Oral and Poster Presentations:

The 2025 Mercer University School of Medicine and College of Pharmacy Joint Research Conference

Atlanta, Columbus, Macon, and Savannah, Georgia

October 31, 2025

Table of Contents

Oral Presentations

Table of Contents
Poster Presentations

Oral Session 1

Oral – 1 – Atlanta

Evaluation of Microparticulate Polymyxin B as a Potential Vaccine Adjuvant

Mahek Gulani, Dedeepya Pasupuleti, Tanisha Arte, Martin J. D'Souza

Abstract

Background and Objective

Given that most infectious agents enter the body through mucosal surfaces, effective vaccines must generate protective immunity at these sites which serve as the first line of defense. Adjuvants enhance the immune response to antigens co-delivered in vaccine formulations. There is a need for more mucosal adjuvants, hence we explored the potential of repurposing existing drugs with established safety profiles in humans. Polymyxins, a class of antibiotics are known for their strong activity against gram-negative bacteria and have been in clinical use since the 1950s. They are cationic peptides and mast cell activators which are a novel class of vaccination adjuvants. The goal was to assess the adjuvant effect of PMB MPs in combination with five vaccine candidates previously developed in our laboratory such as microparticulate gonorrhea, influenza H1N1, measles, Zika, and Canine COVID vaccines-and to compare their performance with approved adjuvants, such as Alum and MF59.

Methods

The immunogenic potential in these vaccines was studied by Griess assay and immune profiling of Th1 or Th2 based response elicited by PMB by using flow cytometry.

Results & Conclusion

The results indicated that PMB MPs exhibited immunogenicity comparable to that of FDA-approved adjuvants and showed a balanced Th1 and Th2 response which is a crucial prerequisite for prompting T cell responses- cytotoxic CD8+ T cell responses and helper T cells responses. Further studies with additional vaccine candidates and the *in vivo* evaluation will confirm the potential of PMB as a probable vaccine adjuvant candidate.

Oral – 2 – Columbus

A Novel Model of Human Retinal Degeneration: Direct Neuronal Conversion of Human Fibroblasts into Photoreceptors

Arsha Moorthy, Samuel Swinford, Seong Won Lee

Abstract

Background and Objective:
Photoreceptor degeneration is the ultimate outcome of retinopathies, which continue to be the leading cause of irreversible blindness in developed nations. Some retinopathies of interest are age-related macular degeneration (AMD), the leading cause of irreversible blindness in the United States, as well as retinitis pigmentosa (RP), but there are no known treatments to restore vision. While some progress has been made in understanding the protein aggregation and oxidative stress that may contribute to photoreceptor degeneration, the potential interplays between different cellular signaling pathways, as well as therapeutic compounds to combat retinal degeneration, are not yet understood. Despite the existence of various transgenic animal models that may model retinal degeneration in the context of inherited gene defects, there is a need to establish a human retinal neuron platform that can clearly recapitulate disease pathology, allowing for the study of the age in retinal degeneration. Here, we perform direct neuronal conversion to generate photoreceptors from patient-derived fibroblasts affected by retinopathies.
Methods:
By overexpressing two brain-enriched microRNAs and various combinations of photoreceptor-defining transcription factors, fibroblasts can be directly converted into photoreceptor neurons that retain the aging signature stored in the initial fibroblasts and recapitulate the disease phenotypes, such as cell death and protein aggregation.
Results:
Our results show that these converted photoreceptors highly express MAP2, a pan-neuronal marker, indicating sufficient neuronal identity with a robust conversion efficiency. Additionally, these converted photoreceptors also highly express rhodopsin, a photoreceptor-specific marker, in the axon and dendrite projections, suggesting photoreceptor identity that is sufficient for studying retinal degeneration mechanisms.
Conclusion:
Together, these results demonstrate that our model holds the potential to serve as an in vitro human photoreceptor model of retinal degeneration and may provide a therapeutic approach to enhance photoreceptor resilience against neurodegeneration.

Oral – 3 – Macon

Decoding Cisplatin Resistance Mechanisms in Ovarian Cancer

Aditya Vayalapalli[1], Balint Kacsoh[2], and Ilana Chefetz[2]

[1]Mercer University, College of Liberal Arts and Sciences, Macon, GA, 31207, United States
[2]Mercer University School of Medicine, Department of Biomedical Sciences, Macon, GA, 31207, United States

Abstract

Background and Objective

Chemoresistance is the major contributor to mortality in ovarian cancer (OC). Underlying molecular mechanisms of resistance are incompletely understood.

Methods

To dissect evolved resistance to cisplatin, differential gene expression analysis was conducted using datasets GSE73935 and GSE26465, which included control and chemoresistant OC cells derived from A2780 and OV90 cell lines, and primary ovarian cancer cells W1. Bioinformatic analysis of these data was then conducted through a DAVID functional annotation clustering and a GOrilla pathway enrichment analysis.

Results

The functional annotation clustering analysis revealed that clusters of aldo-keto reductase (AKR), phosphoinositide 3-kinase (PI3K), ubiquitin-conjugating enzyme (E2s), transcriptional regulation, nuclear factor 1 (NFI), cadherin, the G-antigen (GAGE) family, the golgin-97 Ran binding protein 2 alpha (GRIP) domain, the Ran binding domain, peptidases, and caspases were dysregulated in chemoresistant OC. GOrilla pathway enrichment analysis revealed 280 significantly upregulated and 79 significantly downregulated gene ontologies. Upregulated ontologies were enriched in pathways of DNA damage response, transcription regulation, and cell adhesion. Downregulated ontologies were enriched in organelle organization, amino acid transport, and metabolic transport. Cisplatin-resistant OC cells generate coordinated molecular networks that upregulate detoxification pathways and downregulate apoptotic machinery to generate the chemoresistant phenotype.

Conclusion

Understanding these networks paves the way for the selection of biological pathways to target and overcome the chemoresistance of OC cells in a clinical setting.

Oral – 4 – Savannah

Student Engagement and Performance with Formative Assessments in Preclinical Medical Education

Tyler Grace Hattaway, Kim Meeks, Carolyn Klatt, Edward C. Klatt

Abstract

Background and Objective
Medical students have a variety of tools for practice at their disposal, from a myriad of online resources to print materials. As medical education increasingly emphasizes the importance of self-directed learning, it is crucial to focus on the impact of usage of formative assessments and practice exams throughout curricular blocks. We studied student usage of weekly formative assessments in the second semester of a preclinical medical curriculum.
Methods
This report is a retrospective observational study analyzing results from weekly practice quizzes in a preclinical medical program. We utilized weekly metrics, including quiz score, participation, quiz length, and total time elapsed. Descriptive statistics were used to assess performance trends. Pearson correlation coefficients were used to examine the relationships between quiz length and scores, and quiz scores and exam performance. To compare participation and score differences between shorter and longer quizzes, we utilized two-sample t-tests.
Results
Quiz scores were moderately correlated with mid-module examination performance ($r = 0.5131$) but showed a weak relationship with end-of-module examinations ($r = 0.2803$). Quiz length negatively correlated with both average score ($r = -0.6073$), and number of zeros ($r = -0.5533$). Comparison of the short versus long quizzes revealed a statistically significant difference in the number of zero scores ($p < 0.05$). Shorter quizzes were more likely to have a high amount of zero scores.
Conclusion
Our analysis suggests weekly formative quizzes are not likely predictive of exam performance. Student quiz scores decreased as assessment length increased. However, longer quizzes were associated with improved engagement, as evidenced by fewer zero scores. Shorter quizzes may be skipped more often, whereas longer quizzes are associated with lower scores. The statistically significant difference in participation highlights the importance of quiz design in fostering student engagement. Future work could explore how adjusting quiz length affects completion rates.

Oral Session 2

Oral – 5 – Atlanta

Targeting free-fatty acid receptor-4 to modulate cholesterol-induced macrophage activation in atherosclerosis

Razan L. Teyani, Monika Binwal, Farnoosh Moghaddam, Nader H. Moniri

Abstract:

Free-fatty acid Receptor-4 (FFA4), previously termed GPR120, is a G protein-coupled receptor that belongs to the rhodopsin-like family of 7-transmembrane receptors and is agonized by medium-to-long-chain fatty acids, including omega-3, -6, and -9 free-fatty acids (FFA). FFA4 is known to be involved in various physiological responses, including anti-inflammatory, insulin-sensitizing, and blood glucose-lowering effects, and is widely recognized as a potential target for treating metabolic and inflammatory-related diseases. FFA4 is prominently expressed and functionally active in macrophages, and in this study, we begin to investigate the possible role of the receptor in regulating macrophage function, foam cell formation, and inflammation related to atherosclerosis. Our results show that FFA4 is colocalized with macrophage markers within arterial walls of human atherosclerotic patient tissue, suggesting that FFA4 may have a role in foam cell function and atherosclerosis. Given this, we hypothesized that FFA4 may play significant roles in mediating macrophage function in atherosclerosis. Since the formation of reactive oxygen species (ROS) and lipid deposition are critical to foam cell function, we measured the effects of FFA4 agonism on cholesterol-induced ROS generation and lipid deposition in murine RAW 264.7 macrophages. Our results show that agonism with endogenous FFA and synthetic agonists of FFA4 significantly reduce both ROS generation and Oil Red O staining, suggesting that FFA4 can modulate beneficial effects in the presence of heightened cholesterol. These findings were validated in genetically modified RAW 264.7 macrophages that stably overexpress FFA4, which exhibit significantly reduced ROS generation and lipid droplet deposition compared to wild-type cells. Together, these findings collectively support our hypothesis that FFA4 has a potential role as a therapeutic target for atherosclerosis treatment, particularly in its reduction of pro-oxidative responses and foam cell formation. Future directions will include exploring the involvement of FFA4 in mediating vascular inflammation in in-vitro and in-vivo atherosclerosis models.

Oral – 6 – Columbus

Assessing the Performance of ChatGPT (GPT-4o) as a Study Tool in Radiological Imaging in Medical Education

Brittany Hawkins[1], Yuxuan (Sam) Wu[2], Iqra Mohsin[1], Rachel Abraham[1], Shivani Sharma, MD[1,4] Manisha Arora, PhD[1,3]

[1]Mercer University School of Medicine, Columbus, GA
[2]Mercer University School of Medicine, Macon, GA
[3]Department of Biomedical Sciences, School of Medicine, Mercer University, Columbus, GA
[4]Department of Pathology and Clinical Sciences Education, Mercer University, Columbus, GA

Abstract

Background and Objective:

While ChatGPT-4o demonstrates variable diagnostic accuracy in radiology, its educational value for medical training remains underexplored. This study evaluated ChatGPT-4o's performance in radiological image interpretation from both diagnostic accuracy and educational communication perspectives to determine its potential as a learning tool for medical students.

Methods:

We analyzed 50 radiologic images from Radiopaedia across three anatomical regions (chest, upper extremity, lower extremity) using a standardized 5-prompt sequence. A 10-point rubric assessed performance in two domains: image-based accuracy (27 points maximum) and textbook-based accuracy (21 points maximum). Four student evaluators rated responses after randomized redistribution to minimize bias, with statistical analysis using a 60% expected performance threshold.

Results:

ChatGPT-4o exceeded the 60% threshold for the image-based performance across all regions, with lower extremity achieving the strongest results (74.9% average, $p=0.0068$). However, textbook-based scores showed no statistical significance above 60% across all regions (chest: 53.6%, upper extremity: 57.4%, lower extremity: 62.5%, all $p>0.05$). Overall performance ranged from 57.4% (chest) to 69.5% (lower extremity), with only lower extremity approaching significance ($p=0.058$). Moderate correlation existed between image-based and textbook-based scores ($R2=0.6868$).

Conclusion:

ChatGPT-4o demonstrates a strong capability in basic radiologic interpretation, particularly in anatomical structure identification and modality recognition. However, it falls short of educational standards when evaluated against textbook-quality explanations. The model may serve as a useful adjunct for initial image analysis practice but should not replace structured educational materials or expert instruction, supporting a measured approach to AI integration in medical training with maintained human oversight.

Oral – 7 – Macon

Implementing a PDSA-Based Pain Protocol to Elevate Middle Georgia Pediatric Sickle Cell Care to National Standards

Oluwatimileyin Aderinokun, B.S. M.S, Anthonia Aralu, B.S, M.S, Lily Movagharnia B.S

Abstract

Background and Objective

Sickle cell disease (SCD) is a chronic blood disorder associated with multisystem complications, chronic hemolysis and frequent vaso-occlusive crises (VOCs), which are the leading cause of emergency department (ED) visits and hospital admissions among pediatric patients with SCD. Despite only having two comprehensive sickle cell centers in the state, Georgia ranks as number three for incidence of SCD in the United States, with Atrium Healthcare serving as the major hub for SCD in the Middle Georgia population. Despite recommendations that patients with SCD be triaged as high-priority, timely and effective pain management remains a challenge due to provider hesitancy around opioid use, IV access delays, and systemic bias. These barriers not only contribute to delayed and poorly controlled pain treatment, but also prolonged ED stays, higher admission rates, and poorer patient outcomes.

Methods

This project seeks to address these shortcomings by implementing a standardized ED pain management protocol that introduces intranasal fentanyl (INF) for pediatric SCD patients presenting in crisis. INF offers a rapid, needle-free alternative to IV opioids, with demonstrated effectiveness in acute pain management. Using a Plan-Do-Study-Act (PDSA) quality improvement framework, we are currently collecting baseline data on existing analgesic use (ketamine, INF) and current ED care plans. The protocol will be embedded within the electronic medical record (EMR) to facilitate timely triage, dosing, and follow-up.

Results

Primary anticipated outcomes include reductions in hospital admissions for VOCs and decreased time to first analgesic administration. Secondary outcomes include shorter ED length of stay and improved caregiver and patient satisfaction. Beyond clinical metrics, this project also aims to reduce systemic barriers such as provider bias and stigmatization of SCD patients by codifying standardized care plans into the EMR.

Conclusions

Ultimately, this initiative seeks to elevate Middle Georgia's pediatric SCD care up to the national standard of care, reduce healthcare costs, and improve equity in acute pain management for a historically underserved population.

Oral – 8 – Savannah

Indoleamine 2,3-Dioxygenase Regulates the Immunosuppressive Function of Human Rectum-Derived MSCs on T Cell.

Hwamok Choi, Sara Temple, Dallas Hunt, Sadeq Haidari, Subra Kugathasan, Raghavan Chinnadurai

Abstract

Background and Objective
Mesenchymal stem cells (MSCs) possess anti-inflammatory capacities, notably through the activity of indoleamine 2,3-dioxygenase (IDO), which degrades tryptophan and suppresses T-cell proliferation. While this mechanism is studied in bone marrow-derived MSCs (BM-MSCs), its relevance in other tissue-derived populations such as rectum-derived MSCs (R-MSCs) remains unclear. Additionally, finding out the IDO's role can clarify R-MSCs' immunoregulatory mechanisms of actions. Therefore, we aimed to determine whether R-MSCs suppress T-cell proliferation through an IDO-dependent mechanism, similar to BM-MSCs, using siRNA-mediated IDO knockdown approach.

Methods
Rectal MSCs (R-MSCs) and bone marrow MSCs (BM-MSCs) were cultured in α-MEM supplemented with human platelet lysate and plated in 96-well plates. MSCs were transfected with either IDO-targeting siRNA (knockdown) or control siRNA. Anti-CD3/CD28–activated human peripheral blood mononuclear cells (PBMCs) were co-cultured with control or IDO-knockdown R-MSCs and BM-MSCs for four days. Intracellular Ki-67 assay was performed to quantify T-cell proliferation. Ki-67 served as the marker for proliferation along with CD3-APC/Cy7 was used to identify T cells by flow cytometry.

Results
Both BM-MSCs and R-MSCs suppressed T-cell proliferation under control (IDO intact) conditions. However, when IDO was silenced by siRNA, this suppression was significantly reduced, resulting in increased T-cell proliferation. These findings were confirmed with R-MSCs/BM-MSCs derived from five- independent donors. This demonstrates that IDO activity is essential for the suppressive function of both MSC types in limiting T-cell proliferation.

Conclusion
These results show that IDO plays a central role in the immunosuppressive activity of both bone marrow and rectum-derived MSCs. This also suggests that R-MSCs, like BM-MSCs, rely on an IDO-dependent pathway to regulate T-cell proliferation and indicates their suitability for further investigation as a therapy for T cell-driven inflammatory diseases, including inflammatory bowel diseases.

Oral – 9 – Atlanta

Indole-3-Acetic Acid Attenuates LPS-Induced Endothelial Activation and Vascular Inflammation via NF-κB Pathway Inhibition

Hoque N, Sooreni S, Naser AZM, Shahid MS, Simon NP, Jones ME, Menon SN, Ezewudo EM, Moniri N, Hasan R

Abstract

Background and Objective:
Among the many activators of vascular endothelial cells (ECs), the gram-negative bacterial endotoxin lipopolysaccharide (LPS), which enters the bloodstream through active bacterial proliferation during infection or via translocation across a compromised gut barrier, is implicated in systemic inflammatory disorders and consequent cardiovascular dysfunction. Here, indole-3 acetic acid (IAA), a tryptophan- derived metabolite of gut microbiome with reported anti-inflammatory and antioxidant actions, was investigated for its potential to inhibit LPS-induced EC activation, adhesion molecule overexpression, reactive oxygen species (ROS) and cytokine production, and leukocyte adhesion, all of which contribute to vascular inflammation and cardiovascular dysfunction.
Methods:
Adhesion molecule expression was assessed by Western blotting and ELISA, while cytokine transcripts were quantified by qPCR. Leukocyte adhesion to EC monolayers and intracellular reactive oxygen species (ROS) generation were quantified using fluorescence-based assays. NF-B pathway activation was analyzed by Western blot to determine nuclear translocation of NF-κB subunits. To evaluate vascular function, isolated rat mesenteric arteries were subjected to pressure myography to measure endothelium- ependent vasodilation.
Results:
Our results demonstrate that LPS treatment significantly upregulates adhesion molecule expression, enhances the production of ROS and pro-inflammatory cytokines, all of which was strongly inhibited by IAA treatment. Western blot analysis showed that IAA suppressed LPS-nduced activation of NF-κB signaling, a critical pathway in endothelial inflammation. Additionally, leukocyte adhesion assays revealed a marked reduction in leukocyte attachment to EC monolayers. Functionally, LPS-treated rat arteries exhibited a significantly impaired vasodilation response to acetylcholine, whereas arteries from IAA-treated rats retained their vasodilatory responses, demonstrating IAA's ability to mitigate LPS-induced vascular inflammation.
Conclusion:
Overall, our findings demonstrate that IAA potently inhibits endothelial activation, and vascular inflammation by suppressing NF-κB signaling. These findings highlight the therapeutic potential of this microbiota-derived metabolite in mitigating vascular inflammation, with important implications for the prevention and treatment of various cardiovascular diseases.

Oral – 10 – Columbus

Does Geographic Disadvantage Increase Lower Extremity Amputation Risk in Georgia?

Armarion Stegall, Benjamin Hitchcock, Kara Patrick, Jeffery Radcliff, Maurice M. Solis MD, Edson Jean-Jacques

Abstract

Background and Objective

Over 100,000 lower extremity amputations (LEA) are performed annually in the US, most linked to peripheral artery disease (PAD) and diabetes (DM). Rural populations experience well-documented disparities in socioeconomic status and a higher prevalence of chronic diseases. This study investigated socioeconomic disparities, prevalence of amputation risk factors, and risk of LEA between rural and urban residents of Georgia.

Methods

LEA counts for each Georgia county in 2020 were obtained from the Georgia Department of Public Health's Office of Health Information for Policy database. County-level demographic and socioeconomic data were sourced from the U.S. Census Bureau. Prevalence data for hypertension (HTN), DM, PAD, and smoking were obtained from the CDC's Behavioral Risk Factor Surveillance System (BRFSS). Rural counties were defined as those with populations under 50,000. Bivariate analyses, including paired t-tests, were used to compare group means. Logarithmic transformation was used for non-parametric distributions to meet assumptions of normality. Significance was set at $p < 0.05$, with 80% power.

Results

Rural counties had a higher proportion of males (50% vs. 48%, p=0.12) and individuals over 65 (38% vs. 27%, p=0.0001). No significant difference was found in the proportion of Black residents (28.6% vs. 27.1%, p=0.64). Rural populations faced significant socioeconomic disadvantages, with higher poverty (20% vs. 13%, p<.0001) and lower median incomes ($45,051 vs. $62,970, p<.001). Risk factors were more prevalent in rural areas: DM (15% vs. 13%, p<.001), HTN (44% vs. 38%, p<.001), smoking (19% vs. 15%, p<.001), and PAD (29% vs. 17%, p<.001). LEA rates were significantly higher in rural areas (165.50 vs. 113.41 per 100,000; p<.001).

Conclusion

Rural Georgians experience higher LEA rates associated with significantly increased prevalence of DM, HTN, PAD, and smoking. Further research is needed to assess whether rural residency and socioeconomic status are independent amputation risk factors.

Oral – 11 – Macon

Ethics in Practice: A Clinical Ethics Guide to Georgia Law for Medical Students

Caroline Scarborough

Abstract

Background:
Medical students in Georgia often encounter ethical dilemmas that require balancing patient autonomy, beneficence, non-maleficence, and justice while adhering to state laws. However, there is limited guidance on integrating bioethical principles with Georgia specific statutes for clinical practice. The goal of this handbook was to provide a resource that medical students in Georgia can reference to answer such questions.
Methods:
This project reviewed the Official Code of Georgia Annotated (O.C.G.A.), relevant federal laws, and authoritative state resources to identify laws intersecting with clinical ethics. Topics were selected based on their relevance in the clinical setting, which includes EMTALA, abortion, mental health holds, mandatory reporting, physician-assisted suicide, advance directives, surrogate decision-making, confidentiality/HIPAA, minor consent, sterilization of incompetent persons, and organ donation. For each topic, concise legal summaries were developed, followed by fictionalized case studies adapted from literature and ethics guidelines to illustrate real-world application.
Results:
The resulting Ethics in Practice handbook provides a practical, accessible framework for medical students navigating ethically complex situations under Georgia law. Each chapter integrates statutory requirements with ethical analysis and case-based learning. For example, mental health hold cases highlight conflicts between patient autonomy and public safety, while organ donation scenarios illustrate legal hierarchies for consent and family objections. Throughout, emphasis is placed on recognizing both ethical principles and procedural safeguards to guide clinical decision-making.
Conclusion:
By linking Georgia law with foundational bioethical concepts, this resource equips medical students with the knowledge to approach ethical dilemmas with legal accuracy, ethical sensitivity, and clinical practicality. The handbook serves as both an educational tool and a reference for medical trainees, promoting informed, ethically sound patient care using Georgia's legal code.

Oral – 12 – Savannah

Improving Colorectal Cancer Screening Rates at a Family Medicine Clinic: Patient Perspective

Kenzington Deal, Celia Sada, Dr. Kimberly Roth, PhD, Dr. Eric Shaw, PhD

Abstract

Background

Colorectal cancer (CRC) is the third leading cause of death in men and the fourth leading cause of death in women in the United States. The current CRC screening rate for the state of Georgia is 58.1%, falling below the national rate of 66.4% (2023). Healthy People 2030's goal is to increase the proportion of adults ages 45 to 75 who have received CRC screening to 72.8%. Several barriers to CRC screening have been identified, including lack of education, lack of awareness of screening options, incorrect beliefs, and procedure-related challenges. To address these barriers and increase screening rates, it is necessary to tailor interventions to specific patient populations.

Objective

To understand the reasons why patients have not undergone CRC screening and explore their knowledge, barriers, and motivations related to screening at a family medicine practice.

Methods

This was a qualitative study based on in-depth patient interviews. Using the practice's electronic health records, patients ages 45 to 75 without any history of CRC screening were identified. Phone interviews were conducted with patients to confirm eligibility and complete a 15-question guide until 20 patient interviews were completed. Qualitative data were analyzed via thematic analysis. Quantitative data were analyzed descriptively.

Results

Major barriers to screening included patients not being told they needed to be screened, worrying that the test would hurt, and forgetting to make appointments. Major facilitators included receiving phone calls or text reminders, knowing more about the test, and having a conversation with their doctor. When asked what would make CRC screening easier, patients mostly discussed education and doctor-patient conversations.

Conclusion

The findings highlight patient awareness, barriers, and facilitators related to CRC screening, providing insights to help healthcare professionals tailor efforts to educate and motivate patients to get screened and progress toward achieving the Healthy People 2030 screening goal.

ATLANTA Biomedical

Atlanta – 1

Development of Chitosan-Coated Indole-3-Acetic Acid Nanoparticles: A Novel Nano formulation Approach for Hypertension

Snehitha Akkineni, Dedeepya Pasupuleti, Sterling Symone Neil, Dhruvi Patel, Renee Hayslett, Raquibul Hasan, Mohammad N. Uddin

Abstract

Background and Objective:
Indole-3-acetic acid (IAA) is a naturally occurring plant hormone beyond its established role as a growth regulator in plants; IAA has also demonstrated significant anti-inflammatory and antioxidant properties. However, its poor aqueous solubility and chemical instability have hindered its clinical translation. Moreover, targeted therapies against oxidative stress remain inadequate. This study elucidates how IAA, when formulated as nanoliposomes, shows potential as a novel therapeutic agent that overcomes these limitations for hypertension.
Method:
Nanoliposomes were prepared using the thin film hydration method with all the lipid components. The lipids, along with the drug, were dissolved in a methanol-chloroform mixture and were subjected to solvent evaporation using a rotary evaporator. This film was subsequently coated with chitosan and rehydrated with Phosphate Buffered Saline. Following the optimization, a final batch was formulated under the same conditions. Characterization for Particle size, PDI, and Zeta potential was measured, and the morphology of the particles was studied using Scanning Electron Microscopy (SEM), and the entrapment efficiency of the particles was quantified via HPLC. The in vitro cytotoxicity of both drug and formulation was tested in RAW macrophages using MTT assay.
Results:
The final formulation had a particle size of 199 nm with 0.4 PDI and -27.1nm zeta potential. SEM imaging has shown even distribution of the small spherical molecules and displayed no aggregation. Entrapment efficiency as determined by the HPLC was found to be 86.2 ± 2.4% suggesting effective entrapment of the drug within the lipid bilayers. MTT assay showed that the cell viability has decreased in a dose-dependent manner.
Conclusion:
The successful formulation of Indole-3-acetic acid (IAA) as nanoliposomes presents promising results in the development of hypertension therapy. Through optimization, the formulation has achieved desirable physicochemical characteristics. These preliminary findings lay the groundwork for future in vivo investigations to establish IAA as a novel compound.

Atlanta – 2

Vaccine through Cheek: Heterologous SARS-CoV-2 microparticulate Vaccine Stimulates Serological, Mucosal, and T-Cell Responses in murine models

Tanisha Manoj Arte, Emmanuel Adederian, Mahek Gulani, Amarae Ferguson, Martin J D'Souza

Abstract

Background and Objective

In response to the ongoing evolution of SARS-CoV-2 virus and the emergence of immune-evasive variants, this study explores a novel heterologous vaccination strategy using 3D printed oral dissolving film assisted delivery of microparticulate vaccine formulations.The microparticles, delivered through the buccal cavity is considered to non-invasive route, will generate systemic and localized immune response.

Methods

The vaccine design incorporates whole inactivated Delta and Omicron variants administered at prime and booster stages respectively either intramuscular microparticulate vaccine or ODF-based microparticulate vaccine encapsulated in a PLGA polymer matrix and adjuvanted with alum to enhance immune activation. Characterization of vaccine microparticles and ODF formulation comprising of vaccine formulation was performed. Serum and mucosal samples were collected biweekly post-immunization, and serum antibody titers (IgG, IgG1, IgG2a) and mucosal IgA levels were measured using ELISA. Cellular immune responses (CD4+ and CD8a+ T cells) were evaluated in the spleen. To test for cross-reactivity, responses were also assessed against Alpha and Beta strains.

Results

Microparticles showed a recovery yield above 90%, with particle sizes ranging from 650– 750 nm, surface charge between −40 to −55 mV, and PDI of 0.5–0.7. MTT assays confirmed non-cytotoxicity, while the Griess assay demonstrated significantly elevated nitric oxide release in the adjuvanted vaccine group. Characterization of the ODF based vaccine confirms effective formulation prepared for delivery. In vivo, vaccinated mice showed significantly higher IgG levels in serum and mucosal samples compared to controls. High IgG1 and IgG2a levels suggested a balanced Th1/Th2 response. Cellular analysis indicated increased CD4+ and CD8a+ T cell populations in vaccinated groups across spleen. Notably, robust immune responses were detected against both Delta and Omicron strains, and significant cross-reactivity was observed against Alpha and Beta strains.

Conclusion

The use of a buccally delivered ODF platform offers advantages in vaccine storage, administration, and public acceptance, presenting a promising strategy for broader, more accessible immunization against evolving viral threats.

Atlanta – 3

Role of AMS17 in LPS-induced endothelial dysfunction and vascular inflammation

Muslima Begum, Philip Bowen, Raquibul Hasan

Department of Pharmaceutical Sciences, College of Pharmacy, Mercer University, Atlanta, GA 30341, USA

Abstract

Background and Objectives:
Endothelial dysfunction and vascular inflammation are central to the development of cardiovascular and neurovascular diseases. Sulfonylurea compounds have recently been shown to inhibit NLRP3-driven inflammation in vascular cognitive impairment and dementia (VCID), but the role of other inflammatory pathways such as NF-κB remains less explored. We hypothesize that AMS17, a novel sulfonylurea- based molecule, may reduce lipopolysaccharide (LPS)-induced endothelial dysfunction and vascular inflammation through suppression of NF-κB signaling.
Methods:
Mouse endothelial cells (MECs) will be treated with LPS to induce endothelial activation, followed by treatment with or without different concentrations of AMS17 (0.1 nM – 10 μM). Western blotting and ELISA will be used to measure adhesion molecules including VCAM-1 and ICAM-1, while ROS assays will assess oxidative stress. NF-κB activation will be evaluated by nuclear localization of p65. Ex vivo, pressure myography of resistance mesenteric arteries will be used to examine vascular reactivity and endothelial function.
Results:
We anticipate that AMS17 will attenuate LPS-induced upregulation of adhesion molecules (VCAM-1, ICAM-1), reduce ROS production and ROS-related proteins such as Nox2, and uppress pro-inflammatory cytokine release. Further, AMS17 is expected to inhibit NF-κB activation, thereby limiting downstream inflammatory signaling. Ex vivo studies are expected to confirm protective effects on endothelial and smooth muscle function.
Conclusion:
This study will establish whether AMS17, a novel sulfonylurea-based compound, can mitigate LPS-induced endothelial dysfunction and vascular inflammation by suppressing NF-κB signaling. These findings may identify AMS17 as a promising therapeutic candidate for reducing oxidative stress and inflammation in cardiovascular and neurovascular diseases.

Atlanta – 4

Targeting Beyond the RAAS: A New Strategy for Ang II–Induced Hypertension

Ezewudo EM, Nguyen T, Simon PN, Jones EM, Menon SN, Zerin F, Hasan R

Abstract

Background and Objective:
Hypertension (HTN) is a leading risk factor for cardiovascular disease, with angiotensin II (Ang II) serving as a central mediator of elevated blood pressure and end-organ injury. A critical downstream effector of Ang II is endothelin-1 (ET-1), a potent vasoconstrictor that also drives vascular remodeling, oxidative stress, and kidney dysfunction. Ang II stimulates ET-1 production, while ET-1 further amplifies Ang II signaling, creating a feed-forward loop that accelerates hypertension and cardiovascular damage. Although the Ang II–ET-1 axis is well established, the contribution of gut microbiota–derived metabolites to this pathway remains poorly understood. Indole-3-acetic acid (IAA), a tryptophan-derived metabolite, has recently emerged as a potential modulator of ET-1 signaling. This study investigates whether IAA can attenuate Ang II–induced hypertension and organ injury, offering a novel therapeutic approach that extends beyond conventional RAAS blockade.

Methods:
A chronic Ang II infusion rat model was used to assess the effects of IAA on blood pressure, vascular structure and function, and kidney remodeling. Blood pressure was measured by tail-cuff plethysmography and validated with telemetry. Plasma and tissue ET-1 levels were quantified by ELISA, vascular responses were evaluated by pressure myography, and kidney fibrosis was assessed by histology and molecular markers.

Results:
IAA treatment significantly lowered blood pressure in Ang II–infused rats and preserved vascular structure and endothelial function. IAA also attenuated vascular remodeling and markedly reduced renal fibrosis in Ang II–treated animals. These protective effects were accompanied by suppression of Ang II–induced ET-1 overproduction in plasma and vascular tissue.

Conclusion:
IAA mitigates Ang II–induced hypertension, preserves vascular integrity, and reduces kidney fibrosis, likely through inhibition of ET-1 overproduction and receptor signaling. These findings identify a novel role for a gut microbiota–derived metabolite in disrupting the Ang II–ET-1 feed-forward loop, offering a potential therapeutic strategy for hypertension and associated cardiovascular and renal injury.

Atlanta – 5

Microparticle-Based Whole-Cell Gonorrhea Vaccine Confers Broad Cross-Protection via Microneedle Delivery

Amarae Ferguson, Yashkumar Harshoda, Tanisha Arte, Priyal Bagwe, Mahek Gulani, Revanth Singh, Emmanuel Adediran, Dedeepya Pasupuleti, Parth Patel, Susu M Zughaier, and Martin J. D'Souza

Abstract

Background and objective*:*
Neisseria gonorrhoeae, the bacterium responsible for Gonorrhea, is the second most prevalent sexually transmitted infection in the United States, with over 600,000 cases annually. The emergence of multidrug-resistant strains and the bacterium's ability to evade adaptive immunity complicate treatment and highlight the urgent need for an effective vaccine. Previous vaccine efforts have failed, largely due to antigenic variation and inability to prevent reinfection.
To address these challenges, we developed an adjuvanted, whole-cell inactivated gonococcal microparticulate vaccine using the well-characterized CDC F62 strain, selected for its representative antigenic profile. The vaccine, delivered via pain-free dissolving microneedle patches, was evaluated for immunogenicity and cross-protective potential against heterologous strains FA19 (serum-resistant) and FA1090 (disseminated).
Methods:
Formalin-inactivated gonococci were encapsulated into albumin microparticles with Alum and AddaVax™, spray-dried, and loaded into microneedles. Mice were divided into five groups, vaccinated, and challenged accordingly. Serum IgG levels were measured using ELISA, while T cell responses in spleens and lymph nodes were assessed using flow cytometry.
Results:
All vaccinated groups showed significantly elevated IgG responses compared to the control ($p < 0.0001$). CD4+ T cell responses were significantly increased across all vaccinated groups in both spleen and lymph nodes, with the highest responses observed in FA19 and CDC F62– challenged groups. CD8+ T cell responses were modest but significantly elevated in select groups.
Conclusion:
These results demonstrate that the adjuvanted CDC F62-based vaccine induces robust humoral and cellular immune responses and offers cross-reactive protection against heterologous *N. gonorrhoeae* strains, supporting its potential as a broad gonorrhea vaccine.

Atlanta – 6

Assessment of Novel 1-Guanine-α-D-Fructose as a Potential Vaccine Adjuvant

Yashkumar Harsoda, Mahek Gulani, Snehitha Akkineni, Mohammad Uddin, Martin D'Souza

Abstract

Background:
Adjuvants are essential for enhancing vaccine-induced immune responses, yet traditional options commonly face challenges including inadequate cellular immunity, safety risks, instability, and complex manufacturing processes. These limitations necessitate novel solutions to improve vaccine efficacy and accessibility. In this study, the new molecule 1-Guanine-α-D-Fructose (GADF)
was incorporated into poly(lactic-co-glycolic acid) (PLGA) microparticles (MPs) for detailed physicochemical and immunological evaluation against leading commercial adjuvants, such as Alum and AddaVax®

Methods:
GADF-loaded microparticles were synthesized using a double-emulsion solvent evaporation method. Murine dendritic cells (DC2.4) were exposed to MPs formulated with five representative viral vaccine candidates, such as COVID-19, Zika, Measles, Gonorrhea, and H1N1. Cellular toxicity was first assessed by MTT assay, followed by nitric oxide release measured by the Griess assay. The measurement of immunological activation via flow cytometry for MHC I, MHC II, CD40, and CD80 markers was performed.

Results:
The microparticles showed a mean size of 1533.66 ± 36.96 nm, a zeta potential of -14.8 ± 1.5 mV, and a polydispersity index of 0.960 ± 0.028, confirming uniform dispersion. The GADF MPs were non-toxic to dendritic cells at tested doses, as determined by the MTT assay. Scanning electron microscopy confirmed their spherical morphology. Nitric oxide release was substantially increased for GADF formulations, with responses comparable to those induced by commercial adjuvants. Flow cytometry demonstrated significant upregulation of MHC I, MHC II, CD40, and CD80 on DC2.4 cells exposed to GADF MPs, supporting robust activation of antigen presentation and co-stimulation pathways.

Conclusion:
1-Guanine-α-D-Fructose formulated in PLGA microparticles displays both favorable physicochemical properties and vigorous immunostimulatory activity in dendritic cells. Comparative analysis highlights GADF as a promising, non-toxic candidate with immunogenic potency equal to or greater than established adjuvants. These findings encourage further investigation of GADF-based vaccine platforms to enhance immunogenicity and address current adjuvant limitations.

Atlanta -7

Indole-3-acetic acid suppresses phenylacetylglutamine- induced NF-κB activation and oxidative stress in RAW264.7 macrophages

Islam MN, Hasan R

Abstract

Background and Objectives:
Elevated circulating levels of phenylacetylglutamine (PAGln), a gut microbiota–derived metabolite of phenylalanine, have been associated with coronary artery disease, heart failure, and major adverse cardiac events. Proposed mechanisms include altered adrenergic signaling, endothelial dysfunction, oxidative stress, and enhanced platelet reactivity. However, the molecular basis of PAGln-induced macrophage activation remains unclear. This study investigates the effects of PAGln on macrophage inflammatory signaling and evaluates whether indole-3-acetic acid (IAA), a microbial tryptophan metabolite with anti-inflammatory activity, can suppress these responses.
Methods:
RAW 264.7 macrophages were treated with PAGln (10 μM) to induce inflammatory activation, with or without IAA (1–100 nM). ROS generation was measured by fluorescence assays. Planned experiments include Western blotting and qPCR for pro- inflammatory cytokines (IL-1α/β, IL-6, TNF-α), integrins (LFA-1, Mac-1), and ROS/NO- associated proteins (Nox2, Nox4, iNOS), alongside NO quantification, leukocyte adhesion assays, and NF-κB pathway analysis (cytoplasmic vs. nuclear p-p65).
Results:
Our data show that PAGln increased ROS production approximately two-fold in RAW 264.7 cells compared with untreated controls. Co-treatment with IAA reduced ROS generation in a concentration-dependent manner across the 1–100 nM range. These findings suggest that IAA suppresses PAGln-driven oxidative stress, warranting further mechanistic investigation of downstream cytokine expression, adhesion molecules, and NF-κB activation.
Conclusion:
PAGln promotes macrophage oxidative stress and inflammatory activation, while IAA counters these effects by reducing ROS generation. Ongoing studies will clarify the role of IAA in suppressing PAGln-induced cytokine release, integrin upregulation, and NF-κB activation. These findings highlight the potential of microbiota-derived metabolites such as IAA to mitigate inflammatory signaling linked to cardiovascular risk, suggesting a novel therapeutic avenue for modulating macrophage-driven vascular inflammation.

Atlanta -8

Probing the role of Free-Fatty Acid Receptor-4 (FFA4) as a novel target for Parkinson's Disease: FFA4 agonists reduce 6-OHDA-induced cell death

Farnoosh Moghaddam, Monika Binwal, Andrea Green2, Kalyn M. Rambacher, Kevin S. Murnane2 and Nader H. Moniri

Abstract

Background and objectives:
Parkinson's Disease (PD) is a progressive neurodegenerative disorder affecting more than 10 million people worldwide, with approximately 90,000 new diagnoses annually in the United States. PD is characterized by motor impairments and non-motor symptoms arising from degeneration of dopamine (DA)-producing neurons in the substantia nigra pars compacta. Current treatments, such as levodopa and DA receptor agonists, alleviate symptoms but do not prevent neuronal loss or slow disease progression. Oxidative stress and neuroinflammation are recognized as central contributors to dopaminergic cell death. Free-Fatty Acid Receptor-4 (FFA4), a G protein–coupled receptor responsive to long-chain fatty acids, has been implicated in anti-inflammatory and cytoprotective signaling. We investigated whether FFA4 activation could enhance DA synthesis and confer neuroprotection in cellular and animal models of PD.
Methods:
In vitro, DA-producing PC12 cells were treated with the endogenous FFA4 agonist docosahexaenoic acid (DHA) or the synthetic agonist TUG-891, followed by exposure to 6-hydroxydopamine (6-OHDA). Tyrosine hydroxylase (TH) expression, cell survival, ROS generation, and NF-κB activation were assessed. In vivo, a rat model of PD was generated via stereotaxic injection of 6-OHDA into the striatum. Animals received TUG-891 treatment, and motor function was evaluated using the rotation test and beam traversal test. Brain tissues were analyzed by immunohistochemistry (IHC) for dopaminergic neuronal survival.
Results:
In PC12 cells, FFA4 activation upregulated TH expression, reduced ROS production, and suppressed NF-κB signaling, thereby protecting against 6-OHDA- nduced cell death. In rats, 6-OHDA induced pronounced motor deficits, including increased rotational behavior and prolonged beam traversal times compared with controls. TUG-89 significantly reduced rotations and improved beam performance. IHC confirmed greater preservation of dopaminergic neurons in the striatum of TUG-891–treated animals relative to untreated 6-OHDA rats.
Conclusion:
Activation of FFA4 enhances dopamine synthesis, reduces oxidative stress and neuroinflammation, and improves motor outcomes in preclinical PD models. These findings support FFA4 as a promising therapeutic target that may provide both symptomatic relief and disease-modifying potential in Parkinson's disease.

Atlanta -8

Free-Fatty Acid Receptors FFA1 and FFA4 Differentially Regulate Migration in Genetically Distinct Papillary Renal Cell Carcinoma Cell Lines

Mohsina Mukti, Nader H Moniri

Abstract

Renal cell carcinoma (RCC) is a leading cause of cancer-related mortality among genitourinary malignancies and ranks among the top ten most prevalent cancers worldwide. Papillary renal cell carcinoma (pRCC), the second most common RCC subtype, constitutes approximately 10–15% of all RCC cases and is characterized by a heterogeneous genetic landscape. Unlike clear cell RCC, pRCC is often driven by distinct mutations, most notably in the c-MET oncogene, as well as in CDKN2A and components of the Hippo/NF2 signaling pathway. These diverse molecular etiologies contribute to the aggressive clinical behavior and therapeutic resistance seen in pRCC.

We previously reported that G protein-coupled free-fatty acid receptors FFA1 and FFA4 are endogenously activated by medium- to long-chain fatty acids and are overexpressed in pRCC tumors compared to matched normal kidney tissue. Moreover, activation of these receptors influences the migratory behavior of the c-MET-driven ACHN pRCC cell line. Building upon these findings, the present study investigates the role of FFA1 and FFA4 in modulating cell migration in a panel of patient-derived pRCC cell lines with distinct mutational drivers: UOK112 (CDKN2A mutation), UOK342 (Hippo/NF2 mutation), and UOK337 (c-MET mutation).

Using trans well migration assays, we systematically evaluated the effects of selective FFA1 and FFA4 agonists on the migratory capacity of these pRCC cells. Our findings suggest that the migratory response to FFA receptor activation varies based on the underlying genetic mutations of each cell line, indicating a potential link between FFA receptor signaling and the molecular subtype of pRCC. This work highlights the importance of tumor-specific genetic context in determining response to metabolic receptor modulation and supports the therapeutic potential of targeting FFA receptors in genetically stratified pRCC subtypes.

Atlanta – 9

Selective Antidepressant-Like Effects of Ramelteon in the Wistar-Kyoto Rat Model of Depression

Khadija Murphy, Sterling Neil, Le'Shar Grant, Adriana Peat, Renee Hayslett

Abstract

Major Depressive Disorder (MDD) is a debilitating condition with a higher prevalence in women, highlighting a need for novel therapeutics with improved side-effect profiles. The melatonergic system is a promising target for mood regulation, and ramelteon is a selective MT1/MT2 melatonin receptor agonist. This study aimed to evaluate the efficacy of ramelteon in female Wistar-Kyoto (WKY) rats, a genetic animal model known for its hyper-responsiveness to stress, making it highly relevant for studying depression.

We hypothesized that ramelteon would produce a selective antidepressant-like effect. Female WKY rats were administered either vehicle or ramelteon (0.5, 1, or 2 mg/kg) and assessed in a battery of behavioral tests. Depressive-like behavior was measured using the Forced Swim Test (FST), anxiety using the Elevated Plus Maze (EPM), recognition memory using the Novel Object Recognition (NOR) test, and general motor function using a locomotor activity (LCA) test.

An antidepressant-like effect was observed in the FST ($p = .009$), with the 1 mg/kg dose of ramelteon significantly reducing immobility time compared to vehicle controls. This effect was specific, as ramelteon did not alter general locomotion in the LCA test. Furthermore, no significant effects were observed on anxiety-like behavior in the EPM or on the cognitive performance noted in the NOR test.

These findings suggest that ramelteon exhibits a targeted antidepressant-like effect in the WKY rat model, appearing to modulate circuits related to behavioral despair without broadly affecting anxiety, memory, or motor function. This highlights the potential of ramelteon as a selective agent for mood regulation.

Atlanta – 10

Indole-3 Acetic Acid as an Antidote for Phenylacetylglutamine- Induced Vascular Dysfunction

Naser AZM, Hoque N, Sooreni S, Jones M, Shahid MS, Begum M, Islam N, Simon NP, Ezewudo E, Nguyen T, Rahman T, Hasan R

Abstract

Background and Objectives:
Phenylacetylglutamine (PAGln), a gut microbiota–derived metabolite, has been linked to cardiovascular disease through endothelial dysfunction, oxidative stress, and inflammation. Indole-3-acetic acid (IAA), a microbial tryptophan metabolite, has demonstrated anti-inflammatory activity in other disease contexts, but its ability to counteract PAGln-induced endothelial dysfunction is unknown. This study investigates whether IAA suppresses PAGln-nduced endothelial activation and inflammatory signaling.
Methods:
Endothelial activation was induced in primary mesenteric arterial endothelial cells (MECs) with PAGln (10 μM), followed by treatment with sham, IAA (0.1–100 nM), or Bosentan (50 μM). Adhesion molecules (VCAM-1, ICAM-1) and cytokines (IL-1β, IL-6, TNF-α) were measured by Western blotting and ELISA. ROS generation was assessed by fluorescence assays and confirmed by probing oxidative stress proteins (Nox2, Nox4, iNOS). NF-κB activation was evaluated by nuclear translocation and qPCR. Leukocyte adhesion assays quantified inflammatory cell binding to MECs.
Results:
PAGln significantly upregulated ICAM-1 and VCAM-1, enhanced ROS production, increased Nox2 expression, and induced IL-1β, IL-6, and TNF-α in MECs. These effects were accompanied by greater leukocyte adhesion to endothelial monolayers, consistent with endothelial activation. Treatment with IAA inhibited PAGln- induced adhesion molecule expression, reduced ROS production and Nox2 expression, suppressed cytokine release, and limited leukocyte adhesion. Importantly, IAA attenuated NF-κB activation, highlighting a central mechanism by which it blocks PAGln's pro- inflammatory effects. Bosentan provided partial but less robust protection compared with IAA.
Conclusion:
IAA effectively suppresses PAGln-induced endothelial activation by reducing adhesion molecule expression, ROS generation, cytokine release, leukocyte adhesion, and NF-κB signaling. These findings identify IAA as a promising modulator of gut metabolite–driven vascular inflammation and suggest its potential as a therapeutic strategy for preventing PAGln-associated cardiovascular dysfunction

Atlanta – 11

Formulation and delivery of IAA via *in situ* gel

Sterling Neill

Abstract

Background and Objective:
Roughly 120 million people suffer from hypertension, however some drugs possess co-action, treating both hypertension and rescuing from other harmful gut related diseases. In previous studies, Indole-acetic acid-3 (IAA) has demonstrated efficacy in treating gut microbiota induced diseases. However, due to the acidic environment of the stomach IAA is rapidly degraded preventing extended release of drug over time. Additionally, IAA is highly insoluble, causing issues with drug delivery. To combat these issues an extended-release IAA *in situ* gel was formulated, characterized, and evaluated.
Methods:
The IAA *in situ* gel was formulated using the Design of Experiments (DOE) Jmp software. Thirteen gels with altering concentrations were formulated and tested for pH, gelation time, and floating lag time. Each gel consisted of the same amount of sodium bicarbonate, sodium citrate, calcium carbonate, HPMC 100M, and IAA. The components that were chosen to be altered included sodium alginate, $Cacl_2$, and NaOH.
Results:
Based on the results of each test parameter the optimal formulation was calculated by the Jmp software, which was found to be 99% significant with all three tests pH, gelation time, and floating lag time results falling below 0.05 significance. The final formulation consisted of: sodium alginate, $Cacl_2$, and NaOH at concentrations of 2% (%w/v), 0.175 (%w/v), and 5.5 mL, respectively. According to literature, the best gel formulation would have a pH between 2 and 8, a floating lag time less than 30 seconds, and a floating duration time of over 12 hours. The DOE gel test results were consistent with predicted values from the Jmp software, suggesting the efficacy of the DOE *in situ* gel performance.
Conclusion:
The DOE IAA in situ gel is an extended-release formulation that was formulated, characterized, and evaluated for effective oral delivery to mediate hypertension and gut microbiota related diseases.

Atlanta-12

Development of Melatonin-Loaded Buccal Films: A Novel Approach to Overcome First-Pass Metabolism and Improve Sleep Health

Dhruvi Patel, Atiya Siddiqui, Snehitha Akineni, Mohammad N. Uddin

Abstract

Background and Objective:
Sleep disorders like insomnia, delayed sleep phase syndrome, and jet lag are increasing with the onset of stress, non-traditional working hours, and screen exposure. Melatonin is the circadian rhythm mediator, but oral formulations have low bioavailability (15–30%) as they are subject to first-pass metabolism and gastrointestinal degradation. Oral dissolving films (ODFs) administered via the buccal route provide rapid absorption, improved patient compliance, and are particularly suitable for pediatric, geriatric, and dysphagic patients, thereby overcoming these limitations.
Method:
Melatonin ODFs were prepared by solvent casting from Polyethylene Glycol 2000 (PEG 2000) plasticizer and Hydroxypropyl Methylcellulose (HPMC) film former. Hydroalcoholic solutions having HPMC, PEG, and melatonin were cast in a petri dish and dried under standard conditions. Surface pH, disintegration, mechanical strength, in vitro release, weight variation and thickness were evaluated.
Results:
ODFs had uniform thickness (0.500 mm) and weight (0.212 g). Surface pH was neutral (7.0), ensuring safety to the mucosa. The films dissolved within 90 seconds, permitting fast release of the drug. In vitro, was showing 100% release of melatonin within 30 minutes with a trend of burst release and obeying first-order kinetics. The release profile indicated a rapid onset followed by steady-state release, with the goal of quick absorption and long-lasting therapeutic effects. The increased release efficiency indicates the ability of buccal films to maximize melatonin bioavailability compared to conventional oral dosage forms. The films were flexible and non-brittle.
Conclusion:
Melatonin ODFs provide a new, patient-friendly means of improving bioavailability and quick onset of action by bypassing hepatic and gastrointestinal metabolism. These films have a special benefit for dysphagia patients. In future studies, Ex vivo permeation and in vivo pharmacokinetic studies to determine clinical benefit will be conducted. Melatonin ODFs constitute an important advance in the treatment of sleep disorders and overall sleep health.

Atlanta-13

Challenging the classical paradigm: combating obesity-driven diabetes and hypertension with a novel agent

Simon NP, Shahid M, Oliaie S, Nguyen T, Ezewudo E, Hasan R

Abstract

A recent study from our laboratory has identified that indole-3-acetic acid (IAA), a metabolite produced by the gut microbiome, inhibits endothelin-1 (ET-1) overproduction by targeting endothelin-converting enzyme-1 (ECE-1), the primary enzyme for ET-1 biosynthesis, and also attenuates ET-1 signaling by antagonizing its receptors, ETAR and ETBR. Given the link between obesity and increased ET-1 activity, this study aims to explore whether IAA can mitigate obesity-induced type-2 diabetes (OT2D) and hypertension (HTN). Our preliminary data using methods like random blood glucose measurements (RBG), oral glucose tolerance tests (OGTT), tail cuff plethysmography, pressurized arterial myography show that daily administration of an extended-release formulation of IAA (IAA-ER) in a rat model of OT2D effectively suppresses the development of T2D, insulin resistance (IR), HTN, and vascular dysfunction respectively. Also, as obesity is a disorder of chronic hypoxia leading to increased plasma ET-1 production we demonstrated that ET-1 levels were reduced after IAA treatment in hypoxia-induced mouse endothelial cells (MECs). Overall, our study investigates the efficacy of IAA in counteracting high-fat diet-induced OT2D, HTN and vascular dysfunction. This study promises to provide new insights into the role of this gut microbiome-derived metabolite in OT2D and supports the broader application of IAA as a novel antihypertensive agent.

Atlanta – 14

An indole containing agent 3-{[2-(1H-Indol-3-yl)Ethyl]Carbamoyl}Propanoic Acid inhibits phenylacetylglutamine-induced NF-κB activation and oxidative stress in RAW264.7 macrophages

Md Moklesur Rahman Sarker, Raquibul Hasan

Abstract

Background and Objectives:
Phenylacetylglutamine (PAGln), a gut microbiota–derived metabolite, has been implicated in pro-inflammatory signaling via adrenergic and oxidative stress pathways. While PAGln has been linked to vascular and immune dysfunction, its effects on macrophage activation remain under investigation. This study evaluates the effectiveness of 3-{[2-(1H-Indol-3-yl)Ethyl]Carbamoyl}Propanoic Acid (IAAA2) in suppressing PAGln-induced macrophage activation and elucidates its underlying mechanism, with a focus on NF-κB signaling and downstream oxidative and inflammatory responses.
Methods:
RAW 264.7 macrophages were treated with PAGln (10 μM) in the presence or absence of IAAA2 (0.1–100 nM). ROS generation was assessed by fluorescence microscopy and absorbance-based assays. Western blotting and qPCR are being performed to determine integrin expression (LFA-1/CD11α, Mac-1/CD11β), ROS/NO-associated proteins (Nox2, Nox4, iNOS), and major cytokines (IL-1α/β, IL-6, TNF-α). Leukocyte-endothelium adhesion assays are planned to assess functional activation, while NF-κB activation will be analyzed using cell fractionation and nuclear localization of p65.
Results:
Preliminary data revealed that PAGln (10 μM) increased ROS production by 324.62% in RAW cells compared with controls. Treatment with IAAA2 suppressed ROS production to 35.84%, 38.69%, 58.98%, and 40.01% at 0.1, 1.0, 10, and 100 nM, respectively. Fluorescence microscopy confirmed a reduction in ROS-positive cells in IAAA2-treated groups compared with PAGln-only groups. Additional studies assessing integrins, ROS/NO-related proteins, cytokine expression, and NF-κB activation are ongoing.
Conclusion:
Our preliminary findings indicate that IAAA2 potently inhibits PAGln-induced ROS production in macrophages, supporting its potential as a suppressor of oxidative and inflammatory activation. Ongoing work will clarify the effects of IAAA2 on integrins, cytokines, and NF-κB signaling, with implications for targeting gut metabolite–driven macrophage activation in cardiovascular disease.

Atlanta – 15

Novel targeting of high salt-induced tau phosphorylation and cognitive dysfunction using a gut microbiota-derived metabolite

Shahid MS, Sooreni S, Neil SS, Simon NP, Hoque N, Naser AZM, Ezewudo E, Akkineni S, Nguyen T, Hayslett R, Uddin N, Moniri N, Rahman T, Hasan R

Abstract

High salt diet (HSD) has been linked to tau phosphorylation and cognitive dysfunction (CD) driven by the endothelin-1 (ET-1) pathway. Our laboratory has recently discovered a gut microbiota derived tryptophan metabolite called indole-3-acetic acid (IAA) which antagonize ET-1 receptors Type A (ETAR) and Type B (ETBR) as well as ET-1 biosynthetic enzyme, ECE-1. This novel dual inhibition of the ET-1 has been shown to profoundly reduce the elevated blood pressure (BP) in Dahl salt-sensitive (DSS) hypertensive rats. Since HSD promotes immune dysregulation, leading to CD, we hypothesize that IAA may potentially restrain HSD-stimulated p-tau and the development of CD by inhibiting immune cell activation. Macrophages and dendritic cells, both expressing ETAR and ETBR, and ECE-1 are activated by high levels of ET-1 which upregulates reactive oxygen species, cytokines, and integrin overexpression. The presence of ET-1 receptors and ECE-1 within the cerebral vasculature play integral roles in the development of CD and their blockade by IAA can improve cognition in these animal models.

Pressure myography will be used to assess endothelial and smooth muscle cell function in cerebral arteries. Western blot, ELISA, proteomics and qPCR will be employed to measure p-tau and other neuroinflammatory markers. Flow cytometry will be used to quantify the infiltration of immune cells into cerebral tissue, together with their polarization. Novel object recognition test (NORT) and object location test (OLT) will be used to assess cognition in animal models. Their gut microflora will be analyzed using 16S rRNA amplicon sequencing. Our in-silico analyses and Ca^{2+} imaging experiments have demonstrated interaction between IAA and the ET targets, ETAR, ETBR and ECE-1.

Our future studies will unveil the role of this gut microbiota-derived metabolite in HSD-induced p-tau, leading to the development of CD, potentially unlocking another important aspect of the gut-brain axis.

Atlanta – 16

Optimization of Dimenhydrinate Oral Dissolving Films for Buccal Delivery Using a Permeation Enhancer

Atiya Siddiqui, Dedeepya Pasupuleti, Mohsina Mukti, Snehitha Akkineni, Dhruvi Patel, Mohammad N. Uddin

Abstract

Background and Objectives:
Motion sickness is commonly associated with nausea and vomiting, making conventional oral medications unsuitable for many patients. Dimenhydrinate, although widely used, undergoes extensive first-pass metabolism, which reduces its bioavailability. This study aimed to optimize oral dissolving films (ODFs) of dimenhydrinate for buccal administration to achieve rapid absorption and bypass hepatic metabolism. Another objective was to assess the effect of 1,4-diazabicyclo [2.2.2] octane (DABCO) as a permeation enhancer.
Methods:
Dimenhydrinate ODFs were prepared by solvent casting in a petri dish with hydroxypropyl methylcellulose (HPMC) and polyethylene glycol 2000 (PEG 2000) polymers. Ionic liquid 1,4-diazabicyclo[2.2.2]octane (DABCO) was added to enhance mucosal permeability. The films were assessed for appearance, pH, thickness, weight variation, and disintegration. In vitro release testing was conducted in phosphate buffer (pH 6.8), while ex vivo permeability was evaluated using porcine buccal mucosa using a Franz diffusion cell and analyzed by UV spectrophotometry.
Results:
The optimized films were smooth, semi-transparent, and had near-neutral pH values (6.82–6.94), confirming compatibility with buccal tissues. Thickness ranged from 0.053 to 0.071 mm, and disintegration occurred quickly (73–80 seconds). In vitro cumulative drug release was observed to be 95% within 45 minutes. Ex vivo studies demonstrated that permeation commenced within 10 minutes, and DABCO-containing films exhibited significantly higher drug transport compared to controls.
Conclusion:
Orally dissolving film (ODF) has the advantage of bypassing the first-pass effect, and quick onset of action. Optimized dimenhydrinate ODFs demonstrated favorable physicochemical properties, quick disintegration, and efficient drug release. Inclusion of DABCO improved buccal permeability, supporting faster systemic absorption. Buccal ODFs offer a practical alternative for patients with swallowing difficulties, providing a patient-friendly approach to managing motion sickness.

Atlanta – 17

Dual targeting of ET-1 production and receptor signaling for pulmonary arterial hypertension treatment

Samira Sooreni Oliaie, Taufiq Rahman, Ayako Makino, and Raquibul Hasan

Abstract

Pulmonary arterial hypertension (PAH) is fatal vascular disease characterized by endothelial dysfunction, chronic inflammation, and aberrant Endothelin-1 (ET-1) signaling. In PAH, ET-1 and ET-1 converting enzyme-1 (ECE-1) levels are elevated, along with upregulation of ET-1 receptors (ETAR and ETBR). Excessive ET-1 signaling promotes vasoconstriction, vascular smooth muscle cells (SMCs) proliferation, endothelial dysfunction, barrier breakdown, and eventually structural remodeling of the pulmonary arteries, increased pulmonary vascular resistance (PVR), and a rise in pulmonary artery systolic pressure (PASP). Current ETAR/ETBR antagonists act only at the receptor level but fail to inhibit ET-1 overproduction. Our lab discovered that IAA, a gut microbiota metabolite has a dual mechanism of action: inhibition of ECE-1, which suppresses excessive ET-1 biosynthesis, and antagonism of ETAR/ETBR, which blocks ET-1 receptor overstimulation.

We hypothesize that IAA, by blocking ETAR/ETBR and ECE-1 inhibits ET-1-driven oxidative stress, inflammatory signaling, barrier dysfunction, pulmonary arterial remodeling, SMCs proliferation, heart medial wall thickness, fibrosis, PASP increase, RVSP increase, vascular resistance, RV hypertrophy.

Our preliminary Ca^{2+} imaging and in silico data demonstrate that IAA is a non-selective antagonist of ETAR/ETBR and suppresses ET-1-induced ROS production from the human aortic SMCs, likely by blocking ETAR/ETBR, which may prevent ROS-mediated vascular dysfunction. Also, we found out that IAA inhibits ET-1 signaling, p38 MAPK activation, and VCAM-1 overexpression in mouse mesenteric artery endothelial cells (MECs). Our data shows that IAA reduces hypoxia-induced ET-1 production by inhibition of ECE-1 in MECs. Also, we have demonstrated that IAA suppression of ECE-1 upregulation and ET-1 production in high salt diet-DSS hypertensive rats.

Excessive ET-1 production and signaling play a pivotal role in the development and progression of PAH. IAA has a dual inhibition action on ETAR/ETBR and ECE-1 proved by our preliminary studies, and we expect that it will ameliorate PAH phenotype in both in vitro and animal models.

Atlanta – 18

The Role of Peripheral α2-Adrenergic Receptors in Xylazine-Induced Skin Necrosis

Mary O. Vu, Clinton E. Canal, PhD

Abstract

In the past decade, there has been an increased use of xylazine as an adulterant in illicit drugs in the United States. Xylazine is an α2-adrenergic receptor agonist and chronic intravenous injections of xylazine have been associated with detrimental clinical outcomes, such as overdose and skin necrosis. Currently, there is no antidote for xylazine overdose, and naloxone treatment only reverses the effects of a co-administered opioid. Despite the increased usage, lack of information regarding xylazine and its implications on severe tissue injury has become a major public health concern. The goal of this project is to investigate the potential mechanism of action of xylazine at α2-adrenergic receptors. We hypothesize that xylazine-associated skin necrosis is caused by persistent vasoconstriction, leading to hypoxia via activation of α2A-adrenergic receptors in vascular smooth muscle cells. We have determined xylazine's binding affinities at each α2-adrenergic receptor subtype using radioligand competition binding assays. Using cAMP assays, we have determined xylazine's functional activity at each α2-adrenergic receptor subtype. Finally, we developed a xylazine-induced skin ulceration model in rats and evaluated the effectiveness of selective α2-adrenergic receptor antagonists in preventing these ulcerations. This project seeks to advance the pharmacological knowledge of xylazine and explore the mechanisms causing skin necrosis.

ATLANTA Medical Education

Atlanta – 19

Comparative analyses of safe consumption sites and implications for the pharmacy profession

Claren Hornbuckle, Alexandria Owens, Kenric Ware, PharmD

Abstract

Background:
Safe consumption sites (SCS) are facilities that maintain supportive environments for substance users to self-administer their drug products. The operations of SCS are controversial, with little attention given to how healthcare professionals could integrate into their daily workflows. This exploratory study sought to compare the functionalities of SCS and to propose different roles that pharmacy professionals could play within their current structures.
Methods:
This exploratory analysis reviewed the origins of SCS, activities that take place within SCS, and SCS locations throughout the world. The analysis also examined the importance of affirming language among substance users. Additionally, prospective roles of pharmacy personnel were suggested. Thematic analyses were performed to glean key tenets about SCS and their potential to impact healthcare in under explored capacities.
Results:
The earliest emergence of SCS dates back to almost 40 years. The primary services that SCS offer are drug checking, along with the facilitation of substance users' inhalation, injection, intranasal, and oral consumption of various drug compounds. In some SCS, certain routes of administration are often advised or discouraged based on substance users' preexisting health conditions that could be exacerbated by various formulations. Pharmacy personnel are poised to play key roles within SCS related to drug checking apparatuses and drug interactions observed with substance use administration.
Conclusion:
While the concept of SCS is far from new in terms of years in existence, awareness of these facilities and the potential benefits that they could offer substance users are under investigated. Safety concerns that often surface at the notion of SCS populating neighborhoods have not been supported by the literature. Pharmacy personnel have unique skills sets and vantage points that could help optimize health offerings that take place with SCS.

Atlanta – 20

Student Pharmacist Perceptions of an Interprofessional Immersive Education Experience in a Migrant Farm Worker Population – A Qualitative Review

Tonya Pearson, Pharm.D., Katelynn Mayberry, Pharm.D., Kenric Ware, Pharm.D., Kenneth Mueller, Pharm.D.

Abstract

Background and Objective:
The Farm Worker Family Health Program (FWFHP) is a two-week interprofessional education (IPE) immersion experience where health professional faculty and students provide health services for migrant farm workers and their families in a rural South Georgia community. Since its establishment in 1993 in cooperation with Emory University, the FWFHP has served over 15,000 individuals. Mercer University College of Pharmacy (MUCOP) joined the program in the summer of 2024, sending three faculty and fourteen student pharmacists, and again in 2025 with three faculty and seventeen students, to provide pharmacy services on-site at participating farms. This study's purpose was to evaluate the integration of this rural health IPE immersion experience with MUCOP's experiential education, specifically to assess student pharmacist perceptions regarding other health professions, interprofessional collaborative practice, learning in an underserved mobile clinic setting, and the experience's impact on professional identity and cultural humility.
Methods:
Following IRB approval and student participation in the FWFHP Program pharmacy students were surveyed on IPE perceptions using qualitative methods. This study focused on the qualitative data, which explored student reflections on teamwork dynamics, their understanding of different professional roles, and their experiences providing care to the farm worker community. Survey participation was optional for pharmacy students, no incentives were provided for participation, and students were de-identified.
Results:
Five key themes emerged from student pharmacist responses: 1. Rewards of service and community connection; 2. Advocacy potential for pharmacy's expanding role; 3. Benefits of interprofessional teamwork and collaboration; 4. Awareness of health disparities and challenges; and 5. Opportunities for skills development, continuous learning, and quality improvement. Analysis of these themes provides opportunities for continued improvement of IPE and pharmacy experiential education through the FWFHP.
Conclusion:
The FWFHP experience provided a meaningful and effective method for incorporating interprofessional education into MUCOP's experiential education program.

Atlanta – 21

Exploring the integration of community health worker and pharmacy curricula: a fusion for the future

Olivia Perdue, Kenric Ware, PharmD

Abstract

Background:
Community health workers (CHW) occupy a relatively new professional role that often functions as bridges between patients and providers. Pharmacy professionals have been touted as serving in a similar capacity, with pharmacy students being educated on evolving multidisciplinary team members. The objective of this study was to characterize the synergy that exists between CHW and pharmacy curricula and to strategize how pharmacy students could foreseeably function as CHW.
Methods:
This theoretical analysis surveyed the existing infrastructure of CHW training programs and associated requirements for certification completion. The investigation explored legislative underpinnings that have established CHW certifications as reputable program offerings that can appeal to the masses. In addition, educational standards that guide pharmacy programs were consulted to explore areas of overlap with CHW training. Moreover, specific locations within pharmacy curricula were identified as plausible options to embed CHW training within existing course structures.
Results:
Certification efforts of CHW programs can vary widely among different state regulations. A seemingly agreed upon tenet of CHW pursuit is a predetermined set of hours on competency training that must be satisfied. Within pharmacy curricula, the emphasis placed on communication skills, multidisciplinary collaborations, and liaisons for patient care seems to align closely with CHW foundational pillars. Pharmacy students could foreseeably undergo CHW training within their experiential education responsibilities or through skills-based certificate formats currently offered in other arenas, e.g., immunizations.
Conclusion:
Pharmacy students and pharmacists have substantial professional congruence with CHW in both training requirements and professional aims. As the market for CHW continues to expand, healthcare professional students such as pharmacy students are prepared to assume these responsibilities. Experimental studies on the interplay between pharmacy students and CHW are warranted.

ATLANTA Clinical

Atlanta – 22

Evaluation of dronabinol prescribing patterns and adherence to restricted criteria use within an inpatient setting

Alycia Adams, BSPS; Morgan Manson, MBS; Sarah Boyko, Pharm D; Rachele Hollis, PharmD; Marina Rabinovich, PharmD; Kruti Shah, PharmD; Kenric Ware, PharmD

Abstract

Background and Objective

Dronabinol is a manufactured version of delta-tetrahydrocannabinol, the featured ingredient in cannabis. Decisions about whether to use Dronabinol for various conditions can be complex. The purpose of this study was to evaluate the consistency of dronabinol's prescribing with its associated restricted criteria use within an urban inpatient setting.

Methods

A retrospective chart review was conducted to gauge alignment between Dronabinol prescribing and an institution's restricted criteria use (IRCU) between General Medicine and Trauma, selected due to their largest representation within the sample. Additional data included whether medical nutrition services accompanied Dronabinol prescribing. A chi-square test was used to assess whether a statistically significant difference in adherence to the IRCU existed between General Medicine and Trauma. A chi-square test was also used to determine whether adherence to the IRCU differed based upon the presence or absence of medical nutrition consults. Statistical significance was predetermined as $p < 0.05$.

Results

Forty-two patients were analyzed in this study, with 18 and 24 accounting for General Medicine and Trauma, respectively. Approximately 71% (17/24) of Trauma's Dronabinol prescribing met restricted criteria use as opposed to roughly 33% (6/18) of General Medicine's Dronabinol prescribing met restricted criteria use, a statistically significant difference, $p = 0.016$. Eighty percent (16/20) of patients having medical nutrition consults along with their Dronabinol prescriptions met restricted criteria use compared to almost 32% (7/22) of patients not having medical nutrition consults associated with their Dronabinol prescriptions meeting restricted criteria use, also a statistically significant difference, $p = 0.002$.

Conclusion

Restrictions on Dronabinol prescribing has been instituted in different settings to preserve its use for the most clinically compelling scenarios. Despite the presence of restricted criteria use in this setting, and perhaps abroad, substantial differences to adherence to the policies in place emerged among specialty areas.

Atlanta – 23

Follow the Lead: Evaluation of direct oral anticoagulant lead-in therapy for management of left ventricular thrombus

Phylicia Adams, BSPS; Kylah Ellsberry, BSPS, Sarah Boyko, PharmD; Rachele Hollis, PharmD; Bethany Mullinax, PharmD; Kenric Ware, PharmD

Abstract

Background:
Left ventricular (LV) thrombus refers to clot formation whose detection commonly relies on Transthoracic Echocardiography. Direct oral anticoagulants (DOACs) have off-label, LV thrombus lead-in therapy indications that are inconsistently employed. The objective of this study was to examine whether off-label use of DOAC lead-in dosing was initiated.
Methods:
A retrospective chart review was conducted at an urban hospital featuring two DOACs: apixaban and rivaroxaban, and whether oral lead-in therapies were initiated for LV thrombus management. Independent variables (IVs) included age, gender, weight, kidney function, operationalized to some kidney dysfunction or no kidney issues, anticoagulant used, use of lead-in period, and therapy duration, either indefinite or zero to 6 months. A chi-square test was used to assess whether a statistically significant difference existed between the prescribing of lead-in therapy for apixaban versus rivaroxaban. A multiple logistic regression test was used to gauge whether any of the IVs mentioned above was statistically significantly associated with the prescribing of oral lead-in therapies. Statistical significance was predetermined as $p < 0.05$.
Results:
Sixty-two patients were included in this study. The average age and weight were 60 years old and 81 kg, respectively. Seventy-seven percent were males, 52% having no kidney issues, 61% prescribed oral lead-in therapies, and 68% on indefinite anticoagulation. Patients analyzed either received apixaban (n= 57) or rivaroxaban (n = 5), with an oral lead-in therapy initiated in 42% of apixaban patients (24/57) and 0% of rivaroxaban patients, a non-statistically significant difference ($p = 0.064$). None of the IVs were statistically significantly associated with prescribing lead-in therapies ($p > 0.05$).
Conclusion:
A standardized method of prescribing DOAC lead-in therapies could be beneficial to optimize patient outcomes. Patients are encouraged to report any bleeding events and those demonstrating improvement over the course of six months should be assessed for therapy discontinuation.

Atlanta – 24

Exploring the optimization of IV push administration instructions within an inpatient institution

Ruhama Mengesha, BS; Kap Paull, BS; Sarah Boyko, PharmD; Marina Rabinovich, PharmD; Kruti Shah, PharmD; Debbie Viglotti, PharmD; Laurie Cavendish, PharmD; Kenric Ware, PharmD

Abstract

Background and Objective:
Standardization of instructions for intravenous (IV) push medications within electronic medical records (EMR) systems can be nonexistent. Some medications have detailed IV push instructions including guidance on dilutions and how long of a duration to push the medication. The objective of this study was to explore if select factors were associated with whether changes are needed to an urban institutional EMR system.
Methods:
A list of IV push medications used within an institutional system was furnished for evaluation. Observations were made as to whether administration considerations accompanied IV push medications. Furthermore, the EMR review also focused on if different types of monitoring were recorded alongside the IV push medications. Chi-square tests were employed to assess whether documented administration considerations or monitoring was associated with whether changes to the EMR were warranted. Statistical significance was predetermined as $p < 0.05$.
Results:
Of the medications analyzed, 35 and 23 did and did not have administration considerations included, respectively. Among the 35 medications that contained administration considerations, roughly 63% (22/35) indicated that changes are needed within the EMR. For the 23 medications that lacked administration considerations, approximately 65% (15/23) were found to need changes to EMR information. This difference did not reach statistical significance, $p = 0.855$. During a subsequent review, eight and 52 charts did and did not have associated monitoring, respectively, with roughly 63% (5/8) of the monitoring component deemed to need changes to their EMR. Similarly, almost 62% (32/52) for non-monitoring component was deemed to need changes to their EMR. This difference was also not statistically significant, $p = 0.958$.
Conclusion:
Increasing clarity of the instructions within EMRs on IV push medications figures to be a high priority among healthcare institutions. Improving the messaging around IV push medications is expected to mitigate potential adverse events and improve internal communications.

Atlanta – 25

Evaluating the Impact of a Medication Adherence Team on Blood Pressure Outcomes in Hypertensive Patients - A case of Grady Hospital

Mercy Muniu; Kara Rittenhouse; Cindy Nee, PharmD; Kenric Ware, PharmD

Abstract

Background
Hypertension management requires consistent medication adherence to achieve optimal blood pressure control and reduce cardiovascular risk. Poor adherence which could be driven by factors such as forgetfulness, cost, or side effects is a barrier. This study aimed to evaluate the effect of a medication adherence team on clinical outcomes among hypertensive patients.
Methods
A retrospective chart review assessing the impact of an adherence coach on blood pressure control spanned six months. Patients were divided into two groups: control (unable to be reached by adherence coach) or intervention (educated by adherence coach). Paired-sample t- tests were used to compare pre- and post-diastolic (DBP) and systolic blood pressures (SBP) within the intervention group. An independent sample t-test was used to compare differences in DBP/SBP between the control and intervention group. Statistical significance was pre- determined as $p < 0.05$.
Results
Fifty-five patients in the control and intervention groups were analysed. Within the intervention group, there was not a statistically significant mean drop in DBP from 81 mm Hg (pre-intervention) to 79 mm Hg (post-intervention), 95% CI (-1.760, 5.833), $p = 0.287$. However, there was a statistically significant mean drop in SBP from 156 mm Hg to 148 mm Hg, 95% CI (1.903, 13.188), $p = 0.010$. Between the control and intervention groups, there were statistically significant mean differences in the DBP of 8 mm Hg, 95% CI (1.922, 13.751), $p = 0.010$ and SBP of 9 mm Hg, 95% CI (1.790, 15.847), $p = 0.014$.
Conclusion
Medication adherence interventions showed statistically significant improvements in blood pressure between the intervention and control groups and a statistically significant decrease in DBP within the intervention group. Future research should focus on integrating multifaceted adherence strategies (education, reminders, incentives, regimen management) and applying more outreach strategies to contact persons who are unavailable by telephone.

Atlanta – 26

Impact of Inclisiran

Lincy Varughese , Pharm.D., Naderia Hussein, Pharm.D., Kelly Jackson, MSN, RN, NP-C, Kasey Rose, BSN, RN, CRNI, Naomi Todorut, BSN, RN, Amanda Avila, RN, Ligia Cioloca, BSN, RN

Abstract

Background:
Inclisiran (Leqvio), a small interfering RNA (siRNA) therapy approved in 2021, is indicated as an adjunct to diet and statin therapy for adults with primary hyperlipidemia, including heterozygous familial hypercholesterolemia (HeFH), to reduce low-density lipoprotein cholesterol (LDL-C).
Objective:
This retrospective study evaluated the real-world effectiveness of inclisiran in patients with elevated LDL-C treated at an outpatient infusion center. The primary objective was to assess the percentage change in LDL-C from baseline to 15 months.
Methods:
Patients who received at least one dose of inclisiran between January 1, 2023, and December 31, 2024, were included. Inclisiran was administered according to the manufacturer's recommended dosing schedule (284 mg subcutaneously at baseline, 3 months, and every 6 months thereafter). Data, including LDL-C values and medication history, were obtained from electronic health records. LDL-C was measured at baseline (within 90 days prior to first dose) and within 30 days before each follow-up dose.
Results:
A total of 65 patients were included (27 male, 38 female); most were 50–80 years old (n = 59). The majority were White (n = 56), followed by Black (n = 7) and Asian (n = 2). The mean baseline LDL-C was 138.7 mg/dL. At Month 3 (n = 52), LDL-C decreased to 82.8 mg/dL, reflecting an approximate 40% reduction from baseline. At Month 9 (n = 25), LDL-C remained <100 mg/dL (mean 89.2 mg/dL). At Month 15 (n = 10), LDL-C averaged 92.1 mg/dL, and at Month 21 (n = 1), 81.0 mg/dL. Across all follow-up points, LDL-C values remained well below baseline levels.

Conclusions:
In this real-world cohort, inclisiran was associated with substantial and sustained reductions in LDL-C through 21 months of follow-up. These findings support the clinical utility of inclisiran in routine practice and may inform lipid-lowering strategies for high-risk populations.

BioMedical

Columbus – 1

Validation of Liver Specific IMPDH2 Knockout Model for Investigating Metabolic Health

Rachel Abraham, Nguyen-Anh Nguyen, Jacob W. Myers, Woo Yong Park, Alex Eddie, Zayedali Shaikh, and Elma Zaganjor

Abstract

Background/ Objective:
Obesity affects over 42% of U.S. adults and increases the risk of type 2 diabetes, cardiovascular disease, and metabolic dysfunction-associated steatotic liver disease. Previous studies have shown that purine metabolism pathway affects obesity. Mizoribine, an inhibitor of inosine monophosphate dehydrogenase which is the rate limiting step in purine metabolism, has shown promise in reducing food intake and weight gain in mice while increasing thermogenesis. Although IMPDH2 is the dominant isoform across most tissues, we hypothesize that inhibition of liver IMPDH2 specifically is responsible for mizoribine's systemic metabolic effects.
Methods:
To validate the liver as the primary site of action, we used a liver-specific IMPDH2 knockout model using AAV8-TBG-Cre recombinase in floxed IMPDH2 mice. Tissues were harvested 30 days post-injection. Protein quantification and IMPDH2 expression were assessed via BCA assay and Western blotting across multiple tissues (liver, kidney, VAT, SAT, quadricep).
Results:
Western blot analysis confirmed loss of IMPDH2 expression in liver-specific tissue of AAV8-TBG-Cre floxed mice, while expression remained unchanged in other tissues including kidney, white adipose tissue, and muscle. Wild-type controls injected with AAV8-TBG-Cre showed no variation in IMPDH2 levels, validating specificity of Cre recombinase.
Conclusions:
The results indicate that the liver-specific IMPDH2 knockout mouse model was validated. This genetic tool will allow future studies to determine whether liver-specific IMPDH2 deletion alone can reproduce mizoribine's protective effects against obesity, offering a potential strategy to target purine metabolism to improve metabolic health.

Columbus – 2

Acute Sleep Disruption Impairs Social Behavior and Communication in Mice: Modeling Core Features of Autism Spectrum Disorder

Amalia Louis, Ahmed Eltokhi

Abstract

Background and Objective:
Sleep is a vital physiological state essential for the optimal functioning of the nervous, immune, and metabolic systems. Despite being a universal process across mammals, its precise role in sustaining complex brain functions, such as social behavior, communication, cognition, and motor function, remains incompletely understood, highlighting a critical gap in our knowledge of the neural mechanisms underlying sleep and behavior. Sleep disturbances, including insomnia, parasomnia, and interrupted sleep, are common in the general population but are disproportionately prevalent in individuals with neurodevelopmental disorders, particularly autism spectrum disorder (ASD). However, it remains unclear whether ASD directly causes sleep disruption as a comorbidity or whether disrupted sleep contributes to the onset or exacerbation of ASD symptoms. To address this, we investigated whether experimentally induced sleep disruption could produce behavioral phenotypes reminiscent of ASD, suggesting a causal link.
Methods:
Wild-type adolescent C57BL/6J mice underwent 2 days of intermittent sleep interruption using an orbital shaker protocol (100 RPM for 30 seconds every 2 minutes over 48 hours). Over the subsequent 4 days, mice were assessed with a comprehensive behavioral battery targeting core ASD phenotypes, including social interaction deficits, communication impairments, and repetitive behaviors.
Results:
Sleep-interrupted mice displayed clear deficits in social behavior: they engaged in fewer social contacts and had increased latency to first contact with an unfamiliar mouse. In the tube-dominance test, sleep-interrupted mice showed socially submissive behavior, indicating altered social hierarchy and dominance. Furthermore, these mice emitted fewer ultrasonic vocalizations during social interactions, suggesting impaired communication. However, sleep interruption did not lead to increases in repetitive behaviors, including self-grooming, rearing, or digging.
Conclusion:
Overall, these results indicate that acute sleep disruption can, at least in part, induce ASD-like phenotypes by specifically impairing social behavior and communication, core domains affected in ASD. Future studies should explore the mechanisms linking sleep disruption and ASD, which may inform therapeutic strategies addressing both sleep disturbances and behavioral deficits.

Columbus – 3

Effects of Sleep Interruption on T Cell Activation in a Mouse Model of Sepsis

Mark E. Murray Jr., Jacob Allen, Abhinaya Raguramachandran, Wendy E. Walker

Abstract

Background and Objective:
Sleep is a restorative biological process that is crucial to mammalian physiology. Previous research has shown that sleep is important for immune system homeostasis, including that of the adaptive immune system. This finding holds true in patients with sepsis. Sepsis is a syndrome of dysregulated immune response to infection, leading to multiorgan dysfunction, and is a major cause of infection-associated mortality. Prior research has shown that impaired sleep is associated with poor prognosis in septic patients. However, it is unknown if altered T cell prevalence/activation plays a role. Our aim is to determine the effect of sleep interruption on T cell populations and activation states in a mouse model of sepsis.
Methods:
Our study used mixed sex mice. Mice were split into sleep interruption (SI) and normal sleep (NS) groups. Mice from the SI group were placed on an intermittent orbital rotator for 48h. Sepsis was induced via Cecal Ligation and Puncture (CLP). We collected blood to measure leukocyte populations pre-sepsis and 24h post-sepsis via antibody staining and flow cytometry. Mice were euthanized after 24h.
Results:
Flow cytometry was used to characterize T lymphocyte cell populations in the blood samples. The expression of activation markers CD25 and CD69 on CD4+ and CD8+ was analyzed. The percentage of CD4+ and CD8+ T cells expressing each marker was calculated for all samples. There was no statistically significant difference in CD25 expression in CD4+ T cells between the NS and SI groups. At 24 hours, significantly more CD8+ T cells from the SI group expressed CD25 when compared to the CD8+ T cells from the NS mice.
Conclusion:
Our data suggests that increased CD8+ T cell activation could play a role in the mechanism by which sleep interruption negatively impacts immune system homeostasis in mice, driving increased sepsis pathogenesis.

Columbus – 4

Echolalia-Like Vocalization Changes in Two NaV1.2 Mutant Mouse Models of Autism Spectrum Disorder

Christian Casteel, Shaymaa Abdalla, Gabriela Martyna Bokota, Hossam Ismail, Zachary Thomas Carman, Ahmed Eltokhi

Abstract

Background and Objective

Autism spectrum disorder (ASD) is a complex neurodevelopmental condition characterized by impaired social interaction, restricted or repetitive behaviors, and communication deficits. In preclinical research, ultrasonic vocalizations (USVs) are widely used as a proxy to study communication, especially in mouse models of ASD, where they can capture early-life alterations in vocal output and call structure.

Methods

In this study, we investigated communication behavior in two novel mouse models carrying ASD-associated mutations in the voltage-gated sodium channel NaV1.2, NaV1.2(R854Q) and NaV1.2(R1630H). Using the pup isolation protocol, we recorded and analyzed USVs emitted by heterozygous NaV1.2 mutant pups during separation from the dam. Compared to wild-type littermates, both NaV1.2 mutant models exhibited a significantly higher number of ultrasonic calls, along with prolonged call duration. These changes resemble echolalia-like behavior, which manifests as repetitive and atypical speech patterns in some individuals with ASD.

Results

Interestingly, while both mutants shared these overall alterations, they also exhibited distinct communication phenotypes. Specifically, the two NaV1.2 models displayed unique call features, including differences in peak frequency, peak power, and call- type distribution. Such variation suggests that different NaV1.2 mutations may drive both overlapping and divergent effects on vocal communication.

Conclusion

Together, these findings provide evidence that NaV1.2 mutations contribute to disrupted communication patterns relevant to ASD, while also highlighting the phenotypic heterogeneity of the disorder. By linking specific sodium channel mutations to distinct alterations in vocal communication, this work establishes a foundation for future mechanistic studies and may inform therapeutic strategies targeting core communication deficits in ASD.

Columbus – 5

Sleep Interruption Alters Peritoneal Macrophage Transcriptome in Mice

Jacob A. Allen and Dr. Wendy E. Walker

Abstract

Background and Objective

Sleep is a fundamental biological process that supports immune homeostasis, and the disruption of sleep has extensive effects on host defense mechanisms. Peritoneal macrophages are crucial in tissue homeostasis and contribute to inflammation during infection. Previous experiments from our lab have shown that sleep interruption exacerbates sepsis by increasing macrophage cytokine production, yet the mechanism is still unknown. This study aimed to address this knowledge gap and investigate the molecular effects of sleep interruption on peritoneal macrophages in mice.

Methods

C57BL/6 mice were subject to sleep interruption for 48h or allowed to sleep normally. Mice were euthanized and peritoneal macrophages were harvested via peritoneal lavage. Macrophages were enriched and RNA was purified using the RNeasy mini kit (QIAGEN). Subsequently, RNA was sequenced and analyzed by Novogene.

Results

We found a total of 680 differentially regulated genes between the sleep interruption and normal sleep groups. Analysis of the data highlighted differential expression in several pathways relating to cytokine-cytokine receptor signaling (13 genes), defense response to bacterium (19 genes), and those related to cell killing (16 genes).

Conclusion

These findings demonstrate that sleep interruption drives changes in immune gene expression that may prime macrophages for heightened inflammatory responses and impaired antimicrobial defense. These changes in the transcriptome helps explain the increased cytokine production and increased mortality seen in septic mice that have experienced sleep interruption.

Columbus – 6

A preliminary study of sepsis in a Down syndrome mouse model

Abhinaya Raguramachandran, Wendy E. Walker

Abstract

Background:
Sepsis is a condition where a severe infection causes a dysregulated immune response, organ dysfunction and even death. Down syndrome is a genetic condition caused by trisomy of chromosome 21. It is associated with cognitive impairments and altered anatomical features and affects ~1/700 babies born in the US. Previous studies have shown that children with Down syndrome and sepsis had a 30% higher risk of mortality than kids without Down syndrome. However, the reason for this is not fully understood.

Objective:
Our aim is to determine why Down syndrome increases the risk of sepsis mortality.

Methods:
The Ts66Yah strain is a recently developed mouse model of Down syndrome that we employed to study this question. Our study used mixed sex Down syndrome mice and euploid littermates. Sepsis was induced via Cecal Ligation Puncture (CLP). We monitored disease severity and recorded survival data using a humane endpoint. We collected blood to analyze serum IL-6 and measured leukocyte populations pre-sepsis and 24h post-sepsis via antibody staining and flow cytometry.

Results:
We saw a trend towards increased mortality in Down syndrome vs euploid mice accompanied by a higher disease score. We also observed that some of the leukocyte populations were altered in Down syndrome mice trending towards fewer B cells, both pre- and post-sepsis. There is a trend towards increased CD4/CD8+ T cell ratio in Down syndrome vs euploid mice at post-sepsis. A trend towards higher number of blood Ly6C+ monocytes was also seen in Down syndrome vs euploid mice. We also observed a trend towards lower IL-6 levels in Down syndrome vs euploid mice post-sepsis.

Conclusion:
Our preliminary data suggest that Down syndrome mice are more susceptible to CLP-sepsis compared to euploid mice and showed dysregulated cytokine production and altered leukocyte populations.

Columbus – 7

Morphology of Reprogrammed Dopaminergic Neurons in Parkinson's Disease

Clayton B. Baer, Trinity J. Upshaw, and Young Mi Oh

Abstract

Parkinson's disease is an often-debilitating disorder that primarily elicits motor abnormalities but can also bring about nonmotor issues as well. An important pathological cause is the abnormal aggregation of the α-synuclein protein in dopaminergic neurons. While obtaining these cells from the brain to study can be difficult to execute, doing so with neurons converted from fibroblasts provides a more feasible route. Additionally, epigenetic methods of reprogramming allow for the maintenance of cellular age, opposed to methods such as conversion from embryonic stem cell derivatives that do not retain the age of the cell. This study attempts to analyze the morphology of dopaminergic neurons reprogrammed from human fibroblasts in individuals with Parkinson's disease and healthy controls. Following conversion into reprogrammed dopaminergic neurons, conversion was confirmed via the presence of neuronal markers TUBB3 and MAP2, while conversion into dopaminergic neurons was validated via the TH marker. Differences between Parkinson's disease cell lines and healthy controls were also found using α-synuclein and MJFR antibody, the latter indicating abnormal aggregation of the former. These different cell lines were also evaluated using the TUNEL system, evaluating for apoptosis. These markers not only confirmed the conversion of fibroblasts to dopaminergic neurons, but they also supported the Parkinsonian-like state of those from Parkinson's disease patient-derived cell lines with greater levels of α-synuclein aggregation and apoptosis compared to healthy controls. Obtaining a better understanding of the conversion of fibroblasts to dopaminergic neurons provides better treatment potential of disorders affecting the brain, such as Parkinson's disease.

Columbus – 8

High-Fat Diet Induced Neuroinflammation Drives Microglial Activation and Synaptic Loss

Simran Chhina, Dr. Chang Y. Chung

Abstract

Neuroinflammation plays a substantial role in altering various functional and cognitive aspects of brain function, especially when that inflammation is a result of a high-fat diet. High fat diets have been shown to increase both peripheral and central nervous system inflammatory processes in the body, resulting in the activation of microglia, which serve as the primary immune cell of the brain. High-fat diets also contribute to dysfunction of basal ganglia, resulting in changes related to motor control. To investigate the connection between high-fat diets, inflammation, and microglia, young male mice were subject to a high fat diet-induced obesity (DIO) over a period of 7 weeks. Immunohistochemical analysis of mouse brain sections was done at multiple time points, and a quantification of activated microglia (using CD68 antibody), assessment of neuronal axon structure (using MAP2 antibody), and evaluation of synaptic density (using PSD95 antibody) was examined. Number of activated microglia significantly increased overall across the study period, further supporting the connection between inflammation and high-fat diets. This increase was most remarkable in substantia nigra reticulata. The vast impact of inflammation was also evident in MAP2 and PSD95 stainings, showing reductions in dendritic area and synaptic loss across the study period. These findings further support the implications a high fat diet has on inflammatory processes in the body, specifically leading to sustained microglial activation, reduced neuronal structure, and decreased synaptic density in the brain.

Columbus – 9

Cytotoxic Effects of Polarity-Ordered Artemisia absinthium Extracts on Triple-Negative Breast Cancer Cell Lines

Robert W. Combs[1], Benjamin N. Wacter[1], Xuan Nguyen[1], Mackenzie Phipps[2], Myriam Thiam[2], Wade Holley[3], Ramneet Kaur[4], Emily McMackin[5], Kevin Burgess[5]

[1] Mercer University School of Medicine, Columbus, Georgia, USA

[2] Columbus State University, Columbus, Georgia, USA

[3] Department of Chemistry, Columbus State University, Columbus, Georgia, USA

[4] Department of Biology, Columbus State University, Columbus, Georgia, USA

[5] Department of Biomedical Sciences, Mercer University School of Medicine, Columbus, Georgia, USA

Abstract

Background and Objective: Triple-negative breast cancer (TNBC) is a highly aggressive subtype of breast cancer, defined by the absence of estrogen and progesterone receptors and HER2 amplification. It accounts for 15–20% of breast cancers and is associated with limited treatment options, high ecurrence rates, and poor outcomes. Chemotherapy remains the mainstay of therapy, but resistance and toxicity underscore the need for novel agents. Natural products are a rich source of chemotherapeutics, yet the anticancer potential of *Artemisia absinthium* (wormwood) has not been thoroughly evaluated in TNBC. This study aimed to investigate the cytotoxic effects of polarity-ordered A. absinthium extracts on TNBC cell models.

Methods: Extracts of *A. absinthium* were generated using solvents of increasing polarity (E1–E4) alongside a crude, unfractionated extract. Human TNBC cell lines MDA-231 and MDA-468 were treated with graded doses of each extract. Cytotoxicity was assessed using MTS viability assays after 24 hours of treatment. Methanol and DMSO served as vehicle controls, and docetaxel was included as a positive cytotoxic control. All experiments were conducted in triplicate and repeated across multiple trials to confirm reproducibility.

Results: Extracts E1–E3 consistently induced strong, dose-dependent cytotoxicity in both TNBC lines, reducing metabolic viability to ~20–30% at concentrations of 0.5–1.0 mg/mL. The most polar extract (E4) was largely inactive. The crude extract demonstrated cell line–specific behavior, showing significant cytotoxicity in MDA-468 but weaker and less consistent effects in MDA-231. Docetaxel validated assay responsiveness, while vehicle controls performed as expected. Variability at the lowest doses occasionally produced non-monotonic responses, but overall trends were reproducible and polarity-dependent.

Conclusion:

A. absinthium contains phytochemicals with polarity-dependent cytotoxic effects against TNBC cells, concentrated in less polar to moderately polar fractions. These findings highlight the therapeutic potential of wormwood-derived compounds and support further work to isolate, characterize, and evaluate their selectivity and mechanisms of action in cancer models.

Columbus – 10

Cytotoxic Effects of Artemisia absinthium Extracts on Androgen-Independent Prostate Cancer Cell Lines

Xuan Nguyen[1], Benjamin N. Wacter[1], Robert W. Combs[1], Mackenzie Phipps[2], Myriam Thiam[2], Wade Holley[3], Ramneet Kaur[4], Emily McMackin[5], Kevin Burgess[5]

[1] Mercer University School of Medicine, Columbus, Georgia, USA

[2] Columbus State University, Columbus, Georgia, USA

[3] Department of Chemistry, Columbus State University, Columbus, Georgia, USA

[4] Department of Biology, Columbus State University, Columbus, Georgia, USA

[5] Department of Biomedical Sciences, Mercer University School of Medicine, Columbus, Georgia, USA

Abstract

Background and Objective:

Artemisia absinthium (sweet wormwood) is a medicinal herb traditionally used for various ailments and known for its pharmacological properties, including antioxidant and anticancer activity. Prostate cancer remains the second leading cause of cancer-related deaths in men, with limited therapeutic options for androgen-independent subtypes. This study aimed to evaluate the cytotoxic effects of polar and non-polar extracts of *A. absinthium* against two aggressive prostate cancer cell lines: PC-3 and DU145.

Methods:

A. absinthium plants cultivated in Harris County, Georgia were processed to generate hexane (E1), dichloromethane (E2), ethyl acetate (E3), methanol (E4), and crude (C) extracts. PC-3 and DU145 cells were cultured under standard conditions and treated with serial dilutions of extracts (0.025–1 mg/mL). Cytotoxicity was assessed after 72 hours using an MTS assay, with docetaxel as a positive control and methanol/DMSO as vehicle controls. Cell viability was calculated relative to untreated media controls.

Results:

Extract E1 demonstrated the most potent and consistent cytotoxicity, reducing cell viability to <15% at 1 mg/mL in both PC-3 and DU145 lines. E2 and E3 showed moderate, concentration-dependent activity, while E4 and crude extracts exhibited weaker or inconsistent cytotoxic effects. Docetaxel consistently reduced viability to ~20–25%, validating assay performance. Vehicle controls had minimal impact. Variability in early trials (due to solvent evaporation and dosing inconsistencies) was corrected in later experiments, confirming reproducibility.

Conclusion:

Non-polar extracts of *A. absinthium*, particularly the hexane fraction (E1), exhibit strong cytotoxic activity against androgen-independent prostate cancer cells, supporting their potential as a source of novel anticancer compounds. Future studies will investigate mechanisms of action, optimize dosing, and assess efficacy in combination with standard therapies or in in vivo models.

Columbus – 11

Leaf extracts of *Artemisia absinthium* do not inhibit *Pseudomonas aeruginosa* growth or virulence in vitro.

Benjamin Wacter, Robert Combs, Xuan Ngyuen, Mackenzie Phipps, Myriam Thiam, Wade Holley, Ramneet Kaur, Kevin Burgess, and Emily McMackin

Abstract

Background and Objective:
Pseudomonas aeruginosa is a common opportunistic human pathogen with intrinsic and acquired antibacterial resistance. In the literature, essential oil and methanolic extracts of the plant *Artemisia absinthium* (wormwood) demonstrated antimicrobial effects against *P. aeruginosa*. Our study aimed to corroborate and expand on these findings. We used polarity-based fractional extracts of *A. absinthium* leaves in addition to crude extracts. To determine the effect of extracts on bacterial virulence, we assayed the expression of specific virulence factors of *P. aeruginosa.* These factors included biofilm production and the ability of the bacteria to twitch (a pili-dependent motility), swim (a flagella-dependent motility), and
swarm (a motility dependent on pili, flagella, and quorum sensing).
Methods:
Crude and fractionated extracts of *A. absinthium* leaves were prepared in methanol and dimethyl sulfoxide. Treatment groups included each extract at a range of concentrations, antibiotics azithromycin and ciprofloxacin, vehicle controls, growth controls, and sterility controls. After treatment, minimum inhibitory concentrations were determined by visual comparison of overnight bacterial growth in wells. Biofilm production was measured using crystal violet staining and quantified spectroscopically. Diameters of swarm, twitch, and swim zones of bacteria grown on agar plates were measured after incubation.
Results:
When compared to growth controls, *P. aeruginosa* treated with extracts demonstrated uninhibited growth, increased biofilm staining, larger twitch zones, smaller swarm zones with
some extracts, and no change in swim zones.
Conclusion:
These results suggest that leaf extracts of *A. absinthium* neither inhibit growth, biofilm formation, nor motility of *P. aeruginosa*. Some experiments suggest increased biofilm formation and twitching. These results contradict the demonstrated antimicrobial effects of *A.*
absinthium extracts against P. aeruginosa that have been documented in literature.

Columbus – 12

Peptide X promotes TFEB nuclear localization via RCAN1 suppression in Human Motor Neurons

Samuel Swinford, Seong Won Lee

Abstract

Aging is a key risk factor in neurodegenerative disorders. Recent studies identified RCAN1 as an age-associated disease modifier whose expression is upregulated in aged medium spiny neurons (MSNs), thereby contributing to neurodegeneration in Huntington's Disease (HD). Mechanistically, RCAN1 inhibits the phosphatase activity of calcineurin (CaN), which in turn prevents the nuclear localization of the autophagy regulator TFEB. Therefore, modulation of this RCAN-TFEB pathway can confer neuroresilience in HD via autophagy. We recently identified that Peptide X, a novel small peptide activator of lysosomes, rescued HD patient-derived MSNs from neuronal cell death. Here, we investigated whether this Peptide X molecule can decrease RCAN1 expression to induce nuclear TFEB for autophagy function. Using the microRNAs-mediated neuronal conversion method, we generated motor neurons (MNs) from aged healthy individuals and found trends of decreased RCAN1 expression when treated with Peptide X. Additionally, nuclear TFEB expression significantly increased across all age groups by Peptide X treatment, indicating a strong promotion of CaN activity. These findings suggest that targeting RCAN1 with Peptide X enhances neuronal resilience by enhancing autophagy function, and this may offer a therapeutic strategy for neurodegenerative disorders.

Columbus – 13

Sterility of fresh whole blood units stored for an extended period of time above room temperature

Grant Stapleton, Charles H. Moore, Andrew S. Oh, Mark H. Yazer

Abstract

Background:
Whole blood (WB) is stored between 1–6°C to minimize bacterial proliferation. Recent studies suggest that storing WB at room temperature (RT) for short periods may also be bacteriologically safe. Storing WB at or above RT could have significant implications for prehospital and military transfusion practices and prevent its waste. This study determined if FWB stored above room temperature led to positive bacteria cultures.
Methods:
Fresh WB (FWB) was collected from five healthy, military-aged male volunteer donors in CPDA-1 bags. The units were sampled for bacteria culture at the time of donation and again after approximately 23 hours of storage under experimental conditions. After collection, the FWB units were labelled and placed into "Golden Hour" containers without the cooling material; the units were then placed into different environments designed to simulate military field conditions where WB might be collected including on the ground in direct sunlight, in the covered cargo bed of a vehicle in direct sunlight, in a non-climate-controlled storage facility, in an open field, and under vegetation. Automated thermometers and hygrometers were included in each container.
Results:
The median temperatures for all five stored units ranged from 28.3°C to 30.1°C. The relative humidity range was 41.7%-85.9%. All of the pre- and post-storage cultures were sterile.
Conclusion:
These results support the potential microbiological safety of short-term, above RT storage of FWB. If confirmed, the ability to store FWB above RT for an extended period of time could positively impact blood unit management on the battlefield.

Epidemiological

Columbus – 14

Glaucoma Prevalence and Access to Eye Care: A Geographic Analysis in Georgia

Rachel Fisher, BS, Austin Garrett, BS

Abstract

Background and Objective

Glaucoma is a leading cause of irreversible blindness worldwide, with an estimated 4.2 million Americans affected. Early diagnosis and treatment by eye specialists are critical for preventing vision loss; however, access to care is not evenly distributed. This study examined the geographic relationship between glaucoma prevalence and ophthalmology clinic availability across Georgia.

Methods

Addresses of glaucoma-treating ophthalmology clinics were collected from a public database and verified. Locations were mapped using QGIS alongside county-level glaucoma prevalence data from the CDC.

Results

Distance to the nearest ophthalmology clinic was calculated with an average of 15.58 miles (SD = 11.96). A positive association was observed between prevalence and average travel distance, indicating that areas with the greatest disease burden often had the least access to specialized care.

Conclusion

These findings underscore the need for targeted interventions, including expanding specialist availability, implementing tele-ophthalmology, and improving outreach in underserved regions. Future research should incorporate optometrists and neighboring states to better understand access patterns and inform equitable distribution of eye care resources.

Columbus – 15

Optimizing Outcomes in Pediatric Dentistry for the Rural Medicaid Population

Logan Dominique, B.S.

Abstract

Pediatric Dental Care (PDC) is a critical component of pediatric health. Children with untreated tooth decay and caries face problems in eating, speaking, and learning.1 Additionally, mental health complications are significantly higher for children with untreated tooth decay.3 PDC relies on high-quality dentists, parents or caregivers who can provide encouragement, transport, and scheduling, and the children themselves who may have dental phobia or be noncompliant with suggestions. Finally, there is a shortage of PDC for the Rural Medicaid Population (RMP) precipitating health disparities. A systemic analysis of Georgia Rural Dentistry studies using PubMed and limiting results to Georgia studies concerned with the rural or medicaid population occurring in the last 15 years. Following this review a broad solution analysis considering US based approaches for pediatric dental care undertaken in the last 15 years. The reviews yielded three main issues facing Georgia: extensive one way travel distance to PDC, lack of medicaid options for PDC, and lack of caregiver comfort with available PDC. Potential solutions include a HHS approach with mobile hygienists and assistants being overseen remotely by dental residents, AI intraoral cameras with > 92.5% accuracy in accessing caries, and a telehealth dentistry with local dentists overseeing mobile hygienists. Implementation of a modified HHS plan that integrates local dentists, patient and caregiver education, and intraoral cameras for School nurses should precipitously decrease the rate of untreated carries in the state of Georgia. Furthermore, the rate of missed dental appointments would decrease, decreased work hours would be lost to caregivers traveling to appointments, and far fewer kids would have to suffer from tooth ache, pain, or shame related to poor oral health. Georgia’s pediatric population deserves a quality childhood without the burden of poor oral health.

Columbus – 16

Bridging the Gap: Pediatric Readiness in Rural Georgia Emergency Departments

Haley Holloway, B.S.

Abstract

Background

Reducing pediatric morbidity and mortality with improved access to trauma care is critical. In Georgia, many emergency departments see a small number of pediatric patients daily, which leads to lower competence among physicians and staG as well as smaller investments in pediatric-specific training, equipment, and protocols. Rural hospitals are further aGected due geographic isolation and financial constraints. This project aims to evaluate pediatric readiness across rural Georgia emergency departments, identify the barriers associated with implementation, and propose feasible interventions to improve outcomes of pediatric traumas.

Methods

A problem analysis was conducted through literature review of the Emergency Medical Services for Children (EMSC), Georgia Department of Community Health, and Georgia State OGice of Rural Health. A solution analysis was examined using the three pillars of readiness identified by EMSC.

Results

Rural Georgia hospitals had a significantly lower score on pediatric readiness evaluations compared to their urban counterparts. Evidence from national studies showed that implementing the EMSC guidelines is beneficial for patient outcomes as well as cost- eGective, with investment estimated at $0-$12 per pediatric patient. Georgia's State Ogice of Rural Health has also allocated $430,000 annually to further support implementation; however, participation is still voluntary and inconsistent.

Conclusions

Lower levels of pediatric readiness in rural Georgia emergency departments has led to delays in care and poorer trauma outcomes for children across the state. Implementing EMSC's guidelines has proven to be an impactful strategy at decreasing morbidity and mortality in pediatric traumas. Continued improvement relies on statewide policy, funding, and support.

Columbus – 17

Barriers to Bariatric Obstetric Care in Rural Georgia

Tiffany Wangui Mukundi

Abstract

Background and Objective

Pregnant patients with a body mass index (BMI) ≥40 kg/m² in rural Georgia face substantial barriers to accessing safe obstetric care. High risk deliveries require specialized anesthesia, bariatric equipment, and adequately staffed labor and delivery (L&D) units, which are often unavailable in these regions. This study aimed to evaluate structural barriers to bariatric obstetric care in rural Georgia and propose feasible, cost effective solutions to reduce maternal and neonatal morbidity.

Methods

A problem based analysis of rural Georgia counties (Wheeler, Telfair, Treutlen, Johnson, and Clinch) was conducted using obesity prevalence data from the 2025 Annual Release (2017–2023). Comparative data from Fulton County provided urban control. Literature review and policy reports were synthesized to identify maternal risks, anesthesia challenges, EMS limitations, and systemic barriers such as L&D unit closures and reimbursement constraints.

Potential solutions were evaluated for feasibility and impact.

Results

Rural Georgia has experienced widespread L&D closures, leaving 93 counties without active units. Morbidly obese patients must often travel over 60 miles for delivery, delaying access to emergent anesthesia and surgical support. These delays increase risks of cesarean complications, hemorrhage, infection, and NICU admissions. Maternal obesity compounds risks of hypertensive disorders, thromboembolism, and neonatal macrosomia. Proposed solutions include regional bariatric obstetric hubs supported by telehealth consults, workforce training with simulation based airway and delivery management, and upgraded EMS transport with bariatric capability. Policy reforms such as expanded Medicaid reimbursement could incentivize rural facilities to sustain L&D services.

Conclusion

Bariatric obstetric patients in rural Georgia face critical gaps in timely, safe delivery care due to facility closures, inadequate equipment, and provider shortages. A hybrid model combining regional hubs, telehealth, EMS upgrades, and workforce training offers a practical, resource efficient strategy to reduce maternal morbidity, neonatal complications, and health disparities. These interventions strengthen rural health infrastructure and promote equitable maternal outcomes across Georgia.

Columbus – 18

Paging Dr. Teddy: A Longitudinal Study of Medical Play to Improve Pediatric Healthcare Perceptions

Julia Stager, BS; Mackenzie Morgan, BS; Edson Jean-Jacques, MSD

Abstract

Objective:
Children often experience anxiety and fear when interacting with medical environments, negatively affecting their perception of healthcare. Medical play is an intervention that addresses these fears by fostering familiarity and engagement in a non-threatening setting. Building on prior studies highlighting the potential of medical role play, this study evaluates the impact of a longitudinal, school-based Teddy Bear Clinic (TBC) on reducing fear and promoting more positive perceptions of healthcare over time.
Methods:
A total of 38 students at an elementary school participated in a 6-session TBC program between January and March 2025. Sessions were conducted biweekly during the school day and led by 5 to 7 medical student volunteers. Each session featured structured demonstrations where children practiced basic medical procedures on teddy bears. Attitudinal changes were measured using surveys with emoji-based Likert scales, administered before the first session and after each subsequent session. Five key dimensions were assessed: preference, fear, safety, feelings, and comfort.
Results:
The intervention surveys revealed that "Like a lot" remained the highest response, suggesting a strong preference for doctor visits. There was a decrease in fear over time, with the "Like a lot" response increasing to 35%. Perception of safety increased, peaking at 60%. Positive feelings peaked at 55%, indicating improved emotional responses. High comfort levels were sustained, peaking at 65%.
Conclusion:
Findings suggest that the TBC effectively reduced medical fear and fostered more positive associations with healthcare, supporting the use of longitudinal medical play interventions in early childhood education settings.

Medical Education

Columbus – 19

Review of Piedmont Columbus Regional's Nurse-Implemented Order Sets

Maddison L. Montgomery[1] and Charles H. Moore[1, 2]

[1]Mercer University School of Medicine | Columbus, GA

[2]Piedmont Columbus Regional Hospital | Columbus, GA

Abstract

Background and Objectives:
Nurse-implemented order sets are utilized across emergency departments in the United States to reduce physician-to-door times, initiate intervention, and increase quality of care in adherence with clinical guidelines. The primary objective of this study was to review triage procedures and frequently utilized nurse-implemented order sets of a local hospital and compare those protocols with clinical guidelines outlined in current literature.

Methods:
Triage protocols were obtained from Piedmont Columbus Regional's Emergency Department and compared to clinical policies and procedures outlined by the American College of Emergency Physicians, Society for Academic Emergency Medicine, UpToDate, Medscape, and AccessMedicine Emergency Medicine textbooks.

Results:
Among the 50 protocols reviewed, no change considerations were recommended for 60%. Of the 20 protocols for which change considerations were proposed, 55% included a single recommendation to align with current literature, 20% with two recommendations, and 25% with three or more recommendations.

Conclusion:
The majority of triage protocols at Piedmont Columbus Regional are consistent with current literature on nurse-initiated order sets and standard emergency department practices. However, there are opportunities to expand some protocols to reflect the specificity emphasized in existing professional guidelines Additional research is needed to determine cost effectiveness of nurse-implemented order sets and implementation of nurse-implemented analgesia.

Columbus – 20

Guiding, Not Replacing: Student-LLM Co-Design of Learning Tools

Thomas Costner, MS3

Abstract

Background and Objective
In recent years, the acceleration of large-language models (LLMs) has fueled debate over their replacement for native human thought. This poses problems for medical education as students learn to understand and evaluate a constantly evolving landscape of research - a process that may be usurped by LLMs. This case demonstrates how LLMs may accelerate independent reasoning while building JSS/HTML Anki templates for clinical tables and algorithms with the goal of being broadly applicable to other medical students. Objective: Demonstrate functional application of LLMs in medical education to improve student efficiency while maintaining independent research and reasoning.
Methods
All work was categorized by iteration for future training. The LLMs (GPT-4,-4.o,-5) were restricted to formatting and code without access to content generation.
1. Defined success as JSS function compatibility, front-end fidelity, table/algorithm stability, readability, and transferability.
2. Annotated >3,000 JSS lines (scaffold) and set access points for LLM modification. LLM access to HTML/CSS (front-end) was granted.
3. Iteratively modified the scaffold based on LLM training until success criteria met.
4. LLM access to back-end JSS restricted after stabilization.
5. Defined front-end template via examples from legacy Anki cards.
6. Iteratively reproduced ‘readme’ files with ‘for-student’ and ‘for-LLM’ guides. ‘For-LLM’ file verified on independent LLM chat.
Results
The current iteration includes 50 customizable clinical algorithms/grids/tables, JSS template library, HTML template library, student training guide, LLM training guide, and failure catalog based on previously found/resolved errors.
Conclusion
The project successfully outlines student-LLM priming in standardizing Anki card construction while preserving student acquisition of medical knowledge. This case also offers an example for medical school administrators and students to accelerate the efficiency of education. Future work will focus on application to other student-LLM pairs by quantifying template fidelity, student efficiency, and learning outcomes.

Columbus – 21

Beyond the Textbook: Program Evaluation of Culinary Medicine Training

Zoe S.J. Bradley, Pearla Faith Hodo, B.S, MS, David C. Bury, MD

Abstract

Nutrition training is underemphasized in early medical education, despite the high burden of diet-related diseases. Medical students should develop both knowledge and confidence to counsel patients on nutrition and its role in health and disease prevention. We piloted a hands-on culinary medicine (CM) series to assess student knowledge and interest, program feasibility, and future implementation. Six independent three-hour sessions employed a mixed-modality approach, incorporating lectures, guest speakers, cooking demonstrations, small-group discussions, and hands-on cooking. Sessions were held at a community teaching kitchen in Columbus, GA. Content and recipes were adapted from established CM curricula. Participation was voluntary; pre- and post-session surveys assessed confidence, perceived skills, and intent to apply CM in practice. Students were recruited through peer networks, email, and outreach by student researchers. Across the pilot, 26 students attended at least one session. Pre-session surveys showed strong interest in hands-on cooking and improving counseling skills. Confidence in nutrition knowledge increased from 34% pre-session to 100% post-session (62.5% "confident," 37.5% "very confident"). Students would recommend the program (93.75% "very likely") and plan to integrate nutrition and CM into their future practices (93.75% "very likely"). Students responded positively to the content and structure of the program, specifically the linkage of brief teaching to hands-on cooking and dietitian-led discussions, and suggested including more clinical applications to strengthen preparation for future physician roles. A short, skills-based CM curriculum was feasible and associated with considerable improvements in learner confidence and self-reported counseling skills. In response to this feedback, future nutrition education events are being developed to assess the retention of nutrition content in preclinical curricula and evaluate novel interventions to enhance students' confidence and competence in nutritional counseling. Ultimately, survey findings and student recommendations suggest culinary medicine programs may enhance nutrition content while building counseling confidence, supporting its potential integration into medical curricula.

Columbus – 22

Street Medicine in Action: Developing a Sustainable Student-Led Outreach Program for the Unhoused in Columbus, Georgia

Jared Boldt, Grant Stapleton, Jeffery Radcliff, Emily Bacallao, Maddison Montgomery, Allie Dishman

Abstract

Background and Objective:
Columbus, Georgia, has a poverty rate of 17.8%, exceeding state and national averages, and an unhoused population of over 300, an 11% increase from 2024. Many in this population face barriers to consistent healthcare, leading to untreated chronic conditions, infections, and wounds. The Mercer University School of Medicine (MUSM) Street Medicine Group, in partnership with local ministry M2540, aims to reduce morbidity, mitigate delayed treatment, and decrease emergency department overuse among individuals experiencing economic and health vulnerabilities, all while providing students with a unique learning environment.
Methods:
Through consistent outreach at fixed community locations established by M2540, medical students provide blood pressure and blood glucose screenings, basic wound care, health education, and resource referrals. The trusted relationship between M2540 and the unhoused community facilitates engagement and continuity. Student teams participate every 2 weeks, allowing rapport and follow-up over time.
Results:
Outreach has led to identification and referral of multiple individuals with uncontrolled hypertension and diabetes for urgent evaluation and ongoing care. For example, one participant with a blood pressure of 190/120 was referred, began medication, and returned reporting continued management. M2540 leadership reports several cases in which student interventions directly prevented untreated disease from progressing, including referrals for substance use treatment.
Conclusion:
The MUSM Street Medicine Group demonstrates that consistent, relationship-based outreach can bridge critical gaps in care for individuals experiencing homelessness in Columbus, Georgia, while also fostering meaningful medical education experiences. Building on this foundation, future efforts will focus on strengthening partnerships, expanding access to essential resources, and establishing a student-run free clinic to ensure sustainable, longitudinal care for this vulnerable population.

Columbus – 23

Unseen and Underserved: Correlating Negative OB/GYN Experiences with STI risk in Transgender and Assigned Female at Birth Patients in Georgia

Isabel Luna, MS

Abstract

Background

Transgender and assigned female at birth patients (AFAB) in Georgia experience disproportionate obstacles to OB/GYN care, including discrimination, stigma, provider knowledge gaps, and limited inclusive data collection. The barriers contribute to increased STI prevalence, delay in treatment of STIs, provider mistrust, and further complications such as infertility and HIV progression. Georgia public health surveillance does not report STI data by gender identity, limiting the full understanding of disparities in this population and targeted interventions.

Objective

This project aims to analyze the factors that contribute to STI risk in transgender and assigned female at birth patients in Georgia to identify feasible interventions to improve the STI risk, experiences, and outcomes of these individuals with a focus on rural communities.

Methods

A problem analysis was built off a series of peer reviewed literature, Georgia STI data, and barriers to care. Solutions are based on provider training and data infrastructure and evaluated based on feasibility and evidence in efficacy and potential in reducing disparities.

Results

Findings indicate that provider training in LGBTQ+ inclusive care is at the center of the evidence framework. Training can improve provider knowledge gaps, behaviors, and patient experiences. Short-term outcomes are expected to increase STI screenings and competence. Long-term outcomes include decreased untreated and undiagnosed STIs, improve continuity of OB/GYN care, and decrease complications. Additional strategies include incorporating LBGTQ+ curriculum into existing continuing medical education (CME), engaging providers and public health staff, and utilizing tele-education platforms for rural providers.

Conclusion

By equipping providers with inclusive care tools, correcting gaps in STI surveillance, and fostering resilient feedback loops, Georgia can build a more equitable and stronger reproductive health system. These interventions target clinical and structural disparities of mistrust, reinforce surveillance equity, and create feedback loops for continuous OB/GYN care for LGBQT+ communities in rural Georgia.

Columbus – 24

Qualitative Analysis: Navigation Medicare policy barriers to improve geriatric health outcomes in Georgia

Lilah Widner, Jaya Martin

Abstract

Background

Geriatric patients remain one of the most vulnerable populations in today's healthcare society. Medicare is the primary insurer of the aging community, yet the system's limited availability, high costs for medigap coverages, and minimal assistance can limit its effectiveness. This study seeks to explore how practicing healthcare professionals in Georgia utilize their knowledge about insurance to navigate the challenges of the Medicare system when treating geriatric patients.

Methods

We conducted 13 one-hour virtual interviews with nurse practitioners, clinical directors, and physicians across Georgia who accept both Medicare Advantage and Traditional Medicare plans. All sessions were audio-recorded, transcribed and manually de-coded. Themes were removed for comparison to develop a code book. The comparative analysis will be used to convert the qualitative data into quantitative to analyze the variations and similarities of how professionals navigate the Medicare system within their practice.

Results

The collected insights from professionals consistently reported the following recurring themes across interviews: delays due to prior authorization, restrictions from medication formularies, variation in plan efficacy with Medicare Advantage providing more comprehensive coverage and the need to tailor patient plans according to their medical history. While professionals discussed the use of adaptive strategies, insights showed a need for policy reforms to broaden coverage, improve medication and transportation access, and expand specialist networks. Most clinicians gained an understanding of Medicare informally during their residency and suggested a formal insurance navigation education be integrated into medical curricula, especially during residency.

Conclusions

By collecting healthcare professionals' real-world experiences and strategies, this study highlights the real-world challenges professionals face when navigating the Medicare system for geriatric patients. Although limited by the short time frame available to conduct interviews and the small sample size from which data were drawn, the study provides a starting point for more conversations on optimizing Medicare's impact in delivery of geriatric care.

Columbus – 25

Shoulder Arthroplasty Outcomes Using Glucagon-Like Peptide-1 Receptor Agonists: A Systematic Review

Kha Minh Kami P. Nguyen, MSE[1], Emily N. Jones, MS[2], Vincent Lee, BS[3], Ramtin Doroodchi, BS[4], John S. Avant, BA[1], Tyler Overbeek, BS[3], Brent A. Ponce, MD[5]
[1]Mercer University School of Medicine, Columbus, GA, USA
[2]Tulane University School of Medicine, New Orleans, Louisiana, USA
[3]Edward Via College of Osteopathic Medicine - Auburn Campus, Auburn, Alabama, USA
[4]Mercer University School of Medicine, Macon, GA, USA
[5]Hughston Foundation, Columbus, GA, USA

Abstract

Background and Objective Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are increasingly prescribed for both glycemic control and weight loss, particularly in patients undergoing total joint arthroplasty. While studies on total hip and knee arthroplasty suggest potential perioperative benefits, the impact of GLP-1 RA use on outcomes following total shoulder arthroplasty (TSA) is unclear. Given the unique biomechanical demands of TSA, rising TSA volumes, and increasing GLP-1 RA use, this systematic review aims to evaluate the current literature on the impact of GLP-1 RA therapy on postoperative outcomes in TSA patients.

Methods A systematic search of PubMed, Embase, and Scopus was conducted through July 26, 2025, in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Studies were included if they evaluated postoperative outcomes in TSA patients prescribed GLP-1 RAs. Data extracted included study design, population characteristics, matching strategy, outcomes measured, and main findings. Four retrospective case-control studies met inclusion criteria, representing a total of 7,406 TSA patients prescribed GLP- 1 RAs. All studies utilized large national databases (TriNetX and PearlDiver).

Results

Two studies found no increase in postoperative complications among GLP-1 RA users; one demonstrated improved outcomes, including lower mortality and reduced rates of surgical site infection, pneumonia, and cardiac events, while one study reported higher rates of adverse events, including deep vein thrombosis, myocardial infarction, and readmission. Differences in findings were attributed to variation in patient populations (e.g., diabetic vs. obese), medication timing, and outcome definitions.

Conclusion

The current evidence on GLP-1 RA use in TSA is limited and mixed, with some studies suggesting benefit and others indicating potential risks. As the use of GLP-1 RAs becomes more widespread among TSA candidates, further prospective research is needed to clarify optimal perioperative protocols, assess patient selection, and evaluate long-term outcomes.

Columbus – 26

The current most common reported challenges of artificial intelligence in dermatology: a review

Imeisha D. Rountree, BS[1]; Olivia G. Penela, BS[1]; Spencer R. Anderson, MD

Abstract

Background and Objective:
The use of artificial intelligence (AI) as a diagnostic tool within the field of dermatology has increased significantly in recent years. This literature review focuses on the growing use of AI as a diagnostic tool and reports encountered challenges in published literature.
Methods:
A National Center for Biotechnology Information (NCBI), PubMed, and Google Scholar databases search produced 96 articles; of those, 41 were included due to the exclusion criteria.
Results:
Although a multitude of challengers were identified, this review highlights and elaborates on the concerns of AI within the field of dermatology: melanoma, multiple skin tones, and various non-cancer skin pathologies.
Conclusion:
Further research is warranted to investigate these known challenges prior to complete integration of AI into dermatology as a useful modality.

Clinical

Columbus – 27

Impact of Glucagon-Like Peptide-1 Receptor Agonists on Postoperative Outcomes in Arthroplasty: A Systematic Review

Stephen Durkee, Vincent Lee, Brent A Ponce, Nino Augusto Coutelle, Paul E Gerges, Diego Lima

Abstract

Background and Objective:

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) have become increasingly popular for weight loss, extending beyond their original use in diabetes mellitus (DM) management. With 6% of Americans currently using GLP-1 RAs and obesity rates projected to reach 50% of adults by 2030, these medications play an expanding role in managing obesity-related conditions. Osteoarthritis (OA), a leading cause of joint degeneration, is strongly linked to obesity and is the primary indication for total joint arthroplasty (TJA). Consequently, GLP-1 RAs may have significant implications for TJA outcomes. Although emerging studies suggest benefits such as fewer infections and readmissions, no comprehensive synthesis exists to guide practice. This systematic review evaluates the impact of GLP-1 RA therapy on postoperative outcomes in total knee arthroplasty (TKA), total hip arthroplasty (THA), and total shoulder arthroplasty (TSA).

Methods:

This systematic review was conducted in accordance with PRISMA guidelines and registered with PROSPERO (CRD4202510000206). PubMed, Embase, and Scopus were searched through January 29, 2025, for studies examining postoperative outcomes in TKA, THA, or TSA patients taking GLP-1 RAs. Abstracts and full texts were screened by two independent reviewers. Data was extracted on study design, patient characteristics, outcomes, and findings.

Results:

Ten studies (23,241 patients) met inclusion criteria. Nine used national database analyses, and one was a single-institution study. Six studies found improved outcomes with GLP-1 RA use, including lower prosthetic joint infection, readmission, and complication rates. Two reported increased complications, one showed mixed effects, and one no effect. Reported benefits included reduced sepsis, pneumonia, and readmissions in TKA/THA, and lower 90-day mortality after TSA. Risks included higher rates of myocardial infarction, deep vein thrombosis, and transfusions.

Conclusion:

GLP-1 RAs may improve postoperative outcomes in TJA through weight loss, glycemic control, and anti-inflammatory effects. Conflicting results highlight the need for large, prospective studies to clarify risks, benefits, and procedure-specific effects.

Columbus – 28

Anatomical Basis of Pain Syndromes: A Systematic Review of Fibromyalgia and Chronic Back Pain

Hana Abualadas, Morgan Howes, Hannah Watkins

Abstract

Background:
Chronic pain syndromes such as fibromyalgia (FMS) and chronic back pain (CBP) are leading causes of disability, yet their anatomical underpinnings remain incompletely understood. Emerging evidence highlights distinct central and peripheral changes contributing to their pathophysiology.

Objective:
To systematically review and compare the anatomical and neurobiological changes associated with fibromyalgia and chronic back pain, focusing on brain structure, spinal cord alterations, peripheral nerve involvement, and mechanisms of central sensitization.

Methods:
A systematic review of studies published between 2000 and 2025 was conducted across five major databases, in accordance with PRISMA and JBI guidelines. Eligible studies included neuroimaging, histological, and anatomical analyses of adults with FMS or CBP.

Results:
Fibromyalgia is characterized by widespread cortical thinning, altered connectivity in pain modulation circuits, elevated excitatory neurotransmitters (e.g., glutamate), and small fiber neuropathy in a subset of patients. Chronic back pain shows localized cortical atrophy, spinal abnormalities, disrupted limbic connectivity, and functional reorganization, with central sensitization emerging as a secondary process. Both conditions demonstrate reduced gray matter in key pain-related regions such as the thalamus and insula, though with differing clinical implications.

Conclusion:
Distinct yet overlapping neuroanatomical changes underlie fibromyalgia and chronic back pain. Central sensitization is a primary mechanism in FMS, whereas CBP often originates from peripheral sources but may develop central features over time. Understanding these anatomical differences may inform targeted diagnostic strategies and individualized treatment approaches.

Columbus – 29

Managing Ischemic Wounds Post-Total Knee Arthroplasty: A Case Study

Sydney Butler, Ainsley Stephens, Bhavya Kamepalli, and Dr. Ravi Kamepalli

Abstract

Background and Objective:
Ischemic skin wounds are a rare but severe complication following total knee arthroplasty (TKA) in elderly patients with underlying vascular or metabolic compromise. Adequate tissue oxygenation, nutrition, and vascular support are critical for post- operative healing. Specifically, oxygenation is essential for cellular metabolism, energy production, and collagen synthesis. Therefore, prolonged hypoxia can impair wound healing. A 73-year-old female presented to the Regional Infectious Disease and Infusion Center, Inc. (RIDIC) with an ischemic post-surgical skin wound following TKA. The patient's history includes sarcopenia, protein-calorie malnutrition, osteoarthritis, osteoporosis, reactive hypoglycemia, distal microvascular dysfunction, and small fiber neuropathy.
Methods:
Initially, the wound bed was stabilized with betadine and gauze, and Augmentin was prescribed for infection prophylaxis. Continuous diffused oxygen (CDO) therapy and serial debridement were utilized for 12 and 9 weeks, respectively. Nutritional counseling began on initial presentation and focused on a low-carbohydrate, high-protein diet.
Results:
Following wound bed stabilization, infection prophylaxis, CDO therapy, serial debridement, and nutritional support, full epithelization was achieved in 17 weeks post-presentation.
Conclusion:
Ischemic wounds require a multidisciplinary approach. CDO therapy was targeted due to the prolonged hypoxia which promotes myofibroblast differentiation, excess extracellular matrix deposition, and delayed healing. By applying topical oxygen, cellular metabolism, angiogenesis, and collagen synthesis are upregulated, and wound healing is enhanced. Nutritional counseling focused on a low-carbohydrate, high-protein diet in order to build lean body mass and increase insulin sensitivity to manage reactive hypoglycemia. Furthermore, adequate insulin sensitivity enhances the body's healing process by increasing angiogenesis, cell proliferation, and glucose utilization. This case highlights the importance of addressing multifactorial causes that impede nuanced wound healing journey with wound bed stabilization, CDO therapy and serial debridement, as well as providing nutritional support to increase lean body mass.

Columbus – 30

Atypical Neuropsychiatric Presentations of Post-Concussive Syndrome in the Emergency Department: A Case Series

Tirys Carr, Dr. Lynn Nguyen, Dr. Ramsha Bhutta

Abstract

Background

Post-concussive syndrome (PCS) Describes persistent symptoms after head injury. While headache, dizziness and cognitive impairment are common, 10 to 20% of patients develop atypical neuropsychiatric features such as tremor, dysarthria, agitation or altered mental status (AMS). These symptoms may mimic stroke or seizure, causing diagnostic delays in unnecessary interventions. This case series highlights three emergency department presentations of atypical PCS.

Methods

Three patients with atypical PCS following head injury were reviewed for ED evaluation, diagnostic workup, and clinical outcomes.

Results

Case 1: An 18-year-old man presented with weakness, stuttering and gait difficulty. CTA suggested carotid narrowing, prompting tPA. MRI was negative for stroke. He later developed tremor, headache, and confusion. Repeat imaging and labs were unrevealing. PCS was diagnosed and symptoms improved with amitriptyline, clonazepam, magnesium, physical therapy and psychotherapy. **Case 2:** A 57-year-old woman developed agitation, confusion, headache, chest pain, and dyspnea one week after a fall. CT suggested possible infarct, but MRI labs were normal. She was diagnosed with PCs and improved with pharmacotherapy. Case 3: A 57-year-old woman presented with dizziness, vision changes, nausea, vomiting, weakness, ataxia and "feeling drunk" one month post-fall. Imaging and labs were negative. PCS was diagnosed and magnesium along with Compazine improved symptoms.

Conclusion

PCS may present with atypical symptoms mimicking acute neurologic or systemic emergencies. Functional neurological features (Ex: stuttering, tremor, gait disturbance) may overlap with functional neurologic disorder and respond to multidisciplinary treatment (Ex: CBT, SSRIs, SNRIs). Psychiatric symptoms can include agitation, confusion, dissociation, amnesia, or psychosis. Awareness of these atypical presentations may streamline evaluation, reduce unnecessary interventions, and improve outcomes. Further research is necessary to identify predictive features and refine diagnostic algorithms for patients with neuropsychiatric comorbidities.

Columbus – 31

Diagnostic Performance of Transbronchial Needle Aspiration vs. Transbronchial Cryobiopsy in Pulmonary Lesions

Daniel Rzewnicki, Niraj Gowda, Brennan Carter, Jake Rubin, Matthew Schimmel, Abesh Niroula

Abstract

Background and Objective:
Robotic-assisted navigational bronchoscopy (RAB) has become a primary modality for sampling lung nodules and masses. While prospective trials have defined overall diagnostic yield (DY), less is known about performance differences between specific tools. This study compared DY between transbronchial cryobiopsy (TBCB) and transbronchial needle aspiration (TBNA).
Methods:
We performed a retrospective review of 361 RAB procedures across two sites by four interventional pulmonologists between February 2024 and February 2025. All had performed >100 prior RAB cases. Pathology was categorized as malignant, specific benign, non-specific benign, or non-diagnostic. DY was calculated using the "strict" definition outlined by the American Thoracic Society/ACCP Delphi consensus statement.
Results:
Tissue acquisition was obtained from 417 lesions, including 321 <30 mm. TBCB alone was used in 162 lesions, TBNA alone in 38, and both in 217. Overall DY was 82.5% for TBCB and 56.3% for TBNA ($p<0.05$). For nodules <30 mm, DY was 81.8% vs. 53.8% ($p<0.05$). In paired lesions, yields were 77.4% for TBCB and 54.8% for TBNA ($p<0.05$). TBCB was the sole diagnostic tool in 25% of paired cases, compared with 2.7% for TBNA. TBCB yield did not vary significantly by lesion characteristics. In contrast, TBNA performance differed, with
62.5% DY in solid lesions and 30.3% in part-solid/ground-glass lesions ($p<0.05$).
Conclusions:
TBCB demonstrated significantly higher diagnostic yield than TBNA when performed with RAB for pulmonary nodules and masses. Differences were particularly notable in part-solid and ground-glass lesions.

Columbus – 32

LONG-TERM EFFECTS OF RECTAL RADIATION: A CASE OF COLONIC STRICTURE AND PERFORATION PRESENTING AS PNEUMOMEDIASTINUM SECONDARY TO BOERHAAVE SYNDROME

Tahirah Nimi MS, BS; Erica Giron BS; Carmen Lee, MD

Abstract

Introduction:
Esophageal perforations can result from several causes, with iatrogenic causes accounting for the majority at 52%. Boerhaave Syndrome (BS), a rare and highly lethal disorder characterized by a spontaneous transmural esophageal rupture, accounts for approximately 26% of esophageal perforations. Due to its high mortality rate and risk of delayed diagnosis, early recognition and prompt management of BS are essential to improving patient outcomes.

Case Presentation:
A seventy-seven-year-old female with a history of rectal cancer status-post chemoradiation and resection with coloanal anastomosis twenty years prior, presented to the emergency department with a one-day history of facial and neck swelling, and a ten-day history of intermittent abdominal pain, nausea, and vomiting. She reported severe indigestion and worsening abdominal pain with eating for over a week. Physical examination revealed left facial edema and left neck subcutaneous edema, abdominal distention, and mild upper abdominal tenderness. Imaging showed pneumomediastinum extending into the abdomen, extensive large bowel dilation, and subcutaneous emphysema of the neck and upper chest bilaterally. Although the esophagram was negative, a micro-perforation of the esophagus from intractable vomiting, secondary to fecal impaction, was suspected. She was admitted to the ICU. Over the twelve-day hospital course, a flexible sigmoidoscopy relieved the fecal
impaction, briefly improving her symptoms. However, the patient developed multiple complications, ultimately necessitating a total proctocolectomy with end ileostomy. Postoperatively, the patient remained intubated and sedated and required vasopressors due to septic shock. After discussions with her family, care was withdrawn three days after the colectomy.

Conclusion:
This case report describes a rare presentation of colonic stricture formation secondary to rectal radiation, which led to chronic fecal impaction and ultimately resulted in Boerhaave Syndrome. While radiation is effective for neoplasms, clinicians must remain vigilant for long-term complications, which may present in atypical and clinically challenging ways, as demonstrated in this case.

Columbus – 33

Gut Microbiota Dysbiosis at the Interface of Neuropsychiatric Disorders and Their Dermatological Comorbidities

Brittany Hawkins[1], Maddison Montgomery[1], Gabriela Bokota[1], Maria Santoyo[1], Erica Giron[1], Ahmed Eltokhi[1,2]*

[1]School of Medicine, Mercer University, Columbus, GA, 31901, USA
[2]Department of Biomedical Sciences, School of Medicine, Mercer University, Columbus, GA, 31901, US

Abstract

Background and Objective:
Neuropsychiatric disorders, including autism spectrum disorder, schizophrenia, major depressive disorder, and generalized anxiety disorder, show high comorbidity rates with dermatological conditions such as atopic dermatitis, psoriasis, rosacea, and chronic urticaria. However, the biological basis of these associations remains poorly understood. This comprehensive review investigates whether gut microbiota dysbiosis represents a shared pathophysiological mechanism underlying these comorbidities, potentially highlighting integrated therapeutic targets.

Methods:
We reviewed clinical studies examining gut microbiota dysbiosis in major neuropsychiatric disorders and several dermatological conditions. Our analysis focused on microbial diversity patterns, taxonomic alterations, inflammatory biomarkers, and mechanistic pathways. Given the heterogeneity of neuropsychiatric disorders, we first identified shared patterns of microbiota dysbiosis within neuropsychiatric disorders and dermatological conditions separately. We then integrated these findings to propose a unified conceptual framework linking neuropsychiatric disorders and their dermatological comorbidities through the gut–brain–skin axis.

Results:
Across both domains, consistent findings included depletion of short-chain fatty acid–producing bacteria (e.g., Faecalibacterium, Roseburia, Eubacterium), altered Bacteroidetes/Firmicutes ratios, and reduced microbial diversity. These alterations correlated with elevated systemic inflammatory markers (IL-6, TNF-α, IL-1β) and disrupted metabolic pathways relevant to neural and cutaneous function. Preclinical studies confirmed that dysbiotic microbiota can simultaneously induce psychiatric-like behaviors and skin inflammation. Microbiota-targeted interventions, including specific probiotic strains (such as Lactobacillus plantarum PS128, Bifidobacterium breve), showed therapeutic efficacy in patients across both neuropsychiatric symptoms and dermatological manifestations.

Conclusion:
Gut microbiota dysbiosis represents a unifying mechanism linking neuropsychiatric disorders' core symptoms with their dermatological comorbidities through shared inflammatory and metabolic pathways. This gut-brain-skin axis model supports integrated therapeutic approaches where microbiome-based interventions could simultaneously address mental health and skin conditions, offering new precision medicine opportunities for complex comorbid presentations.

Columbus – 34

Delayed-onset hematomas following Mohs surgery in patients taking a direct oral anticoagulant

Monica Constantinescu, MD[1]; Olivia Penela[2], BS; Chinmoy Bhate, MD[1,3]; Armand B. Cognetta, MD[1,3]

[1]Dermatology Associates of Tallahassee, FL, USA
[2]Mercer University School of Medicine, Columbus, GA, USA
[3]Division of Dermatology, Florida State College of Medicine, Tallahassee, FL, USA

Abstract

Background and Objective:
Direct Factor Xa inhibitors or direct oral anticoagulants, like apixaban, are used to reduce the risk of stroke, deep vein thrombosis, and pulmonary embolism. It is essential that patients prescribed these drugs follow the instructions carefully. When a patient needs surgery and is on a direct oral anticoagulant, the question arises as to whether they should stop taking them before the elective surgery. There are currently no well-established guidelines instructing whether a patient should discontinue taking them before a Mohs procedure. A Mohs rocedure is a precise surgery that removes skin cancers.

Methods:
We describe two cases of delayed-onset hematoma formation following Mohs micrographic surgery and reconstruction in patients taking direct oral anticoagulants not withheld prior to the procedure. To our knowledge, the occurrence of a late-onset hematoma greater than 2 weeks postoperatively has not been previously reported in patients treated with apixaban.

Results/Conclusion:
This report highlights the need to instruct patients on the possible complication of continuing the prescription and the importance of consulting the prescribing doctor before telling the patient to cease taking the drugs.

Columbus - 35

Subtle Presentation of a Large Cutaneous Angiosarcoma

Maria G. Santoyo Martinez, MS, BS, Sneha Rajeev, BS, Joshua E. Lane, MD, PhD, MPH, MBA

Abstract

Background:
Angiosarcomas are rare vascular tumors that originate from endothelial cells. Cutaneous angiosarcomas are mostly seen in elderly light-skinned individuals with appearance varying in size, color, texture, and location.
Case Presentation:
We report an 81-year-old woman with no significant medical history that presented with an enlarging nodule on her frontal scalp present for one year. Physical examination showed a faint erythematous patch extending from her right scalp down to her jawline. Multiple biopsies demonstrated invasive dysplastic and anastomosing vessels with additional characteristics consistent with angiosarcoma. Initial treatment consisted of bevacizumab, paclitaxel, and radiation therapy. A subsequent treatment plan included the use of bevacizumab and topical imiquimod for the persistent/recurrent angiosarcoma. The patient did well on this treatment for six months. The patient subsequently passed away due to pulmonary metastasis from the angiosarcoma.
Discussion:
Angiosarcoma represents 1-2% of all soft tissue tumors. They mimic many other cutaneous conditions risking delay in treatment. Many cases are idiopathic, but prior radiation, cancer, and lymphedema are risk factors. Diagnosis of angiosarcoma requires histopathological confirmation via punch or incisional/excisional biopsy, showing irregular anastomosing vascular channels with variable differentiation and pleomorphism. Immunohistochemical stains and imaging modalities are used to support diagnosis and assess disease extent. Cutaneous angiosarcomas are primarily managed with wide surgical excision and radiation. However, many patients are inoperable, especially with tumors greater than 5 cm, leading to poor outcomes and median survival of approximately 8 months. In unresectable cases, radiation is used palliatively. Chemotherapy with paclitaxel with/without bevacizumab has shown therapeutic benefit. Imiquimod, a topical TLR-7 agonist, has shown subjective improvement in inoperable angiosarcoma when combined with bevacizumab. While not curative, its use as an adjunctive or palliative therapy may help improve quality of life in non-surgical patients.
Conclusion:
It is important to recognize atypical features of angiosarcoma presentation. Due to the subtle rash-like appearance of this patient's angiosarcoma, accurate diagnosis was only established with biopsy and histopathological exam. This angiosarcoma required rapid diagnosis and treatment due to the aggressive behavior, local recurrence, and early metastasis.

Biomedical

Macon – 1

Identifying a target for therapy in tumor-initiating cells

Lloryn J. Cylin[1], Alexander Marion[2], and Ilana Chefetz[1]
[1]Mercer University School of Medicine, Department of Biomedical Sciences, Macon, GA, 31207
[2]Navicent Health, Department of Obstetrics and Gynecology, Macon, GA, 31207

Abstract

Background and Objective

Eliminating cancer stem cells (CSCs) has the potential to significantly improve patient prognosis, as studies in mice demonstrate that CSC eradication can enhance cure rates and reverse chemotherapy resistance. However, ovarian CSCs present a unique challenge, as they develop chemoresistance to standard therapeutics, such as cisplatin and paclitaxel. While nearly 70% of ovarian cancer patients initially respond to chemotherapy, recurrence occurs within weeks or months. Thus, to effectively cure ovarian cancer, there is an urgent need to specifically target ovarian CSCs to block their tumor initiation and propagation capabilities. To identify ovarian CSCs, both we and others have utilized aldehyde dehydrogenase (ALDH) activity and CD133 expression as biomarkers. ALDH consists of a group of 20 enzymes responsible for converting toxic aldehydes into corresponding carboxylic acids. However, the commonly used ALDEFLOUR FACS-based assay does not distinguish between different ALDH enzymes. Additionally, many ovarian cancer cell lines express high levels of CD133 (up to 50%), indicating the necessity to identify more specific markers for CSCs. These CSCs are defined by their resistance to chemotherapy and their capacity to initiate tumors.

Methods

Tumor initiation capacity in vitro is assessed through clonogenic assays, where serial dilutions of cell numbers are evaluated. We have previously shown that as few as 10 CSCs are capable of forming viable clones.

Results

Our objective is to identify surface biomarkers of ovarian CSCs using proteomic analysis that correlate strongly with their tumor initiation capacity. Based on the identified tumor antigens, we aim to develop genetically engineered T cells with chimeric antigen receptors (CARs) to specifically target ovarian CSCs, thereby preventing recurrent disease.In our approach, we utilized serial dilution clonogenicity assays to evaluate tumor initiation. Proteomic analysis of five biological replicates from two ovarian cancer cell lines revealed 11 upregulated proteins located on the cell surface that are common across both lines.

Conclusion

Current validation studies are underway to identify the most promising candidates for CAR therapy development.

Macon – 2

Integrating Immune-Related Gene Signatures into Triple Negative Breast Cancer Subtype Classification

Karisha Khadayat[1], Ilana Chefetz[2]
[1]University of Georgia, Franklin College of Arts and Sciences, Athens, GA, 30601, United States
[2]Mercer University School of Medicine, Department of Biomedical Sciences, Macon, GA, 31207, United States

Abstract

Background and Objective

Triple negative breast cancer (TNBC) is a heterogeneous disease lacking targeted therapies. Prior studies have classified TNBC into four molecular subtypes (BLIA, BLIS, MES, and LAR) using gene expression–based models. While these approaches provide insight into biology, they rarely examine immune-related features or chemotherapy responses. The objective of this study is to replicate an established TNBC subtype classification pipeline while extending it by incorporating immune gene signatures and exploring potential associations with chemotherapy sensitivity.

Methods

Seven TNBC gene expression datasets were obtained from the GEO database (Affymetrix Human Genome U133 Plus 2.0 Array, GPL570). After background correction, normalization, and $\log_2$ transformation, differentially expressed genes (DEGs) were identified across TNBC subtypes (BLIA, BLIS, MES, LAR). Machine learning classifiers including Support Vector Machines, Random Forests, and Logistic Regression were trained and evaluated using five-fold cross-validation. In contrast to prior studies, we implemented models in Python with modern algorithms (e.g., XGBoost) and performed feature importance analysis to identify robust predictive gene signatures across datasets. Additionally, we integrated immune-related gene sets from and performed feature importance analysis.

Results

Preliminary analyses replicated TNBC subtype classification with good agreement to previously published benchmarks, demonstrating that our data processing and modeling pipeline is functioning as expected. Further analyses are ongoing, as training and validating machine learning models across multiple subtypes requires significant computational time. Planned evaluations include feature importance analysis to identify genes most predictive of each subtype and exploratory assessment of whether immune-related gene signatures correlate with differential chemotherapy response.

Conclusion

This study demonstrates that replication of TNBC subtype models is feasible using publicly available GEO datasets, while extension with immune signatures provides new biological insight. Incorporating immune features into TNBC molecular classification frameworks may improve prediction of both subtype and therapeutic response, offering a potential path toward personalized treatment strategies.

Macon - 3

Glioblastoma Gene Expression Correlation Networks across Sex and Vital Status: Shared ECM and Notch Programs with Subgroup Specific Patterns

Katelyn Castelli, Dr. David Hollar

Abstract

Background and Objective: Glioblastoma (GBM) is the most common and aggressive primary malignant brain tumor in adults: only ~7% of patients survive 5 years. While the two-hit somatic mutation theory of cancer stresses oncogene and gene regulatory promoting mutations, complex metabolic and stem cell interactions within the tumor microenvironment must be considered. The objective of this study was to compare significant correlations between a predefined set of upregulated and downregulated genes in GBM patients.

Methods:

We used deidentified, public use genomic data from the National Cancer Institute (NCI) Genomic Data Commons (GDC; gdc.cancer.gov), focusing on expression clustering and mutation frequency (n = 534 patients). Analyses included SPSS Pearson's correlation coefficient, linear regression, and network analysis. Correlations addressed gene expression upregulation/downregulation across four groups: female/male alive/deceased.

Results:

The sample was 39.1% Female, with 74.9% White, 10.7% Asian, and 5.2% Black. There were 78.5% decedents. Mean age was 58.54 +/- 13.44 years. ECM/immune remodeling and Notch/stemness motifs appeared in all groups. Deceased males showed a coherent retinoid-Wnt-lipid axis of upregulated genes (APOD-CRABP2: 0.876, APOD-SFRP1: 0.867, CRABP2-SFRP1: 0.852); whereas living males showed a Notch/adhesion pattern (downregulated NOTCH2-BCHE: 0.922, upregulated CRABP2-THBS4: 0.850). Deceased females showed strong negative cholinergic/EMT-tilted associations between downregulated genes (BCHE-S100A16: -0.817, BCHE-EMP3: -0.815) and a positive correlation for upregulated PLOD2-TRIP6 (0.733), consistent with 3 a mesenchymal shift. Among deceased females, correlations between upregulated genes APOD, CCND2, and CPM were significant and higher.

Conclusion:

The results show many commonalities across glioblastomas, regardless of vital status. However, subgroup contrasts suggest pathway level differentiation: deceased individuals exhibited strong positive correlations among upregulated retinoid-Wnt-lipid genes and strong negative correlations among downregulated cholinergic/EMT genes; whereas survivors show enhanced Notch/adhesion coupling that includes both downregulated and upregulated components. These correlational patterns highlight molecular networks linked to disease aggressiveness and survival status that may inform pathway-targeted validation and targeted chemotherapy.

Macon – 4

CRISPRi-Mediated Transcriptional Silencing of LINE-1 Retrotransposons in MCF-7 Cells using dCas9-KRAB-MeCP2

Jacob S. Hilson, Pamela R Cook

Abstract

Background and Objective

LINE-1 (L1) elements are autonomous retrotransposons that make up about 17% of the human genome. Most L1 elements are silenced in healthy somatic cells, but in some conditions are reactivated. Derepressed L1 elements have been linked to conditions like neurodegenerative diseases, epithelial cancers, and early pregnancy loss. Studying L1-encoded proteins has been difficult because the large number of L1 copies in the genome makes traditional CRISPR methods unfeasible.

Methods

In this project, we set out to repress L1 in MCF-7 breast cancer cells, which express high levels of L1, using an enhanced CRISPR interference (CRISPRi) construct. We first used lentivirus to deliver a plasmid containing four single-guide RNAs (sgRNAs) targeting the 5′ UTR of L1 into MCF-7 cells, followed by PiggyBac transposon delivery of a dCas9-KRAB-MeCP2 repressor fusion protein. The deactivated Cas9 (dCas9) protein is guided to L1 promoters in the 5'UTR via the sgRNAs but does not cut the DNA. Upon binding to L1 5'UTRs, the two transcriptional repressor proteins fused to dCas9, Krüppel associated box (KRAB) transcriptional repressor and the methyl CpG binding protein-2 (MeCP2), were expected to repress L1 transcription.

Results

The sgRNA and dCas9-KRAB-MeCP2 plasmids carried antibiotic resistance genes for puromycin and blasticidin, respectively. After puromycin and blasticidin selection to establish a stable cell line expressing both the sgRNA and dCas9-KRAB-MeCP2 constructs, we compared L1-encoded ORF1p protein levels by western blot. Cells containing both dCas9-KRAB-MeCP2 and the plasmid encoding the four sgRNAs showed reduced ORF1p compared to control cells.

Conclusion

These results demonstrate that CRISPRi can be used to repress reactivated L1 at the level of transcription. This provides a potential tool for future studies to study L1 expression and its effect on cellular function and genome stability.

Macon – 5

Role of Chronic Stress-Induced Immune Antiviral Reactivity in the Development of Cardiovascular Diseases

Ethan Guest, Hashim Akhtar, Reed Resendiz, Peter Uchakin

Abstract

Background:
Cardiovascular disease (CVD) remains the leading cause of death in Georgia and the U.S., accounting for roughly one in three deaths in Georgia alone. CVD prevalence is projected to rise by 90% by 2050, with 35.6 million deaths compared to 20.5 million in 2025. Chronic psychological stress—especially from long-term caregiving—represents an underrecognized risk factor for CVD. Prolonged stress disrupts the Th1-Th2-Th17-Treg immune equilibrium, shifting toward Th2- and Treg-dominant responses. This impairs cell-mediated immunity, increasing vulnerability to infections and facilitating reactivation of latent viruses such as herpes simplex virus type 1 (HSV-1). Repeated viral reactivation may promote chronic low-grade inflammation, a key driver of atherosclerosis and other cardiovascular conditions. As caregiving becomes more prevalent with an aging population, understanding this complication is critical to addressing rising CVD risk.
Methods:
This study enrolled two groups: (1) parents and legal guardians of children with special needs (STRESS group), and (2) individuals with clinical signs of CVD (CVD group), serving as a positive control. Saliva samples and test DNA-containing controls were collected for viral detection. Two DNA extraction kits, the VNA and gDNA kits, were compared for performance. PCR was used to assess DNA quality and yield.
Results:
Our findings show that the VNA kit provided better performance in DNA extraction compared to the gDNA kit. By establishing the VNA kit as the more effective approach, we were able to determine the optimal extraction method for processing saliva collected from patients with underlying cardiac pathologies, thereby strengthening the validity of our analyses.
Conclusion:
Our summer project focused on establishing protocols for saliva collection, DNA extraction, and PCR analysis in the CVD group. The VNA kit was validated as the preferred method for sample processing. These results lay the groundwork for future analysis of viral reactivation in chronically stressed populations.

Macon – 6

Transport of Mercury-Albumin Complexes into Hepatocytes

Bhumi R. Patel, Anya Surani, Lucy Joshee, Purva Lotwala, Christy C. Bridges

Abstract

Background

Mercury (Hg) is a toxic heavy metal to which humans are regularly exposed. It has a high affinity for thiol-containing biomolecules with the majority of Hg in blood being bound to albumin. The current study hypothesized that circulating Hg-albumin complexes are taken up into hepatocytes by receptor-mediated endocytosis.

Methods

To test this hypothesis, the uptake of mercuric conjugates of albumin-FITC (fluorescein isothiocyante; Hg-albumin) was measured in cultured hepatocytes (HepG2). Cells were seeded into 8-well glass chamber slides at a density of 0.2 x 106 cells/mL and were cultured for 24 hours until at least 80% confluent. Cells were exposed to buffer or Hg-albumin (10 μM, 25 μM, or 50 μM) for two hours. Slides were then washed with buffer and cells were viewed using a fluorescent microscope.

Results

Our data indicate that Hg-albumin conjugates are readily taken up into hepatocytes and accumulate in structures that appear to be lysosomes. In some experiments, Lysotracker-Red was added to the cells to localize the lysosomes. However, we were unable to consistently detect lysosomes in HepG2 cells using our current protocol.

Conclusions

Even so, the current study provides novel definitive data showing that Hg-albumin conjugates are taken up into hepatocytes. Future studies are needed to evaluate the co-localization of Hg-albumin conjugates with lysosomes.

Macon – 7

Primary Cilia Effects on Nerve Growth Factor Transcription in Alzheimer's Disease

Harry Patel, Guillermina P. Rentsch, Seth Tart

Abstract

Background:
Alzheimer's disease (AD) is a progressive neurodegenerative disorder marked by memory loss, synaptic dysfunction, and neuronal death. The hippocampus supports memory consolidation and neuroplasticity through Nerve Growth Factor (NGF) production. Reduced NGF signaling contributes to neuronal vulnerability in AD. Primary cilia, sensory organelles that regulate signaling and transcription of neurotrophic factors, are known to be reduced in AD. However, their role in NGF transcription remains unclear.
Methods:
Post-mortem hippocampal CA4 tissue from AD and non-AD individuals was analyzed. Formalin-fixed paraffin-embedded (FFPE) samples underwent deparaffinization, in-situ hybridization, and immunohistochemistry. Markers included DAPI (nuclei), AC3 (cilia), and NGF RNA probe. Confocal microscopy and quantitative analysis with ImageJ were used to assess NGF transcription and ciliation rates.
Results:
AD hippocampal neurons exhibited a significant reduction in ciliation compared to non-AD controls ($p < .05$). NGF transcription was also decreased in AD samples. However, Welch's t-test showed no statistically significant difference in NGF transcription between ciliated and non-ciliated cells across disease states.
Conclusions:
Both primary cilia loss and reduced NGF transcription are associated with AD hippocampal pathology, yet a direct mechanistic link between ciliation and NGF regulation remains inconclusive. Increasing sample size and examining neuronal subtypes (e.g., cholinergic, GABAergic) may clarify cilia's contribution to NGF expression. Elucidating these interactions could guide development of therapies aimed at restoring neurotrophic support and enhancing neuronal resilience in AD.

Epidemiological

Macon – 8

Age-Stratified Phthalate Exposure in U.S. Children: Identifying Cortisol Vulnerable Populations for Improved Surgical Outcomes

Abbie Earnest, BSA, Sydnee Burke, BA, and Dr. Yudan Wei, MD, PhD

Abstract

Background & Objectives: Phthalates have been recognized as endocrine disruptors with detrimental impacts on glucocorticoid regulation. Cortisol is one of the body's key glucocorticoids that plays an essential role in the body's response to stress and has been directly associated with poor clinical outcomes in perioperative surgical cases. However, the relationship between age-dependent phthalate exposure and its consequences of elevated cortisol in the perioperative setting remains poorly defined.

Methods: Data of 1,015 children aged 3-18 years from the 2017-2018 NHANES biomonitoring data were analyzed. Participants were categorized based on school ages: preschool (3-5), lower elementary (6-8), upper elementary (9-11), middle school (12-14), and high school (15-18). Urinary concentrations of three major phthalate metabolites that children are commonly exposed to, including mono-n-butyl phthalate (MBuP), mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHP), and mono-benzyl phthalate (MBeP), were studied. To control for urine dilution in spot urine samples, creatinine-adjusted urinary concentrations of phthalates were determined for each individual. Geometric means of creatinine-adjusted urinary concentrations of phthalates were analyzed. Differences in phthalate concentrations among the age groups were assessed with analysis of variance (ANOVA).

Results: A significant and age-dependent decrease in urinary concentrations of all three phthalate metabolites was observed ($p<0.0001$). Preschool children had the highest levels of phthalates: MBuP (22.96 μg/g creatinine), MEHP (15.27 μg/g creatinine), and MBeP (11.49 μg/g creatinine). Urinary phthalate levels declined steadily with age, reaching their lowest concentrations in high school children: MBuP (7.76 μg/g creatinine), MEHP (3.80 μg/g creatinine), and MBeP (3.31 μg/g creatinine).

Conclusion: Urinary phthalate concentrations show significant elevations in younger children, with a downward trend as children enter high school. Given evidence linking phthalate exposure to cortisol dysregulation and poorer surgical outcomes, these findings highlight early childhood as a critical window of vulnerability. Future analyses should assess integrating endocrine biomarkers and clinical outcomes to improve perioperative outcomes.

Macon - 9

Promoting Physical Activity in Rural Primary Care: Barriers, Opportunities, and Patient Perspectives

Douglas Morris, MS[1], Marvin Sineath Jr, MD, FAAFP, CAQSM, DipABLM

Abstract

Background and Objective:
Rural populations face unique barriers to physical activity, including limited community resources and inconsistent counseling from primary care providers. This pilot study aimed to explore patient perceptions and potential solutions to improve physical activity engagement and health equity in rural primary care settings.
Methods:
An IRB-approved feasibility study (#H24-06017) was conducted using two web-based surveys distributed at participating rural clinics. Due to low initial response rates, in-person data collection was implemented at Mercer Medicine Putnam County. The primary survey assessed current activity levels, perceptions, and provider roles; the secondary survey, distributed 1–2 weeks later, aimed to detect changes in perception. Informal interviews with clinic staff provided contextual insights.
Results:
Twenty-five patients completed the primary survey. Respondents were predominantly female (76%) with an average age of 52.6 years. Most were retired and confident in meeting national activity guidelines. Pain and medical issues were common barriers. While 72% had discussed physical activity with their provider in the past year, nearly half were not interested in further guidance. Preferences for activity settings included home (60%), gyms (56%), and outdoors (48%). Interest in fitness professional support was moderate. Respondents favored in-person and email-based support. Staff interviews revealed inconsistent counseling practices and limited provider awareness of local resources.
Conclusion:
Primary care clinics play a critical role in shaping rural patients' physical activity behaviors. Integrating fitness professionals into clinic workflows and improving provider education on exercise prescription may enhance patient outcomes. Despite limitations in sample size and survey design, findings support further research into scalable models for physical activity promotion in underserved rural communities.

Macon - 10

Analysis of the differences in perception of human and companion pet vaccines

Katarina Amelchenko, Hannah Jackson, Nicole Nelson, Sriniketh Edupuganti, Eva Walker-Fairchild, Janet Hendrickson, Hank Schwartz, Mary W. Mathis

Abstract

Background and Objective:
As human vaccine hesitancy has grown into a greater public health issue, its role in veterinary vaccination has become a topic of interest in understanding the motivations of vaccine behavior. A prior study found that canine vaccine hesitancy was "associated with rabies non-vaccination, as well as opposition to evidence-based vaccine policies" (Motta et al., 2023). The resurgence of vaccine-preventable illnesses and the potential spillover effects into reduced pet vaccination has made understanding the factors that influence vaccination decisions more important than ever. This research is intended to identify how pet owners' hesitancy toward human and companion animal vaccines may be interconnected and byidentifying key factors that influence their vaccine-related decision-making.

Methods:
The sample for the study was obtained from the Macon, GA People and Pets Clinic LLC, where individuals screened for elevated blood pressure and elevated blood glucose. They also receive free veterinary care for their pets. Participants at the clinic were asked to complete a 10-minute survey with questions about social media usage, human vaccine attitudes, pet vaccine perception, beliefs in popular health fads, and demographics.

Results:
Preliminary findings indicate that trust in pet vaccines is significantly greater than trust in human vaccines and when deciding whether or not to vaccinate themselves, Doing a poster presentation participants most often cited trust in healthcare providers as well as concerns for side effects, and recommendations from the government, friends and family. Additionally, when differentiating between core and non-core pet vaccines, participants assign significantly more importance in vaccinated for core vaccines when compared to non-core.

Conclusion:
The more favorable outlook on pet vaccination when compared to human opens up the door for a different approach to vaccine education, one that applies these findings for better understanding about the importance of vaccination.

Macon – 11

Ethylene Oxide and Early Menarche: Untangling Environmental and Sociodemographic Influences

Sydnee Burke (BA), Abbie Earnest (BSA), Yudan Wei (MD, PhD)

Abstract

Background and Objective:
Ethylene oxide (EO) is a colorless gas used in textiles, plastics, and detergents, as well as in sterilization of medical equipment. Exposure occurs primarily through air pollution. EO may act as an endocrine disrupting chemical with the ability to alter sex hormones in adult populations, but data in adolescents is limited. This study aims to discover an association between EO exposure and early age of menarche among adolescents.
Methods:
We analyzed data from the 2015-2018 National Health and Nutritional Examination Survey. Our sample included 1,619 girls aged 12 to 19 years. Early menarche was defined as menstruation before age 12. EO exposure was assessed by measuring hemoglobin adducts of EO (HbEO) in whole blood samples. A multivariate logistic regression model estimated odds ratios (ORs) of EO exposure with early menarche, adjusting for potential confounders.
Results:
Of 1619 participants, 400 had early menarche (weighted prevalence, 21.34%). The geometric mean of HbEO was significantly higher in girls with an early age of menarche (27.50 pmol/g Hb; p=0.0263) than the girls with normal age of menarche (23.93 pmol/g Hb). After adjusting for race, family income, BMI, and serum cotinine, higher levels of HbEO were positively associated with increased odds of early menarche, but the association was not statistically significant (OR: 1.17, 95% CI: 0.83-1.64). Among the covariates, BMI was found to be positively associated with early menarche. Non-Hispanic Black (OR: 2.10, 95% CI: 1.45-3.04) and Hispanic girls (OR: 2.01, 95% CI: 1.43-2.83) displayed significantly higher odds of early menarche, as compared with non-Hispanic White girls.
Conclusion:
EO exposure showed a positive but non-statistically significant association with early menarche. Increasing BMI and racial categories were found to be significant predictors, suggesting that metabolic and demographic factors may influence pubertal onset greater than EO exposure.

Macon – 12

Mapping Health Disparities in Rural and Urban Georgia: Examining the Relationship Between Food Environment, Social Drivers of Health (SDOH), and Obesity and Diabetes Prevalence Using QGIS

Kendra A. Jenkins, Dr. Michael R. Kramer

Abstract

Background and Objectives:
Shifts in the United States (U.S.) food environment—marked by increased reliance on processed foods, limited access to fresh produce, and larger portion sizes—have contributed to rising rates of obesity, diabetes, and cardiovascular disease. These issues disproportionately affect rural communities, where food insecurity and structural barriers to healthy living are prevalent. This study examines how food environment factors and social determinants of health (SDOH) are associated with obesity and diabetes rates in Georgia's North Central Health District, using granular census tract data to identify at-risk areas and inform targeted policy interventions.
Methods:
A quantitative cross-sectional analysis was conducted using public datasets from public health sources. Census tracts were classified as rural or urban/suburban using U.S. Census Bureau definitions. Key predictors included food insecurity, SNAP usage, transportation access, and socioeconomic indicators. Health outcomes (obesity and diabetes prevalence) were analyzed using QGIS mapping, independent-samples t-tests, and linear regression models via SPSS.
Results:
Obesity prevalence was significantly higher in urban/suburban areas compared to rural ($p = 0.011$), with regression models showing a consistent inverse association between rurality and obesity across all adjusted models ($B \approx -3.1\%$, $p < 0.05$). Diabetes prevalence did not significantly differ by rurality but was positively associated with food insecurity ($B = 0.125\%$, $p < 0.001$), limited transportation ($B = 0.157\%$, $p = 0.014$), and household size ($B = 0.384\%$, $p = 0.022$). Urban areas generally had better access to clinics and lower rates of physical inactivity.
Conclusion:
Contrary to existing literature, this study found higher obesity rates in urban areas and inconsistent rural-urban trends in diabetes when examined at the census-tract level. Food insecurity and transportation barriers were stronger predictors than rurality alone. Community-based, spatially targeted interventions and participatory research approaches are essential to address chronic disease risk and promote health equity.

Macon – 13

Classifying the Rural Definition of Heart Disease Mortality in Georgia

Radhika Patel, B.S.

Abstract

Background

Rural counties in Georgia experience a disproportionate burden of heart disease mortality. However, the definition of "rural" varies across state and federal agencies. This project explores the research question: Why does the rural definition of heart disease mortality in Georgia matter?

Methods

Age-adjusted heart disease mortality rates (ICD-10 I00–I09, I11, I20–I51) from 2016–2018 and 2021–2023 were examined at the county level in Georgia. Two outcomes were analyzed: the 2021-2023 age-adjusted heart disease mortality rate and the change in mortality rate between 2016-2018. Counties were classified under three major rural classification systems: (1) Binary rural vs non-rural as defined by the Georgia legislature, (2) USDA Rural–Urban Continuum Codes (RUCC, 1–9, grouped into urban, suburban, rural), and (3) CDC's National Center for Health Statistics (NCHS, 1–6, grouped into urban, suburban, rural). For each, the mean mortality rates were calculated, and disparities quantified as absolute differences and rate ratios. Across all three classifications, rural counties consistently showed higher mortality.

Results

Using GA def, rural counties averaged 230.1 deaths per 100,000 compared to 204.6 in non-rural counties (gap +25.5; ratio 1.12). RUCC classifications showed a rural rate of 233.0 versus an urban rate of 209.9 (gap +23.1; ratio 1.11). NCHS yielded the largest disparity, with rural 233.8 versus urban 206.6 (gap +27.2; ratio 1.13). Assessment of trends over time showed overall declines in mortality but with variation. Depending on the classification system, the estimated rural–urban gap in heart disease mortality ranged from 23 to 27 excess deaths per 100,000.

Conclusions

Nearly one-third of Georgia counties shifted their rural status across definitions, underscoring the policy implications of definitional choices. These findings suggest that binary definitions such as GA_def may not entirely capture rurality, potentially overlooking "suburban" counties that share rural-like health burdens.

Macon – 14

Prevalence and Geographic Distribution of Rural Patients Excluded from Spatial Epidemiological Research and Implications for Clinical Medicine

Lea Villamor, Shaan Prasad, Kara Patrick, Dr. Jacquline Curtis

Abstract

Background

To improve the healthcare of our rural Georgia communities, we must first learn and understand the populations that we want to serve. An emerging approach to achieve this goal is Geographic Information Systems (GIS), which are used to map patients and characteristics of their social, natural and built environment. These linked patient and environmental data are growing evidence to understand patient drivers of health and health outcomes, ultimately informing precision medicine, patient-centered care, and policy. However, when patients use a Post Office Box (P.O. Box) for their home address, as often in rural America, their location cannot be mapped and are excluded from this growing area of clinical translational science. Furthermore, their physicians lack comprehensive data that can improve patient-centered care. Therefore, the aim of this project was, for the first time, to quantify and visualize the prevalence and geographic distribution of rural patients who are missing from all maps that we would use in clinical medicine.

Methods

This is a case study in Georgia using three study sites that compare prevalence and geographic distribution of P.O. Box residential addresses in urban and rural counties. Prevalence was calculated using United States Postal Service (USPS) data on the number of total addresses and the number of P.O. Box addresses by zip code. A GIS was utilized to map the geographic distribution of prevalence across the sites.

Results

Results indicate heterogeneity across the study sites and the rural-urban continuum and require further investigation at more local levels, such as census tracts.

Conclusion

This study describes and visualizes, for the first time, the prevalence and geographic distribution of these lives with the aim of raising awareness and ensuring that this growing area of clinical translational science benefits all lives.

Macon – 15

Marital status and risk of cardiovascular disease

Laramie Prince, David Hollar

Abstract

Background:
The literature shows that marriage is linked to a lower risk of CVD. Prior studies show there is a higher incidence of CVD in people who are divorced or separated from their partners. In a prior study, we found that not being married or strongly being married was correlated ($p < 0.001$) with CVD risk. This study aims to further explore correlations between cardiovascular health and marital status.

Methods:
Risk of cardiovascular disease in men and women was calculated using data from the 2017-2018 National Health and Nutrition Examination Survey. CVD risk was calculated based on age, total cholesterol, HDL, systolic blood pressure, smoking, and diabetes. To calculate CVD risk for individual's, the D'Agostino et al. regression algorithm was used. The CVD risk score was compared to participants self-reported marital status using SPSS analysis of variance. Groups included married, widowed, divorced, separated, never married, and living with partner.

Results:
Our analysis included data from 1,249 participants. Compared with married participants, there was a slightly higher risk of CVD in participants who were widowed, divorced, or separated. However, compared with married participants, there was a lower risk of CVD in participants who were never married or living with their partner ($p <0.001$, CI 95%, F 52.65). Widowed participants had a high CVD risk of 11.75. Participants who were divorced had a CVD risk of 11.37. Participants who were married had a CVD risk of 11.05.

Conclusion:
Marital status may have a role in the risk of cardiovascular disease. Several studies show that marriage seems to be a protective factor when it comes to risk of CVD. Stressful events such as divorce and separation appear to increase a person's risk of CVD. When screening patients for cardiovascular disease, marital status should be considered with smoking history and a history of hypertension.

Medical Education

Macon – 16

Faith-Based Interventions to Improve Maternal Mental Health Outcomes and Screening Access in Rural U.S. Communities

Alexandra Bernard, M.S.

Abstract

Background and Objective
Postpartum depression (PPD) often goes undiagnosed and untreated, particularly in rural communities, where structural barriers, stigma, and fear of being reported to child protective services discourage women from seeking help. These factors contribute to underreporting and missed opportunities for care. In Georgia, mental health conditions were the leading cause of pregnancy-related deaths in 2022, yet 90 counties lack a single psychiatrist (Georgia Department of Public Health). Faith-based institutions may help address these gaps by offering trusted, community-based support for postpartum women. This problem–solution analysis explores how rural Georgia communities can adapt existing faith-based intervention models to improve maternal mental health outcomes.
Methods
This analysis draws on existing literature, public health data, and faith-based intervention models to identify barriers to postpartum mental health care in rural Georgia and evaluate the potential role of religious institutions in addressing these gaps. The problem is framed through the lens of structural, cultural, and resource limitations, and solutions are examined based on feasibility and sustainability.
Results
Current research on faith-based interventions for rural postpartum women is limited. Nevertheless, adapted models indicate that churches can serve as geographically accessible and trusted spaces to support maternal mental health in rural communities. Still, challenges such as limited resources, unidirectional referrals, and a lack of data to demonstrate long-term effectiveness, persist.
Conclusion
By integrating mental health education, screening support, and referral pathways within trusted religious institutions, communities may reduce stigma and expand access to care. Future efforts should focus on sustainability of partnerships between the mental health sector and faith communities, as well as conducting more research on faith programs and maternal mental health, as existing studies are often pilot programs focused broadly on depression in the general population, rather than the unique needs of postpartum populations.

Macon – 17

Developing a Toolkit for Premature Ovarian Insufficiency (POI): Enhancing Patient and Provider Education in Rural Georgia

Madison Martin, Tina Hawkins, Sorita Ann Carter, Candi Nobles-James, Ilana Chefetz

Abstract

Background and Objective
Premature ovarian insufficiency (POI) is defined as the loss of ovarian function before age 40, resulting in infertility, estrogen deficiency, and increased risks of osteoporosis and cardiovascular disease. Despite these consequences, POI remains under-recognized, especially in rural areas where limited educational resources and provider awareness contribute to delayed diagnosis. This project aimed to create an evidence-based toolkit to improve POI awareness, patient support, and provider engagement in rural Georgia.
Methods
A literature review of POI guidelines, resources, and supporting physicians was created to establish a support network for women in rural Georgia. A stakeholder interview involving rural health providers, community members, and patients will be conducted in the future. Toolkit materials were designed for accessibility and integration into existing rural health initiatives.
Results
Preliminary findings indicate low awareness of POI with a lack of accessible resources in rural Georgia. The resulting toolkit includes patient education materials covering diagnosis, fertility options, hormone replacement therapy, and support groups.
Conclusion
The POI toolkit addresses critical gaps in awareness and care by equipping patients and providers with accessible, evidence-based resources. This model has potential for broader application in underserved communities, supporting earlier diagnosis, improved management, and better quality of life for women affected by POI.

Macon – 18

Evaluating ChatGPT-4o and Grok 3 Performance on Solving USMLE Step 1 Sample Test Question

David Gu, MD, MS

Abstract

Background and Objective
Generative artificial intelligence (AI) tools are rapidly transforming medical education. ChatGPT and Grok are two leading large language models (LLMs). This study aimed to evaluate the performance of ChatGPT-4o and Grok 3 on solving the latest USMLE Step 1 sample test questions.
Methods
All 119 multiple-choice questions (MCQs) containing both text-based (n = 95) and image-based (n = 24) questions from USMLE January 2024 release were tested with ChatGPT-4o and Grok 3. The overall question accuracy, text-based question accuracy, and image-based question accuracy, were calculated and compared. To test the consistency of the output of two LLMs, the second test was taken when a MCQ was answered incorrectly by either AI model. The third test was also carried out using Grok 3's DeepSearch function.
Results
ChatGPT-4o and Grok 3 achieved an identical overall accuracy of 87.4%. ChatGPT-4o scored 91.6% and 70.8%, while Grok 3 scored 89.5% and 79.2%, on the text-based and image-based MCQs, respectively. There was no significant performance difference between ChatGPT-4o and Grok 3 in solving each type of MCQs. The data further indicated that the complexity of the question including the associated image could lead to the underperformance from the AI models in their tested versions.
Conclusion
Both ChatGPT-4o and Grok 3 showed impressive performance on solving USMLE Step 1 sample questions. The study suggests that LLMs could serve as effective supplemental medical education tools. However, AI-generated outputs cannot be considered universally accurate, and cautious use with human verification is imperative.

Navigating Ethical Tensions in Medicine: The Role of Personal Values in Physicians' Decision-Making

Alexandra Bernard, Olivia Johnson

Abstract

Background and Objective

In light of ongoing debates in healthcare and the growing influence of public opinion, understanding how physicians navigate ethical challenges is increasingly important. This study explores how physicians reconcile personal and professional ethics, particularly when faced with policies or patient requests that conflict with their core values. The objective was to examine the foundations of physicians' personal values and how these values interact with professional ethical frameworks in shaping responses to clinical dilemmas. By examining how physicians apply their personal ethics in practice, we aim to better understand how they confront moral dilemmas in medicine.

Methods

This study used a qualitative research approach, utilizing semi-structured interviews to collect data. We conducted interviews with 12-15 physicians, each lasting approximately 30 minutes. The interviews focused on physicians' perspectives on ethical decision-making, including scenarios where their personal and professional ethics align or diverge. Participants were recruited through email; and in-person or virtual interviews wererecorded and transcribed. We will use qualitative thematic analysis to identify patterns in how physicians' approach ethical dilemmas, with coding methods ensuring reliability. The 9/11/25 findings will be compared with existing literature, such as Gils-Schmidt and Salloch (2024), to provide insights into the broader discourse on medical ethics.

Results

Data collection is ongoing. Preliminary findings suggest that many physicians identify their upbringing and family values as central to shaping both their personal and professional ethics. Participants also emphasized the importance of conscientious objection in medicine, with some supporting its use consistently and others advocating for a more situational approach.

Conclusion

This study seeks to illuminate how physicians approach ethical dilemmas and the personal values they draw upon in decision-making. Insights from this work may inform medical education, institutional policy, and professional development initiatives aimed at equipping physicians to navigate ethical conflicts in clinical practice.

Macon – 20

Bridging the Gap: Increasing Healthcare Career Interest in Rural Georgia Through Med Camp Programs

Arya Datta, B.A., Carson Edwards, B.S., Seth Johnson, B.S., Be-Atrice Cunningham, MBA., Ali Gheidi, Msc. PhD

Abstract

Background/Objective

Rural counties in Georgia face significant healthcare disparities, due to a shortage of healthcare professionals. This challenge stems from limited resources and exposure to healthcare careers among students. Mercer University School of Medicine (MUSM) addressed these healthcare disparities in rural Georgia by conducting a series of educational workshops targeting middle and high school students in underserved areas across Georgia in the summer of 2025. Outreach events, called "Med Camps", aimed to increase interest in healthcare professions among students from rural areas. The initiative sought to combat the underrepresentation of individuals from these regions by increasing early exposure to healthcare careers, with the hope students will enter the healthcare field and return to serve their rural communities, thus helping address the physician shortage in rural Georgia.

Methods

The program included three in-person events at Berrien High School in Nashville, Georgia, Andrew College in Cuthbert, Georgia, and Atrium Health Navicent's REACH Program in Macon, Georgia. Each Med Camp featured interactive, hands-on workshops on topics such as CPR, vital sign training, and sheep brain dissection, while including educational sessions on various healthcare-related subjects. Students completed an optional post-event survey to assess changes in their knowledge and interest in healthcare professions.

Results

The survey results were highly positive, with 100% of respondents reporting an increase in their knowledge of healthcare career options. Furthermore, 81% of the students expressed a greater interest in pursuing a healthcare career after participating in the program.

Conclusion

These findings suggest short-term, targeted outreach interventions can effectively enhance awareness and enthusiasm for healthcare professions among students in rural areas who may lack access to healthcare education or mentorship. While the absence of a pre-survey limits the ability to quantify baseline knowledge, the results demonstrate the significant potential of early healthcare exposure in addressing workforce shortages in rural communities.

Macon – 21

Shoulder Arthroplasty Outcomes Using Glucagon-Like Peptide-1 Receptor Agonists: A Systematic Review

Kha Minh Kami P. Nguyen, MSE; Emily N. Jones, MS; Vincent Lee, BS; Ramtin Doroodchi, BS; John S. Avant, BA; Tyler Overbeek, BS; Brent A. Ponce, MD

Abstract

Background and Objective:
Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are increasingly prescribed for both glycemic control and weight loss, particularly in patients undergoing total joint arthroplasty. While studies on total hip and knee arthroplasty suggest potential perioperative benefits, the impact of GLP-1 RA use on outcomes following total shoulder arthroplasty (TSA) is unclear. Given the unique biomechanical demands of TSA, rising TSA volumes, and increasing GLP-1 RA use, this systematic review aims to evaluate the current literature on the impact of GLP-1 RA therapy on postoperative outcomes in TSA patients.
Methods:
A systematic search of PubMed, Embase, and Scopus was conducted through July 26, 2025, in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Studies were included if they evaluated postoperative outcomes in TSA patients prescribed GLP-1 RAs. Data extracted included study design, population characteristics, matching strategy, outcomes measured, and main findings. Four retrospective case-control studies met inclusion criteria, representing a total of 7,406 TSA patients prescribed GLP-1 RAs. All studies utilized large national databases (TriNetX and PearlDiver).
Results:
Two studies found no increase in postoperative complications among GLP-1 RA users; one demonstrated improved outcomes, including lower mortality and reduced rates of surgical site infection, pneumonia, and cardiac events, while one study reported higher rates of adverse events, including deep vein thrombosis, myocardial infarction, and readmission. Differences in findings were attributed to variation in patient populations (e.g., diabetic vs. obese), medication timing, and outcome definitions.
Conclusion:
The current evidence on GLP-1 RA use in TSA is limited and mixed, with some studies suggesting benefit and others indicating potential risks. As the use of GLP-1 RAs becomes more widespread among TSA candidates, further prospective research is needed to clarify optimal perioperative protocols, assess patient selection, and evaluate long-term outcomes.

Macon – 22

Improving Prenatal (Maternal) Care Access in Georgia Through Mobile Health Units

Alexander Gomez, B.S.

Abstract

Background and Objective:
Georgia continues to rank among the states with the highest maternal mortality rates in the United States, with rural mortality 2.5 times higher than urban rates. More than 35% of Georgia counties are designated as maternity care deserts, and 82 counties have no practicing OB/GYNs. Over 150,000 women of reproductive age live in areas with limited or no access to prenatal and maternal services. These disparities are compounded by hospital closures, Medicaid restrictions, systemic barriers, and provider shortages, all of which limit timely prenatal care and increase preventable maternal deaths. The objective of this study is to evaluate whether mobile maternal health units, when paired with telehealth, can provide an effective and sustainable solution to expand access, improve outcomes, and reduce disparities in Georgia's underserved communities.
Methods:
Studies from both global and U.S. contexts were reviewed to determine how mobile maternal health units influence prenatal access, early engagement in care, antenatal attendance, and maternal-child outcomes. Caregiver satisfaction and implementation feasibility were also assessed to guide adaptation for Georgia's needs.
Results:
Mobile units were associated with earlier prenatal visits, improved birth outcomes, and higher caregiver satisfaction. Integration of telehealth services further reduced travel and healthcare costs. Ongoing challenges include provider shortages, licensure restrictions across counties, and limited broadband access in rural areas.
Conclusion:
Mobile maternal health units represent a cost-effective and scalable strategy to strengthen Georgia's maternal health system. By reaching high-need communities directly, they can reduce geographic inequities, ease hospital burden, and provide timely, patient-centered care that improves both maternal and neonatal outcomes.

Macon – 23

Increasing Cervical Cancer Screening with At-Home Pap Kits: Barriers and Facilitators in Rural Populations

Madison Martin, Dr. Anne Montgomery, Ms. Samantha Johnson

Abstract

Background and Objective

Cervical cancer is highly preventable with regular screening, yet women in rural Georgia face disproportionately low screening rates and higher mortality. More than 60 counties lack a practicing OB/GYN, limiting access to Pap smears and delaying diagnosis. At-home HPV self collection kits provide a promising alternative, offering privacy, convenience, and accuracy comparable to clinician-collected samples. This project examined barriers and facilitators to implementing at-home kits in rural Georgia.

Methods

Literature review of clinical trials, national guidelines, and state-level screening data was combined with analysis of rural health system barriers. Program models from Appalachia and Texas were evaluated, and stakeholder insights from providers and community health workers informed recommendations.

Results

Barriers included digital illiteracy, limited internet access, low awareness of self-sampling, and mistrust of the healthcare system. Systemic challenges involved laboratory reporting, follow-up coordination, and referral pathways for HPV-positive results. Facilitators included high patient acceptability (94% preference for self-sampling), cost-effectiveness ($50–$80 per kit), and opportunities for distribution through public health departments, free clinics, and Medicaid. Incorporating community health workers, patient navigation, and phone-based registration options enhanced accessibility and follow-up.

Conclusion

At-home HPV self-collection kits address major access barriers for cervical cancer screening in rural Georgia. Successful implementation depends on coordinated efforts across public health systems, providers, and community organizations to ensure equitable distribution and timely follow-up. This model has the potential to reduce preventable deaths, improve early detection, and advance reproductive health equity in underserved populations.

Macon – 24

Assessing Primary Care Providers' Attitudes Before and After Adoption Competency Training in One Rural Georgia County

Chloe Pate, Gracie White, Dr. Betsy Smith

Abstract

Background

This study aimed to evaluate primary care providers' attitudes toward adoption and adoption care services in Tift County, Georgia. The primary objectives of this study were to increase PCPs competency of adoption care services benefiting the underserved populations of Tift County. The specialties included in this study were Internal Medicine, Family Medicine, OBGYN, and Pediatrics.

Methods

During the study, we provided a pre-training anonymous survey through GoogleForms to providers in Tift County to ascertain their views, attitudes, and current competency to connect their patients with adoption care services. Covenant Care Adoptions, a non-profit adoption care agency, then offered a medical provider based adoption training course via a pre-recorded video. The training was completed in a single session lasting 45 minutes. Lastly, we re-administered the original survey post-training to reassess providers' attitudes towards adoption and how they may have changed.

Results / Conclusions

18 providers were contacted and given the opportunity to participate and only 9 chose to participate. Because of the small sample size, statistical analysis methods were not effective at summarizing the results. 55.6% of providers in the study indicated that they had encountered a patient seeking adoption services at least once per year in their practice. In addition, 7 of the 9 individuals who participated stated that they had never received adoption competency training before, which emphasizes the great need for growth in this field. Out of the 16 total possible responses generated from the pre or post survey responses, statistically significant differences were produced from the responses of 5 out 10 survey questions. Statistically significant differences were displayed in the responses for survey questions evaluating provider confidence in being able to answer patient questions regarding adoption and in being able to describe the differences in the terms of open, closed, and semi-open adoptions.

Macon – 25

Building Georgia's Rural Physician Workforce: Insights from Mercer University's Pathway Programs

Ravi Patel, Be-Atrice Cunningham

Abstract

Background and objective:
Rural Georgia communities continue to face persistent workforce shortages and limited access to primary care. Mercer University School of Medicine (MUSM) was founded with the mission of educating physicians to serve these communities. MUSM Pathways (e.g., Med Camps, 4-H collaborations, Setting Your Sights on Medical School, shadowing, and "Doctor for a Day") provide early, hands-on exposure, mentorship, and clear roadmaps into health careers. The objective of this study was to evaluate participation trends and program outcomes to assess the impact of Pathways initiatives on the rural physician pipeline.
Methods:
Program evaluation data were compiled from multiple MUSM Pathways initiatives (2012–2025), including student surveys, county-level participant information, and admissions data. Descriptive analyses assessed proportions of rural vs. urban participants, participant satisfaction, and commitment to health careers. Visualization included line graphs of MUSM admissions by geography and bar charts of rural vs. urban program participation. Open-ended survey feedback was analyzed to identify impact and opportunities for program enhancement.
Results:
Across programs with county-level data, >80% of participants were from rural counties. SYSMS (83% rural) and 4-H programs (82% rural) showed the strongest rural reach, while virtual camps drew more diverse participants. MUSM admissions data demonstrated a steady rise in rural matriculants between 2012 and 2024. Program evaluations indicated that >90% of students reported increased healthcare knowledge and interest in pursuing medical careers. Students consistently requested more hands-on experiences (e.g., interactive manikins, specialty exposure) alongside the strong mentorship provided by medical students and faculty.
Conclusion:
MUSM Pathways strives to engage rural students and strengthen the physician pipeline for underserved areas. Findings support expanding interactive, skills-based learning opportunities, broadening specialty exposure, and reinforcing partnerships with rural schools and community colleges. These initiatives align with MUSM's mission and may serve as a model for other medical schools committed to addressing rural health workforce shortages.

Macon – 26

Assessing Primary Care Providers' Attitudes Before and After Adoption Competency Training in One Rural Georgia County

Gracie White, Chloe Pate, Dr. Betsy Smith

Abstract

This study aimed to evaluate primary care providers' attitudes toward adoption and adoption care services in Tift County, Georgia. The primary objectives of this study were to increase PCPs competency of adoption care services benefiting the underserved populations of Tift County. The specialties included in this study were Internal Medicine, Family Medicine, OBGYN, and Pediatrics.

During the study, we provided a pre-training anonymous survey through GoogleForms to providers in Tift County to ascertain their views, attitudes, and current competency to connect their patients with adoption care services. Covenant Care Adoptions, a non-profit adoption care agency, then offered a medical provider based adoption training course via a pre-recorded video. The training was completed in a single session lasting 45 minutes. Lastly, we re-administered the original survey post-training to reassess providers' attitudes towards adoption and how they may have changed.

18 providers were contacted and given the opportunity to participate and only 9 chose to participate. Because of the small sample size, statistical analysis methods were not effective at summarizing the results. 55.6% of providers in the study indicated that they had encountered a patient seeking adoption services at least once per year in their practice. In addition, 7 of the 9 individuals who participated stated that they had never received adoption competency training before, which emphasizes the great need for growth in this field. Out of the 16 total possible responses generated from the pre or post survey responses, statistically significant differences were produced from the responses of 5 out 10 survey questions. Statistically significant differences were displayed in the responses for survey questions evaluating provider confidence in being able to answer patient questions regarding adoption and in being able to describe the differences in the terms of open, closed, and semi-open adoptions.

Macon – 27

Design and Validation of a 3D-printed Cost-Effective Thoracostomy Simulator

Autumn Young1, Ethan Guest1, Priya Patel2 , Oladipo Sonuga2, Meshwa Patel2, Michael A. Marcoux2 , Joanna Thomas2 , Robert Sarlay1 , Yahya A. Acar1
1Mercer University School of Medicine
2Mercer University School of Engineering, Biomedical Engineering Department

Background and Objective

Thoracostomy is a critical intervention for the management of pleural space pathologies. Simulation-based education offers a safe environment to practice these skills, yet commercially available models are often costly and lack anatomical realism. The goal of this collaborative project between Mercer School of Medicine and Mercer School of Engineering is to design a 3D-printed low-cost thoracostomy simulator and conduct a validation study for its use in physician education and training.

Methods

The simulator's base and intercostal spaces were 3D printed to replicate relevant chest wall landmarks and ribs pacing. To simulate the soft tissue layers, textured vinyl was hot glued to a picture frame and coated with Ease Release® 200. A mesh layer was added and secured, followed by the incremental application and curing of pigmented Ecoflex® 00-30 to create the dermis. The fat layer was simulated using Ecoflex® Gel tinted with yellow pigment, and the muscle layer was constructed with a blood-pigmented Ecoflex® 00-30. Each layer was sequentially poured, stippled, and cured to achieve realistic thickness and texture, then trimmed to fit the 3D-printed intercostal space. Multiple simulators were produced for educational use. To assess the simulator's effectiveness, a survey was developed based on literature review and adapted from existing validated tools.

Results

The project team developed a cost-effective, anatomically accurate thoracostomy simulator using a hybrid approach of 3D printing and silicone molding. The evaluation phase is currently in progress, with data collection and analysis forthcoming. The survey, hosted on Qualtrics, will gather feedback from residents regarding the simulator's realism, education value, and utility in thoracostomy training. Survey approval is pending, and a sample group is being recruited for the validation study.

Conclusion

By improving procedural competence in a risk-free environment, such simulators have the potential to enhance patient safety and standardize thoracostomy training for medical trainees.

Clinical

Macon – 28

Innovations in Medicine and Engineering for Infectious Disease Aircraft Transport

Seth McDonald, Cuyler Morris, Mike Flueckiger, MD, and Larry Nichols, MD

Abstract

Background and Objective
Transporting patients with highly infectious diseases poses major challenges, particularly during long international flights. Critical care in an aircraft requires safe delivery of medications, ventilatory and cardiac support, fluid management, and containment of infectious waste, all while protecting crew. This study describes the development and outcomes of the first air-certified, negative-pressure isolation system deployed during the 2014 Ebola outbreak.
Methods
A U.S. based air service created a negative-pressure isolation system featuring reversed cabin airflow, dual HEPA filtration, and a self-contained isolation capsule. Phoenix Air transported patients from West Africa to specialized centers in the U.S. and Europe. Operational considerations included diplomatic clearance, aircraft decontamination, and adaptation of in-flight critical care for high-acuity patients.
Results
Over 20 confirmed or suspected Ebola patients were transported without a single in-flight transmission. The system ensured strict biocontainment while allowing full patient access. Following its success, the model was adapted to support a broader range of patients, including those requiring high-flow oxygen, neonatal incubators, and ECMO. It has since been applied to transport individuals with COVID-19, Lassa fever, and extensively drug-resistant tuberculosis.
Conclusion
Airborne biocontainment systems have transformed global medical evacuation, enabling safe transoceanic transport of critically ill patients while preventing transmission. These operations highlight the essential role of engineering and clinical innovation in meeting the challenges of infectious disease outbreaks.

Macon - 29

Beyond the Biopsy: Genetic Testing as a Diagnostic Lifeline in Community Medicine

Cuyler Morris B.S.[1] Dr. Rajeev Chauhan M.D.[2], Dr. Tamorie Smith M.D.[2], Dr. Ann George M.D.[3], Simran Patel B.S.[4]

[1]Mercer University School of Medicine
[2]Renal Associates, LLC 6228 Bradley Park Dr, Columbus, GA 31904
[3]St. Francis-Emory Healthcare, 2122 Manchester Expy, Columbus, GA 31904
[4] 1633 1st Ave, Columbus, GA 31901

Abstract

Background and Objective

Chronic kidney disease (CKD) is often attributed to more common etiologies such as hypertension and diabetes. However, rare genetic causes are frequently overlooked in the practice of community medicine. Inadequate kidney biopsy sampling, particularly with the absence of diagnostic cortical tissue, can delay the diagnosis of glomerulopathies. The objective of this case study highlights the role of genetic testing as an imperative adjunct in uncovering Fabry disease in a patient initially thought to have hypertensive nephropathy.

Methods

We present a retrospective analysis case study of a 49-year-old African American man with hypertension, hyperlipidemia, and a history of NSAID use that was referred for progressive renal insufficiency and nephrotic proteinuria. A percutaneous kidney biopsy was performed and revealed only non-diagnostic medullary tissue, precluding histopathologic diagnostic evidence. Genetic testing was subsequently undertaken after continued renal decline.

Results

Next-generation sequencing identified pathogenic variants in GLA and COL4A5, establishing Fabry disease and Alport syndrome, along with APOL1 heterozygosity. Enzyme activity assays confirmed absent alpha-galactosidase A function accompanied by an elevated Gb3 level. Although enzyme replacement therapy with agalsidase beta was initiated, therapy was delayed by 11 months due to the nondiagnostic biopsy. During this interval, renal function declined from an estimated GFR of 15 mL/min to 6 mL/min, necessitating referral for transplantation.

Conclusion

This retrospective analysis highlights two central lessons for community nephrology. First, biopsy specimens lacking cortical tissue provide limited diagnostic value and may misdirect management. Second, genetic testing can establish the etiology of CKD when standard approaches fail, allowing for earlier initiation of targeted therapy. Broader integration of genetic diagnostics, alongside improved biopsy technique, may prevent avoidable delays in treatment and mitigate progression in patients with rare genetic nephropathies.

Macon - 30

Pica as a manifestation of stress and anxiety

Darquis Grant, Joshua Dempsey

Abstract

Background and Objective

This case report describes a man in his forties with pica, major depressive disorder, anxiety, and iron deficiency anemia. Pica involves ingestion of non-nutritive substances and is often associated with nutritional deficiency or intellectual disability. Such ingestion may cause gastrointestinal obstruction, ulceration, or infection. Our patient presented with ingestion of leather, vinyl, and sponges as a coping mechanism for stress and anxiety. An esophagogastroduodenoscopy (EGD) failed to retrieve foreign material, necessitating gastrotomy.

Methods

A complete blood count and a comprehensive metabolic panel were performed to assess for anemia and metabolic abnormalities. Cross-sectional imaging with CT of the abdomen and pelvis was obtained to localize foreign material and evaluate for complications. An echocardiogram was also performed to assess cardiac status. Endoscopic evaluation with EGD was attempted to remove the foreign bodies; however, removal was unsuccessful, he ultimately required gastrotomy for extraction.

Results

The esophagus was normal. Multiple non-bleeding gastric ulcers were identified, the largest measuring 15 mm, along with foreign bodies in the gastric body. The patient reported no recollection of ingestion. A urine drug screen was positive for amphetamines, opiates, and cannabis. On psychiatric evaluation, he admitted to a one-year history of sponge ingestion as a coping response to depression and anxiety, particularly related to estrangement from his children.

Conclusion

The patient was diagnosed with pica, major depressive disorder, anxiety, and polysubstance use. While pica is typically described in pediatric populations or adults with intellectual disability, this case demonstrates onset during a depressive episode in an adult. He was counseled on SSRI therapy and psychotherapy, with a discharge plan including parental supervision to reduce access to sponges but was lost to follow-up. This case highlights the need for clinicians to consider unusual eating behaviors in adults presenting with mood disorders or GI complaints in addition to the psychiatric underpinnings of pica.

Macon - 31

Examining Racial Disparities in Home Feeding Tube Choices at Discharge for Infants in the Neonatal Intensive Care Unit

Rachael Aldridge, Eva Proels, Chloe Gray, Kylie Tobey, Joleen Dako

Abstract

Background and Objective

Infants admitted to the Neonatal Intensive Care Unit (NICU) often experience feeding difficulties, frequently requiring enteral support with either gastrostomy tubes (GT) or nasogastric tubes (NGT). While GT placement has been linked to increased emergency room visits compared to NGT, there are no standardized guidelines for tube selection, and practices vary widely.

Methods

This was a retrospective chart review of infants admitted from July 1st, 2021, to July 31st, 2024, and discharged from a level III NICU with tube feedings. Infants transferred to the hospital primarily for GT placement were excluded. We reviewed demographics, risk factors for home tube feeding and referrals to the Division of Family and Children Services (DFCS) for social concerns perceived by caregivers. Data was analyzed using Fisher's exact test and independent t-test for bivariate analysis and multivariable logistic regression was used when controlling for potential confounding variables.

Results

Of the 216 infants included in the study, 51.9% identified as Black, 41.7% identified as White and 6.4% identified as Asian/Other/Unknown race. 42.1% were discharged home with NGT and 57.9% were discharged home with GT. Of those discharged with GT, 64.8% were Black ($p<0.001$), and of those discharged with NGT, 59.3% were White ($p<0.001$). Black race was associated with Bronchopulmonary Dysplasia (BPD), ($p=0.004$), lower birth weight ($p =0.013$) and more female infants ($p=0.009$). Infants discharged home with GT were more likely to have severe intraventricular hemorrhage (IVH) ($p=0.034$) and bronchopulmonary dysplasia (BPD)($p=0.001$). After adjusting for BPD, severe IVH, maternal gestational diabetes, gender, referrals to DFCS and birth weight, Black race and BPD were significant predictors for home GT with Black race being the stronger predictor (aOR =3.02; 95% CI 1.64 – 5.55).

Conclusion.

We observed a racial disparity in the type of tube feeding for infants with home tube feeds. Further research is needed to understand this disparity and guide equitable, evidence-based decisions.

Macon - 32

Evaluation of Anti-Xa-Based Enoxaparin Dose Adjustment in Trauma Patients

Dr. Ashley Jones, Dr. Dennis Ashley (Presented by Jaliah Allen, BS)

Abstract

Background:
Venous thromboembolic events (VTE), including deep vein thrombosis (DVT) and pulmonary embolism (PE), are significant causes of morbidity and mortality in trauma patients. Without prophylaxis, the incidence of DVT in this population can exceed 50%, underscoring the need for effective prevention. Low molecular weight heparins (LMWH), particularly enoxaparin, are widely used for VTE prophylaxis due to their safety profile and ease of administration. Trauma patients often demonstrate altered pharmacokinetics related to hypermetabolism, renal clearance, and obesity, which can result in subtherapeutic anti-Xa levels with standard dosing. Weight-based dosing and anti-Xa monitoring have been proposed to improve prophylactic efficacy. The purpose of this study is to evaluate the frequency of enoxaparin dose adjustments in trauma patients receiving weight-based enoxaparin with anti-Xa monitoring.

Methods:
This is a retrospective review of trauma patients ≥15 years old admitted between August 2021 and March 2025 at an urban level 1 trauma center. Patients received enoxaparin prophylaxis with weight-based dosing (>90 kg: 0.5 mg/kg BID from January 2018–June 2022; BMI >30: 0.5 mg/kg BID from July 2022–March 2025). Peak anti-Xa levels were obtained 4–6 hours after at least three consecutive doses. Levels outside this window or before three doses were excluded. The target range was 0.1–0.3 IU/mL, and doses were adjusted ±10 mg until the therapeutic range was achieved.

Results:
Of 15,485 patients screened, 5,912 met the inclusion criteria. To date, 3,211 charts have been reviewed, with 348 meeting final inclusion criteria. Most patients had initial anti-Xa levels outside the target range and required dose adjustment. Length of stay ranged 1–88 days. No DVT or PE events have been observed.

Conclusion:
Preliminary data support routine anti-Xa monitoring to optimize enoxaparin prophylaxis. Data collection and analysis are ongoing.

Macon – 33

Reducing RSV Hospitalizations in Infants: Barriers and Facilitators to Maternal Vaccination and Infant Monoclonal Antibody Use

Abigail Doorley

Abstract

Background and Objective

Respiratory syncytial virus is the leading cause of hospitalization among infants in the United States, with the highest burden among infants under six months. In 2023, two prevention strategies were introduced: Abrysvo, a maternal RSV vaccine administered 32-36 weeks gestation, and Beyfortus (nirsevimab), a monoclonal antibody given to infants after birth. Both interventions have demonstrated substantial reductions in RSV-related hospitalizations, yet, uptake remains suboptimal, particularly in Georgia's rural counties.

Methods

This project analyzed epidemiologic and implementation data from recent RSV seasons, national coverage estimates, and cost-effectiveness models to evaluate maternal vaccination and infant monoclonal antibody administration. Barriers and facilitators influencing uptake of these products were assessed considering patient hesitancy, private practice limitations, logistical constraints, and health system infrastructure in rural Georgia.

Results

Rural areas historically demonstrate lower maternal vaccination rates for influenza and Tdap, and early data suggest that RSV vaccine uptake is likely to follow a similar trend. In 2024-25, infant Beyfortus use in Georgia was well below national averages despite national preference for Beyfortus use over maternal vaccination. Barriers include parental hesitancy, limited provider stocking due to high upfront costs, and narrow vaccination windows. Cost analyses show broader uptake could reduce RSV-related expenditures by up to $368 million annually, primarily through decreased hospitalizations. Provider recommendation strongly influences uptake, while opt-out EMR orders and on-site vaccine availability increased uptake by >50%. Additionally, expanding Beyfortus access at birth through the Order Replacement Model within Vaccines for Children enrolled hospitals can reduce the administration burden and improve timeliness particularly for in rural hospitals.

Conclusion

Despite the availability of highly effective RSV prevention tools, uptake in Georgia remains low, particularly in its rural areas. Among available interventions, opt-out EMR orders, on-site vaccination, and expanded VFC enrollment represent high impact, scalable strategies that leverage existing infrastructure and are well-suited for Georgia's under-resourced rural hospitals. As the upcoming RSV season approaches, successful protection of infants will further depend on system-wide coordination, equitable funding distribution, and removing logistical and behavioral barriers to uptake.

Macon – 34

Assessing Patient Compliance in Postoperative Outcome Surveys Across Orthopaedic Subspecialties

Garrett Jebeles[1], LaMiah Hall, MD[1], Simon Lalehzarian, MD[1], Tyler Kelly, MD[1], Binam Shrestha, MD[1], Payal Gupta, MD[1], Damon Dunwody[2], Ashish Shah, MD[1]

[1] University of Alabama Birmingham
[2] Mercer University School of Medicine

Abstract

Background and Objective:

The current study analyzes compliance rates amongst six orthopaedic subspecialties and identifies patient factors which may contribute to lower response rates.

Methods:

Retrospective review was performed from July 2020 to December 2024. Patient compliance rates were compared preoperatively, at 6 months, and 1 year postoperatively. Statistics were performed by a biostatistician using SAS ® software (version 9.4).

Results:

Adults between 65 and 85 were more likely to complete their surveys compared to younger individuals aged 19-44 (41.3% vs. 31.03%). Female patients showed greater compliance at 40.45% compared to males at 35.55%. Trauma had the lowest compliance rate at baseline, six months, and one year.

Conclusion:

The orthopaedic subspecialty of trauma has the lowest compliance rate for patient surveys. Patient factors such as male sex and younger age may contribute to lower completion rates.

Macon – 35

Disseminated EBV-Associated PTLD Following Lung Transplantation: An Autopsy Case Report

Sarah Holder, Josh Bellflower, Henna Iqbal, Larry Nichols

Abstract

Background

Post-transplant lymphoproliferative disorder (PTLD) is a serious, sometimes fatal complication of transplantation. It results from immunosuppressive therapy that weakens T-cell mediated immune surveillance and allows unchecked proliferation of lymphoid cells. PTLD most often arises from Epstein-Barr virus (EBV)-infected B cells. Over 90% of adults have B cells with latent EBV infection, consequently, most donor organs contain EBV infected B-cells, and EBV-negative organ transplant recipients must receive an organ from an EBV-positive donor. Co-existing medical conditions and other post-transplant complications can obscure the presence of PTLD and make its diagnosis challenging.

Methods / Results

This is the case of an EBV-negative 59-year-old woman with a history of idiopathic pulmonary fibrosis (IPF) who underwent an EBV mismatched single-lung transplant. Her post-transplant course was marked by chronic nausea, vomiting and diarrhea, periods of persistent coughing despite antibiotic therapy, and pulmonary infection with Aspergillus fumigatus, progressing to refractory septic shock, multi-organ failure, and death 11 months following transplantation. Although donor-origin PTLD is typically confined to the allograft, autopsy in this case revealed widespread, multi-organ involvement by EBV-positive PTLD.

Conclusions

This case highlights the serious risk of PTLD in transplant recipients, underscores the importance of EBV surveillance, and emphasizes the need for timely diagnosis and management of this complication.

Macon – 36

Malignant Pleural Effusion as an Initial Manifestation of Gastrointestinal Malignancy: A Diagnostic Challenge

Adam McHugh, MS, BS; Olivia Johnson, BS

Abstract

Background:
Malignant pleural effusion (MPE) is a common complication of advanced malignancy and typically arises in patients with known metastatic disease, most often from lung or breast primaries. Gastrointestinal cancers are an uncommon source, and diagnosis can be delayed when no prior history of cancer is documented.

Case:
We report a patient with no known history of malignancy who presented with nonspecific symptoms and multiple abnormalities on admission. Despite extensive evaluation, the diagnosis of MPE was delayed until thoracentesis confirmed malignant cells of gastrointestinal origin. The patient rapidly deteriorated and died shortly thereafter.

Conclusion:
This case highlights the diagnostic challenge of MPE in patients without a known cancer diagnosis and the importance of an extensive workup upon presentation. Although earlier recognition would not have altered the fatal outcome, the detailed workup underscores an important clinical lesson: thorough follow-ups are still warranted upon unusual case presentations, especially in this case, where an unexplained pleural effusion, particularly in the absence of cardiac or infectious etiologies, warranted an early diagnostic thoracentesis resulting in an unthinkable diagnosis. Awareness of this presentation may improve timely diagnosis and counseling in similar cases.

Macon – 37

SMART Syndrome: When Cartoons Come To Life

Morgan Mathis MS4, Taylor Ramirez MD, David Mathis MD

Abstract

Background

Stroke-like migraine attacks after radiation therapy (SMART) syndrome is a rare, delayed complication of prior cranial irradiation. Clinical presentation is variable and may include headaches, seizures, stroke-like symptoms, visual disturbances, aphasia, and altered mental status. Symptoms begin years after radiation and often resolve within weeks. The exact pathophysiology remains unclear, but proposed mechanisms include radiation-induced endothelial injury and vasculopathy, leading to blood-brain barrier disruption, edema, and vascular remodeling. This abstract presents the case of a 53-year-old Caucasian male with a history of childhood cerebellar tumor, now presenting with recurrent headaches and visual disturbances.

The patient came to the emergency department with severe right periorbital pain lasting five hours and visual disturbances described as blurry, foggy vision where everyone appeared animated. Neurological examination showed a left visual field deficit, right lateral gaze nystagmus, and broad-based gait. The remainder of his exam and blood work were Unremarkable.

The patient had undergone posterior fossa tumor resection with radiation at age eleven. Previous imaging had shown stable meningiomas deemed unrelated to his symptoms. MRI on admission revealed enhancement of the right occipital lobe, with meningiomas unchanged.

Alternative diagnoses including stroke, transient ischemic attack, seizures, encephalitis, tumor recurrence, and migraine variants were excluded. A presumptive diagnosis of SMART syndrome was made.

Conclusion

Careful history-taking and awareness of long-term radiation sequelae are essential for timely diagnosis and management. Treatment is supportive with corticosteroids, anticonvulsants, verapamil, and aspirin. This patient received intravenous methylprednisolone followed by a taper, plus verapamil and aspirin, with complete resolution at four-week follow-up.

Biomedical

Savannah – 1

Impact of Stress on Aromatase Interacting Partner in Breast (AIPB) Expression and Estradiol (E2) Synthesis in Triple-negative (Er-/Pr-/Her2-) Breast Cancer

Lauren K. Kogan, Daniel M. Pham, and Himangshu S. Bose

ABSTRACT

Among the different forms of cancer, breast cancer is a major cause of death in women at any age. According to WHO, worldwide 2.3 million new cases of breast cancer were diagnosed in 2023 with a death of 800K. A specific enzyme, Aromatase, expressed in many tissues, but catalyzes testosterone to estradiol in adrenal and ovaries (gonads for men). Estradiol level is increased during tumorinesis and after menopause. Endocrine receptors nurture tumorigenesis, including the estrogen receptor (ER+), progesterone receptor (PR+), and human epidermal growth factor receptor 2 (HER2+). Triple-negative breast cancer (TNBC) lacks aromatase enzyme. Our lab identified a new 22-kDa protein, Aromatase-Interacting Partner in Breast (AIPB), in both nontumorigenic and tumorigenic breast tissue. AIPB is not transcriptionally regulated or hormonally stimulated and mostly localized in the mitochondria associated-ER membrane (MAM). Our preliminary results showed increased AIPB expression during acute stress with a reduction in estradiol synthesis. We hypothesize that AIPB independently synthesizes estradiol in TNBC. The TNBC (MDA-MB-231) cells were stressed from 15 - 35 minutes in the presence and absence of estrogen agonist, Zeranol. Following stress, the cells were regrown for an additional 24 hours with or without stimulation and determined the change in AIPB and HSP70 expression by western blotting, and activity by radioimmuno assay. We observed a 2-3 folds increase in AIPB expression and 50% reduction in estradiol synthesis with Zeranol-stimulated or stressed cells compared to unstimulated or untreated one. HSP70 had no chaperonic activity in AIPB expression or activity. In summary, AIPB independently synthesizes estradiol in breast cells and its expression is directly induced by stress and Zeranol. We conclude AIPB is possibly a new biomarker in triple negative breast cancer.

Savannah – 2

Targeting Obesity – Induced Ephrin - B2 Reduces Melanoma Growth

Anjali Patel, JT Belflower

Abstract

Melanoma is an aggressive skin cancer with high metastatic potential, and its incidence has been rising globally. Obesity has been epidemiologically linked to increased melanoma risk and progression, in part through enhanced angiogenesis within the tumor microenvironment. Our group previously demonstrated that obesity increases vascular expression of Ephrin-B2, a ligand for the EphB4 receptor tyrosine kinase that promotes melanoma tumor growth. The objective of this study was to test whether pharmacologic inhibition of Ephrin-B2 using EphB4-Fc could reduce melanoma growth in obese conditions. Obesity was induced in C57 bL mice by feeding a high-fat diet for 26 weeks. B16 melanoma cells were injected subcutaneously, and tumor growth was monitored for 14 days. Tumor samples were analyzed for vascular density and vessel morphology by immunohistochemistry. In vitro, B16 melanoma cells were cultured under normal (5 mM) or high glucose (25 mM) conditions to mimic obesity and treated with EphB4-Fc. Cell migration assays and western blot analyses were performed to assess vascular and inflammatory markers (RAGE, Ephrin-B2). Obese mice developed significantly larger melanoma tumors compared to lean controls. Pharmacologic inhibition of Ephrin-B2 with EphB4-Fc markedly reduced tumor size in obese mice ($p<0.05$). Histological analysis showed reduced vascular density and vessel diameter in treated tumors ($p<0.05$). In vitro, high glucose conditions increased melanoma cell migration and expression of inflammatory markers, while EphB4-Fc treatment significantly suppressed these effects ($p<0.05$). Obesity enhances melanoma progression through Ephrin-B2–mediated angiogenesis and inflammation. Pharmacologic blockade of Ephrin-B2 with EphB4-Fc reduces tumor growth, vascularization, and inflammation, supporting Ephrin-B2 as a promising therapeutic target for melanoma in obese patients.

Savannah – 3

Cardiovascular Toxicity of Poly (ADP-ribose) Polymerase Inhibitors (PARPis) in Mice

John Belflower, MS2; Kaitlyn Vu, MS3; Anjali Patel, MS2; Parker Hilliard, MS3; Veronica Hermanns, BSS; Ilana Chefetz, PhD; and Mohammed Abdelsaid, RPh, PhD

Abstract

Background and Objective

Ovarian cancer is the 6th leading cause of cancer-related deaths among women in 2024. Platinum-based compounds are effective against solid-tumor cancers but cause severe cardiovascular adverse effects that hinder their therapeutic use. Recently, poly (ADP-ribose) polymerase inhibitors (PARPis) have been used as maintenance and in combination therapy for solid-tumor cancers such as ovarian cancer. Yet, the cardiotoxicity of PARPis is unclear and requires further investigation/ This study aims to assess the cardiotoxicity of two clinically used PARPis, Olaparib and Rucaparib. We investigated the effect of PARPis on cardiac fibrosis in mice.

Methods

C57BL mice were treated with varying doses or treatment durations of PARPis. Mice were treated with Olaparib (50 or 200 mg/kg/day for two weeks) and compared to Cisplatin (1or 10 mg/kg/day for three weeks). For treatment duration, mice were treated with either Rucaparib at 150mg/kg/day for 25 or 50 days or Niraparib (duration). Hearts were assessed for fibrosis using Masson's Trichrome stain. Collagen deposition was quantified using ImageJ software.

Results

Dose-response analysis revealed that Olaparib-induced cardiovascular fibrosis was comparable to that induced by cisplatin and significantly greater than in controls. In addition, results showed that Rucaparib and Niraparib significantly increased cardiac fibrosis compared to the controls. Quantification of collagen deposition supported a positive correlation between the longer treatment duration of the PARPis and increased fibrosis.

Conclusion

Our results provided novel evidence that the PARPis, Olaparib, Rucaparib, and Niraparib exacerbate cardiovascular toxicity by inducing cardiac fibrosis in mice. Further studies are required to investigate the effects of PARPis on human cardiac muscles and follow us to cardiac function.

Savannah – 4

Testing the Effects of NAD+ Against Mercury Induced Kidney Damage

Emily Birnbaum, Emma Palefsky, Dr. Jong-Hyuk Lee

Abstract

Mercury (Hg) is a common environmental pollutant that is known to be a carcinogen and causes damage in the kidney's proximal tubules. Proximal tubular cells are very important for renal function and require a constant supply of ATP to meet the body's metabolic demands. Mitochondrial function, which relies on nicotinamide dinucleotide (NAD+), must be optimal to create this ATP supply. Mercury induces oxidative stress in these cells and reduces viability. We hypothesized that nicotinamide riboside (NR), an NAD+ precursor, may serve a protective role against this damage. We treated rat and human proximal tubular epithelial cells with a Cys-S-Hg-S-Cys conjugate to test the cytotoxic effect of mercury and potential protective effect of NR. Cellular damage was assessed via PCR and MTT assays. We observed that NR treatment helps to protect renal tubular cells against mercury induced damage.

Savannah – 5

Understanding Mosquito–Virus Interactions to Stop Disease Transmission

Tse-Yu Chen

Abstract

Mosquito-borne viruses, such as dengue virus, pose a serious global health threat, causing an estimated 96 million symptomatic cases and approximately 40,000 deaths each year. My lab aims to understand the interactions between mosquitoes and viruses in order to identify and develop novel mosquito-centric strategies to disrupt transmission. We approach this from multiple angles. First, our single-cell RNA sequencing of virus-infected mosquito midguts has identified galectins, a mosquito gene family, as being strongly influenced during infection. We are investigating whether galectins contribute to viral infection through roles in immunity or metabolism, using both *in vitro* and *in vivo* models. Second, a blood meal introduces a wide variety of host factors that can influence mosquito physiology and viral infection dynamics. By examining how mammalian cytokines alter infection in mosquitoes, we aim to better understand cross-species host–vector–pathogen interactions. Together, these studies will provide fundamental insights into mosquito-virus biology and guide the development of innovative control approaches. By applying small molecules or CRISPR-based genome editing, our ultimate goal is to stop virus transmission through the mosquito.

Savannah – 6

Mechanistic Analysis of Extracorporeal Photopheresis Therapy

Zachary C. Franklin, Sara Temple, Hwamok Choi, Raghavan Chinnadurai

Abstract

Introduction
Hematological malignancies are a major health challenge, and treatments such as myeloablation and allogenic hematopoietic stem cell transplantation are complicated by graft-versus-host disease (GvHD). Extracorporeal photopheresis (ECP), an FDA-approved therapy for GvHD, treats immune cells with the combination of UVA irradiation after treatment with UVADEX (methoxsalen, 8-methoxypsoralen). While effective, the mechanisms of ECP's immunomodulatory activity in the bone marrow are not fully understood. Mesenchymal stromal cells (MSCs), non-hematopoietic stem cells with regenerative and immunoregulatory properties, may influence ECP outcomes. This study investigated the effects of ECP-treated immune cells (PBMCs) on human bone marrow–derived MSCs.

Methods
De-identified leukapheresis and bone marrow filters were used to isolate PBMCs and MSCs, respectively. PBMCs were treated with UVADEX and UVA irradiation, then stimulated with anti-CD3 and anti-CD28 to induce T-cell activation. Activated PBMCs, both ECP-treated and untreated, were co-cultured with MSCs. Then, flow cytometry assessed T-cell viability and activation via CD25, CD69, CD71, and HLA-DR expression.

Results
Our results demonstrated that ECP induced extensive T-cell death and inhibited upregulation of activation markers (CD25, CD69, CD71, HLA-DR). MSCs did not reverse the inhibitory effects of ECP, although a slight protective effect was observed for CD71 expression. These findings suggest ECP exerts a dominant immunosuppressive effect on T-cells, with limited modulation by MSCs.

Conclusion
Our results provide evidence that the MSCs do not reverse the immunosuppressive effect of ECP treatment and thus provide a beneficial advantage of attenuating inflammation in patients with GvHD. Further studies will incorporate molecular genetic responses and genetically diverse donor samples to confirm these findings and further elucidate the interaction between ECP and MSCs. This work contributes to a better understanding of ECP's mechanism of action and its potential for optimizing therapies for GvHD and related immune disorders.

Savannah – 7

Ex vivo investigation of the immunomodulatory fitness of human rectum derived mesenchymal stromal cells

Sadeq Haidari, Sara Temple, Dallas Hunt, Hwamok Choi, Subra Kugathasan, Raghavan Chinnadurai

Abstract

Background and Objective
Mesenchymal stem/stromal cells (MSCs) are being tested/ used as cellular therapy for mitigation of inflammatory and degenerative disorders. Inflammatory bowel disease (IBD) containing both Crohn's disease and ulcerative colitis is a current public health issue, and advanced cell therapies are necessary. Unlike bone marrow derived MSCs, the role of human gut derived MSCs have not yet been tested for mitigation of IBDs. Human gut derived MSCs should be explored for potential cellular therapeutics in mitigation of IBD. To accomplish this the present research was defined to identify the immunobiology of human gut derived MSCs with an aim to identify whether human gut derived MSCs can exhibit immunomodulatory properties on inflammatory T-cells.

Methods
Human gut derived MSCs, isolated from the biopsies of 6 independent individuals, were tested for their immunomodulatory capabilities on human Peripheral Blood Mononuclear Cells (PBMCs). T-cells in the PBMCs were activated with anti-CD3/CD28 antibodies and cocultured with human gut derived MSCs for 4 days. In comparison bone marrow derived MSCs were used as controls. T-cell proliferation was measure by quantifying the expression of Ki67 on CD3+ T-cells using flow cytometry.

Results
Bone marrow derived MSCs dose dependently inhibit T-cell proliferation, as identified with the dose dependent reduction of CD3+/Ki67+ populations in flow cytometry. Similarly, human gut derived MSCs also exhibited a dose dependent inhibition of T-cell proliferation, under identical conditions used for the bone marrow derived MSCs. Across experiments (n=6), both MSC sources consistently shifted the proliferative profile downward relative to activated PBMCs cultured without MSCs.

Conclusion
These results provide evidence and interpretation that human gut derived MSCs possess immunological properties that can essentially stop T-cell mediated inflammation. Thus, warrant further investigation to test their additional immunomodulatory properties and to define their potential application as cellular therapeutics.

Savannah – 8

Hypoxia and Ferroptosis: A Double Hit Driving Pericyte Dysfunction and Pathological Transition in Stroke.

Veronica Hermanns, BS, BA and Mohammed Abdelsaid, PhD

Abstract

Background and Objective
Pericyte regulates cerebral blood flow, promotes blood–brain barrier (BBB) integrity, and orchestrates reparative angiogenesis after stroke. Ferroptosis, an iron-dependent regulated cell death pathway, has been implicated in driving pericyte dysfunction and pathological transition of healthy type-1 pericytes (PC1) into type-2 pericytes (PC2). PC2 are characterized by upregulated expression of inflammatory, BBB-disruptive, and phagocytic genes, as well as enhanced Alpha-smooth muscle actin (α-SMA) expression, all of which worsen stroke outcomes. We proposed that a combined insult of hypoxia and ferroptosis accelerates the PC1-to-PC2 transition and aggravates stroke injury.

Methods
To test our hypothesis, Cre-lox P mice expressing rhodamine red in pericyte underwent a transient ferric chloride/middle cerebral artery occlusion (MCAO) stroke model. Ferroptosis was inhibited in select groups with the iron chelator deferoxamine (100 mg/kg bodyweight) daily for 5 days after stroke. Infarct size, edema, and motor function (grip strength test) were assessed post-stroke. In vitro, human brain pericytes were exposed to hypoxia with or without ferric chloride to induce ferroptosis, confirmed by lipid peroxidation assays. Immunohistochemical studies were used to assess pericyte transition (α-SMA expression), and pericyte dysfunction (BBB integrity, tight junction proteins, and pericyte capillary coverage).

Results
Hypoxia increased ferroptosis-induced PC1-to-PC2 transition, evidenced by elevated α-SMA expression in pericytes ($P<0.05$). The combined hypoxia–ferroptosis insult markedly worsened pericyte dysfunction evidenced by reduced tight junction protein expression, increased BBB permeability, and exacerbated cerebral edema ($P<0.05$). These vascular impairments correlated with worsened motor performance ($P<0.05$). Deferoxamine treatment reversed these pathological changes in both in vivo and in vitro models.

Conclusion
Hypoxia amplifies ferroptosis-driven pericyte dysfunction after stroke, accelerating the PC1-to-PC2 transition and worsening motor function outcomes. Targeting PC transition may offer a novel neurovascular protective strategy in stroke.

Savannah – 9

Responsiveness of Human Gut-Derived Mesenchymal Stromal Cells to Exogenous Cues as Surrogate Markers of Potency

Dallas Hunt, Sara Temple, Sadeq Haidari, Hwamok Choi, Raghavan Chinnadurai

Abstract

Background and Objective

Mesenchymal stromal cells (MSCs) offer promising cellular therapy due to their ability to suppress T-cell activity via expression of immunomodulatory enzymes like indoleamine 2,3-dioxygenase (IDO). While bone marrow-derived MSCs are well characterized, potency of human gut-derived MSCs remains largely unknown. Evaluating responsiveness of human gut-derived MSCs to exogenous cues through IDO expression can serve as a surrogate measure of therapeutic potency. This project aimed to assess immunomodulatory characteristics of human gut-derived MSCs and compare their response to inflammatory stimuli with well-characterized bone marrow-derived MSCs.

Methods

Human rectum-derived MSCs were obtained via biopsy and processed at Mercer University School of Medicine for isolation and expansion. Previously isolated bone marrow-derived MSCs were used as controls. Two stimulation protocols were used: one with increasing concentrations of interferon-gamma (IFN-γ) and tumor necrosis factor-alpha (TNF-α), and one using supernatant from activated peripheral blood mononuclear cells (PBMCs) to simulate an inflammatory microenvironment. After 48 hours, MSCs were harvested and analyzed for intracellular IDO expression using flow cytometry and fluorescence-based gating strategies in FlowJo software to provide quantitative results.

Results

Like published results, bone marrow-derived MSCs do not express IDO in the resting state but upregulate IDO's expression upon stimulation with IFN-γ and TNF-α and activated PBMC supernatant. We identified human gut-derived MSCs do not express IDO in the resting state. However, addition of IFN-γ and TNF-α dose-dependently upregulates IDO expression as identified with percentage of IDO positive MSCs through flow cytometry. We also identified that activated PBMC supernatant upregulates IDO on gut-derived MSCs.

Conclusion

Gut-derived MSCs demonstrated inducible IDO expression in response to pro-inflammatory stimuli, consistent with immunomodulatory behavior of well understood bone marrow-derived MSCs. These findings suggest that IDO expression could serve as the potency marker for gut-derived MSCs and support their potential use as autologous cell therapy for mitigating chronic inflammation.

Savannah – 10

Induction of the UPR Pathway Leads to Upregulation of Carcinogenic Lipid Metabolism Genes

Dr. Jinoh Kim, Dr. Soon Choi, Wes Livingston

Abstract

Background and Objective
The unfolded protein response (UPR) is a cellular stress pathway that enhances the endoplasmic reticulum's (ER) protein folding capacity, limits protein influx into the ER, and promotes clearance of misfolded proteins. Cancer cells exploit the UPR to support survival and growth. In mouse embryonic fibroblasts (MEFs) subjected to ER export blockade, we observed upregulation of multiple lipid metabolism-related genes. Among these, *DGAT2* and *ETNK2* stood out because they are significantly upregulated in several cancers, yet the mechanism underlying their induction remains unclear. Since ER export blockade is expected to activate the UPR, we hypothesized that *DGAT2* and *ETNK2* expression is regulated by the UPR.

Methods
To test this hypothesis, MEFs were treated with DTT, an established ER stress inducer, to activate the UPR. Gene-specific primers were designed, and RT-PCR was performed using mRNA isolated from the treated and control cells.

Findings
DGAT2 and *ETNK2* expression showed a trend toward upregulation following DTT treatment, although the increase did not reach statistical significance across three independent trials.

Conclusion
Our data suggest a potential link between UPR activation and *DGAT2/ETNK2* expression, but additional experiments are required to establish causality. Future studies should aim to identify the specific UPR signaling branch responsible for their regulation in cancer cells. Defining these pathways may uncover novel therapeutic targets, enabling more precise pharmacological interventions to slow cancer progression and improve patient outcomes.

Savannah – 11

FOXD3-Mediated Restoration of p53 Tumor Suppressor Function

William Ian Meeks, B.S.[1], William Harry Yang, B.S.[2], Wei-Hsiung Yang, Ph.D.[1]
[1]Mercer University School of Medicine, Savannah, GA 31404
[2]Medical College of Georgia, Augusta, GA 30912

Abstract

Background
Previous studies have tested small synthetic compounds in an attempt to restore p53 function in cancer patients with mutant p53, but these compounds often cause severe side effects in normal human cells.[1] In the Yang lab, current experiments focus on restoring the tumor suppressor function of mutant p53 using endogenous proteins.

Objective
This study evaluates whether FOXD3, a stem cell regulator identified through extensive screening, can restore mutant p53 activity in a cell-based study.

Experimental Design
We used H1299 p53-null cells and p53 (14X)RE-Luciferase system-based study. Additionally, WT p53 and mutant p53 (G245S and R175H) were tested with and without FOXD3. Stable H1299G245S cells further confirmed FOXD3 effects. Forty-eight hours after plasmid transfection, luciferase activity was measured and normalized by Renilla activity. The samples were then used for Western Blot testing protein presence.

Results
We observed that FOXD3 increased p53 transactivation in H1299 cells 3-5-fold. Next, mutant G245S p53 displayed ~1% p53 activity compared to WT p53. When FOXD3 was introduced with G245S p53, p53 function was restored by 40-50%. However, when FOXD3 was combined with mutant R175H p53 (less than 0.2% p53 activity), p53 function was not restored. Furthermore, FOXD3 enhanced G245S p53 activity in H1299G245S stable cells. Finally, while MDM2 (the major p53 negative regulator) decreased WT p53 transactivation, FOXD3 can partially reverse MDM2-mediated p53 repression, suggesting potential competition between FOXD3 and MDM2 in p53 binding.

Conclusion
FOXD3 significantly restores p53 activation in cells with the G245S p53 mutation. Meanwhile, FOXD3 does not significantly restore p53 activation in the R175H p53 mutation. Future testing is warranted for determining whether FOXD3 increases p53 activity in mutant G245S p53 through stabilization, alternative pathways, or upregulation. Additionally, p53 activation is restored when FOXD3 and MDM2 are co-transfected, suggesting that FOXD3 competes with MDM2. Further testing is needed to determine the competitive relationship FOXD3 and MDM2 share.

Savannah – 12

Investigating p53 Interaction Differences Between Human and Elephantine MDM2

Emma Palefsky, Dr. Wei-Hsiung Yang, Dr. Jong-Hyuk Lee, Jacob Miller

Abstract

Peto's paradox describes the observation that cancer rates are independent of mammal size and lifespan, with some mammals such as elephants having cancer rates lower than humans and other smaller mammals. Gaining an understanding of the mechanisms responsible would offer significant value in the development of novel cancer therapeutics. Previous studies have investigated elephant genomes and found that elephants contained numerous copies of p53 or p53-like genes. Given that p53 is considered "undruggable", we investigated a target upstream in the p53 pathway. We compared elephantine MDM2, a key regulator of p53, to human MDM2 for any differences that could lead to differences in p53 regulation. We identified substitutions at 7 amino acid residues, generated humanized variants containing these substitutions, and assessed their regulation of p53 through various assays. These assays indicated that elephantine MDM2 does not seem to regulate p53 as tightly as human MDM2. One variant, T63A, demonstrated the weakest p53 regulatory ability. We hypothesized that the T63A mutation would cause a decreased physical interaction affinity of MDM2 with p53. Contrary to our expectation, the in vitro binding assay using purified proteins showed that the T63A mutant had a higher binding affinity for p53 than WT MDM2. Although this result requires further validation, it suggest that the reduced regulatory capacity of elephantine MDM2 may arise through mechanisms other than physical interaction. Future studies will investigate potential post-translational modifications of MDM2 that reveal species-specific differences in p53 regulation.

Savannah – 13

Modulation of Cancer Associated Genes by the Unfolded Protein Response

Bhumi Patel MS2, Dr. Jinoh Kim

Abstract

Background and Objective

Cancer cells frequently encounter stressful conditions such as hypoxia, nutrient deprivation, and oxidative damage – situations that would normally induce cell death. To survive, they reprogram the unfolded protein response (UPR), a stress-adaptive signaling network that restores endoplasmic reticulum (ER) homeostasis. This reprogrammed UPR promotes cancer cell survival, therapy resistance, and metastasis. In mouse embryonic fibroblasts (MEFs) subjected to ER export blockade, we unexpectedly observed upregulation of *CASS4* and *PTPRU*, two cancer-associated cell adhesion genes not previously linked to the UPR. Since ER export blockade is expected to activate the UPR, we hypothesized that UPR activation upregulates these genes to support tumor migration.

Methods

MEFs were treated with dithiothreitol (DTT) to induce ER stress. Total RNA was isolated, and RT-qPCR was performed using primers specific for *CASS4* and *PTPRU*.

Results

Contrary to our hypothesis, both *CASS4* and *PTPRU* were significantly downregulated following ER stress.

Conclusion

These results suggest that UPR-mediated regulation of these two adhesion genes is context-dependent and may differ across cancer types or stress conditions. Future studies will investigate how *CASS4* and *PTPRU* influence adhesion and migration under ER stress and whether modulating the UPR could enhance therapeutic strategies against cancer progression.

Savannah – 14

Quantitative TEM Analysis of Hepatic Mitochondrial Morphology in Type 2 Diabetic C57BL/6 Mice

Mahi B. Patel, Veronica C. Hermanns, Mohammed Abdelsaid, Maheshinie Rajapaksha

Abstract

Mitochondria are organelles that frequently alter their shape in response to environmental stress. Through cellular respiration, mitochondria generate ATP while also producing reactive oxygen species that can be harmful in excess. Growing evidence indicated that changes in mitochondrial dynamics are linked to the development of diabetes and other metabolic diseases. However, the exact mechanism of mitochondrial morphology and disease progression remains unknown.

Present study investigates mitochondrial morphological changes in hepatocytes under metabolic stress induced by a high-fat diet (HFD) and type 2 diabetes mellitus (TIIDM) in mice. To test this hypothesis, three groups of mice were examined: mice in the control group were given a regular diet while mice in the experimental groups were fed with a HFD followed by streptozotocin-induced TIIDM. The third group of mice were treated with a GLP-1 receptor agonist, exendin-4 (HFD Ex) as a treatment to maintain blood glucose levels in diabetes. After 8 weeks, liver tissues were harvested, fixed and processed for transmission electron microscopy (TEM). TEM images were collected and mitochondrial morphology – including area, perimeter, length, and width – was quantified using ImageJ software. Statistically significant differences ($p < 0.05$) were observed across all parameters among the three groups, indicating that hepatic mitochondria undergo morphological changes. All parameters were significantly reduced for the HFD group and the appearance of the mitochondrial membrane was fuzzy, suggesting that there is fragmentation between the outer and inner membrane. The HFD mitochondria shrunk in response to HFD induced diabetes. However, when they were treated with exendin-4, significant increase was evident for all parameters. The HFD Ex group had more visible outer and inner membranes compared to the HFD group, suggesting that the mitochondria are not fragmenting. These findings underscore the sensitivity of mitochondrial structure to metabolic stress and highlights its potential role in pathophysiology of TIIDM.

Epidemiological

Savannah – 15

Analysis of Allostatic Load and Adverse Childhood Experiences (ACE's) using NHANES

Benjamin Dozier, Dr. David Hollar

Abstract

Background and Objective
Allostatic load is the measure of cumulative physiological burden on the body through attempts to adjust to life's demands. Adverse childhood experiences (ACEs) are potentially traumatic events representing early adversity, such as abuse or neglect. The effects of ACEs can persist into adulthood. This research sought to examine if allostatic load worsens ACE outcomes.

Methods
This report examined seven measures of AL from the 2021-2023 National Health and Examination Survey (NHANES). The variables included body mass index, systolic and diastolic blood pressure, high-density lipoprotein, total cholesterol to HDL ratio, glycohemoglobin, and C-reactive protein. Most of the NHANES data on adolescents was restricted, so data on mental health and oral health were used for ACEs analysis. For the purposes of examining ACEs in children, the dataset was filtered to include participants age 17 and younger. After applying the age filter, a cross-sectional sample of n = 1,192 people was obtained. Weighted statistical analysis included independent sample t tests, chi-square tests, and linear regression. Statistical analysis used IBM SPSS software.

Results
There were significant differences between all seven AL measures on weighted analysis by t-tests. Chi-square tests were run for ACEs analysis. The type of ACEs reported was different between males and females. Males were more likely to report being misunderstood, whereas females were more likely to report feelings of anxiety or depression. Linear regression of ACEs and AL yielded a Pearson coefficient of .052.

Conclusion
Statistical findings revealed no significant relation between AL and ACEs. The limitations of this research included lack of data. Numerous NHANES cases were missing data needed for measuring ACEs and AL scores. Future research should focus on more comprehensive ACE outcomes in minority and rural populations.

Savannah – 16

Geographic Patterns of Obesity and Arthritis in Rural Georgia

Elizabeth Patel[1], Jacqueline Curtis[2,3]

Affiliations
[1]Mercer University School of Medicine, Savannah, GA
[2] Mercer University School of Medicine, Columbus, Georgia
[3] School of Medicine, Case Western Reserve University, Cleveland, Ohio

Abstract

Background and Objective

Arthritis, and specifically osteoarthritis, has been associated with obesity, largely due to increased mechanical load placed on joints due to elevated BMI. Given this observed association in some studies, as obesity rates increase, arthritis rates are also expected to increase. Therefore, understanding the trends in prevalence and geographic distribution of obesity and osteoarthritis is important for physicians. With this data, they can target their prevention and intervention activities, improve their risk stratification of patients, and provide comprehensive patient-centered care. Therefore, the aim of this study is to describe and visualize these patterns for rural Georgia counties.

Methods

County level prevalence data for arthritis and obesity for Georgia were acquired from the Centers from Disease Control and Prevention (CDC) PLACES. These data were then mapped in QGIS, a Geographic Information System (GIS). Heat maps were created to visualize the geographic patterns in these data. Scatterplots were created in Excel to visualize correlations between obesity crude prevalence rates and arthritis crude prevalence rates.

Results

Obesity is a more widespread issue in Georgia than arthritis. Urban areas have the lowest crude prevalence rates for both obesity and arthritis, while rural counties have the highest. Arthritis prevalence rates are highest in parts of North and South Georgia. However, neither maps not scatterplots indicate a positive linear association as expected.

Conclusions

A majority of rural counties are burdened by arthritis which could be due to social drivers of health and comorbidities as well as lack of access to orthopedic care. It should be noted, however, that there is likely a lag between onset of obesity and symptom burden from arthritis that may result. The data in this study were contemporaneous. Future studies might investigate arthritis rates in a lagged time-period from obesity.

Savannah – 17

Heterogeneity in Vulnerability: LCA of Social Risk and Health Outcomes among U.S. Crop Workers

Josie L. Peebles, Janine Chalk-Wilayto, and Kimberly B. Roth

Abstract

Background
Crop workers in the U.S face significant social vulnerabilities that shape their health outcomes. However, prior analyses of farmworker populations often treat these workers as a uniform population. This study uses Latent Class Analysis (LCA) to uncover hidden subgroups within the farmworker community and examine disparities in chronic health conditions across these groups.

Methods
After searching the literature on social vulnerability in farmworkers, we selected 21 indicators from the most recent NAWS dataset (2021-2022; n respondents = 2,598). All non-binary indicators were dichotomized. Indicators spanned six domains: demographics, education, socioeconomic status, healthcare access, job characteristics, and family characteristics. Latent classes were derived using LCA in Mplus. Four self-reported, physician-diagnosed health conditions (asthma, heart disease, hypertension, diabetes) were analyzed as distal outcomes using the BCH method. Class membership was also explored in relation to region and work type.

Results
A five-class model best captured population heterogeneity. Classes differed significantly in social vulnerability and health outcomes. Class 1 (Medicaid users with mixed-status families) had the highest prevalence of diabetes (20.4%) and hypertension (27.3%). Class 5 (uninsured, non-English speakers) showed elevated rates of asthma (11.1%) and heart disease (3.6%). Class 4, the least vulnerable group (U.S.-born, educated, low work hours), had the lowest rates of chronic disease. All health disparities across classes were statistically significant ($p<0.05$).

Conclusion
Crop workers in the U.S. are a heterogeneous population with distinct vulnerability profiles that are strongly associated with chronic disease burden. Identifying and understanding these subgroups is critical for designing targeted health interventions and informing equitable labor and health policy. Future work will examine regional and occupational predictors of class membership

Savannah – 18

Data-Intensive Approaches to Studying Gestational Tobacco Exposure and Cancer Risk in the Female Reproductive Tract

Sudhanva Rao, Dr. Anthony Kondracki

Abstract

Introduction
Prenatal exposures are believed to play an important role in cancer risk later in life, but the link between gestational tobacco exposure and cancers of the female reproductive tract is not well understood. Our project is focused on studying these associations using the 2017-2025 NIH All of Us, a large, population-level health dataset.

Methods
Our initial dataset contained N= 18,078,802 observations sorted by person ID (a unique number or identifier assigned to an individual) and contained missing information and uneven sampling. There were 22,453 pregnant women after parsing (breaking down) the dataset. Logistic regression was used to estimate the odds of the most common female reproductive tract cancers (endometrial, ovarian, vaginal, and vulvar), adjusting for covariates. Using special tools called Dask (which enables a computer to split large jobs into smaller pieces and work on them simultaneously) and DuckDB (which quickly searches through large files, much like a super-fast Excel), we built step-by-step Python pipelines that can handle up to 20 million records. These pipelines automatically clean the data, combine information from different sources, and adjust for differences in who was surveyed so that the results better reflect the overall population. To address missing values, we developed an imputation pipeline that utilizes K-Nearest Neighbors (KNN) imputation and includes automatic checks and side-by-side comparisons between original and imputed values.

Results
The prevalence of smoking during pregnancy was 5.0%. Among women who smoked, the highest odds were for ovarian cancer aOR 9.13 (95% CI: 8.19, 10.18) and vaginal cancer aOR 5.34 (95% CI: 5.02, 5.68).

Conclusions
This work establishes a solid foundation for studying how developmental tobacco exposure may influence cancer risk later in life. By combining epidemiologic concepts with modern data science tools, large-scale data can be used to better understand how early-life exposures shape long-term health outcomes.

Savannah – 19

Rural-Urban Disparities in Pediatric Appendicitis Outcomes: A Post-COVID Analysis of Access, Delays, And Innovations in Care

Ritij Sarvaiya MS2[1], Dr. Montgomery[2,3]; Dr. Williams[2,3]

[1]Mercer University School of Medicine, Savannah, GA
[2]Mercer University School of Medicine, Macon, GA
[3]Georgia Rural Health Innovation Center, Macon, GA

Abstract

Background and Objective
Pediatric appendicitis is the most common surgical emergency in children, yet outcomes vary significantly between rural and urban settings. Prior to the COVID-19 pandemic, rural hospitals were already associated with higher complication rates, fewer laparoscopic procedures, and increased negative appendectomy rates compared with urban centers. COVID-19 further disrupted pediatric surgical care, leading to delayed presentations, higher rates of complicated or perforated appendicitis, and increased length of stay. This study examines post-pandemic disparities in pediatric appendicitis outcomes, particularly focusing on transfer delays and rural–urban differences, and evaluates emerging strategies such as telemedicine.

Methods
A literature review was conducted using multicenter retrospective cohort studies, national databases (PubMed, Open Evidence, NIH), and systematic reviews of disparities in pediatric appendectomy outcomes. Studies from the United States and Europe published between 2018–2023 were analyzed for differences in presentation, management, and outcomes across rural vs. urban hospitals and pre- vs. post-COVID timeframes.

Results
During the pandemic, rates of complicated or perforated appendicitis increased by 10–15% in many regions, with rural children disproportionately affected due to delayed transfers and reduced access to pediatric surgeons. Rural hospitals demonstrated lower laparoscopy rates (74% vs. >90% in urban academic centers), longer travel distances, and higher odds of complications (Bhatnagar et al., 2023). Nearly 30% of children transferred for suspected appendicitis required no surgical intervention at receiving hospitals, highlighting inefficiencies in transfer systems. Telemedicine interventions in trauma and pediatric surgery have shown promise in reducing unnecessary transfers and supporting local providers.

Conclusion
COVID-19 amplified existing rural–urban disparities in pediatric appendicitis care, with rural children facing higher risks of delayed diagnosis, complicated disease, and inefficient transfers. Telemedicine networks, standardized transfer protocols, and integration of clinical scoring systems (e.g., Pediatric Appendicitis Score, Alvarado, AIR) represent feasible strategies to improve timely diagnosis and reduce outcome disparities in Georgia and similar underserved regions.

Savannah – 20

Community Priorities for Suicide Prevention in a Rural Military-Connected County

Elijah Frix, Dr. Kimberly Roth

Abstract

Background and Objective
Suicide is a leading cause of preventable death in the United States, with rural communities facing heightened risks. In Liberty County, Georgia, a rural community with strong military ties, self-harm was the leading cause of years of potential life lost in 2024. This study assessed community concerns and priorities to guide suicide prevention efforts.

Methods
A cross-sectional survey (June-July 2025) used a 28-item anonymous questionnaire, distributed online through Qualtrics and at local venues (farmers markets, churches, hospitals, recreation centers) via pen and paper. The survey assessed perceived importance of community issues and interest in health and wellness programming on a scale from 1 to 5. Preferred modes of engagement were also assessed. Responses were analyzed descriptively. One-way ANOCAs assessed differences in community priorities across three military affiliation categories.

Results
A total of 83 residents participated. The sample was majority female (≈65%) and spanned ages 18-80+. Military affiliation was common (79.8%), with both active-duty and veteran households represented. Suicide prevention (mean=4.78) and mental health and wellness (mean=4.74) emerged as the highest-priority community concerns, followed by stress management, social support, and youth health. Participants expressed the greatest interest in suicide prevention, mindfulness, and healthy relationship programming. Preferred engagement formats included in-person (n=65 respondents), weeknights (m=52), and weekends (n=54), with substantial support for hybrid and virtual options. Childcare availability was a facilitator for participation. ANOVAs revealed no significant differences by military affiliation across community priorities, although Food Insecurity trended toward significance ($F(2.96) = 2.4$, $p = 0.096$).

Conclusion
Findings underscore suicide prevention and mental health as community priorities in Liberty County. Residents expressed string interests in wellness programming and emphasized flexible, accessible delivery formats. These results highlight opportunities for community-based, culturally responsive interventions to address rural suicide risk and strengthen local mental health infrastructure.

Savannah – 21

Analyzing Access to Fertility Care in Rural Georgia

Mary Geralds, Dr. Anne Montgomery, Ms. Samantha Johnson

Abstract

Background and Objective
According to the World Health Organization, 1 in 6 people globally are affected by infertility, which is defined as not being able to conceive after one year of unprotected sex. The CDC reports that 1 in 5 married women between the ages of 15 and 49 with no prior births are unable to get pregnant after a year of trying to conceive. Despite the growing prevalence of infertility struggles, access to various fertility diagnoses and treatments remains limited due to many factors including cost, physical accessibility of fertility clinics, stigma, and lack of insurance coverage. This project examined the impact of geographic and financial barriers on access to fertility care in rural Georgia.

Methods
Problem analysis conducted included review of national guidelines and statistical reports as well qualitative, quantitative, and meta-analysis studies. Solution analysis conducted by reviewing studies on impact of potential solutions and national surveys.

Results
While it is estimated that only 24% of the demand for fertility care is met in the United States, this number is likely higher for those in rural counties who face additional barriers. Expanding the care being currently offered via satellite office integration, in addition to mandating insurance coverage of fertility care, could potentially alleviate geographic and financial barriers faced by patients seeking care.

Conclusion
Infertility is classified as a “disease of the reproductive system” by the WHO, therefore, the treatment gap seen in our current healthcare system constitutes a major health disparity that needs to be addressed. Exploring potential solutions to make fertility treatment more accessible is the first step in closing this gap.

Savannah – 22

Para-dichlorobenzene exposure and increased visceral fat accumulation in young and middle-aged adults

Mary Elise Roark[1], Yudan Wei[2]

[1]MD Program, Mercer University School of Medicine, Savannah, GA
[2]Department of Community Medicine, Mercer University School of Medicine, Macon, GA

Abstract

Background and Objective
As prevalence rates of metabolic disease and obesity continue to rise, other factors besides physical inactivity, diet, and genetics should be considered. This study aims to assess the association between exposure to para-dichlorobenzene (*p*-DCB), a common household and commercial deodorizer, and visceral fat accumulation as a strong indicator of risk for metabolic diseases.

Methods
A total of 1670 adults aged 20-59 years from the 2011-2016 National Health and Nutrition Examination Survey was analyzed. Exposure to *p*-DCB was determined by measuring urinary concentrations of 2,5-dichlorophenol (2,5-DCP), the major metabolite of *p*-DCB. Visceral fat accumulation was assessed by sagittal abdominal diameter (SAD) and visceral adipose tissue (VAT) mass. Multiple general linear models were constructed to examine the association of urinary 2,5-DCP concentrations with SAD and VAT, adjusting for potential confounders.

Results
Participants with higher urinary levels of 2,5-DCP had increasing measurements of both SAD and VAT. Geometric means of SAD were significantly higher in the higher quartiles of 2,5-DCP (22.34, 22.43, and 22.58 cm in Q2, Q3, and Q4, respectively; all $p<0.0001$), as compared to the lowest quartile Q1 (20.63 cm). Geometric means of VAT mass were also significantly higher in the higher quartiles of 2,5-DCP (457.05, 473.44, and 445.62 g in Q2, Q3, and Q4, respectively; all $p<0.0001$), as compared to Q1 (385.62 g). After adjusting for potential confounders, urinary 2,5-DCP was associated with 4.53% (95% CI: 2.05, 7.07), 2.79% (0.04, 5.60), and 3.40% (0.32, 6.57) increased SAD in Q2, Q3, and Q4, respectively. A dose-dependent increase in percent changes of VAT was seen, with a 9.92% (2.70, 17.66), 10.22% (2.09, 19.01), and 10.71% (1.62, 20.60) increase in VAT across Q2, Q3, and Q4, respectively.

Conclusion
Our study suggests that higher exposure to *p*-DCB may be associated with increased visceral fat accumulation and metabolic diseases.

Savannah – 23

Integrating Doulas into Maternal Healthcare Teams for Management of Gestational Diabetes in Rural Georgia

Janiah Ryans

Abstract

Georgia has one of the highest maternal mortality rates in the United States, with cardiovascular conditions among the leading causes of preventable deaths. Gestational diabetes mellitus (GDM), a form of glucose intolerance during pregnancy, increases the risk of developing these complications and creates immediate and long-term health risks for both mother and baby. The prevalence of diabetes in pregnancy has risen markedly, intensifying the burden on Georgia's maternal health system. Rural Georgia is disproportionately affected due to limited access to obstetric care, shortages of nutritionists and healthy foods, and essential monitoring resources. These gaps hinder timely diagnosis, nutritional counseling, and adherence to glucose monitoring. This study analyzes barriers to GDM management in rural Georgia and explores the integration of doulas as a complementary strategy.

A problem solution analysis was conducted using literature review and state-level health data. Areas examined included provider shortages, hospital closures, food insecurity, and insurance limitations. The potential role of doulas in addressing these challenges was evaluated based on their functions in patient education, care reinforcement, and support in underserved communities.

Evidence shows that doula support improves birth outcomes including fewer complications and better prenatal adherence. In rural areas, doulas offer low-cost, home-based education. Medicaid reimbursement models in Oregon and Massachusetts improved maternal outcomes but faced billing and compensation challenges, which were partially addressed through support networks and provider education. In Georgia, the Healthy Mothers, Healthy Babies Coalition Doula Medicaid Reimbursement program demonstrated fewer preterm and low birthweight deliveries and lower rates of hypertension, GDM, and maternal mental health issues. Doulas can extend prenatal care in rural Georgia where GDM continues to pose a public health challenge. Medicaid reimbursement for doulas could enhance GDM management, improve maternal outcomes, and reduce long-term health costs.

Savannah – 24

Improving Colorectal Cancer Screening Rates at a Family Medicine Clinic: QI Initiative

Celia Sada; Kenzington Deal; Dr Kimberly Roth; Dr Eric Shaw

Abstract

Background
Colorectal cancer (CRC) is the second leading cause of cancer deaths in the US. The current US CRC screening rate is 66.4% (2023) and Georgia is lower at 58.1%. Healthy People 2030's goal is to increase the proportion of adults ages 45 to 75 who have received CRC screening to 72.8%. Several barriers to CRC screening have been reported including lack of education, lack of awareness of screening options, incorrect beliefs, and procedure related challenges. Using interventions tailored to specific patient populations can address these barriers and help close the screening gap.

Objective
To implement a tailored quality improvement (QI) initiative to educate patients about CRC screening, and ultimately to improve screening rates at a family medicine practice.

Methods
This QI project was based on 20 in-depth patient interviews conducted at a local outpatient clinic to better understand patient knowledge, beliefs, and barriers related to CRC screening. Findings were used to guide conversations between our research team and key stakeholders at the clinic. We engaged key stakeholders, including physicians and residents at the clinic, to better understand the problem of low clinic CRC screening rates and brainstorm the most effective QI intervention based on patient experiences. Clinic-specific CRC screening rates will be calculated at baseline and at three interval periods post-intervention (3, 6, and 12 months).

Results
Patient interviews and stakeholder discussions revealed patient education as a pressing need. We created a 5-minute video for patients to convey information about what CRC is, screening options, and common false myths about colonoscopies. Feedback from key stakeholders was helpful and positive. Discussions are currently underway to determine the best way to disseminate the video to patients needing CRC screening.

Conclusion
The QI project will be implemented in a primary care setting with the goal of educating and motivating patients to get screened, helping increase the clinic's CRC screening rates.

Savannah – 25

Dermatophyte Populations on Local Beaches

Mark Swain, Elexia Ochoa

Abstract

This study attempted to assess the diversity of the dermatophyte populations found on local beaches and to assess factors that may contribute to their populations and distribution. We sampled 2 local beaches: Tybee Island and Daufuskie Island. Tybee Island is a very popular vacation destination that receives over one million guests stepping on its shores yearly. Daufuskie on the other hand is much less heavily traveled and receives only a few thousand. Global climate change has driven fungi to adapt to tolerate higher temperatures than in the past, which we believe will be contributory to an increase infection rate of common dermatophytes. Core samples were taken from high traffic areas of the beaches, such as entrance ramps. A remote-controlled car which a keratin laden trap to catch dermatophytes was also employed to go over a 12x12 foot area of surface sand. After an incubation period, the feathers and sand were plated on DermDuet agar. This is a selective media for dermatophytes as well as an indicator media. The results revealed a much greater growth of dermatophytes on the Tybee Island samples than the Daufuskie Island samples. Pure colonies were obtained and Tinea mentagrophytes was identified via light microscope from multiple Tybee samples. An anonymous survey was also conducted to identify if Tybee beach goers have contracted ringworm after visiting the beach, with 9% saying that they had. There is much more to uncover in these sands, but this study shows that there is in fact a heavy dermatophyte population on beaches and that population may increase the load of dermatophytes in the sand.

Savannah – 26

Prevalence and Geographic Distribution of Rural Patients Excluded from Spatial Epidemiological Research and Implications for Clinical Medicine

Dr. Jacqueline Curtis, Lea L. Villamor, Shaan G. Prasad, Kara H. Patrick.

Abstract

Background and Objective
Mercer University School of Medicine's mission is to educate physicians to meet the primary care and health care needs of the rural and medically underserved areas of Georgia. To improve the healthcare of rural Georgia communities, we must learn and understand the populations. An approach to achieve this goal is using Geographic Information Systems (GIS), which map patients and characteristics of their social, natural and built environment. These linked data are a growing evidence base to understand patient drivers of health and health outcomes, ultimately informing patient-centered care and policy. However, when patients use a Post Office Box (P.O. Box) for their address, as they often do in rural America, their location cannot be mapped, and they are excluded from this area of clinical translational science. Furthermore, their physicians lack this data that can improve care. Therefore, the aim of this project was to quantify and visualize the prevalence and geographic distribution of P.O. box users who are missing from maps used in clinical medicine.

Methods
This is a case study in Georgia using three study sites that compare prevalence and geographic distribution of P.O. Box residential addresses in urban and rural counties, including the Lowcountry region. Prevalence was calculated using United States Postal Service (USPS) data on the number of total addresses and the number of P.O. Box addresses by zip code. A GIS was utilized to map the geographic distribution of prevalence across the sites.

Results
Results indicate heterogeneity across the study sites and the rural-urban continuum and require further investigation at more local levels, such as census tracts.

Conclusion
This study raises awareness, for the first time, of the prevalence and geographic distribution of P.O. box users and highlights the importance of ensuring that this area of clinical translational science benefits all.

Medical Education

Savannah – 27

The Yin and Yang and Research and Service in Medical School

Lauren Boyle, Jessica Schwarz

Abstract

Background
Following the transition of the USMLE Step 1 from a numerical score to pass/fail reporting in 2022, it was proposed that a student's interest in research and their research productivity will become the most important non-academic characteristics influencing the residency match process.

Methods
Using data from the National Residency Matching Program (NRMP) surveys of program directors and U.S. MD seniors from 2016-2024, we evaluated the changes in MD students self-reported research experiences and outcomes along with program director perceptions of the importance of research in determining candidates to interview and rank in the past decade.

Results
Analyses revealed that the change in Step 1 reporting (2022) coincided with medical students reporting significantly more research outcomes, but there was not too much of a change in the number of reported research experiences corresponding with this jump in research outcomes. Students matching to one of the Top 5 competitive specialties reported substantially inflated numbers of research outcomes compared to research experiences when compared with their primary care counterparts. On the other hand, program directors did not report any change in the importance of research following the changes in Step 1 reporting. Instead, they placed a higher valuation on a candidates' leadership and service qualities during the selection process. Interestingly, students reported significantly fewer service experiences and activities associated with leadership in 2022 compared with previous years.

Conclusion
Our findings challenge the assumption that research has overtaken Step 1 scores in program director decision-making. We propose that there is a more nuanced weighting of candidate attributes in the post-Step 1 pass/fail era, and faculty and administrators need to keep abreast of these weightings during student career counseling. Students should be advised to ensure they emphasize service, volunteering, and leadership alongside research to have the most complete and competitive application for the Match.

Savannah – 28

Music Therapy and Its Applications at Children's Healthcare of Atlanta (CHOA)

Sara English, Taylor Macera

Abstract

Background and Objective

Music therapy is an empirically supported practice that utilizes music to address the physical, mental, and social needs of a patient. It has a wide range of therapeutic applications that span various healthcare settings. However, music therapy is not as highly recognized and referred to amongst physicians and other health professionals across facilities. The goal of this project was to investigate the clinical applications of music therapy and develop an educational module to be shared with medical students.

Methods

A qualitative approach was used for this project to study music therapy education and its applications across different healthcare facilities. A seminar was attended at Georgia College and State University to learn about music therapy curriculum and internship requirements. A broad review of peer-reviewed literature and clinical studies was performed to become familiar with recent research and interventions of music therapy. Interviews were conducted with music therapists from Hospice Savannah, Children's and Johns Hopkins University to gain a deeper understanding of various perspectives and music therapy techniques. Direct observation of music therapists from Hospice Savannah and Children's Healthcare of Atlanta was conducted to visualize population specific interventions.

Results

In the Comprehensive Inpatient Rehabilitation Unit (CIRU) at CHOA, music therapists participate in healthcare team meetings and collaborate with physiatrists, nurses, physical therapists, occupational therapists, speech therapists, and other healthcare professionals to develop comprehensive treatment plans. Using techniques based on neuroscience research, music therapists in this setting used both live and recorded music to enhance cognition and development. Physical movement, communication, and expression in pediatric patients.

Conclusion

Music therapy is a valuable form of medicine that can be incorporated into a treatment plan to complement traditional healing practices, serving as an intrinsically motivating form of therapy.

Savannah – 29

National Perspectives from Clinical Ethicists and Bioethicists on the Implementation and Use of NRP/taNRP

Benjamin Hand, Aneri Patel, Maggie McFather

Abstract

Background and Objective

Normothermic regional perfusion (NRP) has become a subject of significant debate in organ procurement. Critics have questioned whether the practice aligns with the Uniform Determination of Death Act (UDDA, 1980) and the Dead Donor Rule (DDR, 1967) which are two legal standards increasingly viewed as inadequate in addressing our contemporary understandings of death. Our study explores the perspectives of bioethicists and clinical ethicists all around the United States on the ethics of NRP and thoracoabdominal NRP (taNRP) and how they relate to the UDDA and DDR.

Methods

Ethicists were recruited through a screening survey assessing familiarity with NRP and taNRP. Eligible participants were randomly selected for interviews conducted with a standardized template. A thematic analysis was performed using a codebook generated from these interviews.

Results

Findings revealed almost unanimous concern among ethicists regarding the sufficiency of the UDDA and DDR. While most agreed that revisions are necessary, there was no consensus on how these statutes should be updated. Overall, participants expressed support for NRP but were less certain regarding taNRP. Concerns about taNRP centered on informed consent, patient autonomy, transparency and trust in the medical field, and unresolved legal ambiguities with the DDR and UDDA. Additionally, one-third of participants reported perceiving pressure from their local organ procurement organization (OPO) to adopt NRP. Which raised further ethical questions about the influence of OPOs in clinical and legal decision-making.

Conclusion

These findings highlight both broad support for NRP and ongoing tensions around taNRP, underscoring the need for clearer ethical guidance and potential legal reform to ensure that organ procurement practices align with evolving definitions of death, patient rights, and public trust.

Savannah – 30

Music Therapy and its Applications in Hospice Care

Taylor Macera, Sara English

Abstract

Background
Music therapy is an evidence-based therapeutic intervention that can be used in various patient care settings. Music therapy can accompany traditional rehabilitation modalities and provide alternative approaches to patient care. In hospice, music therapy can assist with meeting the psychosocial and physical needs of the patient, provide comfort for patients and their families, and provide alternative opportunities for processing emotions. While music therapy has a wide array of uses in medicine, it is often misunderstood by medical students and medical professionals. The aim of this project was to identify the uses of music therapy in hospice, experience music therapy in clinical settings, and create an educational module on music therapy for medical students.

Methods
Direct observation of music therapy in clinical settings was conducted at Hospice of Savannah and Children's Healthcare of Atlanta. Interviews were conducted with music therapists from Nationwide Children's Hospital, Fulton County Schools, Children's Healthcare of Atlanta, Hospice of Savannah, and John Hopkins University. Literature search was conducted through PubMed and Science Direct to obtain information regarding the application of music therapy in hospice care.

Results
Through direct observation, music therapy was shown to be used frequently at Hospice of Savannah. It is an important modality to assist with patient comfort, provide opportunity for bereavement support, and improve overall patient care. While it is important for music therapists to stay within their scope of practice, they serve as valuable members of a patient care team.

Conclusion
Music therapy is rapidly growing within the clinical setting. Its use within hospice facilities has been shown to benefit the physical, emotional, psychological and spiritual needs of hospice patients.

Savannah – 31

Development and Validation of a Cost-Effective Rhythm Analysis and Defibrillator Use Training Program

Charleigh R. Stepp[1], Benjamin Rahimitabar[1], Joe Slattery[1], Yahya A. Acar[2]

[1]Mercer University School of Medicine, Savannah
[2]Mercer University School of Medicine, Macon

Abstract

Background
In the United States, more than 400,000 people die annually from coronary artery disease and more than 1,000,000 suffer acute coronary events, such as myocardial infarction and sudden cardiac death. Major rhythms that can be treated with electrical intervention include bradycardias, heart blocks, unstable atrial fibrillation, ventricular and supraventricular tachycardias with pulses, ventricular tachycardia without pulse, and ventricular fibrillation.

Objective
Training new medical students and other healthcare workers in identifying the possible rhythms that may present during acute coronary events and cardiovascular disease will enable early intervention using defibrillation, cardioversion, and transcutaneous pacing to increase survival rates. Our team's goal is to make training more accessible through online education in identifying and treating pathological heart rhythms while also lowering the cost by not having to use expensive medical equipment.

Methods
The online training curriculum is being developed using current AHA guidelines for adult advanced cardiac life support as well as Mercer's curriculum for rhythm analysis and treatment. The training will include practice quizzes involving the decision making through the course of disease involving different heart rhythms. The curriculum will first be tested on residents with prior training and then will be implemented for use with medical students. We will implement a pre- and post-quiz during our online training sessions to determine the efficacy of the training.

Results
Planned evaluation includes delivery of the online curriculum to residents at Mercer-affiliated hospitals. Participants will complete pre-training surveys, engage in interactive case-based sessions via QR code, and complete post-training surveys. Data will be analyzed using frequencies and percentages to assess knowledge gains.

Conclusion
An online, interactive, and low-cost training system may enhance defibrillation preparedness, particularly in rural settings. Incorporating QR codes enables real-time tracking of learner performance and provides instructors with a scalable, accessible teaching tool.

Clinical

Savannah – 32

Hemodialysis Access Outcomes in Nonagenarians

Abraham Hussain, B.S. and Mohamad A. Hussain M.D., Ph.D.

Abstract

Background
Arteriovenous (AV) access remains the preferred modality of hemodialysis. Nonagenarians, or individuals greater than 90 years of age, are frequently faced with increased comorbidities, diminished blood vessel conditions, and reduced life expectancies. Thus, whether AV access creation should be a first-line approach and if it yields promising results in this demographic is essential to guiding individual care for aged 90 years or older.

Methods
We conducted a retrospective, single-center study (2015-2025) of nonagenarian patients who underwent AV fistula or AV graft placement for hemodialysis. Patients were identified through the Massachusetts General Brigham Institutional Research Patient Data Registry (RPDR), and data were extracted with chart review adjudication. The primary outcome assessed was mortality with a 2-year observation period. Our secondary outcomes are the patency (6 months, 1 year, 2 years), and reintervention techniques. Statistical analyses for patency over 6 months, 1 year, and 2 years were performed using the Kaplan-Meier method.

Results
A total of 25 elderly patients were included, with a mean (SD) age of 91.8 (1.5), and 32% of the participants being female. 72% of patients received AV fistulas and 28% received AV grafts. 76% of patients had ESKD. The mortality of the 25 patients within 2 years was 32%. 77.8% of AVFs and 100% of AV grafts matured over 2 years. The 6-month primary, primary-assisted, and secondary patency were 40%, 80%, and 84%, respectively. Comparatively, the 2-year primary, primary-assisted, and secondary patency was 24%, 64%, and 80%, respectively. Endo-balloon angioplasty, endo-stenting, and endo-thrombectomy accounted for 55%, 20%, and 14% of all reinterventions performed, respectively.

Conclusion
Our findings suggest that AV access creation for hemodialysis appears safe and effective in nonagenarian populations, with outcomes that support its consideration in elderly populations. However, the limited sample size underlines a strong need for larger, multicenter studies to better define the primary and secondary outcomes.

Savannah – 33

Understanding Low Follow-Up Rates in a Hospital-Based Hereditary Cancer Screening Program: A Retrospective Analysis of Demographic and Geographic Predictors

Daniel Rivera, MS2; William Burak, MD; Katie Bennett, MD; Jillian Giblin, MD; Zoe Siegel, MS, CGC

Abstract

Background and Objective

Hereditary cancer screening programs identify individuals at elevated genetic risk through family history assessments, counseling referrals, and multigene testing. Despite their value, follow-up adherence after patients are flagged for further evaluation remains low, particularly among younger patients, racial/ethnic minorities, and those with socioeconomic barriers. This study aims to identify demographic, geographic, and clinical factors associated with follow-up completion with attention to underserved/rural populations.

Methods

We are currently conducting a retrospective observational analysis using de-identified records from the Ambry CARE Portal between July 2023 and August 2025. Eligible participants were adults (≥18 years) meeting criteria for hereditary cancer risk at the Memorial Breast Care Center. Exclusions included minors, incomplete demographic data, or insufficient follow-up. Variables included age, sex, race/ethnicity, family history, and geographic distance. Follow-up completion was defined as documented confirmatory testing. Associations between patient characteristics and follow-up are being analyzed to identify predictors of non-completion.

Results

Data collection is ongoing, with over 17,000 patient records available for review. A recent two-year Ambry program review at Memorial found only 28% compliance in follow-up after genetic risk identification, highlighting a large gap in adherence. Medical management was impacted among patients with positive findings, including increased referrals for preventive care. Additionally, breast MRI utilization grew by 63% since the program's initiation, reflecting the clinical impact of hereditary cancer risk assessments. Available ethnicity and age-range demographics underscore disparities but lack sufficient detail on follow-up completion. Early findings suggest barriers to confirmatory testing are most pronounced among rural and low-resource populations.

Conclusion

By identifying predictors of non-completion, this work can guide patient-centered interventions. Preliminary results reinforce existing evidence that demographic and geographic disparities persist in the utilization of genetic services. Insights from this study will guide the design of targeted, hospital-based interventions to improve engagement and reduce gaps in hereditary cancer care.

Savannah – 34

Exploring the Genomic Intersections of Autism and Cancer: Insights into the Dual Pathogenesis and Clinical Care

Omeka Bhatia

Abstract

Background and Objective

Autism spectrum disorder (ASD) is a neurodevelopmental condition that typically presents between 2–4 years of age and is characterized by social communication difficulties and restricted, repetitive patterns of behavior or sensory responses, and a wide range of intellectual, motor, and verbal functioning.

Like cancer, autism is thought to be a polygenic condition. Recent studies have reported an increased prevalence of cancer among children with ASD. Genome sequencing has revealed overlap in risk-related genes, including pathways influenced by PTEN. This functional overlap suggests an increased cancer risk developing cancer in individuals with ASD.

Given the rising prevalence of ASD and emerging evidence of genetic overlap with cancer, this project aimed to develop resources for the Autism Toolkit website to support indiiduals with ASD who are facing a cancer diagnosis.

Methods

A literature review was conducted using 20 peer-reviewed research articles identified in PubMed with search terms such as “Autism and Cancer” and “Autism and PTEN Mutations.”. Findings were synthesized to author educational articles and a social story. Drafts were reviewed in collaboration with physicians to ensure clinical accuracy before publication on the Autism Toolkit website.

Results

Two educational articles, “Autism and Cancer” and “Cancer Types and Treatments” were created, along with a social story, “Getting a Bone Marrow Biopsy.” Each resource was tailored for individuals with ASD undergoing cancer-related procedures.

Conclusion

The growing evidence of genetic overlap between autism and cancer highlights the need for resources that address the unique challenges faced by individuals with ASD who receive a cancer diagnosis. This project created accessible, clinically informed educational tools for the Autism Toolkit website to provide patients and families with practical support while raising awareness of the emerging link between ASD and cancer. Ongoing research and resource development will be essential to ensure that individuals with ASD are supported throughout their cancer journey.

Savannah – 35

Guideline-Adherent Care is Associated with Higher Rates of Symptom Relief in Claudicants with Surgical Intervention

Richard Shi, MD1, Nicholas Bulatao, BS1, Rebecca Oyetoro, MD1, Rupak Mukherjee, PhD1, Adam Tanious, MD, MMSc, MBA1

Abstract

Background and Objective
Surgical guidelines recommend intervention in claudicants with severe lifestyle limiting symptoms that have failed optimal medical therapy (OMT) and supervised exercise therapy (SET). We investigate the rate of complete guideline-adherent care in claudicants and assess its impact on post-surgical symptom relief.

Methods
A single institution retrospective cohort study was performed on claudicants with an endovascular/open surgical intervention from 2014 to 2023. Guideline adherence was defined as: lifestyle limitation documentation, OMT adherence (composite of single antiplatelet agent, lipid-lowering therapy, smoking cessation), and exercise therapy completion. The primary outcome was symptom relief at one year, defined as an improvement in walking distance or impact on activities of daily living. Statistical analysis included independent sample t-tests, Pearson $\chi 2$ tests, Kaplan-Meier analysis, and logistic regression modeling.

Results
Of 258 claudicants with surgical intervention, 19% were guideline-adherent. Lifestyle limitation documentation was found in 62.4% of patients, 65.1% were on OMT, and 31% completed exercise therapy. One-year symptom relief was found in 87.8% of guideline-adherent patients, compared to 67.0% of guideline-nonadherent patients ($p = .01$). On multivariable logistic regression analysis, guideline-adherence (OR: 3.31 [1.30, 8.42], $p = 0.01$), 5-factor modified frailty index > 2 (OR: 0.48 [0.27, 0.87], $p < .02$), and prior peripheral vascular intervention (OR: 0.27 [0.13, 0.59], $p < .01$) were predictors of one-year symptom relief.

Conclusion
Guideline directed care in claudicants remains low, despite its association with one-year symptom relief. There is increasing need for initiatives to qualitatively characterize and improve adherence rates of guideline directed care in claudicants.

Savannah – 36

Diagnostic Accuracy of CT and/or PET/CT in Assessment of Lymph Node Metastasis in Head and Neck Cancer

Dr. Dhruv Patel, MD; Dr. Pavan Patel, DO; Joseph Pham, MS2

Abstract

Background and Objective
Cervical lymph node status is a critical prognostic factor in head and neck squamous cell carcinoma (HNSCC), with even a single metastatic node significantly reducing survival. Clinical examination is often unreliable, emphasizing the need for accurate imaging. Computed tomography (CT) is widely used in clinical practice because of its accessibility and ability to visualize complex neck structures, but diagnostic accuracy varies. This study aims to evaluate the diagnostic accuracy of neuroradiologists in identifying lymph node metastasis on CT compared to histopathologic findings following neck dissection.

Methods
A retrospective review was conducted of 1,589 CT neck scans performed at Memorial/HCA Hospital between January 2024 and May 2025. From these, 126 patients underwent neck dissection, with 74 demonstrating histopathologic evidence of metastasis. After exclusions, 38 patients with head and neck primaries (excluding thyroid cancer) were selected for blinded retrospective review by board-certified neuroradiologists. CT scans are being reinterpreted without knowledge of prior reports or pathology results, and findings will be directly compared to histopathology to determine diagnostic accuracy.

Results
The study remains in progress, and final sensitivity and specificity values are pending completion of neuroradiologist review. Preliminary analysis anticipates discrepancies between CT interpretations and pathology due to factors such as variable diagnostic criteria and benign entities mimicking metastatic nodes.

Conclusion
This study seeks to clarify the diagnostic reliability of CT in detecting nodal metastasis in HNSCC. Standardization of diagnostic thresholds and incorporation of advanced imaging modalities or artificial intelligence may enhance accuracy and inter-reader consistency. Results will inform strategies to optimize nodal staging, reduce misclassification, and improve treatment planning for patients with head and neck cancer.

Savannah – 37

Bridging the Gap: Assessing PrEP Implementation in High-Risk HIV-Negative Populations in a Southern Safety-Net Hospital

Jean Wiggins, MSPH, William Hannah, MD, Eric Shaw, PhD, Ujwal Modi, MS-2, Brandon Kight, MS-2, and Rishi Patel, MS-2

Thomas Atha, MS2

Abstract

Background
Georgia remains 1st in the U.S. for new incidence of HIV. Despite the proven effectiveness of pre-exposure prophylaxis (PrEP), uptake remains low among high-risk groups`, including Black men, women, and patients served by safety-net systems in Southeast Georgia. This gap between eligibility and prescribing highlights the limited use of PrEP in Georgia as a HIV reduction strategy.

Methods
A retrospective cohort analysis took place at an outpatient internal medicine clinic of patients aged ≥13 with negative HIV screenings between January-June 2025. EMR identified high-risk patients by two or more STD tests in six months and/or multiple genitourinary complaints. Notes and summaries were reviewed for PrEP discussion and/or prescription.

Results
Of the 232 patients meeting inclusion criteria, thirty-four high-risk patients were identified, of whom 27 (79%) had no documented PrEP discussion or prescription, one (3%) had a documented discussion, and six (18%) were prescribed PrEP. Among the 27 without PrEP documentation, 19 (70%) were female and 8 (30%) were male. The racial/ethnic distribution was 22 Black (81%), 2 White (7%), 1 Hispanic (4%), 1 Asian (4%), and 1 other (4%). The average age was 40.6 years (SD 13.2). Patients averaged 2.6 STD tests in the past six months, and 7 (26%) tested positive for at least one STD, including syphilis, trichomoniasis, gonorrhea, or
HSV-1/2.

Conclusions
These findings highlight the need for earlier and more consistent PrEP discussions with high-risk HIV-negative patients. Providers often focus on the chief complaint or males with high-risk behaviors, often overlooking other at-risk groups. A standardized approach to identify candidates for PrEP could improve prescribing practices and reduce missed opportunities to reduce incidence of HIV in Georgia. Future plans include adding a section to the annual exam checklist to prompt providers to review recent STD tests, genitourinary complaints, and other risk factors when considering PrEP discussions.

Savannah – 38

The Importance of Water Safety for Autistic Individuals

EmilieAnne M. Baker

Abstract

Water safety for neurodivergent children is an important topic because autistic children are 160x more likely to drown than their neurotypical peers. Autistic individuals' tendency to elope, or wander away from caregivers and secure locations, puts them at a greater risk of traumatic outcomes related to controlled and uncontrolled water environments, including injuries and drownings. Extensive research, reliance on credible sources and organizations, and communication with experts in the field, such as Miss Dayna of 'Water Safety with Miss Dayna', allowed us to write three informative articles relating to the importance of water safety for autistic individuals. Articles included recommendations on how to enforce water safety skills and habits, such as the installation of barriers and alarm systems, the use of life jackets, and the importance of swimming lessons, supervision, and education. The creation of these articles even yielded a "Water Safety Worksheet" to allow parents and caregivers to identify sources of water in around their home or rental property that might pose a hazard to their autistic loved one. Our hope is to continue to expound upon the topic of water safety and autism and raise awareness through the creation of additional resources in the future, such as a poster presentation.

Savannah – 39

Treprostinil and its Effects on Pulmonary Hypertension with Lung Disease

Josh Belflower, B.S, Sarah Holder, B.S, Henna Iqbal MBBS, PhD, Muhammad Khan, M.D

Abstract

Pulmonary hypertension (PH) resulting from chronic lung diseases or conditions causing hypoxemia are categorized into group III PH. Several lung disorders contribute to this category, including obstructive and restrictive lung diseases, sleep disordered breathing, high-altitude hypoxic disease, obesity hypoventilation and developmental disorders. Treatment strategies vary depending on disease severity and the underlying etiology. In recent clinical trials, prostacyclin analogs and other pulmonary vasodilators have shown some benefit in patients with group III PH. Treprostinil, a prostanoid, has demonstrated efficacy in group I PH and in select patients with restrictive lung disease. The initial studies showed a perceived benefit in exercise tolerance, but more recently its role has expanded to patients with chronic hypoxia secondary to mixed lung disease and pulmonary hypertension. In this report, we present the case of a patient who was started on treprostinil with the goal of improving symptoms, but the patient's hypoxia deteriorated following treatment. We hypothesized that this deterioration occurred due to reversal of the body's natural protective mechanism known as hypoxia-induced pulmonary vasoconstriction (HPV). The patient's clinical improvement after discontinuation of treprostinil supported this proposed mechanism. Our case highlights the need for further investigation into the safety and efficacy of treprostinil in patients with group III PH, particularly those with a complex clinical profile involving both restrictive and obstructive lung disease.

Savannah – 40

Educating Families in Rural Georgia about Early Autism Diagnosis

McKenzie Clark

Abstract

The lack of autism resources and diagnosis continues to be a major concern across the state of Georgia, especially in rural Georgia. The low diagnosis rate is concerning because children need to have a diagnosis in order to receive access to the many important resources and therapies that can improve their well-being. The Autism Toolkit website aims to provide parents and physicians in rural Georgia with education on autism and the resources available to them in their community and online. The website features numerous articles covering topics related to autism. These articles contain information from peer-reviewed resources. Additionally, liaisons from programs that focus on autism provide their valuable insights and information about autism, as well as resources available in their communities. With the rate of diagnosis continuing to stay low, one topic that I focused on this summer was to better understand the role a parent can play in their child being evaluated for autism. I focused on how parents can better facilitate a conversation with their provider about their child being evaluated for autism. Additionally, I located alternative diagnosis routes for parents who do not have a provider willing to evaluate their child. This research paper will further cover the importance of the Autism Toolkit website and dive deeper into ways parents can advocate for their children.

Savannah – 41

Endometriosis Induced Immune Imbalance and its Potential Role in Ovarian Cancer

Stephanie Girle M.S., Ronald Garner Ph.D, Abigail Haythorn M.D.

Abstract

Background
Endometriosis is a disease wherein endometrial cells colonize the peritoneal cavity. Women with this disease are at a four-fold risk for developing clear cell ovarian cancer. We predict there is an underlying connection between ovarian cancer and endometriosis producing a common immune tolerance.

Objective
We tested age and gender standardized patient groups that might be used in assessing Treg lymphocyte participation in endometriosis and ovarian cancer immunity. Our objective was to compare immune lab values that might eventually be correlated with Treg-derived CTLA-4 involvement. CTLA-4 -mediated immune regulation may contribute to the increased incidence of ovarian cancer occurring among previously diagnosed endometriotic patients.

Experimental Design
MRNs of patients diagnosed with endometriosis, ovarian cancer and patients undergoing tubal ligation (control) were requested. An IRB exemption was granted. Patients diagnosed outside of Memorial Hospital and without surgical or pathological documentation to support their diagnosis eliminated from the study. Lab values at the time of diagnosis were documented. Values included data points from CBCs, CMPs, BMPs and CA-125 values. One-way ANOVAs were generated to compare differences between groups.

Results
Elevated monocytes and CA-125 were seen in the ovarian cancer group. Elevated albumin levels were seen in the endometriosis and ovarian cancer groups. Decreases in red blood cells and hematocrit were seen in the control.

Conclusion
Future testing is needed to examine more inflammatory markers that were not reported at the time of the diagnostic procedures in this group of patients. Our standardized grouping of retrospective patient populations did yield comparable populations with reasonable statistics on the available lab data. In a prospective study these groups and data can provide foundational patient parameters for testing CTLA-4 involvement in both diseases. Identifying CTLA-4 involvement could open the door for targeted immune therapy that promotes immune intervention with displaced endometrial cells and ovarian cancer.

Savannah – 42

Physician Adherence to Dual-Antiplatelet Therapy Guidelines for Ischemic Stroke and TIA

Brandon Kight M2

Abstract

Introduction

The American Heart Association guidelines for recurrent stroke prevention for patients with mild ischemic stroke or high-risk TIA is short term dual-antiplatelet therapy (DAPT) with clopidogrel and aspirin for 21 days followed by mono-antiplatelet therapy with aspirin. In patients with mild ischemic stroke or high-risk TIA, prolonged use of DAPT is associated with an increased risk of life-threatening bleeding. This quality improvement project sought to improve physician adherence to the DAPT guidelines for ischemic stroke and TIA in the emergency department and inpatient internal medicine clinic. This current abstract reports on baseline data and will serve as the basis for implementing the QI initiative.

Methods

Dr. William N Hannah Jr A retrospective chart review from the emergency department and inpatient internal medicine clinic of an institution in Georgia was used to determine patients who were discharged with a diagnosis of ischemic stroke or TIA during January 2024- May 2025. The NIHSS score was identified in ischemic stroke patients, and the ABCD2 score was identified or calculated for TIA patients. The prescriptions were viewed in the discharge summary, and physician adherence to guidelines was identified.

Results

A total of 76 patients were used in this analysis. There were 18 (23.7%) patients who did not receive appropriate DAPT. Of the 40 (52.6%) patients with NIHSS or ABCD2 scores that qualified them for DAPT, 6 patients did not receive DAPT. Of the 36 (47.4%) patients with scores that did not qualify for DAPT, 12 patients inappropriately received DAPT.

Conclusion

The data collected in this project highlights the need for a quality improvement intervention to improve adherence to DAPT guidelines for ischemic stroke and TIA. One potential intervention will be utilizing smart phrases with the guidelines embedded for TIA and ischemic stroke diagnoses.

Savannah – 43

"From Scan to Plan": Improving Inpatient Recognition and Discharge Planning After Incidental Imaging of Hepatic Steatosis

Ujwal Modi, MS2[1]; Tommy Atha, MS2[1]; Brandon Kight, MS2[1]; Rishi Patel, MS2[1]; Dr. Eric Shaw, PhD[1,2]; Jean Wiggins, BSPH[2]; and Dr. William Hannah, MD[1,2]

[1]Mercer University School of Medicine, Savannah GA
[2]Memorial Heath University Medical Center, Department of Internal Medicine

Abstract

Background
Steatotic liver disease (SLD), including metabolic dysfunction-associated steatotic liver disease (MASLD), is a driver for chronic liver disease, with potential to progress to, metabolic dysfunction-associated steatohepatitis (MASH), fibrosis, cirrhosis, and hepatocellular carcinoma. Although 10–11% of all inpatient abdominal imaging identifies hepatic steatosis, very few of these incidental findings are documented at discharge, representing missed opportunities to intervene early and potentially prevent the develop of chronic liver disease.
Methods
We reviewed charts of adult internal medicine in-patients with abdominal imaging. For those patients who were noted to have hepatic steatosis, we assessed if steatosis was documented in discharge or after-visit summaries with a follow-up plan. FIB-4 scores were also calculated to stratify fibrosis risk.
Results
Among 326 charts reviewed, 130 (40%) had abdominal imaging, and 22 (17%) reported hepatic steatosis. Of these, 19 (86%) represented missed opportunities: 14 lacked discharge documentation or a follow-up plan, and 5 had documentation at discharge but no follow-up instructions. Only 3 patients (14%) had steatosis documented with follow-up planning. FIB-4 scores indicated intermediate-to-high fibrosis risk in 86% of the 22 patients. Our findings demonstrates incidental hepatic steatosis is often overlooked in inpatient discharge planning, even for patients with elevated fibrosis risk. Barriers include lack of structured documentation, competing inpatient priorities, and limited provider awareness. While our sample highlights important trends, the current dataset is underpowered to detect statistically significant associations. Expanding the dataset will strengthen the analysis and better evaluate the impact of missed follow-up on patient outcomes.
Conclusion
Incidental hepatic steatosis is under-recognized during inpatient care, representing a missed opportunity to prevent progression to advanced liver disease. We plan to implement a low-cost intervention using provider education/awareness and the FIB-4 score to improve recognition and follow-up planning. Future evaluation will assess the impact of these interventions on documentation and follow-up rates, supporting value-based, preventative liver care.

Savannah – 44

Lipid Management in Secondary ASCVD Prevention: Risk-Stratified Analysis of LDL-C Goal Attainment in CAD Patients

Rishi Patel MS2, Ujwal Modi MS2, Brandon Kight MS2, Tommy Atha MS2, and William Hannah MD

Abstract

Background and Objective
In patients with established coronary artery disease (CAD), secondary prevention of major ASCVD events is essential. The latest guideline recommended high-intensity statin therapy, with LDL-C targets below 70 mg/dL for high-risk and below 55 mg/dL for very high-risk patients. This project examined whether patients with CAD received appropriate statin therapy and achieved LDL-C targets, with the broader goal of identifying opportunities to improve lipid management, potentially through adjunctive therapies.

Methods
A retrospective chart review was conducted on patients with CAD at an outpatient internal medicine clinic in Georgia. Patients were stratified as high- or very high-risk for major ASCVD events per 2018 ACC/AHA guidelines. Data collected included prescribed statin therapy and most recent LDL-C values. Statin intensity and LDL-C goal attainment were evaluated relative to risk classification.

Results
Among 301 patients, 46.2% were high-risk and 53.8% were very high-risk with only 37.8% achieving their risk-based LDL-C targets. When stratified by risk category, LDL-C goal attainment was significantly higher in high-risk patients than in very high-risk patients (45.7% vs. 31.1%, $p = 0.009$), including among those on high-intensity statins (52.4% vs. 30.8%, $p = 0.002$). Very high-risk patients were more likely to be prescribed high-intensity statins than high-risk patients (82.7% vs. 60.4%, $p < 0.001$), though this did not result in improved LDL-C control. Only 13.2% of patients were prescribed ezetimibe in combination with a high-intensity statin.

Conclusion
By evaluating both prescription patterns and LDL-C goal achievement, this project sought to highlight opportunities for intervention, whether through medication adjustment, increased adherence support, or provider education. Effective LDL-C control through optimized statin and adjunctive therapy use is critical for preventing recurrent ASCVD events in high- and very high-risk patients.

Savannah – 45

Utilizing Eye-Tracking Biomarkers with EarliPoint to Enhance Early Autism Detection in Rural Georgia

Isabella Valentini

Abstract

Autism Spectrum Disorder (ASD) affects about 1 in 31 children, however families in rural Georgia face significant barriers to autism diagnostic testing and support services. Barriers include geographic challenges, limited providers to detect developmental delays, and long wait times. To address gaps in autism care across rural Georgia, the Autism ToolKit website was developed to provide educational resources, diagnostic services, and a directory of local services to better support rural Georgia families in accessing autism care. I wrote 5 educational articles on various topics and 4 location guides for rural communities using peer reviewed sources. Most notably, I wrote an article highlighting the EarliPoint tool, which improves early detection of autism by utilizing eye tracking as a biomarker for autism diagnosis in outpatient clinics. The Autism Toolkit website addresses the critical need for refining access to autism care throughout rural Georgia in effort to improve awareness, diagnosis, and earlier support services to improve long term outcomes for autistic individuals.