conclusion: This data provides insight into the characteristics of underserved patients needing cardiovascular care in the Kansas City area. By understanding this patient population, JayDoc Cardiology leadership can continue to advocate for resources that better serve the needs of patients.

Central Venous Catheter-Associated Complications in Pediatric Patients with Acute Myeloid Leukemia

Central venous catheters (CVCs) are mainstays of pediatric cancer treatment but can cause complications, including local-site infections and central-line-associated bloodstream infections (CLABSIs). Analyzing CVC-associated complication rates may inform future decisions about CVC choice. We hypothesized that tunneled-cuffed catheters (tunneled) have higher rates of CLABSIs than implanted ports (ports) and ports have higher rates of local-site infections than tunneled. A retrospective chart review identified patients diagnosed with acute myeloid leukemia (AML) at Children’s Mercy Hospital from 2010-2022. Demographic data and CVC details were collected. CVCs were categorized as tunneled, port, peripherally inserted central catheter (PICC), or other. One-tailed t-tests compared rates of CLABSIs and local-site infections per 1000-line days for port and tunneled catheters. ANOVA compared rates of non-infectious complications per 1000-line days for the three CVC types. Ninety patients identified included 48 females, 42 males; median age 7.54 years. Tunneled averaged 10.1 CLABSIs and 1.56 local-site infections per 1000-line days, and ports averaged 4.18 CLABSIs and 3.08 local-site infections per 1000-line days. t-tests showed significantly higher rates of CLABSIs for tunneled compared to ports (t=1.99, df=139, p=0.049), but a nonsignificant difference in rates of local-site infections. Non-infectious complications occurred 32 times, and ANOVA showed a significant effect of CVC type on instance per 1000-line
days (F=6.17, df=2, p=0.003). PICCs caused significantly more than ports (p=0.026) and tunneled (p=0.003). In this single center review, the choice of tunneled catheter increased risk of CLABSI but not local-site infections. The choice of PICCs increased the risk of non-infectious complications.

#27 Carlos Silva  
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Mentor: Terrence McIff, PhD.

Use of Staples in Hand and Wrist Surgery: a Literature Review
This literature review examines the utilization of bone staples in hand and wrist surgery with a focus on identifying their indications and summarizing their applications across various conditions. By synthesizing existing literature, this review aims to provide insights into the efficacy and potential benefits of bone staples in orthopedic procedures targeting the hand and wrist. Notable advantages over traditional fixation methods in indicated procedures include technical ease of application, reduced soft tissue dissection, and maximized healing surface area, potentially leading to improved patient outcomes in specific situations. The review discusses the current state of research, highlighting areas where bone staples have shown promise as viable surgical tools. Popular indications include correction of pediatric radial or ulnar growth discrepancies, fixation of traumatic injuries to the bone or ligaments of the hand and wrist, and management of arthritic degeneration. Furthermore, this review underscores the imperative for continued investigation and exploration of their utility to stimulate further advancements in orthopedic surgery techniques. Currently, many conditions of the hand and wrist requiring surgical fixation lack an optimal strategy. Therefore, continued research in this area may identify superior methods and contribute to enhanced patient outcomes. Through a comprehensive analysis of the literature, this review enhances understanding of the role of bone staples in hand and wrist surgery and encourages future research endeavors in this field.

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Mentor: Jesalyn Tate, MD.

Comparing Postoperative Outcomes in Dermatologic Surgery Patients Continuing or Discontinuing Direct Oral Anticoagulant Agents: A retrospective study
The use of direct oral anticoagulants (DOACs), such as apixaban, rivaroxaban, and dabigatran, has become increasingly common for dermatologic surgery patients. While dermatologic surgery has a low reported incidence of postoperative adverse events, bleeding/hemorrhagic events are among the most common, and antithrombotic agents are a contributing factor to these events. Guidelines for perioperative management of DOACs for dermatologic surgery patients are currently unclear. We performed a retrospective study investigating outcomes of patients who had interrupted or uninterrupted DOAC therapy regimens prior to dermatologic surgery. Patients in the interrupted group discontinued their DOAC regimen 12-48 hours perioperatively. Primary outcomes were rate of arterial thromboembolism (ischemic stroke, transient ischemic attack, and arterial systemic embolism), recurrent deep vein thrombosis or pulmonary embolism, and bleeding complications. Secondary outcomes were death and myocardial infarction. Thirty patients were in the uninterrupted group and 51 patients were in the interrupted group. The interrupted group had no primary outcomes and 1 secondary outcome, a death due to heart failure 26 days
postoperatively. There were no significant differences in primary or secondary outcomes in the two study groups. While our results corroborate previous findings indicating the low thrombotic risk of perioperative DOAC interruption in a dermatologic setting, prospective randomized controlled trials are needed before definitive conclusions can be drawn regarding perioperative management of DOACs in dermatologic surgery patients.

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Time to Appendectomy: A Review of Disparities in Time to Appendectomy at a Midwest Hospital System

Background: Previous studies have indicated that Black patients wait longer for appendectomies after arrival to the hospital for appendicitis. Our study investigated whether race and ethnicity-related discrepancies in time to appendectomy exist at this Midwest institution. Methods: All appendectomies from July 2022 to September 2023 at The University of Kansas were analyzed. Using chart review, patient records were organized into self-reported race and ethnicity categories. Length of time from emergency department arrival to surgery start was determined for each patient, and the average elapsed time was calculated in minutes for each category.

Results: Our study included 119 patients. Of these patients, 64 identified as White and 55 identified as non-White or Multiracial. Additionally, 77 identified as non-Hispanic and 40 identified as Hispanic. We found that from time of arrival to surgery, White patients were taken to the operating room an average of 42.6 minutes faster than non-White or Multiracial patients (832.5 minutes vs 875.1 minutes). Hispanic patients were taken to the operating room for appendectomies an average of 19.3 minutes faster than non-Hispanic patients (841.9 minutes vs 861.2 minutes). Further statistical analysis of significance is pending.

Discussion: This data showed that on average, patients who identify as White are taken to the operating room faster than patients of other races. Additionally, patients who are of Hispanic ethnicity are taken to the operating room faster than non-Hispanic patients. We hope this study will raise awareness regarding discrepancies in the provision of appendectomies in order to address them and improve patient care.

#30 David Fritz Email: jfritz3@kumc.edu Mentor: Amit Noheria, MBBS, SM.

Rates Of Lead Dislodgement And Complications With Adoption Of Left Bundle Branch Area Pacing At A Tertiary Care Center

Background: Left bundle branch area pacing (LBBAP) is preferable over right ventricular pacing (RVP) to help prevent pacing induced cardiomyopathy but is a comparatively challenging implantation procedure. Objective: We sought to determine the frequency of lead dislodgements and other complications with LBBAP vs. historical RV lead implantation. Methods: We performed a retrospective analysis of baseline/procedure characteristics and 3-month complications in patients who received LBBAP vs. historical RVP controls at The University of Kansas Medical Center. Results: 289 patients who underwent LBBAP between 2020-2023 were compared with 172 RVP controls who were implanted between 2018-2019. There was no significant difference in baseline characteristics other than female sex (38% female in LBBAP patients vs 51% in RVP controls, p=0.006). Most implantations were new devices but there were more device
upgrades/revisions (9% vs 2%, p=0.001) and biventricular implants (9% vs 1.7%, p=0.002) in the LBBAP group. Among new device implantations, procedure duration (102.1 ± 37min vs 66.5 ± 30 min, p<0.0001) and fluoroscopy times (9.3 ± 8.7min vs 6.9 ± 8.1min, p=0.006) were longer in the LBBAP group than RVP controls. There was no significant difference in complication rates between the two groups (p=0.4). Lead dislodgement was the most common complication (3.8% in LBBAP group vs. 2.3% in the RVP group, p=0.38). For LBBAP, 6 of 11 dislodgements were the LBBAP lead while in the RVP group, 1/4 dislodgements were the RVP lead. Conclusion: Despite LBBAP implantation being a more complex procedure, LBBAP does not increase the rate of lead dislodgement or other complications.

#31 Luke Prohaska Email: lprohaska@kumc.edu Mentor: Shelley Bhattacharya, DO, MPH.

Patient Transportation Barriers and Solutions at JayDoc Free Clinic
Background: JayDoc Free Clinic serves patients in Kansas City that experience difficulties with access to care. This study evaluated transportation barriers for patients at JayDoc via a survey tool. The goal of the study was to understand transportation difficulties for JayDoc patients and to obtain baseline data to use for grant applications to fund transportation programs. Methods: A prospective, cross-sectional study was used. Surveys were given to patients that presented to JayDoc clinic on "general medicine nights". The front desk distributed the survey, which asked Likert scale, categorical "yes" or "no", and transportation services questions. Results: A total of 230 patients completed the survey. Approximately 26.4% of patients had delayed medical care in the past year because they didn't have transportation. Around 15.2% answered that they delayed coming to JayDoc due to transportation difficulties, and 16% said they knew people that couldn't come to JayDoc due to transportation difficulties. Approximately 44.5% stated that it was occasionally a problem, sometimes a problem, or a major problem to find transportation. The cost of transportation was also an issue, with around 45.2% answering that it was at least occasionally an issue. Around 43.1% answered they would use a ride service that could offer pickup and drop-off services at the clinic and their home. Conclusion: Transportation barriers are preventing patients from receiving care at JayDoc, a safety-net clinic for many underserved patients in Kansas City. Improving JayDoc transportation resources will have a direct impact on patients' ability to access invaluable primary care.

#32 Megan Murray Email: mmurray6@kumc.edu Mentor: Timothy Ryan Smith, MD.

Evaluating PHQ-9 Implementation in a Pediatric Clinic
Rates of adolescent depression are increasing. In order to address this issue, patients need to be identified and appropriate interventions need to occur. This study aims to evaluate the recent implementation of the Patient Health Questionnaire (PHQ-9) depression screener in the University of Kansas Health System Department of Pediatrics as well as assess the ongoing completion of the screener in the Department of Family Medicine. The primary objective is to investigate the completion rates of the screener in each department. The secondary and tertiary objectives are to assess the outcomes of the shortened version of the screener against the full-length questionnaire and to evaluate if patients received interventions based on the results of the screener. A convenience sample evaluated patients with a well child, physical, new patient,
or return visit to the Department of Family Medicine or Department of Pediatrics for 3 months in 2023. Inclusion criteria included completed appointment in time frame, age between 12 and 18, and English and Spanish language preference as recorded in the electronic health record. Patients were identified through the electronic health record. Retrospective chart review was conducted to verify PHQ-9 scores, check for presence of chronic diagnoses, and investigate clinical notes for associated interventions. The analysis of this study is ongoing. Methods will include chi-squared tests as well as the student’s t-test. Significance (alpha) is set at .05 or 5%.

#33 Hannah Zerr Email: hzerr@kumc.edu Mentor: Amit Noheria, MBBS, SM.

Evaluation of Unipolar and Bipolar Left Bundle Branch Area Pacing
Background: Left bundle branch area pacing (LBBAP) recruits the cardiac conduction system from the left interventricular septum. LBBAP output can be programmed in unipolar or bipolar for some devices. In contrast to unipolar pacing, bipolar pacing can additionally recruit the right side of the septum. Objective: To compare differences in paced ECG with unipolar vs. bipolar LBBAP and compare with traditional right ventricular pacing (RVP). Methods: We retrospectively reviewed 288 patients who underwent a LBBAP lead implantation between 2020-2023 and 172 RVP controls from 2018-2019 at The University of Kansas Medical Center. These patients routinely get ECGs with unipolar and bipolar pacing polarity. We compared the paced QRS duration, left ventricular activation time (LVAT), and V6-V1 interpeak time between unipolar and bipolar LBBAP, and also with bipolar RVP controls. Results: Compared to RVP controls, LBBAP was associated with shorter paced QRS duration (118.9 ± 16.8 ms vs. 143.2 ± 23.2 ms, p<0.01) and LVAT (73.7 ± 18.1 ms vs. 87.5 ± 23.9 ms, p<0.01). LBBAP leads had a lower threshold (p<0.01) immediately after implant, though the difference in threshold disappeared by 3 months (p=0.52). The sensing was higher with LBBAP than traditional RV at 3 months (p=0.007). There were no statistical differences in the QRS duration, LVAT, and V6-V1 interpeak times with unipolar vs. bipolar LBBAP. Conclusion: LBBAP has better ECG synchronization than traditional RVP. There was no difference in QRS duration, LVAT, or V6-V1 interpeak time with unipolar vs. bipolar LBBAP.

#34 Gabrielle Crowell Email: gcrowell2@kumc.edu Mentor: Bryan Vopat, MD.

Auditing the Representation of Female Athletes in Sports Medicine Research: Rehabilitation Following Anterior Cruciate Ligament Reconstruction
PURPOSE: To systematically review the primary literature of rehabilitation following anterior cruciate ligament reconstruction, focusing on the representation of female athletes based on a standardized audit protocol. METHODS: A systematic audit was performed according to methods outlined by Smith et al 2022. This standardized review focused on rehabilitation after ACL reconstruction (ACLR). Identified studies were analyzed for the following factors: study population, male and female sample size, athletic caliber, menstrual status, research theme, journal impact factor, altmetric score, time to return to sport and rate of graft failure. RESULTS: Females made up 44.5% of the total population of participants. Female-only studies were absent while male-only studies accounted for 9%. Athletic caliber had an equal distribution between male and female participants, however, no studies investigated outcomes of athletes at the highest athletic calibers. Menstrual status was not considered or included as a variable in any
study. Most studies (69.7%) had a health research focus, while no studies focused on performance outcomes. Females are underrepresented in most studies looking at RTS timeline and graft failure rate in the setting of functional recovery after ACLR. CONCLUSION: Female representation in studies of rehabilitation following ACLR is lower than male representation in sports medicine literature. Even studies which include female athletes at near-equal rates, failed to account for the potential impacts of biological differences, such as the effect that menstruation, ovarian hormones, and other sexual dimorphisms may have on recovery after ACLR. Future research with improved methodology is needed to provide female athletes optimal rehabilitation.

**#35 Anchitha Honnur** Email: a873h809@kumc.edu Mentor: Andrew Pirotte, MD.

**Characteristics of Intubations in the Emergency Department**

Emergency intubation is a critical care procedure that carries risks, complications, and potential for future clinical sequelae. Skill level of the provider has been identified as a contributing factor for success (or complications) during intubation. This study aims to enhance provider skill through identification of common characteristics visualized during intubation. The Airway Video Database (AVD) was created as an open-access, free, online resource used to enhance airway education and improve patient safety for intubation. This project aims to identify airway characteristics during Emergency Department intubations. Once identified, the project authors aim to use this information to determine which pathways have the highest success rate and how this data can be used to improve intubation safety, efficiency, and provider experience. A retrospective case study analysis of 600 videos from the AVD was completed to determine patient characteristics such as conditions of intubation, number of intubation attempts, and intubation device used. The most utilized tools for emergency intubation evaluated in this study were: Malleable stylets, rigid/angled stylets, and bougies (Eschmann stylet). The bougie was determined to be the most common and successful tool with the lowest number of reintubation attempts. Continued review of the AVD will be a valuable learning tool to help providers optimize emergency airway management, assess what circumstances respond meaningfully to specific techniques or devices, and to allow real-time adjustments to enhance patient safety and provider experience. Studying these factors will help improve quality of care for intubations at the University of Kansas Health System and Health Center.

**#36 Andrew Luzania, Nathaneal Garcia** Email: aluzania@kumc.edu Mentor: Jacob Sosnoff, PhD.

**Arm Response in Experimental Falls Among Older Adults**

Recent data suggests upper limb (UL) bracing increases the risk of head injuries in long-term care residents. This contradicts the commonly held belief that UL use is protective against fall-related head impact and injury. This study analyzes natural UL response and head-to-ground impacts in experimentally induced falls among older adults. Participants underwent experimentally induced falls utilizing a standardized lean and release paradigm. They completed six falls with two to the right, left and backward. Falls were video recorded. Three independent researchers analyzed the video data for UL movement and head impact characteristics using a standardized Fall Video Response Tool. 166 falls were included in the final analysis. Of these, 35 falls exhibited no UL
movement, of which 32 (91.4%) exhibited head impact with 27 (84.4%) being "severe" impacts. The remaining 131 falls exhibited UL movement, of which 58 (44.3%) had head impact with 30 (51.7%) being "severe" impacts. Forearm was the primary (56/131) UL site of greatest energy absorption in falls with UL movement and correlated with 16.1% head impact frequency. Of the 46 falls with UL use but no apparent energy absorbed by UL, 33 (71.7%) had head impacts. Older adults tend to have UL response during falls. In experimentally induced falls, UL movement, particularly of the forearm, reduces the likelihood and severity of head-to-ground impacts. This study displays potential benefits of UL movement to prevent fall-related head injuries. Environmental factors may affect UL use in real-world falls, necessitating further study.

#37 Chelsey Schartz Email: cschartz@kumc.edu Mentor: Albert Poje, PhD.

The Effects of Paid Clinical Employment Prior to Medical School Matriculation on Happiness & Overall Well-being During Residency
Burnout among resident-physicians is correlated with increased medical errors, job dissatisfaction, depression, and suicide. Despite efforts to combat burnout, data indicates it continues to increase among U.S physicians. Suggested by limited studies, medical career exposure and perceived clinical skills aptitude correlates with job satisfaction. The present study hypothesized a beneficial relationship exists between prior clinical experience and overall well-being during residency. A cross-sectional and quasi-experimental study was completed at the University of Kansas Medical Center, utilizing the Professional Quality of Life (ProQoL) scale to measure resident physicians' Secondary Traumatic Stress, Compassion Satisfaction, and Burnout. Item analyses of 51 resident-physicians determined that 33% of responders' past clinical experience influenced their choice of residency specialty; however, influence did not differ by clinical experience ($\chi^2=0.2$, $p=0.9$). Our data discovered a trend towards decreased frequency of low Secondary Traumatic Stress rating with increased clinical experience ($\chi^2=5.6$, $p=0.06$). Of note, none of the resident responders scored in a pathologic range for Burnout, Secondary Traumatic Stress, or Compassion Satisfaction, though we did find 47% of female responders and 75% of male responders scored in the low range for Secondary Traumatic Stress ($\chi^2=3.1$, $p=0.08$). Evidenced through our study, the level of prior clinical experience was not related to Burnout or Compassion Satisfaction; yet, increasing professional responsibility in a clinical care setting was associated with significantly higher ratings for Secondary Traumatic Stress, especially in female respondents. Our results theorize clinical experience prior to medical school may contribute to psychological burden risk as future resident-physicians.

#38 Karthi Murari Email: kmurari@kumc.edu Mentor: Jeffrey Goldstein, MD.

Weigh Easy Study: Weight Tracking of Cleft Lip and/or Palate Infants
Background: Infants born with cleft lip and/or palate (CLP) often fail to achieve proper weight gain after birth and if allowed to persist, malnutrition and failure to thrive are likely to develop. This study aimed to evaluate the effectiveness of the 'Weigh Easy' system which provides families with a means to electronically report weekly weights directly to the Cleft Team, allowing for early interventions when needed. Methods: This experimental study included infants <12 weeks of age who presented to the Cleft Clinic with a diagnosis of CLP. Two cohorts were compared: a
prospective cohort that was provided with a scale and instructed to transmit their weekly weights through the institution's portal system and a retrospective control cohort whose weight was monitored by weight checks at their healthcare appointments. Results: The prospective group (n=22) was significantly less likely to have a weight destabilization loss compared to the retrospective group (n=131) (OR=0.09, 95% CI= 0.01-0.60, p=0.001 at 30 grams/day). From the Parent Satisfaction Survey (n=17), 94.1% of parents either strongly agreed or agreed that they preferred to weigh their child at home with the Weigh Easy Scale compared to having to commute to a publicly available scale. Conclusions: Providing families of infants with CLP a scale to use at their own homes allows the cleft team to collect more weight data from a child, and thus CLP infants have earlier interventions and less frequent, significant weight destabilizations.

#39 Remy Braun Email: rbraun2@kumc.edu Mentor: Terence McLff, PhD, MBA.

Comparative Study of the Mechanical Performance of 2-Tine and 4-Tine Stainless Steel Staples
Fractures are common orthopedic injuries affecting all ages. The efficacy of 2-tine staples in surgical fracture fixation is well documented, but discussion of the efficacy of 4-tine staples is lacking. This study compares the mechanical performance of 4-tine and 2-tine stainless steel staples in bending and examines pullout behavior. Specimens, comprised of two Garolite or Polyurethane blocks (35 x 15 x 12.7 mm) held together by one staple, were designed to simulate fractures. Specimens were tested in dorsal and lateral 4-point bending using an MTS-858 Mini Bionix II System (n = 5). Bending was applied at 1 mm/second until the testing apparatus reached 3 mm of axial displacement. Force and displacement were continuously recorded during testing. The moment produced at the center of each staple was calculated and functioned as an indicator for fixation stability. Photographs were also taken before and after each test. In dorsal bending, there was no difference in the moment between 4-tine and 2-tine staples (p = 0.3095). After testing, 2-tine staples fell out or were removed with minimal effort. 4-tine staples resisted removal and required significant effort to be pulled out. In lateral bending, 2-tine staples rotated and retracted during positioning and were unable to withstand a load. 4-tine staples maintained fracture fixation in lateral positioning. Additional investigation is necessary to further evaluate the mechanical performance of 2-tine and 4-tine staples in bending and torsion. The current findings suggest potential benefits with 4-tine staples in lateral bending scenarios.

#41 Cameron Duello Email: cduello@kumc.edu Mentor: Lyndsey Kilgore, MD, FACS.

Engaging the Pipeline: A Pilot to Introduce Under-Resourced High School Students to Healthcare
Introduction: With the goal of diversifying the physician workforce, medical schools have implemented pipeline programs aimed at recruiting more diverse candidates. However, these programs begin in college, long after many students of diverse backgrounds have been left behind through a myriad of barriers. The Building Approachable Surgical Experiences (BASE) outreach program was designed to showcase healthcare careers, with an emphasis on surgical subspecialties, to historically underserved high school students. This pilot program's goal was to increase high school students' interest and confidence in pursuing future medical and surgical
careers and provide a platform to initiate mentorship. Methods: Forty high school students from underrepresented in medicine (URiM) populations or medically underserved communities were invited to engage in hands-on clinical and basic operative skill workshops led by medical students. They also engaged in small group conversations centered on mentorship with surgical residents and faculty. Conclusion: This event allowed early exposure for high school students to surgical and medical specialties, clinical techniques, and surgical mentorship. From the connections made, students have developed mentorship relationships with physicians and have felt comfortable reaching out with questions regarding the steps required to seek entrance to medical school. This provides students from underrepresented populations an opportunity for direct insight and guidance to and through the path to becoming a physician. Based on qualitative feedback from students, their high school teachers, and administrators, this pilot program succeeded in providing a window into healthcare, using a format that was encouraging to students long before their time in medical school.
Periorificial Dermatitis: Patient Satisfaction on 1% Topical Metronidazole

Dermatologic conditions that primarily affect the facial region have profound impacts on individuals physical and emotional wellbeing. Despite its benign course, periorificial dermatitis (POD) significantly impacts patients' quality of life due to its prominence in the oral-facial region, along with its chronic and relapsing nature. This study investigates patient satisfaction with 1% topical metronidazole for treating POD, a condition prevalent in young women. Current treatment guidelines lack consensus, leaving clinicians uncertain about optimal management strategies. Topical metronidazole is commonly prescribed, but evidence on patient satisfaction remains limited. We are currently enrolling participants diagnosed with POD and assessing their satisfaction on 1% topical metronidazole. Our data collection is currently ongoing. We are administering a survey to participants at 30 and 90 days of treatment, evaluating patients' subjective ratings of redness, bumps, and overall discomfort caused by their POD. By prospectively evaluating patient-reported outcomes, we seek to provide valuable insights into the effectiveness of this treatment regimen from the patient's perspective. Understanding patient satisfaction with topical metronidazole is clinically relevant as it guides treatment decisions, improves patient-provider communication, and ultimately enhances treatment outcomes and patient satisfaction. POD can be emotionally distressing, impacting patients' self-esteem and mental well-being. Thus, identifying effective treatments that align with patient preferences is crucial for optimizing care and improving patient satisfaction. By addressing the gap in literature regarding patient satisfaction with topical treatment options, this study contributes to the development of evidence-based treatment guidelines, ultimately benefiting patients with POD.

Role of SQSTM1/p62 in Regulating Hepatic Stress Granules and Mallory-Denk Body Alcohol-Induced Liver Injury

Alcohol-associated liver disease (ALD) is a global health problem without an effective treatment. Mallory-Denk Body (MDB) is a protein aggregate commonly found in alcohol-associated hepatitis (AH). It primarily contains ubiquitinated proteins, cytokeratin 8/18, and SQSTM1/p62. However, the role and mechanisms of alcohol induced MDBs in the pathogenesis of ALD remain largely unknown. Previous studies have shown that chronic plus binge alcohol (Gao-binge alcohol) impairs the proteasome and autophagy-lysosome pathways, which are crucial for removing protein aggregates. In this study, we aimed to investigate the role of autophagy receptor protein SQSTM1/p62 in alcohol-induced protein aggregates, specifically stress granules (SGs) and MDBs, in mouse livers. Our research found that livers of AH patients had higher levels of p62, CK8 (MDB marker), and G3PB1 (SGs marker) when compared to healthy donors using IHC staining. We
further discovered that Gao-binge alcohol feeding increased insoluble SG markers, such as Hu antigen R protein (HuR), and phosphorylated Eukaryotic Initiation Factor 2 (p-eIF2α) in mouse livers. Mice fed a DDC diet with Gao-binge alcohol had greater hepatic MDB formation (increased insoluble CK8) and liver injury (increased serum ALT and AST levels) than those fed either diet alone. Loss of p62 led to reduced protein aggregation involved in SGs and MDBs but increased liver injury in DDC plus Gao-binge alcohol-fed mice, indicating that SQSTM1/p62 is required for MDB formation. In conclusion, our data suggests that chronic plus binge alcohol increases hepatic SGs and MDBs, which are mediated by SQSTM1/p62 as an adaptive protective mechanism against ALD.

#3 Minh Tran Email: mtran6@kumc.edu Mentor: Matt Shoemaker, DO.

Assessing Perceived Risk for Mpox vaccine recipients
Historically, men who have sex with men (MSM) face an elevated risk of contracting the human immunodeficiency virus (HIV) through unsafe sexual practices. The perceived risk an individual has of acquiring sexually transmitted infections can be different from the actual risk, which plays a crucial role in their preventative strategies. Comparable to HIV, during the recent Mpox (formerly known as monkeypox) MSM were noted to have a higher risk of being infected. During the Mpox outbreak in 2022, 98% of those infected were gay or bisexual men (Thornhill 2022). Mpox transmission was suspected to have occurred through sexual activity in 95% of the infected individuals. We wanted to better understand what prompted this population to get an Mpox vaccine. To do this we analyzed Mpox vaccine recipients perceived risk factors for acquiring Mpox versus their actual risk. Through a voluntary and anonymous survey filled out at the time of these patients' Mpox vaccination appointments, we found that the patients' perceived risk correlated with their decision to receive the Mpox vaccine. Patients engaging in unsafe sexual practices, indicative of higher Mpox risk, were more inclined to receive the vaccine. The data demonstrated that individuals having at least one risk factor for acquiring Mpox were more likely to receive the vaccine, with about a 30% difference between those individuals with no risk factors and those with one or more risk factors. This aligns with what is historically known about the perceived risk versus the actual risk of acquiring HIV.

#4 Taylor Cusick Email: t cusick2@kumc.edu Mentor: Marie Brubacher, MD.

Understanding Cervical Screening Rates at TUKHS Division of General Internal Medicine
The cervical cancer screening rate at The University of Kansas Health System (TUKHS) Division of General Internal Medicine was 72.73% in October 2022, falling short of the goal threshold of 79%. Detection of cervical cancer in the initial stages is associated with a favorable prognosis. We hypothesized differences in cervical screening rates between communication preference, language, gender identity, race, insurance status, ZIP code, county, and Social Determinants of Health (SDOH). Cervical screening rates at TUKHS IM clinic were calculated between these demographics in this quantitative descriptive study. Data was collected from the records of every patient fitting the eligibility criteria of the U.S. Preventative Services Task Force screening recommendations. This includes patients with a cervix from ages 21-64. Only patients from Kansas and Missouri were included in the analysis. Screening rate was defined as the number of
patients not due for cervical screening/total number of eligible patients. Significance was determined with chi-square and confidence interval calculations and an alpha level of 0.05. Data was collected from 10704 patients fitting criteria. There was no significant difference in screening adherence based on primary language(P=0.64651055), gender identity(P=.24698923), county(P=0.1757628), or SDOH(P=0.84776161). Significant screening adherence differences were seen by age group(P=5.21448E-42), ethnicity(P=8.29037E-23), race(P=0.001464833), portal status(P=2.76523E-08) communication preference(P=.049528), insurance status(P=4.28234E-32), and last PCP visit(P=3.03611E-61). This quality improvement needs assessment demonstrates that efforts should include uninsured patients, trans men, and patients of Latino or Spanish Origin as intervention cohorts to improve cervical cancer screening adherence.

#5 Nick Lowe Email: nlowe@kumc.edu Mentor: Vafa Behzadpour, MD.

Foot-strike Hemolysis: A Systematic Review of Long-Distance Runners

Endurance athletes are subject to rigorous physiological demands, leading to a multitude of effects on the human body. In endurance runners, sports-related anemia has been described as commonplace, due to hemodilution, metabolic injury, and direct mechanical injury to red blood cells (RBCs), known as foot-strike hemolysis. This phenomenon has been theorized to contribute to the development of anemia in long-distance runners. A systematic review of literature was performed following PRISMA guidelines by three independent authors. Nine studies containing a total of 267 runners met all inclusion criteria. An analysis of weight means was performed to compare pre- and post-race hematological measurements. Most runners included in the study were male (88%), with mean age of 38 years. The runners' average best marathon time was 220 minutes. Three studies examined races of marathon distance (42.2 km), three examined races between 42.2 km-160 km, and two studies examined a 1 day and 6-day ultra-marathon race, respectively. The average distance ran was 54.4 km. Reticulocyte count showed a 16% increase between pre- and post-race measurements, while haptoglobin levels were reduced by 21%. Hemoglobin, hematocrit, and RBC count values remained within accepted normal limits. Appreicable changes in reticulocyte count and haptoglobin suggest a transient foot-strike hemolysis, while the lack of change in hemoglobin and hematocrit may be attributable to dehydration, advances in shoe technology, or physiological adaptations in endurance athletes. Further studies should evaluate hemolytic changes while matching participants by demographic characteristics, level of experience, and specific marathon course characteristics.

#6 Danielle Rehor Email: drehor@kumc.edu Mentor: Dorothy Hughes, PhD.

Geriatric Patients and Providers: An assessment of needs, education, and retention in Rural Kansas

Physicians raised in rural areas comprise many rural physicians today however, provider shortages remain abundant. As the rural population ages, shortages among geriatric providers are especially concerning. This project seeks to determine (Aim 1) geriatric patient needs and access to medical care across rural Kansas by survey of their providers and (Aim 2) geriatric care provider needs, education, and retention. We hypothesize lack of transportation will be the most common geriatric patient needs. Also, we hypothesize that most rural geriatric physicians remain
in rural practice due to having a rural upbringing; finding life in small communities and relationships with patients the most desirable aspects of their practice. Rural providers were surveyed at STORM program sites across rural Kansas. Data from cross sectional surveys was collected and summary statistics were performed, such as frequencies and percentages, for each survey item. Results indicate cost is the greatest obstacle for geriatric patients to access healthcare. Geriatric providers most desire access to mental healthcare and find language barriers to be the greatest obstacle in their rural practices. Additionally, 76% of providers had a rural upbringing, with 68% planning to retire in their current community. These providers indicated relationships with patients to be the most desirable factor in their practice, with 62% of providers believing they could not achieve these same practice values in an urban setting. By prioritizing the needs of providers, efforts can be made to improve community resources, patient outcomes, and in turn the desirability to reside in a rural community.

# Thao Nguyen  
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Mentor: Irina Tikhanovich, PhD.

The role of nuclear receptor NUR77 in fibrosis resolution after alcohol cessation in mice and humans

Alcohol-associated liver disease (ALD) is a major cause of alcohol related mortality; currently, there are no effective therapies for ALD and abstinence remains the primary treatment. Disease resolution is impaired in ALD due to alcohol induced KDM5B-mediated epigenetic changes. Bioinformatic analysis predicted that KDM5B demethylase could act through inhibition of nuclear receptor NUR77 in hepatocytes, contributing to pro-fibrotic changes in non-parenchymal cells and persistence of liver fibrosis. This project aimed to define the role of nuclear receptor NUR77 during the resolution of alcohol-associated liver disease. NUR77 protein levels were elevated in Kdm5b knockout mice after 4 weeks of alcohol cessation compared to wild type controls. NUR77 protein levels negatively correlated with fibrosis levels measured by Sirius Red staining, suggesting that NUR77 upregulation could contribute to fibrosis resolution. In vitro experiments in hepatocyte-macrophage co-culture system confirmed that while Kdm5b knockout in hepatocyte promoted pro-resolving (anti-fibrotic) phenotype in macrophages, NUR77 knockdown abolished that effect further confirming that NUR77 upregulation contributes to fibrosis resolution. The relevance of this mechanism was tested in humans by measuring NUR77 protein levels in liver transplant explants using immunohistochemistry. We found that NUR77 was elevated in explants from patients with ALD (after 6 months abstinence) compared to patients with non-alcohol associated liver disease, suggesting that NUR77 could contribute to ALD resolution in humans. In summary, alcohol induces epigenetic changes that prevent liver fibrosis resolution after alcohol cessation. NUR77 inhibition contributes to poor fibrosis resolution via regulation of hepatocyte-macrophage crosstalk and pro-fibrotic macrophage phenotype changes.
The Use of Diabetes Educational Videos for Enhancing Medical Student Volunteers' Patient Education Skills at a Student-Run Clinic

Jaydoc Diabetes Night is a free student-run clinic at KUSOM, treating underserved patients with diabetes in Wyandotte County, Kansas. Medical students are heavily involved in patient education, which is limited by their preexisting knowledge of diabetes. To improve the quality of education provided, volunteers watched short videos on the following topics: how insulin functions in the body, injecting insulin, storing insulin, using a glucometer, and finding past blood glucose values on a glucometer. Students were surveyed using Likert scales assessing their comfortability educating patients on each topic before and after watching the videos. Using Wilcoxon Signed-rank tests, we found that students felt significantly more knowledgeable on all five topics after watching the videos. The largest improvement was seen in comfortability finding past values on a glucometer with an average difference of 1.91, nearly two levels of confidence on a Likert scale. Educational videos on critical tasks, such as injecting and storing insulin, improved comfortability of students by an average of 1.6 and 1.62 respectively, demonstrating the efficacy of brief education on key topics in increasing students' comfortability in patient education. These results suggest that student-run specialty clinics can increase student knowledge by employing similar interventions. According to students, videos on how insulin functions in the body (11/39 responses) and insulin injection (7/39 responses) were most often discussed during patient encounters. Further research may explore the effect of this intervention on patient education, compliance, and long-term outcomes.

Examining the Acceptability and Impact of Guided Imagery on Reward and Regulation Systems in Mid-Life Adults: Online Survey

This study explores the integration of Positive Affective Imagery (PAI) and Episodic Future Thinking (EFT) in health behavior interventions for mid-life adults. Through guided imagery, the research aimed to understand the acceptability of guided imagery approaches to increase positive affect and future focused thinking related to exercise. In Phase I, the study investigated the acceptability of each guided imagery approach. Participants included mid-life adults (n=40) aged 45-65. Participants were randomly assigned to EFT or Episodic Recent Thinking (ERT), and then exposed to PAI targeting reward systems or a control condition of Neutral Affective Imagery (NAI) and rated acceptability of the guided imagery after exposure to guided imagery. Results indicate greater acceptability for PAI than NAI (p < .05). No significant differences in acceptability were found between EFT and ERT (p > 0.10). Further, no interaction was found between affective and episodic imagery conditions. This study provides valuable insights into the effectiveness of guided imagery interventions, revealing that guided imagery involving positive affect was perceived as more acceptable than guided imagery involving neutral affect. The findings suggest the potential of PAI as an asset for health behavior interventions.
#10 Nathanael Garcia Email: ngarcia4@kumc.edu Mentor: Andrew Pirotte, MD.

**Case Report: Non-Small Cell Lung Cancer Mimicking Miliary Tuberculosis**

CNS involvement is found in about 1% of patients with tuberculosis (TB); however, the rate is believed to be upwards of 10-30% in cases of miliary tuberculosis. This is a case report of a 26-year-old who presented with a seemingly 'classic' presentation of CNS involvement from miliary tuberculosis based on his chest and brain imaging. When the patient later returned to the hospital with additional complications, he underwent further testing. On tissue biopsy, the patient was ultimately diagnosed with metastatic pulmonary adenocarcinoma. This case highlights the importance of avoiding anchoring on a preliminary diagnosis based on compelling history and thoroughly considering alternative diagnoses. This report will outline the patient's initial diagnostic considerations, his treatment plan, and his course to receiving the correct diagnosis. Written informed consent was obtained from the patient for publishing, including clinical images.

#11 Joy Chang Email: jchang3@kumc.edu, Reid Kelly Email: rkelley2@kumc.edu Mentor: Keith Greiner MD, MPH.

**The Effects of Free Hearing Aids on Quality of Life in an Underserved Population with Hearing Impairment**

The purpose of this project is to examine the new Audiology Night at JayDoc Free Clinic, specifically if after one-month of wearing hearing aids improves quality of life in people with hearing loss. This is an ongoing study with active participant recruitment. Patients answered a 10-item Hearing Handicap Inventory (HHI) to assess the emotional and social burden of hearing loss before hearing aids (pre-fitting) and one-month after wearing hearing aids (post-fitting). Answers were "yes" (4 points), "sometimes" (2 points), and "no" (0 points). Scores 0-8 suggest no hearing handicap, 10-24 suggest mild-moderate hearing handicap, 26-40 suggest significant hearing handicap. Complete data was obtained from 8 participants (59.8 ± 21.2 yrs old, 87.5% female, 37.5% non-Hispanic white). When asked pre-fitting if hearing loss causes them to feel left out in a group of people, 75% reported yes. Post-fitting, 100% reported no. When asked pre-fitting if hearing loss causes difficulty communicating with family, 75% reported yes and 62.5% reported sometimes. Post-fitting, 100% reported no. Pre-fitting HHI was 33.25 ± 2.83 points. Post-fitting HHI was 0 ± 0 points. These results suggest that the effects of Audiology Night through providing free hearing aids to an underserved population may have decreased HHI from significant hearing handicap to no hearing handicap after one-month of wearing hearing aids. Additional statistical analyses will be run once there is a higher power.

#12 Luis Cortez Email: lcortez2@kumc.edu Mentor: Bret Freudenthal, PhD.

**Structural Effects of Ribonucleotide Insertion into Telomeres**

Telomeres are protective noncoding DNA caps at the ends of chromosomes that maintain genomic integrity. In most somatic tissues telomeres will shorten with successive rounds of replication and will reach a critically short length, at which point a cell will become senescent or...
undergo apoptosis. This fate can be avoided if telomeres are maintained through expression of telomerase, a reverse transcriptase that elongates telomeres by adding telomeric repeats. This elongation of telomeres can lead to replicative immortality, one of the hallmarks of cancer. Another hallmark of cancer is genomic instability that arises from DNA damage. The most prevalent form of DNA damage is ribonucleotide (rNTP) misinsertion. Left unrepaired, these rNTPs will promote genomic instability, changes to DNA secondary structure, and human diseases. Given the deleterious effects of rNTPs in DNA, cells have evolved the ribonucleotide excision repair pathway to remove rNTPs. While the deleterious impact of rNTPs in the genome is well established, it's not known what effect rNTPs will have on telomeric structure and integrity, or how rNTPs at telomeres are repaired. One essential DNA secondary structure seen at telomeres are G-quadruplexes (G4s). Given the effect that rNTPs have on DNA secondary structure, we examined the effect of rNTP insertion into telomeric sequences on G4 formation and stability. Using circular dichroism spectrophotometry we show that rNTP insertion can alter G4 conformation and can increase or decrease stability depending on the location within the G4. Additionally, we demonstrate that the repair of rNTPs depends on location within the G4.

#13 Shwetha Sreenivasan  Email: ssreenivasan@kumc.edu  Mentor: Liskin Swint-Kruse, PhD.

**Evaluating contributions of rheostat positions in the evolution of a viral protease**

Viral protein evolution is strongly influenced by the arms race with the host immune response. Several studies show that viral proteins evolve at a much faster timescale than their cellular homologs. This arises from their shorter replication times and reduced fidelity of replication. While some of the resulting amino acid changes alter viral function, others might have no significant effects. Thus, understanding the outcomes of single amino acid changes in viral proteins is crucial for understanding viral evolution and the emergence of novel virulent strains. To that end, a study by Flynn et al., (2022) of the SARS-CoV2 main protease (MPro) assessed a library of all possible Mpro variants for changes in in vivo protease-activity and showed that a variety of single substitutions tune activity of Mpro over a wide range. We re-analyzed these data to identify positions that allowed the widest range of functional tuning (rheostat positions). Up to one-third of Mpro positions are rheostat positions. To discern the contributions from changes at rheostat positions to MPro evolution, we next used bioinformatic tools to curate homologous sequences of Mpro at different evolutionary levels. Finally, we also experimentally tested whether single substitutions in Mpro affect its cellular concentration. These combined computational and experimental studies will illuminate the types of amino acid changes that lead to new Mpro functionalities.

#14 Dionna Thomas  Email: dlittleton@kumc.edu  Mentor: Rubina Ratnaparkhi, MD.

**Readability Assessment of Spanish Patient Education Materials (PEMs) for Gynecologic Cancers**

With increasing internet access on smartphones and tablets, patients frequently turn to online sources for health information. The American Medical Association (AMA) and the National Institutes of Health (NIH) recommend that patient education materials (PEMs) be written below an eighth-grade reading level. Most English PEMs are well above this level; however, little similar
evaluation of Spanish PEMs has been performed. This study aims to analyze the readability of Spanish PEMs covering gynecological cancers. We hypothesized that Spanish PEMs would be non-adherent to AMA and NIH recommendations due to non-identical differences in quality, and source relative to English PEMs. PEMs were identified using validated Spanish-translated gynecological cancer search terms queried using three search engines. The top five results by cancer type were included in addition to materials from academic cancer centers and governmental/non-governmental organizations. Readability and accessibility were evaluated using the Spanish SMOG (Simple Measure of Gobbledygook) Readability Formula (SOL), Gilliam-Peña Mountain graphs, and the NIH Health Education Materials Assessment Tool for Spanish Content. This review is not intended to be a comprehensive analysis but adds empirical data emphasizing frequently used online resources. Poor readability and accessibility of Spanish relative to English PEMs can exacerbate disparities and widen the "digital divide." Our results will guide the improvement of Spanish PEMs for patients who rely on the Internet for information on gynecological cancers.

#15 Joshua Dugdale  Email: jdugdale@kumc.edu  Mentor: Jordan Borrell, PhD.

Investigating Deoxygenated Hemoglobin Response in Fine Motor Tasks
Functional near-infrared light spectroscopy (fNIRS) is a non-invasive technique that is becoming increasingly popular to gather readings on hemodynamic responses within the brain and make inferences on cortical plasticity. The fNIRS system consists of a standard array of sensors placed in a 10-20 coordinate system based around generalized cortical structure. However, the current procedure of data processing of fNIRS results tends to ignore deoxygenated hemodynamic (HbR) responses as the responses are not as strong as oxygenated hemodynamic (HbO) responses and are not as well understood. Recent studies have discovered that when a particular area of the brain was stimulated by two consecutive working-memory (WM) task blocks quickly, the local decrease in deoxy-Hb concentration caused by the second task block was reversed, resulting in an increase. This reversal was attributed to the refractory effect in the hemodynamic response. This study aims to replicate the methodology in this WM study in small motor tasks, such as with finger-tapping and gross manual dexterity, to determine if this phenomenon occurs in motor tasks and WM tasks. Our population will consist of 20 control subjects that will perform these tasks. The data will be analyzed using the Homer3 toolbox. Anticipated findings include observing the reversal of HbR response in motor tasks, akin to what was observed in the working memory study. The findings from this research will influence how researchers interpret HbR data and recommend exercising caution regarding potential signal fluctuations during repetitive neuronal activation.

#16 Erica Martinez  Email: e924m327@kumc.edu  Mentor: Shivani Scharf, MD.

Patient Access at The University of Kansas Health System IM Outpatient Clinics: Examining the Effect of Adding Nurse Practitioners to the Team
The national average wait time for a new patient to get a primary care appointment is 26 days, while at The University of Kansas Health System it is 45. If patients are not seen, their health may get worse which increases their mortality, emergency department utilization and
hospitalizations. To alleviate the continuously long wait time, the internal medicine outpatient department had hired nurse practitioners and assigned them to several physicians. The purpose of this study is to evaluate the influence that hiring nurse practitioners (NP) had on patient access. Data on third next available appointment wait times was collected for physicians comparing six months before a NP was assigned to them, and six months after. These dates were within the window of 2019 and 2023. A RedCap survey was sent to the physicians to gauge what type of appointments they assign their NP to. Wait times improved for about half of the physicians. In the surveys, physicians reported varied uses for their NPs, but all included urgent care. A possible explanation as to why there was not a decrease in wait time for some is that due to demand, when appointments were available, they still filled quickly. Further investigating needs to be conducted about the significant variation in the results. Physician maternity leave and FTE need to be accounted for in the data, and then reevaluated. Since patient access is a significant problem at KU, this is an important step to addressing long wait times.

#17 Zexin Li Email: zli2@kumc.edu Mentor: Xinglei Shen, MD, MPH.

**Determinants of Financial Distress in Cancer Patients Receiving Radiation Therapy**

*Background:* Financial toxicity is an important source of morbidity and mortality in cancer patients. We hypothesize that patients who received radiation therapy may experience financial distress after treatment. *Methods:* Patients were recruited from a single institution from 10/2022 to 7/2023. Financial distress was measured using the validated Comprehensive Score for Financial Toxicity (COST) questionnaire. Lower COST score (0-44) indicates higher financial distress. COST was prospectively collected in all patients prior to radiation therapy and among patient who presented for follow-up in 1/2023 or 7/2023. Worsening financial distress was defined as a change in COST of 3 points or more. Baseline demographic and clinical information were abstracted from the medical record. Univariate and multivariate analysis was used to identify patient and treatment factors associated with worsened financial toxicity. *Results:* 84 patients were identified who had completed pre-radiation and at least 1 follow-up COST. The median pre-radiation COST was 26 (range 1-44, IQR 21-33). The median change in score was +2 (p < 0.01), indicating less financial distress. Overall, 13% of patients had worsening financial distress. On univariate analysis, older age (p=0.02), concurrent chemotherapy (p=0.02) and greater travel time (p=0.09) were associated with worsening financial distress. Type of radiation, type of cancer, and pre-treatment COST were not associated. Concurrent chemotherapy was borderline significant (p=0.06) on multivariable analysis. Conclusions: Only a minority of patients experience worse financial toxicity after radiation therapy. Providers should evaluate for potential financial toxicity in older patients, patients getting multi-modality therapy, and who live greater distance from treatment facility.

#18 Dylan Wentzel Email: dwentzel2@kumc.edu Mentor: Bryan Vopat, MD.

**Augmented Stress Weightbearing CT for Evaluation of Subtle Lisfranc Injuries in the Elite Athlete**

*Background:* Subtle Lisfranc injuries can go undiagnosed on conventional imaging leading to devastating consequences and poor functional outcomes for high level athletes. *Objective:* The
The objective of this case study is to present a novel imaging technique utilizing weight-bearing CT with enhanced stress to identify subtle, dynamically unstable Lisfranc injuries. We illustrate this with a case presentation of an elite athlete that ultimately required surgical fixation for a subtle Lisfranc injury.

Materials and Methods. The patient was positioned standing, with their feet facing forward, and weight equally distributed. The patient was then coached to symmetrically raise both heels from the scanner platform. This plantarflexion provided augmented stress on the midfoot, allowing for more sensitive imaging of the Lisfranc injury. The weight-bearing CT and augmented stress images undergo 3D reconstruction and post-processing to render coronal and sagittal images, allowing for comparison of the standard weight-bearing and augmented stress images.

Results. We present the case of a 22-year-old collegiate football lineman sustaining a Lisfranc injury. The injury diagnosis was made by MRI and clinical examination, without evidence of injury on weight-bearing XR or standard weight-bearing CT. With augmented stress CT imaging, the Lisfranc instability was noted, leading to surgical fixation, and return to sport the next season. Conclusion. We propose this technique for diagnosing subtle, unstable Lisfranc injuries where clinical suspicion persists despite inconclusive imaging, particularly in elite athletes. Further research is needed with larger sample sizes to investigate the sensitivity of this novel imaging technique for the detection of Lisfranc injury.

#19 Gabrielle Marchetto Email: g976m168@kumc.edu Mentor: Ann Davis, PhD.

Effect of IKanEat Intervention on Child Quality of Life

Treatment options are limited and expensive for children transitioning from a G-feeding tube to oral eating. There's also little evidence to support existing treatment options as being effective. This project seeks to identify the effectiveness of psychological interventions on child quality of life during the IKanEat trial. The data reflects the General Health Perceptions, Parental Impact on Emotion, and Parental Impact on time at baseline and 24 weeks of intervention. In the larger study (NIH R01 HD093933 to A Davis) 50 children were enrolled (Mage=3.76, SD=2.143) and randomized to either drug (megestrol) or placebo, and all received the iKanEat behavioral health coaching intervention. All parents completed quality of life questionnaires (measured by Child Health Questionnaire [CHQ] and Infant Toddler Quality of Life Questionnaire [ITQOL]) at baseline, and 24 weeks (end of trial). Paired Sample T-tests showed no significant changes in General Health Perceptions baseline to 24 weeks ITQOL (t(df)=(0.00)=, p=1.000), CHQ (t(2.073)=, p=0.068), no change in Health ITQOL (t(df)=(0.23), p=0.771), CHQ (t(df)=(1.41), p=0.193), Parental Impact on Emotion ITQOL (t(df)=(1.56), p=0.133), CHQ (t(df)=(2.06), p=0.070) or Parental Impact on Time ITQOL (t(df)=(0.50), p=0.623), CHQ (t(df)=(1.89), p=0.091). From baseline to the end of the 24th week of the study the Quality of Life remained high. Overall, the iKanEat protocol did not show any significant changes in quality-of-life measures reported by parents participating in this tube weaning trial. This is important because the protocol did not cause any significant harm to patients in their quality of life.
Quantitative analysis of Free Radiology Service

Background: Healthcare disparity is a widespread problem in the US that plagues nearly every field of medicine. Though disparities in access to radiological services continue to worsen, there is inadequate literature about cost savings in free clinics, and there is a need to quantify the amount saved using radiological services in these clinics. The aim of this project is to determine the amount of money patients saved using a single institution's free clinic compared to the cost-based service at the same institution as well as private practice. Methods: The number of patients that used image services, conventional radiographs and ultrasounds, from 2018-2021 at the free clinic was recorded along with the price and type of service. The expenses for the cost-based service were obtained using the institutions and private practice's price transparency documents. These reports included the out-of-pocket costs for each imaging service, which was then matched to the respective free service provided at the clinic. Results: The costs for the imaging services totaled $74,177 and $41,014 for the institution and private practice, respectively, compared to the same services provided by the free clinic. This equated to roughly $241 and $148 saved per patient using the free clinic, respectively, but can expect to save anywhere from $90-$350 based on the service provided. Conclusions: Patients can expect to save $90-$350 based on the service provided. Most patients saved under $300, which is lower than expected but still meaningful in this low SES patient population.

optima: an R Package for Tapestrí single cell multi-omics data

Multi-omics data in the Tapestrí platform provides insights into DNA and protein analysis at a single-cell level, which is optimal for studying heterogeneous tissues. While there are other software tools for analysis, there is currently no R package for processing and analyzing data from the Tapestrí platform despite being one of the most widely used programming tools for bioinformatics data. To resolve this, we present optima, an Open-source R Package for Tapestrí platform for Integrative single cell Multi-omics data Analysis. Within this package, the core optima object stores all data matrices for DNA, copy number variation (CNV), and protein data for a single sample. This object can be filtered by removing low quality variants and once filtered-cell clones can be identified. The object can be normalized for both protein and CNV data matrices. Ploidy can be calculated for each CNV amplicon. Once the data matrices in the optima object have been processed and analyzed, the user can visualize these data types using the drawHeatMap function. Heatmaps can be generated individually for each data matrix, or side by side in a multi-assay plot sorted by cell clones. The user can also explore an interactive heatmap if desired. In addition, the function drawFishPlot lets users visualize clonal evolution over time. Future aims for the optima package include multiple sample integration and automatic cell type identification. This package allows users to analyze single-cell multi-omics Tapestrí platform data in R, one of the most relevant tools for bioinformatics data analysis.
Evaluation of CBC with Differential Results in Patient Care at the JayDoc Free Clinic

Ordering diagnostic testing when not indicated wastes time and resources and often leads to spurious findings causing patients unnecessary anxiety. In the setting of free clinics, optimizing limited resources is necessary to maximize the impact of care provided to underserved patient populations. The purpose of this quality improvement project is to examine the value of a CBC with differential in contrast to a hemoglobin test in patient care at the JayDoc Free Clinic through a retrospective medical chart review. We identified 211 patients between November 2022 and November 2023 for which a CBC was ordered. CBCs were ordered to evaluate for: anemia (27.0%), a known pre-existing condition (17.1%), routine testing (16.6%), and infection (15.6%). Of the 128 CBCs with one or more abnormal components, hemoglobin levels (42.2%) and red blood cell (RBC) counts (40.6%) were the most frequent out-of-range values. Of the out-of-range results, 74 (57.8%) were interpreted by the physician as normal variation-10 of which were pregnancy-related. Of 53 abnormal results interpreted as clinically meaningful, 42 consisted of an abnormal hemoglobin level leading to the diagnoses of iron deficiency anemia (42.8%) and anemia of chronic disease (16.7%). The remaining 11 exhibited WBC (72.7%) and RBC (27.3%) abnormalities that were attributed to underlying inflammatory processes (36.4%), infection (18.2%), or were idiopathic (45%). Of the 11, only one result warranted medical intervention. These findings suggest most CBC orders at the JayDoc Free Clinic could be replaced with in-house hemoglobin testing.

Sexually transmitted infection testing at JayDoc Free Clinic

JayDoc Free Clinic, a free safety-net clinic run by medical and pharmacy students, serves underprivileged populations in Wyandotte County, Kansas twice a week. One of the most frequent chief complaints managed by this clinic is screening for infections with a predominantly sexual mode of transmission. This quality improvement study aimed to understand underinsured and uninsured patient motivations for seeking sexually transmitted infection (STI) testing at this clinic. A six-question, self-administered survey was provided to patients presenting with a chief complaint of STI testing. Questions had multiple choice response options and an open-ended option. Descriptive analysis of data was performed. Of the 52 responses collected, patients predominantly resided in Wyandotte County, KS (n=22, 42%). When asked about their primary reasoning for coming to JayDoc Free Clinic for STI testing, 77% (n=40) of patients listed no charge for services, 44% (n=23) listed clinic hours, and 35% (n=18) listed convenient location of the clinic. Approximately 71% (n=37) of respondents had previously received STI testing. Patients primarily reported hearing about JayDoc through the website (n=23, 44%) and friend referral (n=17, 27%). Current study findings suggest that free services, clinic hours, and clinic location are key factors for patients in selecting JayDoc Free Clinic for STI testing. Therefore, medical and pharmacy students should highlight and supplement these factors to promote accessible patient care. Future quality improvement should entail implementing new community outreach strategies.
that promote sexual health services at JayDoc and inform patients of STI testing options in their community.

#24 Josie Fails Email: jfails@kumc.edu, Kylie Wilhelm Email: kwilhelm3@kumc.edu Mentor: Selina Gierer, MD.

**Esophagogastroduodenoscopy (EGD) v. Trans Nasal Endoscopy (TNE) in the diagnosis and management of eosinophilic esophagitis (EoE)**

**Background:** Patients diagnosed with eosinophilic esophagitis (EoE) undergo frequent endoscopies for diagnosis and monitoring. Esophagogastroduodenoscopies (EGDs) allow for visualization, dilation, and biopsy samples. Transnasal endoscopy (TNE) is an alternative for diagnosis and surveillance, offering reduction of risks with sedation required for EGD while maintaining a lower cost that may improve quality of life in those diagnosed with EoE.

**Objective:** The authors review the potential risks and benefits of TNE as compared to EGD in the setting of EoE. This small case series study aims to further clarify patient perception of the two procedures regarding tolerability, preference, and well-being.

**Methods:** Individuals with a diagnosis of EoE and completion of EGD and TNE were eligible to participate in the study. Data was collected through an online self-reported REDCap survey using Likert scale-type questions.

**Results:** Of the authors' small number of patients sampled, half elect for TNE for future management of EoE due to factors including satisfaction of procedure location, less post-procedural adverse events, and overall satisfaction. Most patients described less income lost due to time away with TNE. Patient overall satisfaction results were inconclusive favoring EGD or TNE.

**Conclusion:** This study aids in increasing the understanding of the use of TNE for the diagnosis and management of EoE alternatively to EGD. TNE provides an adequate biopsy sample in less time, without sedation, and at decreased cost and time away from work/school. TNE is a safe and effective procedure for those with EoE and may be preferred in some patients.

#25 Maci Clark Email: m692c153@kumc.edu Mentor: Amit Noheria, MD.

**Learning Curve and Outcomes of Left Bundle Branch Area Pacing**

**Background:** Left bundle branch area pacing (LBBAP) is an alternative to conventional right ventricular pacing. While clinical data from centers with LBBAP expertise are promising, less is known about the learning curve and success rates with the adoption of LBBAP implantation.

**Objective:** We conducted a single-center retrospective analysis to assess the learning curve, complications, and clinical outcomes of LBBAP implantation.

**Methods:** We retrospectively compared adult patients undergoing LBBAP lead implantation at a tertiary care academic medical center between 2020 and 2023. Baseline, procedural, and complication rate data was categorized into 2 groups based on the attempted number of LBBAP implantations per operator: ≤10 (LBBAPinexp) and >10 (LBBAPexp). Successful lead implant was defined as LVAT ≤80 ms.

**Results:** There was no difference in baseline characteristics between groups. Successful LBBAP lead implantation, defined by LVAT ≤80 ms post implant, was lower in LBBAPinexp compared to LBBAPexp operators (56.9% vs 72.4, p=0.04). There were no differences in implant duration or procedure related complications but there was a significant higher use of fluoroscopy with LBBAPinexp compared to LBBAPexp (12.6 ± 10.1 vs. 8.2 ± 8.0 minutes, p=0.0001). The number of
attempts at LBBAP was lower with LBBAPinexp vs. LBBAPexp (2.0 ± 1.5 vs. 2.9 ± 2.9, p=0.02). Conclusion: Operators use less fluoroscopy and utilize more attempts at LBBAP implantation after their first 10 cases. Operators without LBBAP experience can achieve a moderately high success rate even with initial implantation.

#26 Sha Neisha Williams Email: swilliams30@kumc.edu Mentor: Wen-Xing Ding, PhD.

Aging exacerbates alcohol-induced steatosis and inflammation but not cell death in mice.
Background: Alcohol-associated liver disease (ALD) is a major chronic liver disease with no successful treatment. Aging is a well-known risk factor associated with ALD. However, the mechanisms of how alcohol and aging cooperatively contribute to ALD in older adults remain incompletely understood. Alcohol and cellular aging are known inducers of endoplasmic reticulum (ER) stress leading to the activation of the integrated stress response (ISR). ISR activation is not well studied in aging and alcohol, thus the goal of the study was to investigate changes in autophagy and ISR in alcohol-induced liver injury in aged mice. Methods: Young (3-month-old) and aged (22-month-old) C57BL/6N mice were subjected to Gao-binge alcohol feeding. Unbiased liver tissue RNAseq was performed. Tail-vein injection of adenovirus-ATF3 was performed to overexpress hepatic ATF3 in mouse livers with Gao-binge alcohol. Liver injury, steatosis and autophagy were determined. Results: Analysis of RNAseq showed that aging and alcohol have distinct effects on hepatic gene expression. The levels of hepatic triglycerides increased while lysosomal protein expression decreased in ethanol-fed aged mice compared to young control diet-fed mice. Genes associated with UPR were upregulated due to alcohol consumption and increased with age. Hepatic expression of proteins associated with ISR were significantly induced by Gao-binge alcohol and increased further with age. Overexpression of ATF3 in livers protected against alcohol-induced liver injury in aged mice. Conclusions: Aging exacerbates alcohol-induced hepatic steatosis and ISR, which may function as an adaptive response in protecting against alcohol-induced liver injury.

#27 Dakota Okwuone Email: dokwuone2@kumc.edu Mentor: Gregory Gan, MD, PhD.

A mechanistic and proteomic analysis of tumor MK2's promotion of tumor metastasis and cell migration-invasion in head and neck cancer
Metastasis is a major contributor to the high mortality rates observed in head and neck cancer (HNC), necessitating a deeper understanding of the mechanisms involved to identify potential treatment targets for improved patient outcomes. This study focuses on investigating the role and mechanism of MAPK-activated protein kinase 2 (MK2) in HNC progression. Using lentiviral and CRISPR-Cas9 systems, we modified MK2 expression in human and murine HNC cell lines, conducting in vivo experiments using syngeneic orthotopic mouse models. In vitro, we evaluated cell migration and invasion in both 2D and 3D culture systems, supported by mass tag proteomic and phospho-proteomic analyses for an unbiased assessment of protein expression/phosphorylation changes regulated by MK2. The results showed that knocking out (KO) MK2 in the metastatic murine cell line Ly2 abrogates tumor growth and metastases in orthotopic in vivo models. In vitro experiments demonstrated that MK2 KO significantly decreased their migratory and invasive capacity in 2D & 3D models. Proteomic/phospho-
proteomic analysis of Ly2 WT vs MK2 KO cells revealed significant variations in proteins involved in integrin-β4 signaling, cMET receptor pathway, and focal adhesion/actin remodeling dynamics. These results implicate MK2 in promoting metastasis in HNC in vivo, and the regulation of migration and invasion likely contributes to this phenotype. This study uncovers several pathways not previously associated with MK2 signaling that may regulate the progression of these tumors. Further deconstructing these novel signaling cascades will further our understanding of HNC spread and validate MK2 and its related proteins as therapeutic targets for metastatic HNC patients.

#28 Michael Jennings Email: mjennings3@kumc.edu Mentor: Heather Minchew, MD.

Change of Practice to Semi-Sitting Retrosigmoid Surgery for Vestibular Schwannoma: Multi-Year Institutional Outcome
The semi-sitting position for retrosigmoid resection of vestibular schwannomas is under-represented in North America. The present study assesses outcomes from semi-sitting retrosigmoid surgeries for vestibular schwannomas after a prospective change in practice. Semi-sitting retrosigmoid surgery outcomes were compared to prior surgical outcomes using the supine retrosigmoid and translabyrinthine approaches. Preliminary data analysis included 26 semi-sitting retrosigmoid, 14 supine retrosigmoid, and 37 translabyrinthine surgeries. Data review is still in progress. Semi-sitting retrosigmoid surgery showed decreased operative times (345.2 minutes) compared to supine retrosigmoid (476.3 minutes) and translabyrinthine (432.5 minutes) surgery (p-value <0.004). Using pre-operative and post-operative hemoglobin levels, semi-sitting retrosigmoid surgery resulted in lower operative blood loss compared to supine retrosigmoid and translabyrinthine surgery (p-value 0.004). Compared to supine retrosigmoid surgery, semi-sitting position resulted in a higher percentage of patients with House-Brackmann 1 or 2 in both the immediate (90.9% vs 50.0%) and 6-month follow-up (90.9% vs 75%) periods for tumors <2.5 cm. Two patients required intra-operative change from a semi-sitting position to supine position: one from changes in spinal monitoring, one from persistent air bubbles on transesophageal echocardiogram. Gross total resection was higher in the semi-sitting group (80.8%) compared to supine (42.9%) and translabyrinthine (67.6%) groups. Intensive Care Unit length of stay was shorter in the semi-sitting group (1.96 days) compared to supine (3.93 days) and translabyrinthine (2.59 days) groups (p-value 0.001). This ongoing study demonstrates the viability of a change of practice to semi-sitting retrosigmoid surgery to produce effective, safe, and efficient vestibular schwannoma resections.

#29 Olivia Yingst Email: oyingst@kumc.edu Mentor: Karen Weis, PhD, RN, FAAN.

The Effect of Durable Medical Equipment Competitive Bidding Program on Long-Term Oxygen Therapy Equipment Availability and Patient Services
Background: The Medicare (CMS) competitive bidding program (CBP) was instituted in 2017, which includes home oxygen delivery devices and supplies. Ongoing assessment and evaluation of equipment, supplies, and patients' status were historically provided by registered nurses or respiratory therapists. The impact of CBP on long-term oxygen therapy (LTOT) services, particularly for rural communities is unknown. Purpose: Explore the effect of Medicare's
competitive bidding program on durable medical equipment (DME) companies' ability to provide LTOT services. Theoretical Framework: The Rural Nursing Theory identifies self-reliance and independence as prevalent in rural communities. The availability and accessibility to appropriate supplies/equipment, with assessment and evaluation by licensed clinicians, has major implications for rural communities and the ability to maintain one's lifestyle. Methods: Narrative inquiry and case study approach will inform the stories and experiences of DME companies and the evolution of CBP on LTOT services in Kansas. Results: The stories of DME companies' experiences implementing and evolving to meet the CMS CBP requirements will be examined and organized into 're-storying' in a chronological case study approach. Conclusions: Approximately 71% of patients receiving LTOT are Medicare beneficiaries. DME reimbursement for assessment, evaluation, and education requirements is undefined. The ramifications of the CBP on the quality of care in rural communities have not been assessed. This project will provide important baseline data for policy development and a more comprehensive project of both DME and patient experiences.

#30 Gabrielle Spring Email: gspring2@kumc.edu Mentor: Branden Comfort, MD.

Exploring Characteristics of Patients Using Telehealth vs In-Person Visits in General Internal Medicine Clinic

There is a lack of research regarding health disparities in telehealth as we move farther away from the start of the COVID-19 Pandemic. We conducted a retrospective chart review to determine if patients' use of telehealth or in-person appointment differed based on payor type, age, race, ethnicity, language, sex, SDOH screening answers, PHQ-9 scores, and reason for visit. Patients studied included those 18 years of age and older who completed a primary care visit in Ambulatory Internal Medicine from 12/1/2022 through 1/31/2023. Of this patient pool, four different patients were randomly selected from each provider, two patients who used telehealth and two who used in-person visits. Differences in visit type (telehealth or in-person) were identified for the "reason for visit" (P<.001) and "new or returning patient" (P=.027). Statistically significant differences were not found for sex (P=.052), payor type (P=.094), language (P=.477), ethnicity (P=.102), race (P=.727), age (P=.227), PHQ9 score (P=.173). No statistically significant difference was found for all 14 SDOH screening questions. If the SDOH do not differ between groups, telehealth could be a good tool to reduce disparities in care. We found that more acute visits occurred via telehealth, therefore additional PDSA cycles could be completed to determine if telehealth visits for acute care effectively reduce patient visits to the emergency department. Although a priori power analysis was conducted, many of the variables had low counts, so it could be beneficial to repeat the study with a larger sample size and further statistical analysis.

#31 Emilee Wells Email: e451w895@kumc.edu Mentor: Jay Shiao, MD.

The Relationship between Radiation Therapy and Urinary Incontinence in Prostate Cancer Patients

Previous studies have focused on the urinary side effects of brachytherapy and external beam radiation therapy used to treat prostate cancer, but there is a gap in literature covering urinary
outcomes when treated for prostate cancer with proton therapy radiation. This single-institution retrospective study was designed to look at patients treated for prostate cancer between the dates of January 2018 through May 2023. A total of 285 patient charts were analyzed: 170 IMRT, 34 IMRT and Brachytherapy, 6 brachytherapy, and 13 proton therapy. Data for each patient was collected through a review of patient medical records (in EPIC) and entered into an existing REDCap database. The principal constraint inherent in this study pertains to the relatively small sizes of both the proton therapy treatment group and the brachytherapy treatment group. To lessen the impact of selection bias, it is imperative to augment the number of patients within each group. Upon mitigating the level of selection bias, our next step will involve collaborating with the statistician to conduct the primary analysis. Anticipated outcomes from this study suggest a reduction in dysuria and genitourinary side effects associated with proton therapy relative to other modalities of radiation therapy utilized in the treatment of prostate cancer. The outcomes of this study will provide valuable insights for both healthcare providers and patients, aiding them in making informed decisions regarding the selection of treatment options.

#32 Anthony Nickel  Email: anickel2@kumc.edu  Mentor: Nicole Freund, PhD.

Knowledge and Perception of Rural Non-Physician Healthcare Providers towards Full Practice Authority for APRNs
This study assessed rural advanced practice provider (APP) opinions of full practice authority (FPA) following Kansas' allowance of FPA in July 2022. APPs are a diverse group of non-physician providers including physician assistants (PAs) and advanced practice registered nurses (APRNs). FPA allows APRNs to perform their full scope of practice without a collaborative agreement with a supervising physician. FPA proponents argue it improves healthcare access and efficiency. A survey was administered to APPs at 27 rural healthcare sites between June and July 2023 with 36 APPs responding (7 PAs, 29 APRNs). Significant differences were quantified by chi-squared test, and relationships via Spearman's rank correlation. The majority of APPs indicated awareness of the change allowing FPA. Many (59%) reported knowing of an APRN altering their practice to operate without physician oversight. Of APPs who responded, 51% indicated FPA will improve healthcare access, but only 18% indicated FPA would reduce healthcare costs, and 60% of APPs felt discussions of FPA caused tension between providers. A majority (85%) of PAs, but not APRNs, believe patients prefer APPs to be in a collaborative agreement with a physician. Generally, APPs indicated they rarely required physician collaboration, with APRNs indicating they required less collaboration than PAs. This study demonstrates that APP opinions on FPA authority are mixed, with some disagreement between APRNs and PAs. Future considerations include expanding the survey to capture more APPs, especially independently practicing APRNs, and comparing APP responses to those of physicians and patients.

#33 Natalie Mullin  Email: nmullin@kumc.edu  Mentor: Alex Finlinson, MD.

Azathioprine use in pregnancy and neonatal hematocrit
The objective of this study is to evaluate neonatal hematocrit levels following maternal azathioprine use. This is a retrospective case-control study using maternal and fetal data from chart review of women with azathioprine use at any time during pregnancy who subsequently
had a neonatal hematocrit drawn during their admission for delivery at a single academic tertiary care center from January 2009 to March 2022. Thirty-five women with azathioprine use during pregnancy whose neonate had a hematocrit drawn at time of admission for delivery were identified with a mean hematocrit of 49.5 (SD 8.88) versus thirty-eight women in the control group with a mean hematocrit of 54.8 (6.71), p-value 0.0057. Mean birth weight was 2640.6 g (SD 911.3) vs 3116.1 (SD 942.3), p-value 0.0209. Mean NICU length of stay was 35.1 days (SD 36.7) vs. 25.56 (SD 35.8), p-value 0.4348. From this data, this study concludes that pregnancies that include azathioprine use may experience mildly lower neonatal hematocrit levels. Azathioprine use may serve as a soft marker for pregnancies that may experience lower birth weight and longer NICU stays. Clinicians managing pregnancies that include azathioprine use should consider serial growth ultrasounds. Data with larger cohorts would assist in better defining the associations of azathioprine use in pregnancy.

#34 Nicholas Ernst Email: nernst@kumc.edu Mentor: Russell Swerdlow, MD.

Alterations to Mitochondrial Translation Increases Mitochondrial DNA Copy Number to Attempt to Maintain Mitochondrial Respiration Function and Proteins in SH-SY5Y Neuron Cell Models

Growing evidence is supporting the critical role of mitochondrial functioning in the development and progression of Alzheimer's Disease (AD), however the direct mechanisms are still unclear. We asked if alterations to mitochondrial translation via chloramphenicol-treatment or knockdown (KD) of PTCD1, a nuclear-expressed mitochondrial translation gene associated with AD, would lead to upregulation of mitochondrial DNA copy number (mtDNAcn) in order to maintain respiration homeostasis and respiratory chain proteins in SH-SY5Y neuron cells. We observed that both chloramphenicol-treatment and PTCD1-KD led to a significant increase in mtDNAcn showing us a functional mitochondrial adaptation when under translational stress. We then analyzed cellular respiration via Seahorse and discovered that chloramphenicol-treated cells had significantly reduced oxygen consumption respiration, whereas the PTCD1-KD cells had minimal to no respiratory changes overall. Upon digging deeper, we found that protein levels of different complexes of the respiratory chain were modified with both treatments to varying degrees. Additionally, we looked at the levels of amyloid precursor protein (APP), a known AD-related protein, and found some small changes. Interestingly, RNA levels of apolipoprotein E (APOE), a known AD-related gene, was significantly increased in PTCD1-KD neurons. Overall, our findings seem to suggest that when SH-SY5Y neurons are placed under mitochondrial translational stress, the cell adapt by increasing mtDNAcn and modifying respiratory chain protein levels in order to preserve adequate levels of respiration unless the stress overcomes the cell leading to pathologic states. However, more research into the intricacies of these mechanisms and its translation into the clinical setting of neurodegeneration are still needed.

Acute occlusion of the internal carotid artery (AICAO) is implicated in a significant proportion of ischemic strokes, presenting diverse clinical manifestations and severe outcomes. Extracranial AICAO (eAICAO) lacks standardized management guidelines, complicating therapeutic decisions. Endovascular recanalization of the occlusion comes with the risk of distal embolization of the thrombus; therefore, intervention is done on a case-by-case basis, with consideration of the clinical risk, prognosis, and penumbra. This retrospective chart review aims to understand the natural history, management trends, and outcomes of patients with eAICAO. Our study, which eAICAO patients evaluated at a single academic center between the years 2021 - 2023, included 59 subjects aged ≥18. The majority (84.8%) were 50 years or older, with varying degrees of NIHSS severity on admission. 32.3% received intravenous thrombolysis, 50.9% underwent endovascular therapy (EVT), and 18.6% received a combination of both modalities. A third of EVT recipients received eptifibatide adjunctively, while carotid stenting was employed in 18.6% of all cases. Throughout their hospital courses, 11.9% of patients experienced symptomatic intracranial hemorrhage, 22.0% passed away, and 23.8% were discharged with a favorable modified Rankin Scale (mRS) score of 2 or less. These findings highlight the complexities in managing eAICAO, emphasizing the need for individualized interventions based on risk factors, clinical deterioration, and thrombus dynamics. The study contributes valuable insights into the current landscape of eAICAO management, setting the stage for further research and potentially informing future guidelines in this challenging clinical scenario.

Vestibular Function and Head Impact During Falls in Older Adults: A Pilot Study

Millions of older adults fall every year, and upwards of eighty percent of traumatic brain injuries in adults aged 65 years or older result from these falls. While the vestibular system plays a vital role in sensing linear and angular acceleration of the head, its relationship to fall-related head impact in older adults is unknown. In this study, five females aged between 66 and 71 years participated in experimentally induced backwards falls onto a crash pad after being released from a tether that was 10 degrees from vertical. Surface electromyography activity was gathered at the sternocleidomastoid (SCM) during the falls, and neck flexion strength was assessed. To evaluate the vestibular system, specifically the saccule which detects linear acceleration, cervical vestibular evoked myogenic potentials (cVEMPs) were utilized. Upon analysis, two participants did not have head impact after the fall, two participants had minor head impact, and one participant had severe head impact. Compared to the participants with no head impact after the fall, the participant with severe head impact was found to have decreased neck flexor strength and delayed SCM recruitment, which resulted in a higher head acceleration. In participants with no head impact, cVEMPs were normal bilaterally in one subject and unilaterally absent in the other subject. In the subject with severe head impact, there was a unilaterally absent cVEMP.
conclusion, the role of vestibular function on head impact after falls in older adults is still unclear and requires further study.

#37 Megan Myers Email: mmyers16@kumc.edu Mentor: Jeffrey Bose, PhD.

**Structural and functional analysis of the Fatty Acid Kinase complex of Staphylococcus aureus**

Staphylococcus aureus can infect any anatomical site. The Fatty Acid Kinase (FAK) complex in this pathogen is responsible for using exogenous fatty acids for phospholipid generation. This complex consists of a kinase, FakA, and an acyl carrier, FakB1 or FakB2. Because the absence of FakA changes virulence potential depending on the host niche, we believe S. aureus can use host fatty acids as a signal to alter virulence factor expression. While the biological importance of this complex is established, the tertiary and quaternary structure of the FAK complex is poorly understood. We have begun efforts toward resolving the structure by cryo-EM and X-ray crystallography, and we have solved the structure of the N-terminal kinase domain and C-terminal domain of FakA. Asp38 and Asp40 were identified to coordinate magnesium necessary for ATP binding. This was confirmed in our structural data, and we confirmed loss of kinase activity when substituted with Ala. Without full structures, we have used modeling to predict essential amino acids for function. His282, His284, and Cys240 are predicted to coordinate a metal. We used ICP-MS to demonstrate that FakA binds Zn. Their substitution by Ala reduced kinase activity and alpha-toxin expression. We demonstrated FakA homodimerization in solution by small-angle X-ray scattering and mass photometry and the FakA/B interaction through biolayer interferometry and combined protein gel filtration. This research sheds new light on the structure and function of the FAK complex to inform downstream therapeutic studies and provides a better understanding of the virulence of S. aureus during infection.

#38 Ethan Scharf Email: escharf@kumc.edu Mentor: Jacob Sosnoff, PhD.

**Comparing a new alternative Subjective Visual Vertical test to the Bucket Test**

This project aims to develop and validate a cost-effective Health-based test for assessing subjective vertical as a functional vestibular measure. Recognizing the limitations of existing Subjective Visual Vertical (SVV) tests, including a rudimentary bucket test and high-cost alternatives, our innovative digital SVV test utilizes a smartphone and basic VR headset. This approach allows precise measurement of head angles, detecting smaller deviations in subjective vertical/horizontal, and offers immersive testing with minimal visual reference points. Participants use an Android phone with a python program to record perceived vertical and horizontal positions at baseline and 30-degree head tilt deviations to the right and left while seated and standing. Real-time head angle orientation and vertical deviation are displayed on a mirrored laptop. The proposed test will be validated against the established Bucket test, providing a cost-effective benchmark. This alternative SVV testing method combines the features of expensive SVV system capabilities tests with simplicity and accessibility. While data collection is just beginning, this abstract introduces the engineering and methods, shedding light on the potential of our SVV testing approach.
#39 Emma Renwick  
Email: erenwick@kumc.edu  
Mentor: David Naylor, MD.

**Review of Hospital Follow Up Clinic in its First Year**
In 2012, the Affordable Care Act implemented the Hospital Readmissions Reduction Program, requiring the Centers for Medicare and Medicaid Services to reduce payments to hospitals participating in the Inpatient Prospective Payment System (IPPS) that have excess readmissions. Hospital readmissions nevertheless still pose a challenge for patients and hospitals nationwide. Strategies to reduce hospital readmissions must continue to be explored. The use of Pre-Visit Planning by hospital follow-up clinics is an intervention that should be considered as a means of improving the quality of patient care by reducing 30-day hospital readmission rates. The purpose of this study was to investigate the effectiveness of Pre-Visit Planning by the KU Internal Medicine follow-up clinic in reducing hospital readmission within 30 days. Pre-Visit Planning was implemented in December of 2022 and consists of a physician chart review of patient electronic medical records prior to patient encounters at the follow-up clinic. Retrospective chart review and REDCap (Research Electronic Data Capture) surveys were used to determine a 30-day readmission rate within the hospital follow-up clinic patient population. Between December 1, 2022 and May 31, 2023, the clinic's readmission rate of 11.2% was 0.4% less than the readmission rate of 11.6% for Internal Medicine inpatient teams. However, the study period was only 6 months. The slight decrease in readmission rates is a positive finding and demonstrates an encouraging trend that hospital readmission rates may be reduced with the use of Pre-Visit Planning by follow-up clinics.

#40 Courtney Goetz  
Email: c910g794@kumc.edu  
Mentor: Linda D'Silva, PT, PhD.

**The relationship between vestibular function and path integration across the lifespan**
The saccule, an organ of the vestibular system, plays an important role in spatial awareness by detecting linear movement. Spatial awareness is integral to path integration, which is the determination of distance and direction from a previous location. Saccule function deteriorates with aging. Individuals between 20 and 80 years without a diagnosed neurological disorder and the ability to ambulate independently are included in the study. Participants performed the Triangle Completion Test, where they were guided through two sides of a triangle with vision and hearing occluded. Then, to assess path integration, participants completed the third side of the triangle independently. The cervical vestibular evoked potential (cVEMP) test was conducted to assess saccule function. Data has been collected on 8 individuals (mean age 26 ± 7.4). The mean end point error (71.44 ± 42.9 cm) showed significant variability among participants (range 37-165 cm). Two participants with the highest end-point-error had normal cVEMP results, however one participant (end point error= 95 cm) had a significant amplitude asymmetry. Of interest, all 3 participants had a history of comorbidities. One had a history of undiagnosed dizziness, another had motion sickness, and the third, age 44, had received chemotherapy 18 years ago. Data collection is ongoing. Due to small sample size, conclusions on age cannot be determined. Participants with greater deviation on the Triangle Completion Test had a history of coexisting dysfunction of the vestibular system. Detailed evaluation of the vestibular system is a necessary next step.
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<td>Joseph Pleen</td>
<td>Neurology / Alzheimer's Disease Center</td>
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