14th Annual Southeastern Pediatric Research Conference

Healthy Minds, Brighter Futures: Advancing Pediatric Research and Innovation

ABSTRACT BOOK

June 6, 2025
Georgia Aquarium

PRESENTED BY

Children's Healthcare of Atlanta
EMORY UNIVERSITY
Georgia Institute of Technology
MOREHOUSE SCHOOL OF MEDICINE

Table of Contents

Oral Presentation Abstracts

Rapid Microfluidic-Based Detection of ESBL-Producing Enterobacteriaceae to Improve Neonatal and Pediatric Infectious Disease Management

Presenting Author: Samadhi Attanayaka; The Georgia Institute of Technology/Emory University

Poster Number: 1

Attanayaka, Samadhi, Georgia Tech/Emory University; Dissanayaka, Anjana, Georgia Tech/Emory University; Haider, Ali, University of Tennessee Health Science Center; Babiker, Ahmed, Rush University Medical Center; Waggoner, Jesse, Emory University; Myers, David, Georgia Tech/Emory

Background: Antimicrobial resistance (AMR) is a growing global health crisis, contributing to 4.95 million deaths in 2019 (Antimicrobial Resistance Collaborators, 2022). Extended-Spectrum Beta-Lactamase (ESBL)-producing Enterobacteriaceae, which are among the most prevalent AMR pathogens, significantly contribute to neonatal sepsis, affecting 2.2% of live births worldwide (Liu et al., 2020). In Neonatal Intensive Care Units (NICUs), ESBL outbreaks carry mortality rates up to 31% (Detsis et al., 2022). Current culture-based ESBL diagnostics require 24–48 hours, delaying targeted therapy and increasing reliance on broad-spectrum antibiotics like carbapenems — further accelerating resistance (Patel et al., 2017). Rapid, accessible diagnostics are urgently needed to guide early intervention and antibiotic stewardship in neonatal and pediatric care.

Methods: We developed a low-cost, microfluidic-based diagnostic platform for rapid, point-of-care ESBL detection. The system integrates miniaturized antibiotic susceptibility testing (AST) with pH-based colorimetric readouts for real-time resistance profiling. Constructed from affordable materials (acrylic, PDMS, and laser-cut silicone-based dry-adhesive films), the platform is designed for scalable fabrication and clinical adaptability. A programmed layout automatically distributes a 150 µL bacterial suspension into four test chambers with varied antibiotic concentrations. Pre-deposited cephalosporin substrates (e.g., cefotaxime) trigger a pH-dependent color change, producing visual signals upon ESBL activity. We validated the system using clinical isolates, including ESBL-producing strains, and benchmarked performance against conventional methods. All outputs were interpreted by trained users.

Results: Our platform reduces the typical 4+ day workflow after culturing to 15-30 minutes, enabling rapid, accurate identification of ESBL activity. With 100% of correctly prepared devices (5/5) producing accurate results and retaining stability for 28 days, the system demonstrates robust performance and long-term usability. By integrating ESBL detection directly into the device, the platform supports real-time assessment of antibiotic efficacy, facilitating earlier, targeted interventions —particularly critical in neonates and children.

Conclusion: This microfluidic-based platform holds significant promise for transforming pediatric infectious disease management. By enabling rapid, on-site detection of drug-resistant pathogens, it minimizes diagnostic delays that can critically affect outcomes in neonates and young children. Our work supports global antimicrobial stewardship by promoting precise therapy over empiric use, helping to protect the most vulnerable patients during a time of rising resistance.

An Age-Based Temporal Profiling of Blood-Based Biomarkers in Pediatric Traumatic Brain Injury

Presenting Author: Laura Blackwell; Emory University; Rapid Fire presented by Makda Mulugeta, Children's Healthcare of Atlanta

Poster Number: 2

BLACKWELL, LAURA, Emory University; Lepard, Jacob, Children's Healthcare of Atlanta; Alawieh, Ali, Emory University; Zohdy, Youseff , Emory University; Baer, Anna, Emory University; Kobeissy, Firas, Morehouse School of Medicine; Wang, Kevin, Morehouse School of Medicine; Reisner, Andrew, Children's Healthcare of Atlanta

Introduction: Recent studies have demonstrated age-related differences in temporal profiles of TBI-related blood-based biomarkers in adults. Less attention has been given to the complexities of age and development in children. We aimed to conduct a temporal profile analysis of TBI-related blood biomarkers by age group in a pediatric sample.

Methods: Prospective cohort study (N=424; 0-21 years) presenting to the ED following TBI (GCS range 3-15). Blood samples were obtained between 1- and 4-times points (range 1-136hr post injury), measured with Quanterix Simoa platform for GFAP and UCH-L1. Area under the receiver operating characteristic curve (AUC) with 95% confidence intervals was used to examine blood biomarkers, age, severity of injury, and intracranial injury.

Results: Age-related differences were found such that GFAP was better at detecting adolescents (12+ years) with intracranial lesions on CT, compared to younger cohorts (<5 years, 5-12 years); AUC for <5yr = .583 (95%CI = .480-.686), AUC for 5-12yr = .770 (95%CI = .696-.844, AUC for 12+yr = .825 (95%CI = .763-.886). UCH-L1 showed age related differences for CT positivity: AUC for <5yr = .585 (95%CI = .481-.688), AUC for 5-12yr = .702 (95%CI = .616-.788, AUC for 12+yr = .580 (95%CI = .488-.671). Temporal profiles of GFAP showed delayed peaks between 24-60hr for <5yr and slower drops in UCHL1 over time compared to older cohorts.

Conclusions: Age related differences were observed across biomarkers, particular differences noted within the younger cohorts. Further studies to define age-related normal values are warranted.

Development, Validation, and Implementation of an Artificial Intelligence Predictive Model to Accelerate Antibiotic Therapy for Critically Ill Children with Sepsis in the Pediatric ED with Pediatric ICU Disposition

Presenting Author: Kathleen Cao; Emory

Poster Number: 3

CAO, KATHLEEN, Emory University; Braykov, Nikolay, Children's Healthcare of Atlanta; McCarter, Andrea, Children's Healthcare of Atlanta; Kandaswamy, Swaminathan, Children's Healthcare of Atlanta; Orenstein, Evan, Emory University; Ray, Edwin, Children's Healthcare of Atlanta; Carter, Rebecca, Children's Healthcare of Atlanta; Gleeson, Mary Beth, Children's Healthcare of Atlanta; Iyer, Srikant, Children's Healthcare of Atlanta; Muthu, Naveen, Children's Healthcare of Atlanta; and Mai, Mark, Emory University

Background: Pediatric sepsis is a leading cause of morbidity and mortality, accounting for over 72,000 hospitalizations annually in the United States. Prompt recognition and timely antibiotic administration are critical to improving outcomes, yet operational complexity in emergency departments (EDs) often leads to delays. This study aimed to develop, validate, and implement a machine learning-based predictive model to enhance early identification and treatment of sepsis in pediatric ED patients.

Methods: A retrospective observational study was conducted at a large urban academic health system. The cohort included pediatric ED patients who received a fluid bolus with disposition to the Pediatric Intensive Care Unit (PICU) without prior antibiotic administration. A total of 5,534 encounters were used to develop and test the "Sepsis on ED to PICU Disposition" (SEPD) model. Model performance was evaluated during a silent implementation phase using 1,058 additional encounters. Following validation, the SEPD model was deployed into live clinical workflow via a Best Practice Alert (BPA) integrated into the electronic health record (EHR), prompting clinicians to consider early antibiotic administration.

Results: The SEPD model demonstrated strong predictive performance, with an area under the receiver operating characteristic curve (AUROC) of 81.8%, significantly outperforming a vendor-supplied comparator model (AUROC 57.5%). During silent validation, the SEPD model achieved a sensitivity of 85.3% and specificity of 60.5%, with balanced precision-recall metrics. Following live implementation, the BPA facilitated earlier recognition and treatment of sepsis. Over a four-month post-implementation period, the mean time to antibiotic administration improved from 181.2 minutes to 154.1 minutes—a reduction of 27.1 minutes.

Conclusions: The SEPD model, integrated into clinical workflows with a targeted BPA, effectively enhanced early sepsis recognition and expedited antibiotic administration in pediatric ED patients at high risk of deterioration. This study demonstrates the real-world value of applying machine learning to clinical decision support, highlighting its potential to improve outcomes in time-sensitive conditions like pediatric sepsis.

Automated Radiomics-Based Risk Stratification in Pediatric High-Grade Gliomas.

Presenting Author: Paul D'Cunha; Emory University; Rapid Fire presentated by Kartik Reddy; Emory University and Children Healthcare of Atlanta

Poster Number: 4

D'Cunha, Paul, Emory University; Midya, Abhishek, Emory University; Rejimon, Abinand, Emory University; Goldman-Yassen, Adam, Emory University and Children Healthcare of Atlanta; Damaraju, Eswar, Emory University and Children Healthcare of Atlanta; McThenia, Sheila, Emory University and Children Healthcare of Atlanta; Eaton, Bree, Emory University and Children Healthcare of Atlanta; Madabhushi, Anant, Emory University; and Reddy, Kartik, Emory University and Children Healthcare of Atlanta

Background: Despite aggressive multimodal treatment, survival outcomes for pediatric high-grade glioma (pHGG) remain poor. Although radiomics has been extensively studied in many adult and pediatric brain tumors, research investigating radiomics specifically for pediatric high-grade glioma is limited. Additionally, manual segmentation for radiomics is labor-intensive, creating a bottleneck in

radiomics studies.This study addresses both gaps by integrating automated deep-learning segmentation with predictive radiomic modeling.

Methods: We conducted a retrospective analysis of pHGG patients treated at Children's Healthcare of Atlanta (CHOA), who underwent a complete course of radiotherapy and/or surgical resection with biopsy-proven grade 3 or 4 gliomas. MRI sequences included T1, T1-contrast, T2, T2-FLAIR, and Apparent Diffusion Coefficient (ADC). Clinical variables (age, sex, treatment modality, surgical resection extent, progression-free survival, and overall survival) were obtained from electronic medical records. Tumors were automatically segmented using nnUNet, trained on expert-generated ground truth annotations from post-resection and/or post-radiation data from the BraTS 2024 dataset. Radiomic features were extracted using PyRadiomics from post-radiation (post-RT) MRIs. Predictive features for progression-free survival (PFS) and overall survival (OS) were selected via LASSO Cox regression following univariable screening. Models were evaluated using concordance indices (C-index) for radiomics alone (CR-index) and radiomics plus clinical variables (CR+C-index).

Results: A total of 46 children with pathology-proven pHGG were included (training set: n = 32, test set: n = 14). Whole-tumor segmentation from post-RT MRIs yielded the best prognostic performance for OS in the test set (CR-index = 0.77, $p < 0.005$, CR+C = 0.78, $p = 0.005$). For the training set, CR-index = 0.97, $p < 0.001$ and CR+C = 0.98, $p< 0.001$. For PFS test set, CR-index = 0.81, $p = 0.002$, and CR+C-index = 0.83, $p = 0.016$. For the training set, CR = 0.98, $p <0.001$ and CR+C= 0.99, $p < 0.001$.

Conclusion: This preliminary data shows the possibility of a fully automated approach combining nnUNet-based segmentation with post-radiation MRI radiomics that may enable risk stratification in post-radiation pHGG patients. To our knowledge, we are the first to analyze radiomics and biopsy proven pHGG and are the first to present preliminary data for a fully automated approach.

Targeting Mitochondrial Membrane Organization to Mitigate Energy Dysfunction

Presenting Author: Nasab Ghazal; Emory University

Poster Number: 5

Ghazal, Nasab, Emory University; Huang, Benjamin, Emory University; Park, Austin, Emory University; Shoemaker, Luke, Emory University; and Kwong, Jennifer Q, Emory University

Background: Mitochondrial dysfunction is a hallmark of heart failure, characterized by impaired oxidative phosphorylation (OXPHOS) and disrupted mitochondrial ultrastructure. The mitochondrial contact site and cristae organizing system (MICOS) complex plays a critical role in maintaining cristae architecture, which is essential for mitochondrial function. In the heart, loss of the mitochondrial phosphate carrier (PiC) disrupts ATP synthesis and triggers compensatory mitochondrial hyperproliferation, causing structural and functional decline. Meclizine, an FDA approved drug for vertigo, has been shown to promote metabolic adaptation, and thus, may ameliorate cardiac mitochondrial dysfunction. This study examines the effect of meclizine on cardiac function and mitochondrial structural defects in a PiC-deficient mouse model.

Methods: Cardiac-specific PiC knockout mice were treated with meclizine or vehicle, and cardiac function was assessed via echocardiography. Mass spectrometry-based proteomics was used to identify

molecular changes associated with meclizine treatment. Mitochondrial assays were used to assess ATP synthesis, oxygen consumption rate, and metabolic shifts.

Results: Meclizine significantly improved cardiac function, increasing fractional shortening in PiC-deficient mice despite persistent mitochondrial dysfunction. Proteomics revealed that meclizine treatment causes an upregulation of subunits of the mitochondrial contact site and cristae organizing system (MICOS) complex, suggesting an impact on mitochondrial architecture. Additionally, meclizine reduced mitochondrial hyperproliferation, which may restore muscle organization and enhance contractility. While mitochondrial ATP synthesis and oxygen consumption remained impaired, the observed reduction in mitochondrial hyperproliferation and structural improvements point to a mechanism beyond energy production. Unexpectedly, glycolytic enzymes (PDK4 and LDH) were downregulated, with lactate levels decreasing, suggesting that meclizine can decrease lactic acidosis enhancing myocardial function without shifting to glycolysis.

Conclusion: Our data suggest that meclizine's ability to restore mitochondrial ultrastructure is due in part to the upregulation of the MICOS complex and reduction of mitochondrial hyperproliferation. In this way, meclizine may function by stabilizing mitochondrial architecture to improve cardiac muscle function. These results open new doors for therapeutic strategies to improve cardiac function by targeting mitochondrial organization and offer a new pathway to mitigate mitochondrial cardiomyopathies. Future research will aim to unlock the precise mechanisms by which mitochondrial structural changes influence cardiac health and explore the broader implications of heart disease treatment.

Targeting Stat3 Vulnerability in Ptpn11-Mutated Juvenile Myelomonocytic Leukemia

Presenting Author: Carly Harris; Department of Pediatrics, Emory University School of Medicine

Poster Number: 6

HARRIS, CARLY, Department of Pediatrics, Emory University School of Medicine; Yu, Wen-Mei, Department of Pediatrics, Emory University School of Medicine; and Qu, Cheng-Kui, Department of Pediatrics, Emory University School of Medicine

Background: Juvenile myelomonocytic leukemia (JMML) is a rare and aggressive pediatric myeloproliferative neoplasm. This cancer has a 40% relapse rate post-transplant, highlighting the need for a novel therapeutic approach.

A significant percentage of JMML cases are caused by a gain-of-function mutation in PTPN11, which encodes the protein tyrosine phosphatase SHP2 and promotes hyperactive Ras-MAPK signaling. We previously found in a mouse model that knock-in Ptpn11E76K/+/VavCre mutant leukemic stem cells (LSCs) have diminished Stat3 phosphorylation, yet remain dependent on the Stat3 protein for survival, suggesting an exploitable vulnerability.

We aim to explore this potential vulnerability through a series of experiments utilizing control Ptpn11+/+/VavCre mice cells, knock-in Ptpn11E76K/+/VavCre mice LSCs, and FDA-approved Stat3 inhibitor Atovaquone.

Methods: To evaluate the effects of Stat3 inhibition, lineage-negative (Lin−) cells were isolated from bone marrow of Ptpn11+/+/VavCre and mutant Ptpn11E76K/+/VavCre knock-in mice using a Lineage Cell Depletion Kit and magnetic columns. Colony-forming unit granulocyte-macrophage (CFU-GM) assays were conducted to assess myeloid differentiation. Lin- Cells were cultured in vitro for 4–6 days in StemSpan media supplemented with SCF, TPO, and FLT3L, and varying concentrations of Atovaquone. Myeloid cell differentiation and apoptosis were analyzed using flow cytometry. Phospho-Stat3 status was analyzed using Western blot.

Results: Western blot confirmed reduced Stat3 phosphorylation in Ptpn11E76K/+/VavCre Lin- cells. Treatment with Atovaquone reduced both the size and number of colonies in CFU-GM assays, suggesting inhibited myeloid differentiation. In vitro culture of Ptpn11E76K/+/VavCre cells showed enhanced myeloid differentiation at baseline, and reduced differentiation following Atovaquone treatment compared to Ptpn11+/+/VavCre. Apoptosis assays revealed more apoptotic cells in Ptpn11+/+/VavCre cells compared to Ptpn11E76K/+/VavCre after Stat3 inhibitor exposure.

Conclusion: This data has been collected using Lin- cells as an experimental model, and the next step will focus on treatment of stem cells. This preliminary data supports the hypothesis that Ptpn11E76K/+/VavCre mutant LSCs are more sensitive to pharmacological inhibition of Stat3. This validates Stat3 as a promising therapeutic target in JMML. These findings pave the way for potential drug repurposing strategies to treat JMML patients with Ptpn11 mutations.

Viral Priming Offers a Novel Two-Hit Model of Murine Sepsis-Associated Acute Kidney Injury

Presenting Author: Karly Laprocina*; University of Alabama Birmingham- School of Medicine

* Medical Student Travel Award Recipient - Funded by Pediatric Residency Investigative Scholars at Emory (PRISE) Program

Poster Number: 7

LAPROCINA, KARLY, University of Alabama Birmingham (UAB)- School of Medicine; Vollmer, Giacynta, UAB; Richter, Jillian R, UAB; Richter, Robert P, UAB; and Odum, James D, UAB

Background: Sepsis is a dysregulated immune response to infection resulting in life-threatening organ failure, especially when associated with acute kidney injury. In children, viral infection prior to bacterial sepsis is associated with a particularly severe sepsis phenotype manifesting with hyperferritinemia and multiorgan failure. Similarly, a preclinical model of “viral priming” prior to bacterial sepsis demonstrates substantially greater organ injury compared to bacterial sepsis alone. However, the impact of viral priming on the presence of sepsis-associated acute kidney injury (SA-AKI) remains unknown. The objective of this study was to determine the effect of viral priming, using polyinosinic-polycytidilic acid (poly(I:C)), on kidney function in a murine model of lipopolysaccharide (LPS)-induced systemic inflammation.

Methods: Male 8-week-old C57BL/6J mice received 2.5 mg/kg of poly(I:C) or vehicle (0.9% saline) via intraperitoneal (IP) injection 24h prior to LPS. At 0h, LPS 0.5 mg/kg was injected IP, and blood, urine, and kidneys were collected at 8h and 48h. Plasma creatinine was measured via liquid chromatography-mass spectrometry. Urinary kidney injury molecule-1 (KIM-1) was measured by ELISA, and KIM-1 was localized

in the kidney using immunofluorescence (IF). Glomerular filtration rate (GFR) was quantified using transcutaneous measurements of FITC-labeled sinistrin 4h and 48h after LPS. A Student's t test was used for comparisons (α=0.05).

Results: Poly(I:C)+LPS resulted in elevated plasma creatinine compared to LPS alone at 8h (0.11±0.02 vs. 0.07±0.01 mg/dL, p=0.018) and 48h (0.14±0.01 vs. 0.07±0.01 mg/dL, p=0.002). GFR was reduced in mice receiving poly(I:C)+LPS relative to LPS alone at 4h (20.2±1.6 vs. 110.5±7.2 µL/min, p<0.001) and 48h (51.2±30.3 vs. 178.9±23.0 µL/min, p=0.014). While urinary KIM-1 at 8h was not significantly different between poly(I:C)+LPS and LPS alone (p=0.2640), IF demonstrated increased KIM-1 tubular epithelial staining at 48h only in mice challenged with poly(I:C)+LPS.

Conclusions: The sequential, "two-hit" administration of poly(I:C) followed by LPS leads to a pronounced reduction in GFR by 4h post-LPS versus LPS alone. Additionally, tubular epithelial injury persists for at least 48h post-LPS in this two-hit model. This suggests that a preclinical murine model of hyperferritinemic sepsis is well suited to further interrogate mechanisms responsible for the development of SA-AKI with promising relevance to human health.

Mechanisms of bacterial tolerance by host neutrophils and macrophages in cystic fibrosis

Presenting Author: Deepali Luthra; Emory University

Poster Number: 8

Deepali Luthra, Brian Dobosh, Justin Hosten, Rabindra Tirouvanziam

Background: Cystic fibrosis (CF) airways are often chronically infected by P. aeruginosa, although this does not occur before alterations are detected in airway macrophages (exhaustion) and neutrophils (reprogramming). Notably, our prior studies showed that neutrophils recruited to the CF airway milieu acquire the GRIM (granule-releasing, immunomodulatory, and metabolically active) fate that combines hyperexocytosis with an active repression of bacterial killing. Here, we sought to determine whether CF airway-conditioned macrophages also display altered bacterial killing.

Methods: To obtain CF-airway conditioned macrophages, blood monocytes were transmigrated in our biomimetic lung model into CF airway supernatant (CFASN) purified from sputum, then treated for 4 days with M-CSF to enable differentiation. Leukotriene B4 combined with CCL2 was used as a chemoattractant control condition. P. aeruginosa (PAO1 strain) was incubated with monocytes post-transmigration and macrophages post-transmigration and differentiation at different timepoints (1 and 4 hrs), and multiplicities of infection (MOI of 1 and 10). Bacterial killing was assessed based on colony forming units (CFU).

Results: Airway-recruited monocytes (ArMos) and macrophages (ArMas) produced in our model killed PAO1 at all timepoints with a MOI of 1. However, when using a MOI of 10, CFASN-conditioned ArMas, but not ArMos, showed 50% or more reduction in PAO1 killing compared to control ArMas, at both 1 and 4 hour timepoints. We previously identified the histone deacetylase HDAC11 in CFASN-conditioned neutrophils as key mediators of their bacterial tolerance phenotype, and found here that treatment with the HDAC11 inhibitor SIS-17 normalized bacterial killing by both CF ASN-conditioned neutrophils and ArMas.

Conclusion: Transepithelial migration combined with CFASN conditioning does not induce defective P. aeruginosa killing by monocytes, but does so in macrophages at an MOI of 10. These data suggest macrophages mimic neutrophils in actively repressing bacterial killing in CF airways, making them prime target for host-directed, anti-infective therapy.

Visual Function and Intraocular Pressure Outcomes Following Surgical Intervention in Pediatric Patients with Inflammatory Glaucoma

Presenting Author: Abhiram Manda; Vanderbilt University School of Medicine

Poster Number: 9

MANDA, ABHIRAM, Vanderbilt University School of Medicine; Ji, Xiangyu, Vanderbilt University Medical Center; Comstock, Jordan, Vanderbilt Eye Institute; Kim, Stephen, Vanderbilt Eye Institute; Chen, Qingxia, Vanderbilt University Medical Center; Joos, Karen, Vanderbilt Eye Institute; and Gangaputra, Sapna, Vanderbilt Eye Institute

Background: Pediatric uveitic glaucoma is a rare but chronic condition, requiring serial monitoring and long-term management by both uveitis and glaucoma specialists. Given the highly varied presentation of uveitis and anatomical structures involved, the treatment of pediatric uveitic glaucoma necessitates an individualized approach. This study compared the visual outcomes of surgically treated eyes in pediatric patients with inflammatory glaucoma to a cohort of similar-aged pediatric uveitis eyes that did not undergo glaucoma surgery in order to inform treatment of this rare condition.

Methods: A retrospective chart review was performed of patients diagnosed with inflammatory glaucoma before the age of 18 years. Outcomes, including intraocular pressure (IOP), visual acuity (VA), and inflammatory activity were assessed over two years. A General Estimating Equations (GEE) model was employed to investigate the associations between longitudinal IOPs and potential risk factors.

Results: Thirty-six eyes (18 surgically managed, 18 non-surgical) were included in this study. At baseline, the surgical eyes had significantly higher median IOP than the non-surgical pediatric uveitis eyes (31.5 mmHg versus 15.0 mmHg; $p < 0.001$). Two years later, the median IOP between the surgical eyes and non-surgical eyes was not significantly different (12.0 mmHg versus 13.5 mmHg; $p = 0.14$). Median visual acuity (VA) was not significantly different between surgically managed eyes (logMAR 0.35 [IQR: 0.10 – 0.50] and non-surgical eyes 0.10 [IQR: 0.03 – 0.85]; $p = 0.92$) at baseline. At two years, the median VA in surgical eyes improved to 0.30 (IQR: 0.12 – 0.70), while the non-surgical eyes maintained a stable median VA of 0.10 (IQR: 0.00 – 0.20). The number of glaucoma medications in the surgical eyes decreased considerably, with 77.8% of eyes on three or more IOP-lowering medications at baseline compared to 5.6% at two years.

Conclusion: Our data showcases that glaucoma surgery in pediatric patients with well-controlled uveitis can provide significant benefit to patients that are refractory to medical management, by reducing IOP and glaucoma medication burden, with excellent visual outcomes at two years.

Screening and Evaluation of Antiviral Compounds Against Respiratory Syncytial virus

Presenting Author: Asha Mathew; Emory University

Poster Number: 10

MATHEW, ASHA MARIA , Emory University; Singh, Uma S., University of Georgia; Kesesidis, Nikolaos , Emory University; Zhang, Huanchun , Emory University; Zheng, Jeffrey Shi Jie , Emory University; Lan, Shuiyun , Emory University; Chu , Chung K., University of Georgia; and SARAFIANOS, STEFAN G., Emory University

Background: Respiratory syncytial virus (RSV) is a leading cause of respiratory infections in infants, young children, and elderly adults, causing severe lung infections such as bronchiolitis and pneumonia. However, despite the large number of patients exposed to RSV, there are not many options for treatments available. For vaccines, there are 3 FDA-approved vaccines named Abrysvo, mResvia and Arexvy for older adults at high risk for RSV. Moreover, Nirsevimab and Palivizumab are monoclonal antibodies used as preventative measures for infection in young children. Finally, there is only one antiviral, Ribavirin, currently utilized for RSV, but its use has been limited to patients with severe symptoms due to its low efficacy, high cost, and toxicity. There is an urgent need for development of novel anti-RSV drugs and virucides . We tested the antiviral potential of several nucleoside analogs developed by our collaborators. In this study, we report the potent in vitro antiviral activity of one of these compounds, CPA, against RSV.

Methods: We used a recombinant RSV strain with GFP to screen test compounds for antiviral activity in RSV-permissive cell lines, with GFP fluorescence indicating viral replication and helping identify inhibitors. Cytotoxicity was assessed using an XTT-based assay. Effective concentrations (EC50) and cytotoxic concentrations (CC50) were calculated, and the selectivity index (SI) was determined by the CC50/EC50 ratio to rank the safety and specificity of the compounds. In situ hybridization and microscopy analyses were performed to assess the replication and entry of the virus in the presence of the compound across different cell lines.

Results: One of the compounds that we tested called CPA, acts as a promising inhibitor of RSV replication, demonstrating a broad-spectrum antiviral effect against multiple RSV strains. Microscopy studies reveal that the compound targets key stages of the RSV life cycle, including replication, without significant cytotoxicity in host cells.

Conclusion : These findings suggest that the compound CPA represents a promising candidate for the development of a novel, targeted antiviral therapy against RSV. Further animal studies are warranted to evaluate its safety, efficacy, and potential for use in clinical trials.

Modulating the Medulloblastoma Immune Response Through Nanoparticle Drug Delivery

Presenting Author: Leon McSwain; Emory University

Poster Number: 11

Leon McSwain, Emory University; Kyoungtea Kim, University of North Carolina Chapel Hill; Jon Jacques, Emory University; Marina Sokolsky, University of North Carolina Chapel Hill; Timothy Gerson, Emory University

Background: Medulloblastoma (MB) is the most common malignant pediatric brain tumor, constituting approximately 20% of all childhood brain cancers. MB is generally considered an immunologically “cold”

tumor with limited infiltration of immunologic effector cells. However, microglia and bone marrow–derived macrophages are the predominant immune cell populations in MB, and their roles in tumor dynamics remain poorly understood. In this study, we investigated whether tumor-associated macrophages could be modulated using a blood–brain barrier–penetrant nanoparticle formulation of the TLR7/8 agonist resiquimod (ResiPOx) to induce an anti-tumor response and prolong survival.

Methods: We studied mice engineered to develop medulloblastomas, including the GFAP-Cre;SmoM2f/f (G-Smo) and Math1-Cre;SmoM2f/f (M-Smo) genotypes. For event-free survival studies, we treated mice G-Smo with 3 IP doses of ResiPOx or saline EOD from p10 to p15 and then followed until onset of tumor progression. To study pharmacodynamic (PD) changes, we similarly treated G-Smo or M-Smo mice and harvested brain at p16 for analysis using immunohistochemistry (IHC), flow cytometry, and western blotting. Additionally, we studied PD effects in isolated mouse bone marrow macrophages (BMDMs) or PBMC-derived donor monocytes. These cells were differentiated in mCSF, exposed to ResiPOx for 24 hours, and then subjected to bulk RNA sequencing.

Results: Following treatment with three doses of ResiPOx, G-Smo mice demonstrated improved overall survival, suggesting a survival benefit potentially mediated by immune modulation. Analysis via flow cytometry, IHC, and western blotting at p16 revealed a higher proportion of BMDMs and microglial cells relative to total cell populations and increased levels of interferon-beta (IFNβ) signaling molecules indicative of macrophage polarization. Furthermore, zsGreen-positive tumors treated with ResiPOx showed a marked increase in zsGreen-positive macrophages, suggesting that the proliferating macrophages induced by ResiPOx are phagocytically active. In vitro, mouse bone marrow–derived and donor PBMC-derived macrophages exhibited robust induction of IFNβ, T-cell activation signaling, and proliferation-associated gene signatures after treatment with ResiPOx.

Conclusion: Overall, our study indicates that the nanoparticle formulation of resiquimod is bioactive and effectively promotes the proliferation and polarization of macrophages toward an anti-tumoral phenotype, leading to improved survival in medulloblastoma models.

Heterozygous Deletion of Two 22q11.2 Mitochondrial Genes Suppresses Congenital Heart Defects Associated with 22q11.2 Deletion Syndrome

Presenting Author: Austin Park; Emory University

Poster Number: 12

PARK, AUSTIN S., Emory University; Ohanele, Chiemela, Emory University; Faundez, Victor, Emory University; and Kwong, Jennifer Q., Emory University

Background: Congenital heart defects (CHDs) are the most common birth defect, affecting nearly 1% of newborns, yet their pathogenesis remains relatively unclear. CHDs frequently occur in chromosomal deletion syndromes. Notably, ~75% of individuals with 22q11.2 deletion syndrome (22q11.2DS)—the most common chromosomal microdeletion syndrome—present with CHDs. One deleted gene in 22q11.2DS implicated in the cardiac presentation is SLC25A1, a gene encoding the mitochondrial citrate carrier. In recent work, we found hemizygous deletion of Slc25a1 in mice is sufficient to recapitulate cardiac defects found in 22q11.2DS by altering gene expression important for metabolic maturation in the developing heart. SLC25A1 has been shown to interact with the mitochondrial ribosome subunit MRPL40, another mitochondrial protein compromised in 22q11.2DS. Although the mitochondrial

ribosome is essential for translation of mitochondrial proteins required for oxidative phosphorylation, research also shows that reduction in mitochondrial translation can promote cardiomyocyte proliferation. Here, we hypothesize that the heterozygous deletion of both Slc25a1 and Mrpl40 could exacerbate the incidence and severity of cardiac defects when compared with heterozygous deletion of Slc25a1 alone.

Methods: Timed matings were conducted between Mrpl40+/- and Slc25a1+/- mice. Embryos were collected at E14.5 and assessed for differences in survival and crown-rump length. Embryonic hearts were histologically analyzed for changes in cardiac morphology.

Results: Heterozygous deletion of Mrpl40 alone, as well as heterozygous deletion of both Mrpl40 and Slc25a1, did not result in any changes in embryonic survival or growth when compared to wild-type embryos. In embryonic hearts, we found that heterozygous deletion of Mrpl40 alone was sufficient to produce ventricular septal defects (VSDs). Notably, we observed a decrease in prevalence of VSDs in embryos heterozygous for both Mrpl40 and Slc25a1 when compared with a single heterozygous deletion.

Conclusions: Heterozygous knockout of Mrpl40 was sufficient to produce cardiac defects, suggesting a role for MRPL40 as a mitochondrial regulator of cardiac morphogenesis. Our findings also suggest that partial loss of Slc25a1 and Mrpl40 have counteracting effects on the developing heart, suggesting that chromosomal microdeletions like 22q11.2DS involve a complex network of interactions and challenging the idea that deleted genes collectively exacerbate disease phenotypes.

Genetic Counseling in Cancer Survivorship Clinic

Presenting Author: Erin Seibel; Emory University School of Medicine/Children's Healthcare of Atlanta

Poster Number: 13

Seibel, Erin, Emory University; Williamson Lewis, Rebecca, Emory University; Cherven, Brooke, Emory University; Pencheva, Bojana, Emory University; Mitchell, Sarah, Children's Healthcare of Atlanta; Effinger, Karen E., Emory University

Background: Childhood cancer survivors are more likely than their cancer-free counterparts to have a pathogenic germline mutation in a cancer predisposition gene (CPG). CPG mutations increase the likelihood of subsequent malignancies. Surveillance for CPG positive individuals can lead to earlier diagnosis, associated with improved prognosis and survival. Knowledge of a predisposition can help providers incorporate cancer surveillance into survivorship care. While there is a demonstrated utility for genetic counseling in survivorship clinics, many do not have genetic counselors (GCs), creating a barrier to genetic testing for patients. We hypothesize that embedding a GC in survivor clinic can facilitate testing to clarify more survivors' cancer risk and coordinate management to decrease mortality.

Objectives: The objective of this study is to evaluate the impact of full-time GC embedded in a cancer survivorship clinic.

Design/Method: This retrospective chart review analyzed the number of patients seen for genetic counseling, the number of tests completed, and actionable results received after GC integration in the Aflac Survivor Clinic on August 1, 2022. The percentage of patients seen in the first year with embedded

GC coverage was compared to those seen between 8/1/21-7/31/22 when survivor patients were seen on a consult basis.

Results: One year prior to GC integration, 15.0% of survivors (144/960 visits) had engaged with genetic counseling (10.9% prior, 4.1% at survivor visit). After embedded GC coverage, 26.1% of patients (247/943 visits) engaged with genetic counseling – 15.4% cancer prior to their visit and 10.8% during their survivor visit. Since GC integration, 76 patients completed genetic testing. Of those, 48 had negative results, 18 (23.7%) had uncertain or carrier results, and 10 (13.1%) had positive results. Positive results included variants in the following genes: ETV6, WT1, TP53, RB1, CHEK2, and ATM. One patient was found to have a secondary malignancy shortly after testing, related to their CPG variant. All positive results have either pediatric management implications or cascade testing recommendations.

Conclusion: A GC embedded in a survivorship clinic increased the number of patients with GC contact by 75%, which can facilitate testing for patients and families, and identify predispositions to guide tailored cancer surveillance.

Development of a Novel Deep Learning Model for the Interpretation of Neonatal Radiographs

Presenting Author: Puneet Sharma; Emory University School of Medicine

Poster Number: 14

Huang, Yixuan, Harvard T.H. Chan School of Public Health; SHARMA, PUNEET, Emory University School of Medicine; Palepu, Anil, Massachusetts Institute of Technology; Greenbaum, Nathaniel, Beth Israel Deaconess Medical Center; Beam, Andrew, Harvard T.H. Chan School of Public Health; and Beam, Kristyn, Beth Israel Deaconess Medical Center

Background: Recent developments in deep learning have allowed artificial intelligence models to interpret medical imaging to make important diagnostic and management recommendations. While this technology has grown in adult and pediatric populations, it has not yet been applied to the neonatal population in a systematic manner.

Objective: To develop a novel, deep contrastive learning model to predict common pathologies from radiographs relevant to neonatal intensive care.

Methods: We identified a retrospective cohort of all infants admitted to the NICU at Beth Israel Deaconess Medical Center from January 2008 to December 2023. Infants were excluded if they did not obtain a radiograph during the admission. We collected radiographs with corresponding reports and relevant demographics for all subjects. We randomized the cohort into three sets: training (80%), validation (10%), and test (10%). Using a BioVIL-T backbone, we pre-trained a novel model to identify 15 unique pathologies and 5 medical devices relevant to neonatal intensive care on plain film radiographs. To fine-tune the image model, we extracted labels from the reports using Mixtral-8x7B, a large language model (LLM). We compared the performance of our fully pre-trained and fine-tuned model against various control models to assess model performance as defined by AUROC.

Results: We identified 4629 infants meeting our inclusion and exclusion criteria. After randomization, 3731 infants were in the training set, 419 infants in the validation set, and 479 in the test set. In addition to demographic data, we collected 20154 radiographs with a corresponding 15795 reports for these

infants. The LLM extracted labels from the reports with a median accuracy of 0.95 (0.85 - 1.00). Our model outperformed all baseline models for every label other than portal venous gas. The AUROCs of the model were higher for all labels with the addition of demographic data, but the difference was not statistically significant.

Conclusions: We trained and validated a novel, deep learning model which successfully identified several common pathologies and medical devices on neonatal radiographs. Our model outperforms similar models trained and developed on adult populations. This represents the first such application of advanced machine learning methodologies to interpret neonatal radiographs.

Modeling Fragile X Syndrome in Human Hippocampal Organoids Reveals Altered Developmental Trajectories and FMRP Binding Dynamics

Presenting Author: Jie Xu; Emory University

Poster Number: 15

Xu, Jie, Emory University; Ma, Wenjing, Emory University; Yu, Shaojun, Emory University; Li, Yujing, Emory University; Jin, Peng, Emory University; Wen, Zhexing, Emory University

Fragile X syndrome (FXS), a leading genetic cause of intellectual disability and autism spectrum disorder, is typically caused by CGG trinucleotide repeat expansion (>200 repeats) within the 5' UTR of the FMR1 gene that results in gene silencing and a complete loss of its protein product, fragile X messenger ribonucleoprotein (FMRP). FMRP is a multifunctional protein that binds to selective mRNAs and regulates their stability, editing, transport, and translation. As a key brain region for learning, memory, and emotional processing – and a major site of FMR1 expression – the human hippocampus is of particular interest, especially in understanding how FMRP loss affects its development. Indeed, anxiety and aggressive behaviors are common in FXS patients, and brain volume examinations revealed hippocampal enlargement in younger patients, suggesting hippocampal abnormalities. However, the regulatory role of FMRP and the impacts of its loss during human hippocampal development have yet to be explored. To address these questions, we generated human hippocampal organoids (HOs) from FXS patient derived- and healthy control derived-iPSCs. Through transcriptomic, cellular, and electrophysiological analyses, we observed altered developmental trajectories, specifically increased neurogenesis and decreased gliogenesis in FXS HOs, which may contribute synergistically to the neural network hyperexcitability observed in them. To investigate potential mechanisms underlying aberrant neurogenesis and gliogenesis, we performed eCLIP-seq on HOs at the early and late stages and identified developmental stage-specific FMRP mRNA targets that correspond to the predominant biological processes at each stage. In particular, we demonstrated, for the first time, a switch in FMRP binding targets from genes involved in cell cycle and neurogenesis at the early stage to genes involved in gliogenesis at the late stage, highlighting a dynamic temporal regulatory role of FMRP during hippocampal development. Further construction of gene regulatory networks in HOs by single-cell transcriptomic analyses revealed key regulons targeted by FMRP that may drive the altered developmental trajectories in FXS HOs. Together, our study delineates the molecular, cellular, and functional impacts of FMRP loss on hippocampus development and provides new insights into the regulatory role of FMRP and its RNA binding dynamics during major developmental processes, offering potential avenues for therapeutic advancement.

Consumption of Low-Calorie Sweeteners among Children Aged 6 Months to 5 Years in the United States, NHANES 2017–2020

Presenting Author: Xinyu Zhu; Emory University

Poster Number: 16

Zhu, Xinyu, Emory University; Sylvetsky, Allison, The George Washington University; Luo Hanqi, Emory University; Hartman Terryl, Emory University; Welsh Jean, Emory University

Background: Although the American Academy of Pediatrics advises against low-calorie sweeteners (LCS) consumption by children <5 y due to potential health and development concerns, the extent of this consumption among these children is unknown. The objective of this study was to describe the intake, sources, and dietary patterns associated with LCS consumption among United States infants and preschoolers.

Methods: We used cross-sectional 24-h dietary recall data (day 1) among 1497 children aged 6 mo to 5 y from the National Health and Nutrition Examination Survey 2017–2020 prepandemic. Complex survey procedures and sampling weights were applied to compare LCS consumption patterns (prevalence and frequency [times/day] of any LCS, any LCS-containing beverages [LCSBs], and any LCS-containing foods [LCSFs], with each occurrence of consumption = 1 “serving”) across demographic subgroups and to assess the associated nutrients and % of total energy intake (TEI).

Results: Thirty-one percent of children aged 6 mo to 5 y consumed 1 LCSB and/or LCSF on a given day. The prevalence of LCS consumption increased with age, 10.5% (6 to <12 mo) to 34.3% (2–5 y). Among LCS consumers, mean serving frequency was 1.4 times/d, with no differences by age or sex. Of all LCSBs servings consumed, 64.0% were fruit drinks; 57.8% of all LCSFs servings were non-Greek yogurt. As consumption levels increased from no LCS to >1 serving/d, intake of the following also increased: total sugar (+1.8% TEI, P-trend=0.04), added sugar (+1.1%, P-trend=0.048), sodium (+304 mg, P-trend=0.04), and fiber (+0.8 g, P-trend=0.01). In contrast, protein intake was lower (-0.7% TEI, P-trend=0.02). Those consuming 1 LCS serving/d consumed more total energy than LCS nonconsumers (1606 compared with 1401 kcal), but TEI did not increase further with >1 LCS serving/d (1607 kcal). LCS consumption was not associated with carbohydrate or fat intake.

Conclusions: LCS consumption, primarily from fruit drinks and non-Greek yogurt, is prevalent among United States preschoolers, and this consumption is associated with greater intake of total sugar, added sugar, and sodium.

Rates of Familial Autism Diagnostic Recurrence in Infants Followed Prospectively from Birth

Presenting Author: Jules Zielke; Emory University

Poster Number: 17

ZIELKE, JULES, Emory University; Klaiman, Cheryl, Emory University; Schultz, Sarah, Emory University; Klin, Ami, Emory University; and Jones, Warren, Emory University

Background: Autism is estimated to occur at 10 times higher rates for siblings of individuals on the autism spectrum relative to the general population. Previous research indicates that siblings (probands) of diagnosed individuals have a recurrence rate of autism of 20.2% [16.6%–24.3%] when diagnosed at 3 years of age (Ozonoff et al., 2024). These recurrence rates vary significantly by proband sex, with siblings of autistic males diagnosed at a recurrence of 22.5% [18.3%–27.4%], and siblings of autistic females diagnosed at a recurrence of 34.7% [24.5%–46.6%] (Ozonoff et al., 2024).

Methods: The aim of this study is to report and statistically-compare recurrence rates from the literature with recurrence observed in infants at elevated familial likelihood for autism (N = 550). We compare recurrence rates across proband and individual sex. Infants were followed from birth until age of outcome diagnosis at 24-36 months of age. Final diagnoses were assigned by clinician best estimate diagnosis based on comprehensive evaluations using standardized assessments of verbal and social disability and were reviewed by a panel of expert clinicians.

Results: The observed recurrence rate in this sample was 26.4% [21.1%–31.8%]. The recurrence rate for individuals with male siblings was 28.72% [22.37%–35.07%] and the recurrence rate for individuals with female siblings was 23.21% [12.16%–34.27%]. The recurrence rate for male individuals was 31.58% [24.61%–38.55%], while the recurrence rate for female individuals was 16.67% [8.97%–24.37%].

Conclusions: Overall recurrence rate was consistent with prior literature. However, siblings of female probands were not more likely to be diagnosed than siblings of male probands. Individual sex was a significant predictor of recurrence rate, as in previous studies. Diagnostic sex ratio of male:female was ~2:1 versus the 4:1 in the literature. This is interesting given literature on potential female autism underdiagnosis, particularly at young ages. Following infants from birth may thus provide increased opportunities to identify signs of autism at earlier ages. In addition, this autism diagnostic prevalence information has important implications for ongoing discussions about diagnostic decision-making by clinicians and conversations about diagnoses with and within families.

Poster Competition Abstracts

Pulsatile Macroperfusion Assay to Study In Vitro Vascular Models

Presenting Author: Lena Do; Georgia Institute of Technology

Poster Number: 18

Debord, Wyatt, Georgia Institute of Technology; DO, LENA, Georgia Institute of Technology; FERARY, GIOVANNI, Georgia Institute of Technology; FERARY, JOSEPH, Georgia Institute of Technology; Saadeh, Maher, Emory University; Parab, Manasvi, Emory University; Tomov, Martin, Emory University; Serpooshan, Vahid, Emory University; and Bauser-Heaton, Holly, Emory University

Background: Accurately modeling physiological hemodynamics is integral to studying the pathophysiology of vascular diseases, such as elastin arteriopathies like Williams Syndrome (WS). While microfluidic systems are generally used to model these vascular complications, they prevent the measurement of micromechanical forces like cyclic stretch, which play a significant role in vascular extracellular matrix remodeling. Consequently, a physiologically accurate macrofluidic perfusion model that maintains these 3D forces is crucial to understanding stenosis development. This study outlines a method for inducing pulsatile flow through a PA bioprinted model, enabling analysis of blood vessel characteristics as it manifests in pediatric WS.

Methods: The bioprinted arterial model was fabricated using our lab's custom hydrogel mixture and digital-light processing (DLP) printer. The model was placed inside a resin bioreactor, with the inlet and outlets of the bioprint aligned with the perfusion system connectors. An ISMATEC peristaltic pump was used to pump phosphate buffer solution (PBS) from a reservoir, through the bioprint, and back into the reservoir. A linear actuator with a potentiometer was positioned between the pump and the bioreactor to induce pulsatile flow at approximately 1 Hz. The linear actuator was programmed using Arduino IDE and powered using a BTS7960 motor driver and Arduino Mega microcontroller. Pressure measurements were obtained using a pressure transducer.

Results: The macroperfusion system sustained a flow rate up to the maximum rate provided by the peristaltic pump, which was 10 mL/min. At flow rates ranging from 2 to 8 mL/min in the pulsatile macroperfusion system, systolic pressure was maintained around 20-25 mmHg while diastolic pressure was maintained around 4-7 mmHg. The produced pressure waveform demonstrated a pulsatile waveform, but did not closely match a typical arterial pressure waveform.

Conclusion: While the produced pulsatile pressure waveform did not match typical pulmonary arterial pressure waveforms, systolic and diastolic pressures were observed. Flow circuit alterations, like the addition of a syringe-controlled water column, could help improve pressure control and facilitate the development of a perfusion system that accurately models physiological pulsatile pressures, allowing for enhanced vascular disease models.

Lactococcus lactis subspecies cremoris, mitigates metabolic disease and induces hepatoprotection by driving changes in the metabolome between the gut and liver

Presenting Author: Camilo Anthony Gacasan; Emory University School of Medicine

Poster Number: 19

GACASAN, C. ANTHONY, EMORY UNIVERSITY SOM; Weinberg, Jaclyn, Emory University SOM; Naudin, Crystal Emory, University SOM; Askew, Lauren, University SOM; Barbian, Stefi, University SOM; Jones, Dean, University SOM; and Jones, Rheinallt

Background: The gut-liver axis is a dynamic communication network mediated partly by gut-derived metabolites formed by both host cells and resident microbes. This project aims to understand the probiotic driven changes to the metabolome between the gut and liver induced by the beneficial microbe, Lactococcus lactis ssp cremoris and how these changes confer protection against metabolic disease and hepatic injury.

Methods: C57BL/6 mice were fed a western-style high-fat, high-carbohydrate diet and supplemented with 1×10^9 colony-forming units of LLC (ATCC 19257), Lactobacillus rhamnosus GG (LGG) (ATCC 53103), or an HBSS vehicle control three times weekly for 16 weeks to assess long-term metabolic outcomes. Serum and liver metabolites were measured using liquid chromatography–high-resolution mass spectrometry (LC-HRMS) and analyzed with publicly available computational tools and pathway enrichment algorithms. We similarly supplemented probiotics to mice fed a control diet and subjected them to an acute acetaminophen (APAP) challenge (300 mg/kg) to assess liver damage via histology. Differential gene expression was analyzed via RT-qPCR.

Results: We identified LLC as a salient probiotic in attenuating western diet-induced obesity and hepatic steatosis. Unbiased metabolomic analysis revealed distinct small molecule changes in serum and liver of LLC-treated mice compared to vehicle and LGG. Pathway enrichment analysis revealed prominent changes in pathways relating to unsaturated fatty acid biosynthesis (Enrichment Factor [EF] = 5.909), hepatic tryptophan metabolism (EF = 1.88), riboflavin metabolism (EF = 4.308), and Cyp450-related pathways (EF = 1.74) (Figure 1). Following APAP challenge, LLC-treated mice showed significantly reduced centrilobular necrosis ($P < 0.05$) versus vehicle. Multiple genes including changes to Farsenoid X Receptor (FXR) and NRF2 downstream targets were upregulated ($P<0.05$) in the liver of LLC treated mice compared to control.

Conclusion: LLC is a highly efficacious probiotic that when supplemented in the context of a western-style diet in mice results in a distinct population of gut derived changes in serum and liver metabolites that may be driving advantageous metabolic phenotypes. Additionally, these changes in the metabolome lead to a primed hepatoprotective state that mitigates acetaminophen induced hepatotoxicity likely through upregulation of genes downstream of both FXR and NRF2.

Indole-3 acetic Acid Inhibits Lipopolysaccharide-induced Endothelial Cell Activation and Vascular Inflammation

Presenting Author: Nazia Hoque; Mercer University, Atlanta

Poster Number: 20

HOQUE, NAZIA, Mercer University, East West University; Jones, Morgan, Mercer University; Sooreni, Samira, Mercer University; Ezewudo, Emmanuella, Mercer University; Simon, Nimi, P., Mercer University;

Menon, Sreelakshmi, N., Mercer University; Naser, AZM, Mercer University; Shahid, Mashmum, S., Mercer University; Nguyen, Tro, Mercer University and HASAN, RAQUIBUL, Mercer University

Background: Among the many activators of vascular endothelial cells (ECs), the gram-negative bacterial endotoxin lipopolysaccharide (LPS), 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: Western blot and ELISA were used to determine the levels of LPS-induced overexpression of adhesion molecules and pro-inflammatory cytokines in EC lysates and rat mesenteric arterial lysates treated with or without IAA at concentrations ranging from 0.1 to 100 nM. ROS levels were measured using 2',7'-dichlorofluorescein diacetate (DCFDA) assay. A leukocyte adhesion assay was performed to evaluate leukocyte attachment to cultured EC monolayers and ex vivo preparations of aorta segments isolated from untreated and LPS-treated rats with or without IAA treatment. Pressure myography was employed to determine EC responses to acetylcholine and smooth muscle cell (SMC) responses to a nitric oxide donor, as measures of the presence and extent of vascular inflammation.

Results: Our results demonstrate that LPS treatment significantly upregulates adhesion molecule expression, ROS production and pro-inflammatory cytokine levels, both in vitro and in vivo, all of which was strongly inhibited by IAA treatment. Western blot analysis showed that IAA suppressed LPS-induced 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 and the aortic lumen in IAA-treated rats. 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, adhesion molecule expression, cytokine release, and leukocyte adhesion by suppressing NF-κB signaling, thereby reducing vascular inflammation and preserving endothelial function. These results 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.

Postnatal Zika Virus Infection Disrupts Socioemotional Visual Attention in Infant Rhesus Macaques

Presenting Author: Joy Matsuoka; Emory University

Poster Number: 21

Matsuoka, Joy, Emory National Primate Research Center; Love, Kaitlyn, Emory National Primate Research Center; Richardson, Rebecca, Emory National Primate Research Center; Suthar, Mehul, Emory National Primate Research Center, Dept of Pediatrics, Emory SOM; Chahroudi, Ann, Emory National Primate Research Center, Dept of Pediatrics, Emory SOM, Children's Healthcare of Atlanta; and Raper, Jessica, Emory National Primate Research Center, Dept of Pediatrics, Emory SOM

Background: Zika virus (ZIKV) continues to pose a significant global health threat due to its endemic presence in mosquito populations, potential for future outbreaks, and the lack of an available vaccine. While fetal ZIKV exposure has been linked to severe congenital outcomes such as microcephaly, cognitive deficits, and socioemotional dysfunction, the consequences of postnatal infection remain largely unknown. This gap is critical, as the infant brain undergoes rapid neurodevelopment in the first years of life, leaving it vulnerable to neurotropic pathogens. Understanding how ZIKV affects behavior and brain function after birth is essential for identifying at-risk children and guiding early clinical interventions.

Methods: This study utilizes a rhesus macaque (RM) model to examine the effects of postnatal ZIKV infection. Twelve infant RMs were infected with the Puerto Rican ZIKV strain (105 pfu PRVABC59) at one month of age (ZIKV-1) and compared to six uninfected controls and six immune-stimulated controls. At 4, 6, and 17 months, eye-tracking was used to measure gaze patterns toward emotional faces and objects across varying valences (positive, neutral, negative) and visual contrasts.

Results

ZIKV-1 animals showed significantly reduced attention to eyes ($p < 0.001$) and increased attention to mouths (Group x Age, $p = 0.008$). At both the 4- and 17-month time points, controls looked significantly more at the eyes than ZIKV-1 infants ($p = 0.021$). Groups did not differ in attention toward nonsocial stimuli, indicating that visual attention disruptions were specific to socially salient content. Although a Group x Contrast effect was found in visual acuity tasks ($p = 0.006$), ZIKV-1 animals still performed above chance on the hardest conditions, further supporting that differences in social attention are not due to a visual impairment.

Conclusion: Postnatal ZIKV infection disrupted the normative development of socioemotional visual attention, with persistent effects on social engagement and attention regulation. These findings suggest that postnatal ZIKV exposure may contribute to neurobehavioral differences relevant to neurodevelopmental disorders and highlight the importance of early behavioral screening and diagnosis during critical windows of development.

Development of a Vascularized Craniofacial Bone Defect-on-Chip Model for Pediatric Bone Regeneration

Presenting Author: Chidubem Onyeagoro; Georgia Tech - Emory

Poster Number: 22

Onyeagoro, Chidubem, Emory University; Sahar, Mehdi, Emory University; Serpooshan, Vahid, Emory University; Goudy, Steven, Emory University

Craniofacial bone defects in pediatric patients pose a major clinical challenge due to limitations in current grafting options and the need to preserve ongoing growth and remodeling. While biomaterials and biologics continue to advance, the lack of physiologically relevant in vitro models slows the development and screening of new therapies. To address this, we're developing a vascularized craniofacial bone defect-on-chip (CBDoC) platform designed to better mimic the pediatric bone environment.

The platform combines 3D bioprinting, perfusable microfluidics, and hydrogel-based delivery to support osteogenic and angiogenic co-culture within a miniaturized, patient-relevant geometry. The chip features compartments for loading human bone organoids (HBOs) and human umbilical vein endothelial cells (HUVECs), allowing us to investigate the interplay between bone regeneration and vascularization in a controlled setting.

At this stage, the chip design and fabrication process are complete, with successful validation of hydrogel encapsulation and flow stability. Current efforts are focused on optimizing cell seeding and viability, with preliminary experiments underway to evaluate short-term survival and integration. Early assays for mineralization and vessel formation are planned to assess biological functionality.

This work lays the groundwork for a modular, human-relevant model of pediatric craniofacial bone healing that can be used to accelerate therapeutic development and reduce reliance on animal studies. In the future, we plan to integrate therapeutic delivery into the system to assess drug efficacy in real time.

The CBDoC model offers a promising tool for bridging the gap between benchtop innovation and clinical translation in pediatric bone regeneration.

In Vivo Tracking of RVG-Tagged Microparticles Delivered Intranasally for Targeted Drug Delivery

Presenting Author: Parth Patel; Mercer University

Poster Number: 23

Patel Parth, Mercer University "and" D'Souza Martin J. , Mercer University

This study investigates the potential of RVG-conjugated tagged with Indocyanine Green (ICG) loaded microparticles for targeted brain delivery via a non-invasive intranasal delivery system. ICG, a water-soluble tricarbocyanine dye, has significant applications in medical imaging due to its near-infrared fluorescence properties. Intranasal administration offers numerous benefits, including bypassing the blood-brain barrier (BBB) and facilitating rapid absorption through the nasal mucosa. This method enables direct delivery of therapeutic agents to the brain without invasive procedures. This method particularly benefits brain-targeted therapies, reducing patient discomfort and minimizing infection risks.ICG was formulated into microparticles using nanoprecipitation, with Bovine Serum Albumin (BSA) as the carrier matrix. The microparticles were crosslinked to improve stability and conjugated with Rabies Virus Glycoprotein (RVG), a ligand known to bind to nicotinic acetylcholine receptors (nAChRs) in the brain. This conjugation enhanced ICG's brain-targeting capabilities. In vitro ICG formulations were characterized to assess particle size, zeta potential, and polydispersity index (PDI). Fourier Transform Infrared Spectroscopy (FTIR) was also identified to bind the RVG-conjugated ICG in microparticles. In vivo studies were conducted on Sprague Dawley rats (n=6 per group), where rats were administered free ICG, ICG-loaded microparticles, and RVG-conjugated ICG microparticles through the intranasal route. The biodistribution of the formulations was tracked over 24 hours using near-infrared fluorescence imaging. Results showed that the RVG-conjugated microparticles had a particle size of 364.7 ± 75.5 nm, compared to 504.4 ± 58.8 nm for non-conjugated ICG microparticles. Both formulations exhibited negative zeta potentials, indicating stability, and FTIR results show RVG-conjugated bind with ICG in microparticles. In vivo, RVG-conjugated ICG microparticles exhibited significantly enhanced brain localization compared to free ICG and non-conjugated microparticles. We also explored more organs to identify distribution-free

ICG, non-conjugated, and RVG-conjugated ICG microparticles. These results suggest that RVG-conjugated ICG microparticles play a crucial role in improving brain targeting delivery compared to the other organs. The results also show that in the initial hours, there are significantly higher signals in the brain compared to other organs. These findings highlight the potential of RVG-functionalized ICG microparticles for non-invasive help in the development of targeted vaccines and drug strategies.

Keywords: Indocyanine Green (ICG), Rabies Virus Glycoprotein (RVG), Non-invasive, Intranasal delivery, microparticles, Near-infrared (NIR) imaging, Brain targeting, Drug delivery

Iron Deficiency in Adolescents Presenting to the Emergency Department with Acute Heavy Menstrual Bleeding: a 5-year experience

Presenting Author: Anna Schwartz; Emory University

Poster Number: 24

McNamara, Maeve, Emory University School of Medicine; Buchanan, Morgan, Emory University School of Medicine; SCHWARTZ, ANNA, Emory University; Shuford, Julia, Emory University School of Medicine; Sidonio Jr, Robert F, Emory University/Children's Hospital of Atlanta, Dept of Pediatrics; Brown, Megan C., Emory University/Children's Hospital of Atlanta, Dept of Pediatrics

Background: Iron deficiency (ID) is prevalent in adolescent females and is associated with negative health outcomes. Almost 40% and 7% of adolescent females have ID and iron deficiency anemia (IDA), respectively. Heavy menstrual bleeding (HMB) is also prevalent among adolescents and leads to emergency department (ED) visits and hospitalizations. The prevalence of ID and IDA is likely higher in those with HMB, compared to those without.

Objectives: This study aims to: (1) characterize the prevalence of ID and IDA in adolescents presenting to the ED with HMB, and (2) describe the effect of intravenous (IV) iron sucrose on length of stay and transfusion utilization.

Methods: A retrospective chart review was performed on ED encounters at three Children's Healthcare of Atlanta centers utilizing a HMB clinical guideline in 2017-2019 and 2021-2022 (excluding 2020 because of COVID-19 pandemic). Demographic information and clinical data were collected. ID was defined as ferritin <25ug/L or elevated total iron binding capacity. Anemia was defined as hemoglobin <12g/dL (World Health Organization).

Results: Seven hundred eighty-seven adolescents were included. ID screening was performed on 496 individuals (63.0%); IDA was identified in 64.3% (n=319) of those screened and 40.5% of the total cohort. Persons screened for ID were younger (p=0.012), closer to menarche (p=0.017), had HMB since menarche (p=0.001), and had a history of prior IDA treatment (p=0.039). Anemia was present in 577 (70.8%) patients. Of 250 individuals with both hemoglobin and ferritin results, 86.8% had IDA. The prevalence of IDA in the bleeding disorder cohort was 45.5%. Hospital admission was required in 458 adolescents; IDA treatments included oral ferrous sulfate (n=340), IV iron sucrose (n=32), and packed red blood cells (n=328). After controlling for admission hemoglobin, IV iron sucrose was not associated with reduced odds of length of stay > 48 hours or red blood cell transfusion as compared to oral or no iron product treatment (p=0.116 and p=0.139, respectively).

Conclusions: IDA is common among adolescents presenting to the ED for HMB and occurred at a rate over 5 times the general population. Improved HMB and ID screening with lower treatment thresholds may benefit patient outcomes.

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

Presenting Author: Julia Stager; Mercer University School of Medicine

Poster Number: 25

Stager, Julia, Mercer University School of Medicine; Morgan, Mackenzie, Mercer University School of Medicine; and Jean Jacques, Edson, Mercer University School of Medicine

Background: Children often experience anxiety and fear when interacting with medical environments, which can negatively affect their perception of healthcare. Medical play has emerged as an intervention to address 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) program on children's attitudes toward medical visits. By simulating routine healthcare experiences through playful, repeated exposure, we aim to assess whether medical role-play can reduce fear and promote more positive perceptions of doctor visits over time.

Methods: A total of 38 kindergarten and first-grade students at a Georgia elementary school participated in a six-session TBC program between January and March 2025. Sessions were conducted biweekly during the school day and led by 5–7 medical student volunteers. With IRB approval, parental consent and child assent were obtained. Each session featured structured demonstrations where children practiced medical procedures—such as using a stethoscope, reflex hammer, and blood pressure cuff—on teddy bears. Attitudinal changes were measured using child-friendly 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, as shown by the "Like a lot" response increasing to 35%. Perception of safety increased significantly, 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 Teddy Bear Clinic effectively reduced medical fear and fostered more positive associations with healthcare, supporting the use of longitudinal medical play interventions in early childhood education settings.

Qualitative Barriers to Behavioral Health Treatment among Families Involved in the Juvenile Legal System

Presenting Author: Sean Stielow; Emory University

Poster Number: 26

Stielow, Sean, Emory University, Piper, Kaitlin, Emory University, Hines-Wilson, Mackenzie, Emory University, Sheerin, Kaitlin, Brown University, Modrowski, Crosby, Brown University, Kemp, Kathleen, Brown University

Background: Between 50-70% of youth involved in the juvenile legal system meet criteria for at least one psychiatric condition, compared to about 20% in the general adolescent population. To address this mental health crisis, juvenile diversion programs often screen youth for behavioral health conditions and refer them to providers. However, only a small proportion of youth in need of treatment initiate care during or after their involvement with the system (<10%). The aim of this study is to identify barriers to treatment participation among youth in a court diversion program with identified behavioral health needs.

Methods: Data collection involved surveys, administrative court records, and interviews with 100 caregivers and youth in a juvenile court diversion program in a northeastern state (July 2023-May 2024). Procedures were approved by the health system-affiliated IRB.

Results: Barriers identified by caregivers were coded into three domains: Obstacles and Stressors, Treatment Demands and Issues, and Perceived Treatment (Ir)relevance. Within the Obstacles and Stressors domain, caregivers were most concerned about challenges related to scheduling, long wait times between screening and treatment, and the difficulty of finding providers with available services. Within the Demands and Issues domain, caregivers voiced concerns about the cost of treatment, confidentiality when receiving services in a court setting, youth resistance to treatment, and cultural and identity-based compatibility between the provider and youth. Within the Treatment Irrelevance domain, caregivers expressed a strong interest in mental health services for their children but showed less enthusiasm for substance use treatment. Participants had varied perspectives on the need for treatment and services for caregivers of court-involved youth.

Conclusions: Caregivers expressed strong support for behavioral health treatment and overwhelmingly favored community-based services over court-affiliated options for their children. These findings underscore the importance of juvenile court diversion programs adopting a family-centered approach in their engagement with both caregivers and youth.

From Bored to Board: Stand Up Paddle Boarding Aquatic Therapy for Children Diagnosed with Cerebral Palsy: A Case Series

Presenting Author: Alyssa Trulove; Georgia State University/Tender Ones Therapy Services

Poster Number: 27

Trulove, Alyssa, Tender Ones Therapy Services & Georgia State University; Chen, YuPing, Georgia State University; Roach, Sarah, Tender Ones Therapy Services

Background: Cerebral palsy (CP) is a non-progressive, neurological condition marked by motor dysfunction. These children often have endurance, balance, and strength deficits that limit involvement in physical activity and sports. Stand up paddle boarding aquatic therapy (SUPAT) may be an effective intervention for targeting these impairments while also promoting peer interaction, community participation, and physical activity in children with CP. However, there is minimal research on the

therapeutic benefits of SUPAT in this population. The purpose of this case series was to describe the effects of SUPAT on balance and paddle boarding ability in children with CP.

Methods: Three female participants with CP (GMFCS levels I–III; diagnoses: spastic diplegia, hemiplegia, ataxic CP) completed the Pediatric Balance Scale (PBS) before and after SUPAT interventions and a weekly timed trial on the paddle board. The intervention consisted of 60-minute SUPAT sessions 1x week over 10 weeks. Sessions consisted of a warmup, a timed paddling trial, and practice of paddle boarding skills (e.g., negotiating the board, transitions on the board, swimming, and more). After SUPAT intervention, parents and treating therapists were asked to report any other changes that they noticed in the participants.

Results: Participants attended 6-8 paddle boarding sessions over 10 weeks. PBS scores improved by 3-5 points after the intervention, exceeding the minimal detectable change threshold (1.59 points). Trial run times also improved by 4-13 minutes for all participants. Other therapist- and parent-reported benefits included improved attention to tasks, decreased need for verbal cueing, and increased engagement and participation in therapy and daily activities.

Conclusions: SUPAT may be effective in improving balance and paddle boarding ability in children with CP, supporting the need for more research on this intervention. It may also provide these children with an opportunity to engage in a new sport with peers, potentially improving physical activity and quality of life.

Impact of ADOS-2 Toddler module summary items on expert clinician certainty

Presenting Author: Rachel Young; Emory University School of Medicine

Poster Number: 28

YOUNG, RACHEL, Marcus Autism Center; Klaiman, Cheryl, Marcus Autism Center; Walum, Hasse, Marcus Autism Center; Kolios, Alex, Marcus Autism Center; Benson, Jessica, Marcus Autism Center; Klin, Ami, Marcus Autism Center; and Jones, Warren, Marcus Autism Center

Background: The diagnosis of autism spectrum disorder (ASD), particularly in young children, can be complex. Previous literature has found that 30-40% of expert clinician diagnoses of ASD in toddlers and preschool-aged children are made with some level of uncertainty (McDonnell et al., 2018; Klaiman et al., 2022). In both studies, the greatest predictor of clinician uncertainty for both autistic and non-autistic toddlers was mid-level autism symptomatology. We aim to identify specific behaviors driving certainty by analyzing item level associations between ADOS-2 Toddler module items and certainty ratings.

Methods: Secondary analyses were performed using 16-30-month-old children from Klaiman et al.'s (2022) sample (n=437). Item scores of 0-3 were included for the purpose of this analysis, as scores of 7-9 are not indicative of autism symptomatology. Clinician certainty was rated on a 1 (0-20% certain) to 5 (81-100% certain) scale. Chi-square analyses between score and certainty rating were completed for each item. The Holm & Bonferroni method was used to account for multiple comparisons.

Results: Eight items were significantly associated with clinician certainty. Among them, we identified two primary categories: clinician perceived quality of social interaction and ability to integrate eye contact.

Irrespective of final diagnosis, receiving a "1" on items in these categories decreased the likelihood of being diagnostically certainty to < 50%. Notably, only three items load onto both scoring algorithms.

Conclusions: Beyond mid-level symptomatology, specific behaviors (e.g., clinician perceived quality of social interaction and eye contact) identified during the ADOS-2 significantly impacted clinician certainty in a sample of 437 16-30-month-olds. These behaviors were primarily described by summary items, which depend more on clinician judgement relative to items that measure completion of discrete tasks. Importantly, items that have been previously deemed less diagnostically differentiating are amongst those that affect certainty in this sample. These results highlight the complex diagnostic presentation of young children and demonstrate the need for continued developmental monitoring and the use of biomarkers to help navigate the ambiguity of the heterogeneity of autism. More work is needed to determine if behaviors impacting certainty vary across demographic factors such as sex, race, and SES.

Exploring Geographic Disparities in Pediatric Firearm Related Injuries

Presenting Author: Coco Zheng; Emory University

Poster Number: 29

Zheng, Coco, Children's Healthcare of Atlanta; Mulugeta, Makda, Children's Healthcare of Atlanta; Reisner, Andrew, Children's Healthcare of Atlanta; and Blackwell, Laura, Children's Healthcare of Atlanta

Background: Firearm-related injuries (FRIs) are the leading cause of death in children and adolescents in the United States, and firearm deaths have been found to be the most prevalent in rural U.S. counties. Despite previous literature identifying trends in the type of firearm, mechanism of injury, and severity, there is limited understanding of how geographic location may influence outcomes. This study aims to examine how a patient's home geographic location relates to the etiology and severity of FRI injuries to pediatric patients.

Methods: Retrospective cohort of children and adolescents aged 0-21 presenting to Children's Healthcare of Atlanta ED with FRI from June 2014 to April 2023 and were entered into hospital-based trauma registry (N=701). Patients were categorized into "metro" and "non-metro" geographic location based on patient's home zip code and guidelines set by the USDA using their Rural-Urban Continuum Codes. GCS scores on admission were used to measure injury severity, and mechanism of injury and type of firearm were used to measure etiology. All variables were populated from the trauma registry and Chi-Square tests were used to assess correlations.

Results: Majority of the patients were males (76.7%) and Black or African American (75.6%). Ages ranged from 9 months to 20 years old with a mean age of 9.8 years old. Majority of the sample were injured in metro areas (92%) and with handguns (59.1%). Majority of patients from non-metro areas were injured unintentionally (67.3%) and had a greater usage of long guns than metro group (9.1% vs 2.9%). GCS scores were categorized into three strata, 3-8, 9-12, 13-15, and results indicated that geographic location was associated with GCS admission scores ($\chi2(1)=15.032, p=0.002$), showing that higher GCS score correlate with metro counties. Results also indicated that geographic location was associated with mechanism of injury ($\chi2(1)=13.075, p=0.004$) and type of firearm ($\chi2(1)=13.231, p=0.004$).

Conclusion: Geographic location is associated with injury etiology and severity, highlighting potential regional disparities. These findings emphasize a need for targeted firearm policies and prevention

strategies that account for geographic variations. Further research is warranted explore underlying factors contributing to these disparities.

All-in-One, Wireless, Nanomembrane Wearable Device for Continuous Health Monitoring of Neonates in Ethiopia

Presenting Author: Lauren Zhou; Georgia Institute of Technology

Poster Number: 30

Zhou, Lauren, Georgia Tech; Joseph, Michele, Addis Ababa University; Yadav, Diva, Georgia Tech; LEE, YOON JAE, Georgia Tech; Nayak, Likhit, Georgia Tech; Woodall, Julia, Georgia Tech; Matthews, Jared, Georgia Tech; Soltis, Ira, Georgia Tech; Kebede Mamo, Yonas, Addis Ababa University; Fekadu, Abebaw, Addis Ababa University; Demissie, Asrat, Addis Ababa University; GLEASON, RUDOLPH, Georgia Tech; YEO, WOON-HONG, Georgia Tech

Background: Neonatal mortality remains a significant global challenge, particularly in sub-Saharan Africa. The neonatal period is critical and stressful, especially in low-resource settings where current monitoring methods for neonates are intermittent, labor-intensive, and reliant on multiple pieces of equipment with manual data logging. There is a pressing need for a user-friendly, continuous, and effective wearable device that can be utilized in both clinical and at-home settings.

Objective: Develop a low-cost, wireless, wearable device that can monitor real-time heart rate (HR), respiration rate (RR), blood oxygen (SpO2), and body temperature (T) in neonates. The aim of this study is to evaluate the system's performance, usability, and acceptability in the NICU of Tikur Anbessa Specialized Hospital (TASH) in Addis Ababa, Ethiopia.

Methods: Physiological measurements from 25 neonates were collected for 72 hours using our device and compared to the current standard used in the NICUs. Nurses record the values displayed by our system and the reference once/hour, For the first 10 patients, reference HR/RR were counted by hand; the latter 15 patients had electrocardiograms (ECG). Reference SpO2 was measured by peripheral pulse oximetry. Survey forms were filled out by the attending nurses and parents to evaluate usability and acceptability, respectively.

Results: The device system costs around $50 to produce, improving accessibility. HR/RR comparison between our system and reference improved drastically when ECG reference was used, demonstrating that hand counting disturbed patients greatly. HR/RR measurements had a mean difference of 4.8 beats/min and 2.6 breaths/min, respectively. SpO2 had a mean difference of -0.04% with 95% CI of [-5.6, 5.5]. Temperature had a high correlation, but changes to the app allowing more recordable significant figures will improve resolution and correlation. Parents viewed our system's continuous monitoring as highly comforting and satisfactory, with 84% expressing a willingness to use the system at home in the future. Concerns included device accuracy and the requirement for technical knowledge or internet connectivity.

Conclusion: The proposed flexible and wearable system successfully computes real-time health metrics. The low cost of the system improves accessibility, however future work to improve validation testing is needed.

Poster Abstracts

Delivery of PLGA-Loaded Influenza Vaccine Microparticles Using Dissolving Microneedles Induces a Robust Immune Response

Presenting Author: Emmanuel Adediran; Mercer University, College of Pharmacy

Poster Number: 31

EMMANUEL, ADEDIRAN, Mercer University; Tanisha, Arte, Mercer University; Dedeepya, Pasupuleti, Mercer University; Sharon, Vijayanand, Mercer University; Revanth, Singh, Mercer University; Parth,Patel, Mercer University; Mahek, Gulani, Mercer University; Amarae, Ferguson, Mercer University; and Martin, D'Souza, Mercer University.

Background: Influenza virus is one of the major respiratory virus infections that is of global health concern. Although a couple of vaccines have been approved, most of these vaccines are administered via the intramuscular route which is usually painful. To this end, exploring the non-invasive, pain-free route of vaccination using dissolving microneedles would have a significant impact on public health. Method: Inactivated Influenza A H1N1 virus (i-Influenza A H1N1) and Inactivated Influenza A H3N2 virus (i-Influenza A H3N2) were encapsulated in a biodegradable Poly (Lactic-co-glycolic acid) (PLGA) polymeric matrix, which enhances antigen presentation. The antigens PLGA MPs were prepared separately using a double emulsion (w/o/w) method, lyophilized, and characterized. The vaccine MPs were assessed in vitro in dendritic cells (DC 2.4) for immunogenicity. Dissolving microneedle-containing microparticulate-based vaccine was fabricated by spin-casting method. The adjuvanted vaccine Microneedles were administered to mice as one prime (w0) and one boost (w3) via the transdermal route to test the in vivo vaccine efficacy. The in vitro nitric oxide (NO) released by the DCs upon exposure to the vaccine MPs was assessed as a marker for the innate immune response and was significant. Results: More importantly, following in vivo immunization, we found that the Influenza A H1N1 specific serum IgG and IgA levels and Influenza A H3N2 specific serum IgG and IgA increased significantly ($p \leq 0.0001$) compared to the No treatment group. The IgG subtype analyses showed both significantly high levels of serum IgG1 (Th-2/antibody mediated response) and IgG2a (Th-1/cytotoxic mediated response) antibodies specific to both strains ($p \leq 0.01$). Additionally, we found significant antibody levels (IgG and IgA) in the lungs which show mucosal immunity ($p \leq 0.0001$). Conclusion: The delivery of influenza vaccine-loaded PLGA microparticles using microneedles would be beneficial to individuals experiencing needle phobia, as well as the geriatric and pediatric population.

Formulation and Characterization of Chitosan-Coated Indole-3-Acetic Acid Nanoparticles

Presenting Author: Snehitha Akkineni; MERCER UNIVERSITY

Poster Number: 32

Akkineni, Snehitha, Mercer University; Pasupuleti, Dedeepya, Mercer University; Uddin, Mohammad N., Mercer University; Hasan, Raquibul, Mercer University

Background: Indole 3 acetic acid (IAA) is a naturally occurring plant hormone belonging to the Auxin family, with a molecular weight of 175.18g/mol. Beyond its established role as a growth regulator in

plants, IAA has demonstrated both anti-inflammatory and antioxidant properties. IAA has been reported to upregulate hemo oxygenase-1 (HO-1), thereby contributing to its anti-inflammatory activity. Additionally, IAA demonstrates antioxidant potential by inhibiting the production of reactive oxygen species(ROS) and nitric oxide(NO) while directly neutralizing free radicals. These attributes suggest IAA's potential as a therapeutic candidate for cardiovascular diseases. However, its clinical application is limited due to low bioavailability. This study aims to develop and characterize a Chitosan-coated nanoliposomal formulation of IAA to enhance its bioavailability and enable sustained release. Methods: Nanoliposomes were prepared using the thin film hydration technique, followed by sonication to convert the multilamellar vesicles into unilamelar vesicles. The formulation was subsequently coated with chitosan to achieve controlled release. Particle size, zeta potential and polydispersity index (PDI) were analyzed using dynamic light scattering (DLS). Morphological evaluation was performed using Scanning electron microscopy(SEM). The formulation parameters were optimized using Box Behnken Design (BBD) under the Design of Experiments framework evaluating the lipid concentration, PEG concentration and sonication time on the physical characteristics of the formulation. Results: The optimized chitosan coated IAA nanoliposomes exhibited an average particle size of 186.2nm, a zeta potential of -38.3mV and a 0.4 polydispersity index (PDI) indicating favorable stability and moderate uniformity. SEM imaging confirmed smooth surface morphology. Box Behnken model has validated the fit model. Conclusion: The chitosan-coated through Box Behnken design shows promising potential for targeted and controlled delivery. Further in vitro and in vivo studies are underway to evaluate its efficacy in cardiovascular disease models.

Patch It, Don't Prick It: A Patient-Friendly Heterologous Covid-19 Vaccine Using Microparticles

Presenting Author: Tanisha Manoj Arte; Mercer University

Poster Number: 33

Arte, Tanisha Manoj, Mercer University; Adediran, Emmanuel, Mercer University; D'souza, Martin, Mercer University

This study aimed to assess the effectiveness of microneedle-assisted delivery of a heterologous microparticulate vaccine against the SARS-CoV virus, serving as a proof-of-concept. Microneedles are minimally invasive transdermal route of administration that may effectively deliver vaccines across the skin. We have used heterologous administration with whole inactivated virus (WIV) of delta at prime dosing and the omicron variant at booster. This aids in enhancing the neutralizing activity of the antibodies formed after vaccination and thus reducing the boosters. We want to analyze the level of cross-reactive immune response produced against other strains of SARS-CoV-2 like alpha and beta, due to the structural similarity within the strains. Our vaccination strategy involves encapsulating the antigens in a polymeric matrix to form MPs, thereby enhancing immunogenicity while protecting the antigen. Furthermore, administration through various routes has multiple advantages, such as specialized immune cells in the transdermal and mucosal layers, neutralizing antibodies at the virus entry sites, and Patient compliance. In vitro testing and characterization of MPs revealed that they are uniform size, shape, charge, safe and immunostimulatory. In vivo testing indicated that an adjuvanted-heterologous microparticulate vaccine could produce robust humoral (antibody), cellular (helper and cytotoxic T cells), and mucosal (secretory IgA) immune responses and cellular memory responses. Thus, our vaccination strategy produced a potent and cross-reactive immune response against the various strains of SARS-CoV-2. Therefore, our vaccination strategy will pioneer in providing a broader immune

response and pain-free vaccination alternatives against the emerging strains of SARS-CoV-2. This vaccine candidate is critical for the development of a universal vaccine against COVID-19.

Early Motor and Cognitive development in Typically Developing Children and Those With or at Risk of CP: A Scoping Review

Presenting Author: Kanishka Baduni; University of Georgia

Poster Number: 34

Baduni, Kanishka, University of Georgia; Khan, Owais, University of Georgia; Modlesky, Christopher, University of Georgia; Maitre Nathalie, Emory University

Background: Motor and cognitive development are closely linked in early childhood, with motor skill acquisition thought to support emerging cognitive abilities in typically developing children (TDC). However, this relationship may be disrupted in children with or at risk of cerebral palsy (CP) due to early neural injury. The combined effects of neuroplasticity, individual developmental trajectories, and neurological risk factors on early motor-cognitive co-development in CP have not been comprehensively reviewed. This scoping review aimed to map and compare evidence linking early motor development with cognitive outcomes in TDC and children with or at risk of CP.

Study Setting: A scoping review protocol was preregistered (osf.io/x58vt) and findings reported following PRISMA-Scoping Review guidelines.

Materials/Methods: Five databases (PubMed, Web of Science, EMBASE, PsycINFO, and Cochrane) were searched using predefined terms. Included studies examined both motor and cognitive outcomes in TDC or children with or at risk of CP (birth to 5 years). Reviews and methodological papers were excluded.

Results: Thirty-three studies were included, comprising 4,212 TDC and 652 children with or at risk of CP. Strong associations were found between early motor development and later cognitive outcomes in both groups. TDC showed consistent relationships between gross motor skills and cognitive abilities, with early motor milestones predicting IQ, executive function (EF), and working memory. In children with or at risk of CP, associations were more variable, with greater impairments linked to greater cognitive delays. In children with or at risk of CP, relationships were more variable but often indicated cognitive delays with greater motor impairment. Fine motor skills were consistently linked to EF, attention, and visual perception. Individualized, play-based motor-cognitive interventions showed the most benefit in CP populations.

Conclusion: This review underscores the interdependence of motor and cognitive development in TDC and children with or at risk of CP, highlighting the need to monitor both domains together. Early motor delays often co-occur with cognitive challenges, reinforcing the need for early, integrated assessment and intervention. Future research should adopt standardized methods and innovative approaches to better capture motor-cognitive dynamics. Integrated frameworks can guide personalized strategies to improve long-term outcomes and quality of life for children with developmental challenges.

Cryoablation of Splanchnic Nerves for Pain Management in Pediatric Median Arcuate Ligament Syndrome (MALS): A Case-Based Insight

Presenting Author: Vipin Bansal; Children's Healthcare of Atlanta / Emory University

Poster Number: 35

Kulkarni, Shaurya, Alliance Academy for Innovation; Leshen, Michael, Emory University School of Medicine, Department of Interventional Radiology; Bansal, Vipin, Children's Healthcare of Atlanta, Emory University School of Medicine, Department of Anesthesiology

Background: Median arcuate ligament syndrome (MALS) is a condition in which the median arcuate ligament presses too tightly on the celiac artery and the celiac plexus. Opioids are widely used in hospitals as a primary pain relief method, but their normalization poses serious risks, including respiratory depression, dependency, and long-term addiction. In contrast, cryoablation offers a safer and more effective alternative by targeting pain at its source without systemic side effects.

Methods: Cryoablation freezes nerves to block pain signals, providing long-lasting relief without harming surrounding tissues. Celiac plexus and splanchnic nerve blocks are used for abdominal pain, and neurolysis or radio-frequency ablation can help. At our hospital, cryoablation was used to block the splanchnic nerves when celiac plexus blocks were difficult to perform. The splanchnic nerves (T5–T12) are an alternative target for symptomatic patients.

Results: Cryoablation was performed under ultrasound, fluoroscopy, and/or CT guidance. A cryoprobe was inserted near the nerve plexus, and argon gas was injected to freeze the nerves, causing temporary damage. Since cryoablation of the splanchnic nerves, one patient is no longer in constant abdominal pain and has returned to their regular school lifestyle. Pain has decreased in both intensity and frequency. Another patient now feels completely pain-free, is able to eat and drink normally, sing, and take deep breaths.

Conclusion: The use of cryotherapy for MALS is not well-studied in literature. These cases demonstrate the potential of cryotherapy to freeze the splanchnic nerves, providing abdominal relief. Cryoablation can be an option for patients where surgical intervention has not worked. More research is warranted to better characterize the safety and efficacy

Participation in Research for Children with Motor Delays: a Study of Hispanic Caregivers' Perspectives

Presenting Author: Ana Barahona; Emory University

Poster Number: 36

BARAHONA, ANA JOSELYN, Emory University; Castro, Daniela, Emory University; Murphy, Melissa, Emory University; McIntyre, Allison, Emory University; Marsilli-Vargas, Xochitl, Emory University; and Maitre, Nathalie, Emory University

Background: Monolingual Hispanic families in the U.S. often face language, cultural, and socioeconomic obstacles that limit research participation, linked to healthcare services access. These challenges are compounded for children with motor delays who experience additional marginalization due to language barriers. However, motor delays are addressable with targeted interventions. This project sought to identify barriers and facilitators impacting healthcare access and research participation among non-English proficient Hispanic families of children with motor delays.

Methods: The team used a community-based participatory methodology (World Cafe) to structure 2 focus groups with Hispanic caregivers from the Atlanta and Orlando metro areas. Eligibility included Spanish-speaking caregivers of a child under 8 receiving physical therapy. Groups were co-facilitated by five clinicians and researchers, including three native Spanish speakers. Participants were asked open-ended questions surrounding healthcare access and research participation. Discussions were recorded, transcribed, and analyzed using an inductive thematic analysis approach. Two coders reviewed the transcript materials and met with the senior researcher to reach consensus on themes. During the second round, the process was repeated for subthemes. Results were reviewed to derive action items, which were shared with initial participants to maximize salience and ensure analysis validity.

Results: Eighteen caregivers participated. Caregivers agreed lack of confidence/trust in the system is a common barrier to healthcare access, arising from language barriers associated with reliance on translators and limited cultural awareness. Quality of provider interactions was recognized as both a barrier and facilitator. When positive and supportive, caregivers reported the facilitating role of providers, however, perceived negligence and negative interactions with providers were described as barriers. Parent training emerged as a key theme, with caregivers seeking guidance to better support their child's development. The following themes regard research participation: perceived benefit to the family, estimated time burden, and parent training, prompting the following recommended actions.

Conclusions: This study supports the role of (1) improving interpretation services and culturally sensitive communication, (2) expanding caregiver training in research settings, (3) mitigating logistical barriers in research to include Hispanic families, with the goal of promoting generalizable clinical research for US children with motor delays.

Enhancing Patient Care in the NICU: General Movement Assessment Quality Improvement Initiative

Presenting Author: Kaleb Barnes; Emory University

Poster Number: 37

Barnes, Kaleb, MD, Emory University; Maitre, Nathalie, MD, PhD, Emory University; Neel, Mary Lauren, MD, MSCI, Emory University

Background: Early identification of infants at risk for neurodevelopmental delays remains a challenge in neonatal care. The General Movements Assessment (GMA) is a validated tool for detecting early neurological impairment, particularly cerebral palsy, through analysis of spontaneous infant movements. Cramped synchronized (CS) or absent fidgety (AF) patterns are rare but require systematic performance and response to ensure appropriate medical care for these children. Despite GMA utility, barriers such as logistical complexity, inconsistent communication, and unclear referral processes limit its use in the NICU.

Methods: Setting: Level IV NICU at Children's Healthcare of Atlanta from August 2023-February 2025. Our aim was to increase GMA performance from 32% to 64% among eligible infants and to increase appropriate referrals for infants with abnormal GMAs to 98% over the study period. We used Institute for Healthcare Improvement methodology with an initial barriers and facilitators survey to build a key driver diagram to guide two 6-month Plan-Do-Study-Act cycles, based on interventions derived from a prioritization matrix exercise. Baseline data were collected monthly for 3 months. Cycle 1 focused on

GMA faculty/staff education and culture. Cycle 2 addressed operational challenges and provider comfort with delivering unfamiliar diagnostic reports.

Results: During the baseline months, a total of 56 infants were eligible, and 32% of those eligible received a GMA. 83% were appropriately referred for MRI and/or Developmental Progress Clinic (DPC) follow-up. During Cycle 1, a total of 53 infants were eligible, and 48% received a GMA. 89% were appropriately referred for MRI and/or DPC. During Cycle 2, a total of 60 infants were eligible, and 64% received a GMA. 100% were appropriately referred for MRI and/or DPC. At the end of the second cycle, 36% of eligible infants were still not receiving GMAs, with a root cause analysis planned to design future cycles.

Conclusion: This quality improvement initiative increased GMA completion among eligible NICU infants and maintained high follow-up rates for those with concerning findings. Interventions focused on communication, provider education, and streamlined workflows proved effective. Sustaining improvements and achieving complete screening of eligible patients will require continued education, multidisciplinary collaboration, and integration into routine NICU processes.

Neural Synchrony in Preterm Infant-Caregiver Dyads: EEG Hyperscanning as a Measure of Dyadic Interaction

Presenting Author: Kayla Beck; Emory University

Poster Number: 38

BECK, KAYLA, BS, Emory University; Huang, Junwen, BS, Emory University; Key, Alexandra, PhD, Emory University; Jeanvoine, Arnaud, PhD, Ajrmonips LLC; Maitre, Nathalie, MD, PhD, Emory University; Kjeldsen, Caitlin, PhD, Emory University; and Neel, Mary Lauren, MD, MSCI, Emory University

Background: Parent-infant synchrony supports neurodevelopment, yet neural mechanisms remain understudied in preterm populations. EEG hyperscanning offers a potential tool to quantify neural synchrony in caregiver-infant dyads. This study examines the neural underpinnings of parent-infant synchrony by assessing associations between parenting style and dyadic behavioral interactions with EEG-based measures of neural coupling indicative of dyadic neural synchrony.

Methods: In this observational pilot study, we assessed caregiver-infant dyads (infants<35 weeks' gestation, evaluated at 6-8 months postmenstrual age (PMA)). Dyads completed EEG hyperscanning during baseline and free play. Neural synchrony was quantified with circular correlation coefficient (CCorr), behavioral synchrony with the Welch Emotional Connection Screen (WECS) coding system, and parenting style (parental structure and attunement) with the Baby Care Questionnaire (BCQ). We collected infant baseline characteristics (gestational age, PMA at EEG administration) and demographics (infant race/sex, maternal education level).

Results: N=10 dyads were included. All caregivers self-identified as biological mothers. Infants' average age at birth was 30 weeks and at EEG was 7 months PMA. Most infants were Black/African American, and most mothers reported high school, but not college, completion.

Higher caregiver structure scores (BCQ) correlated with increased CCorr neural synchrony differences at the F3 electrode (β=0.756, p=0.030). No significant associations were found between BCQ attunement

scores and CCorr synchrony differences. A marginally significant inverse relationship was observed between maternal WECS scores and CCorr synchrony differences at F3 (r=-0.682, p=0.062), with caregiver facial expressiveness significantly inversely correlated with synchrony differences (r=-0.729, p=0.040). Infant behavioral synchrony showed no significant associations with neural synchrony. An exploratory analysis of F4 electrode activity revealed no significant associations with behavioral synchrony measures.

Conclusion: These findings suggest that caregiver structure may play a key role in increased neural synchrony between preterm infants and their caregivers. Maternal emotional connection and facial expressiveness may have inverse relationships with synchrony changes. Infant behavioral synchrony did not emerge as a strong predictor of neural synchrony. This study provides preliminary evidence supporting the utility of EEG hyperscanning in assessing dyadic neural interactions in preterm infant-caregiver dyads and highlights directions for future research to optimize early interventions to enhance neural synchrony and possibly neurodevelopmental outcomes.

Predictors of Fatality in Pediatric Rocky Mountain Spotted Fever Cases in Sonora, Mexico 2004-2024

Presenting Author: Stephanie Bellman; Emory University

Poster Number: 39

Bellman, Stephanie, Emory University, Children's Healthcare of Atlanta; McCoy, Kaci, Emory University, Children's Healthcare of Atlanta; Enriquez, Diana, University of Sonora; Romo, Pamela, University of Sonora; Murray, Kristy, Emory University, Children's Healthcare of Atlanta; Alvarez, Gerardo, University of Sonora

Background: Rocky Mountain Spotted Fever (RMSF) is a severe and fatal illness caused by the bacterium Rickettsia rickettsii. Over the past two decades, fatality rates in the pediatric population of Sonora, Mexico have been 3x higher than across the border in the U.S. This study evaluates the clinical and demographic features associated with RMSF in the pediatric population of Sonora.

Methods: We conducted a retrospective analysis of 393 cases of hospitalized pediatric RMSF cases in Sonora, Mexico from January 2004 to December 2024. Descriptive statistics and multivariate logistic regression were used to analyze factors associated with fatal infections.

Results: The case fatality rate (CRF) in this cohort was 17.3% across the entire time period with a CFR of 28.9% before 2014 and 13.9% from 2014-2024. The median time from symptom onset to hospitalization was 5 days. Across the entire time period, fatality was significantly associated with being from an indigenous population and having a delay in treatment with doxycycline past 5 days from symptom onset. Children with fatal infection were also more likely to have higher leukocyte and neutrophil counts, higher procalcitonin, higher liver enzymes, and have vomiting, diarrhea, edema, petechia, rash on the palms and soles, neurologic symptoms, hemorrhage, and kidney injury/failure on presentation or during admission. From 2014-2024, older age was significantly associated with fatal outcomes. There was also a significant decrease in treatment delay with doxycycline over the past 10 year; providers were 5x more likely to initiate treatment within 5 days of symptom onset in 2014-2024 compared to 2004-2013.

Conclusion: RMSF is a serious public health problem in the pediatric population in Sonora, Mexico with high CFR. In the past 10 years the CFR has decreased, though more fatalities are being seen in teenagers.

Increased awareness and initiation of doxycycline in children has likely driven this decrease in CFR over the past 10 years. All children presenting with fever should be evaluated for RMSF and treated immediately if suspected. Despite decrease in CFR over the past decade, RMSF remains a concern to the pediatric population and demands attention.

Examining Gaze-Linked Neural Responses to Naturalistic Social Stimuli: Effects of Preceding Visual Information

Presenting Author: Jessica Benson; Emory University

Poster Number: 40

BENSON, JESSICA A., Emory University; Douglas-Brown, Josie Dylan, Emory University; Saad, Moura, Emory University; Zielke, Jules, Emory University; and Key, Alexandra P., Emory University

Background: Children with Autism Spectrum Disorder (ASD) demonstrate differentiated patterns of social engagement with visual stimuli in the first year of life. However, the connection between gaze behaviors and the underlying neural processing of social information is not yet fully understood. To address this gap in knowledge, we examined gaze-evoked event-related potentials during naturalistic viewing of real-life social interactions. Natural social stimuli are dynamic, and we hypothesized that neural responses to social elements of visual scenes will be modulated by the immediately preceding visual information (e.g., a neural response to the eyes will be larger if the preceding gaze was on a nonsocial object vs. a mouth).

Methods: 128-channel electroencephalogram (EEG) and eye-tracking data were recorded concurrently from 20 young adults (Mage= 24.76+/-2.6 years, 6 males) as they watched a series of 18 videos depicting naturalistic social interactions. The Social Responsiveness Scale-2 (SRS-II) quantified individual differences in autistic traits. This pilot sample provides a reference data set for interpreting joint EEG/eye-tracking results from children undergoing gaze-based clinical diagnostic evaluations for ASD. Neural response amplitudes to social/nonsocial elements were examined over left and right occipito-temporal regions between 150-250 ms after gaze onset.

Results: Data collection and analyses are ongoing and will be completed by June. Preliminary results suggest that neural responses to the eyes are modulated by preceding visual information. As predicted, larger EEG responses to the eyes were elicited when they followed fixations on objects, rather than bodies. Unexpectedly, a larger neural response to the eyes was also observed after fixations on the mouth vs. body, suggesting that the mouth region contributes unique contextual social information. Differential relationships between autistic traits (SRS scores) and neural responses to eyes preceded by fixations on objects vs. mouth regions further support this observation.

Conclusion: These preliminary findings provide the initial evidence that social information processing is a dynamic process affected not only by stimulus content but also by the broader perceptual context. Uncovering how the brain integrates consecutive social and non-social visual inputs provides a novel framework for investigating social engagement in children with or at risk for ASD.

Continuous Infusion versus Intermittent Furosemide in Neonatal Cardiothoracic Surgery Patients: A Pilot Study

Presenting Author: Asaad Beshish; Emory University School of Medicine, Children's Healthcare of Atlanta

Poster Number: 41

Kathleen Len, Emory University School of Medicine; Ifeyinwa, Ogu, Emory University School of Medicine; Neha Krishnam, Emory University School of Medicine; Ahmed Akila, Michigan State University, Hurley Medical Center; Adithi Shyam, Children's Healthcare of Atlanta; Hania Zaki, Children's Healthcare of Atlanta; Joshua W. Branstetter, Children's Healthcare of Atlanta; Asaad G. Beshish Emory University School of Medicine, Children's Healthcare of Atlanta

Introduction: Fluid overload is estimated to occur in about 40% of pediatric patients after cardiothoracic surgery and is associated with increased morbidity and mortality. The aim of this study is to compare the efficacy of continuous versus intermittent furosemide in post-operative neonates with congenital heart disease.

Methods: This was a retrospective cohort study of patients less than 30 days of age with congenital heart disease admitted to the cardiac intensive care unit from 10/1/2020 to 10/1/2023 who received either continuous or intermittent furosemide post-operatively. The primary efficacy outcome was to evaluate diuretic response on urine output (mL/kg/hr).

Results: During the study period 279 neonates met inclusion criteria. Urine output was similar per shift between continuous furosemide and intermittent furosemide respectively [5.3 mL/kg/hr (IQR 4.95-5.85) vs 5.36 mL/kg/hr (IQR 4.46-5.94) p-value 0.754]. Patients in the continuous furosemide group received more furosemide compared to the intermittent group [4.5 mg/kg/day (SD 1.7) vs 1.9 mg/kg/day (SD 1.6); p=0.001]. Patients in the continuous intravenous group had a longer mechanical ventilation time [14.4 hours (IQR 13.6-15.4) vs 12.2 hours (IQR 11-14.5); p-value 0.028] and a longer length of stay [33 days (IQR 21-49) vs 8 days (IQR 5-14); p-value <0.001] compared to the intermittent group. Neither group had a significant increase in serum creatinine from baseline.

Conclusion: Both continuous intravenous infusion and intermittent furosemide were safe and efficacious in producing a diuretic effect in post-operative neonates with congenital heart disease. Additional studies are needed to evaluate optimal furosemide dosing strategies in post-cardiothoracic patients.

Establishing Developmentally Appropriate Benchmarks for Social Communication Between Non-Autistic Peers

Presenting Author: Elena Bien; Emory University

Poster Number: 42

Bien, Elena, Emory University, CHOA, Marcus Autism Center; Edmier, Kathleen, Emory University, CHOA, Marcus Autism Center; Naresh, Aparna, Emory University; Keleher, Courtney, Endicott College; Argueta, Tracy, Emory University, CHOA, Marcus Autism Center; Edwards, Laura, Emory University; Yosick, Rachel, Emory University, CHOA, Marcus Autism Center; and Lampert, Erica, Emory University, CHOA, Marcus Autism Center

During peer interactions, preschool children with autism have shown lower rates of prosocial behaviors (initiations and responses) between non-autistic and autistic peers within an inclusive classroom. Interventions encouraging social communication are an important way for supporting the development of meaningful social relationships, positive mental health, and later academic success in both autistic and non-autistic children. Existing assessment tools are used to design intervention goals by comparing individuals against established criteria. These tools, however, do not provide specific benchmarks for social communication rates and frequencies at developmental age groups. This study will specify social communication benchmarks from non-autistic populations to help practitioners set developmentally appropriate intervention goals for children on the autism spectrum. Data was collected from 19 preschool children (2-5 years old) with four video recordings per child. This current work will share our preliminary coding analysis from one video with three, 4-year-old individuals.

Three 4-year-old, non-autistic, preschool children participated in a 10-minute free play session with a familiar teacher. Free play classroom videos were recorded and hand coded for social communication behaviors. Two trained coders independently recorded the frequency of each type of verbal behavior for each child. Initial intercoder agreement was calculated and disagreements were discussed together until arriving at consensus. Social communication was operationalized as the frequency and variety of vocal verbal operants (VVOs) coded as mands (requests), tacts (labels), sequelics (two exchanges between a listener and speaker), and conversational units (three exchanges between a speaker and listener).

During the 10-minute recorded interaction, the three, 4-year-old preschool students emitted an average of 32.6 total verbal operants (range 7-68 VVOs) across participants. Specifically, an average of 9.33 mands (range 8-11), 18.33 tacts (6-43), 2.3 sequelics (range 0-5), and 12 conversational units (range 1-20) were emitted and coded.

More research is needed to further determine what a developmentally appropriate goal may be for the frequency and variety of verbal operants in non-autistic preschool children. Preliminary data suggests that an average of 32.6 verbal operants are typical for four-year olds during free play with peers. This will be accomplished by further coding recorded videos of 19 preschool participants.

Quantitative Flow Cytometry-Based Detection of Mesenchymal Stem/Stromal Cell Immunomodulation on Monocytes

Presenting Author: Lawson Blake; Mercer University School of Medicine

Poster Number: 43

BLAKE, LAWSON, Mercer University School of Medicine; Temple, Sara, Mercer University School of Medicine; and Chinnadurai, Raghavan, (Mentor), Mercer University School of Medicine

Background: Mesenchymal Stem/Stromal Cells (MSCs) are immunomodulatory cells within bone marrow that support hematopoiesis. Their interaction with immune cells is of emerging interest as a cellular therapy for pediatric inflammatory disorders, such as Hematopoietic Stem Cell (HSC) transplant complications. Monocytes are important innate immune cells that mediate inflammation. Although previous studies have shown some effect of MSCs on monocytes, quantitative methodology to identify this effect has yet to be well defined. Our study defines a flow cytometry-based methodology to quantify the effect of MSCs on monocyte differentiation. We also determine the impact of the stem cell mobilization drug AMD3100 on this process.

Methods: MSCs were derived from discarded and deidentified bone marrow filters/bags. Monocytes were isolated from leukapheresis bags using magnetic enrichment procedures. MSCs and enriched monocytes were co-cultured at varying ratios. 100 millimolar of AMD3100 was also included in certain conditions. The co-cultures were analyzed 48 hours later for monocyte differentiation into immunosuppressive M2-macrophages (CD14+, CD206+) using flow cytometry. The percentage of CD14+ and CD206+ cells was determined utilizing FloJo Software, quantifying the degree of monocyte differentiation within each culture.

Results: We observed that monocytes, on their own, do not substantially express CD206. However, we identified that MSCs massively upregulate CD206 expression on monocytes, which suggests differentiation into M2-macrophages. We confirmed these results with repeated experiments from all independent donors. The degree of CD206 upregulation varies from donor to donor. We also identified the addition of AMD3100 had no major effect on MSC mediated differentiation of monocytes.

Conclusions: We developed a flow cytometry-based methodology to quantify MSC's effect on monocytes by determining the percentage of CD206+ populations. Although AMD3100 does not impact this immunomodulatory effect, our methodology can be utilized to screen the effects of other transplant drugs.

Utilization of Laparoscopic Common Bile Duct Exploration (LCBDE) and a Surgery First Approach in the Management of Choledocholithiasis among Pediatric HbSS Population

Presenting Author: Maame Tekyiwa Botchway; Emory University School of Medicine

Poster Number: 44

BOTCHWAY, MAAME TEKYIWA, Emory University School of Medicine; Aworanti, Eunice, Emory University School of Medicine; Lehane, Alison, Atrium Health Wake Forest Baptist Medical Center; Zhulin, He, Emory University School of Medicine; Neff, Luke; Atrium Health Wake Forest Baptist Medical Center and Alemayehu, Hanna, Emory University School of Medicine

Background: Despite increasing childhood obesity and choledocholithiasis of other etiologies, sickle cell disease (HbSS) is still a significant cause of biliary stones in the pediatric population. 1,2 A surgery first (SF) approach has been shown to have improved outcomes compared to ERCP first in children with choledocholithiasis3. ERCP and LCBDE have not been compared in the HbSS population. Given the higher risks associated with HbSS patients, we aimed to evaluate outcomes of ERCP vs SF in this cohort.

Method: A single center retrospective review of patients <18 years of ages with choledocholithiasis between 2017 and 2022 was performed. We recorded demographics, clinical data, and outcomes. We compared the rates of successful duct clearance and complications between the SF vs ERCP first approach in HbSS patients.

Results: 130 children with choledocholithiasis were identified, with a median age of 13.4 years (IQR: 11.19, 15.46). Duct clearance was similar between non HbSS vs HbSS patients (100% vs 77.4%, p=0.175), as was the rate of surgical complication (3.2% vs 1.8%, p > 0.999). In the HbSS cohort, there was no difference in outcomes for surgery first vs ERCP first: duct clearance rate (15.5% vs 33.3%, p=0.446), operative time (78 min vs 94 min, p=0.137), length of stay (3 days vs 4 days, p=0.542), ED revisit rate

(18.2% vs 16.7%, p>0.999) and readmission rate (11.6% vs 2 16.7%, p=0.639). Surgical (0.0% vs 8.3% p=0.214) endoscopic (0.0% vs 0.0%, p>0.999) and HbSS-specific complication rates (15.6% vs 8.3%, p>0.999) also showed no difference.

Conclusion: A SF approach with LCBDE is effective in the management of choledocholithiasis in children with HbSS, albeit without the improved outcomes previously reported in children over the ERCP first approach.

Impact of freeze-thaw cycles on detection on influenza A and B virus when assessing novel multiplex diagnostic assays.

Presenting Author: Heather Bowers; Emory University

Poster Number: 45

BOWERS, HEATHER B., Emory University; Sabino, Courtney, Emory University; McLendon, Kaleb, Emory University; Morales, Evelyn, Emory University; Solis, Zianya, Emory University; Greenleaf, Morgan, Emory University; Sillivan, Julie, Emory University; Lai, Eric, VentureWell; Damhorst, Gregory, Emory University; Lam, Wilbur, Children Healthcare of Atlanta; Bassit, Leda, Emory University; and Rao, Anuradha, Emory University.

Background: As a part of the NIH's Rapid Acceleration of Diagnostics (RADx) program, viral panels are being used to evaluate new rapid antigen tests (RATs) for their sensitivity and efficacy. Many of these newly emerging RATs are capable of the simultaneous detection of FluA, FluB, and SARS-CoV-2. These highly validated panels often shipped to outside laboratories and may intentionally or unintentionally undergo a freeze-thaw cycle during transit. To ensure the efficacy of these panels is maintained at all times, we characterized the effect of four freeze-thaw cycles on FluA and FluB serial dilutions using RT-qPCR, two RATs and an already commercially available point-of-case (PoC) assay.

Methods: Viral stocks of live Influenza A and B virus were obtained from BEI. A serial dilution of the virus made in negative nasal wash (Lee BioSolutions) was prepared and aliquot into separate panels. The serial dilutions were tested on the two rapid antigen tests (RATs) and the point-of-care assay fresh and after experiencing one, two, three, or four freeze thaws. Testing of the two RATs was done in triplicate in a limit of detection (LOD) range-finding experiment. The LOD is determined to be the last dilution where all three replicates were positive. The results of the RATs and PoC assay were compared for the different freeze-thaws to observe efficacy.

Results: While there were minor variations in Ct values for both FluA and FluB throughout the freeze-thaw cycles, both the RATs and the PoC assay were able to successfully detect up to four freeze thaw cycles without losing efficacy.

Conclusion: Correct handling of these viral panels which are used to evaluate emerging rapid antigen test (RATs) is critical for correctly determining the sensitivity and efficacy. While in transport, storage conditions are challenging to maintain and must be carefully considered by laboratories and engineers designing or validating diagnostics tests. Luckily, it seems are though there may be some leniency when it comes to freeze-thaws cycles on live influenza A and B virus.

High-Throughput Model for Mechanistic and Drug-testing Studies of Cystic Fibrosis Airway Neutrophils

Presenting Author: Kelsey Brew; Georgia Institute of Technology

Poster Number: 46

BREW, KELSEY, Georgia Institute of Technology; Hatano, Steven, Georgia Institute of Technology; Tirouvanziam, Rabindra, Emory University; and Takayama, Shuichi, Georgia Institute of Technology

Background: Cystic fibrosis (CF) is a genetic disease characterized by early-onset and chronic lung inflammation and bacterial infection. Recently developed CFTR modulators address the basic molecular defect in CF and improve outcomes for patients, but so far have failed to quell chronic inflammation and infection. Previously, we identified a subset of immunomodulatory and bacteria-tolerant neutrophils (termed “GRIM”) within CF airways, which we showed to be early drivers of the disease. Moreover, we showed that GRIM neutrophils can be mass-produced in vitro (even from healthy donor blood) via transmigration through an epithelium-lined filter into cell-free CF sputum (CF-ASN). However, this initial biomimetic model employs a 12-well system, with a high CF-ASN volume requirement, limiting its throughput. While a 96-well system modeling the air-blood barrier (ABBA) of the lung has also been developed by us, this platform has yet to be fully validated for CF neutrophil studies.

Methods: Transwells were coated in collagen and then seeded with NCI-H441 and HUVECs, forming a dual epithelial-endothelial cell barrier. After 5-7 days of culture at air-liquid interface, neutrophils (isolated from healthy blood) were seeded onto the endothelial side for an overnight transmigration towards negative and positive controls - air, media, LPS & LTB4 (neutrophil attractants) - and CF-ASN diluted 1:3 in media. Post-transmigration, neutrophils were collected, stained for flow cytometry. Statistical comparisons used 2- and 3-way ANOVA.

Results: Blood neutrophils were efficiently transmigrated through differentiated lung epithelia in both 12- and 96-well platforms, as evidenced by lower CD62L and higher CD66b levels. Moreover, both platforms enabled the generation of GRIM neutrophils similar to those observed in patient sputum based on lower CD16 and higher CD63 levels, ranging between 10-60% depending on donor. Variations in "GRIMming" between CF-ASN from modulator-treated and untreated patients, and other patient-specific variations, were captured in the 96- but not the 12-well platform.

Conclusions: The ABBA platform described here can be employed for generating and analyzing GRIM neutrophils in a high-throughput and patient-specific manner. Future studies will focus on personalized drug response assessment as a tool for basic understanding of biological variability between patients and treatment selection.

Acknowledgments: TIROUV22G0-CFRD and R01HL159058 (RT)

Impact of Educational Strategies on Staff Adherence to HIV opt-out Testing in the Pediatric Emergency Department

Presenting Author: Jordan Bryant; Emory University

Poster Number: 47

BRYANT, JORDAN E., Emory University; Griffiths, Mark A., Emory University and Children's Healthcare of Atlanta; François, Sandy, Emory University; Cameron, Melissa C., Emory University; Wynn, Bridget A., Emory University; Brown, Sara P., Children's Healthcare of Atlanta; Thompson, Sarah, Children's Healthcare of Atlanta; Carter, Rebekah G., Children's Healthcare of Atlanta; DeNaples, Kelly, Children's Healthcare of Atlanta; Kandaswamy, Swaminathan, Children's Healthcare of Atlanta; Orenstein, Evan, Children's Healthcare of Atlanta; Camacho-Gonzáles, Andrés, Emory University and Children's Healthcare of Atlanta; Morris, Claudia R., Emory University and Children's Healthcare of Atlanta; Middlebrooks, Lauren, Emory University and Children's Healthcare of Atlanta

Educating hospital staff on the importance of HIV prevention creates a supportive environment that encourages routine testing for all patients. Children's Healthcare of Atlanta (Children's) implemented an opt-out HIV testing program in its pediatric emergency departments (ED) for all patients ≥13 years undergoing venipuncture for any chief complaint in July 2023. Several methods of education were utilized to increase medical and non-medical staff knowledge on the testing procedure and basic HIV knowledge. The objective is to demonstrate the need for ongoing education for staff.

Children's population discovery tool-Pop Disco was used to compare Children's ED HIV testing volumes of 13–24-year-old patients at each site for 20 months pre implementation (Nov 21 – June 23) and post (July 2023 – Feb 2025). Education methods were categorized as face-to-face education, technological intervention, and passive education (defined as sticker reminders on computers and flyers). Sites one and two received education for at least one full year, while site three only had education for eleven months. The data was reviewed using descriptive statistics and a T test was utilized.

During the implementation, all three sites received 3 technological interventions and 35 passive education interventions. For face-to-face education site one, two, and three received 85, 71, and 52 hours respectively. Days and times of education were varied to reach as many staff members as possible. When looking at a comparison of eligible patients tested pre vs post implementation, there was an increase across all three sites, and the increase was statistically significant ($p=0.01$). After the third technological intervention there was an increase in patient consent rate. All three sites increased by 89%, 126%, and 37% respectively.

Our opt-out HIV testing implementation raised our testing and awareness, but there is still room to grow. There is a constant need for education due to staff turnover and HIV stigma. In the South there is still heavy stigma around HIV and sex education. The education provided to the staff helps relieve stigma and create a more comfortable space to discuss topics like HIV in the ED.

Midterm Outcomes of the Bifurcated Y-Graft Fontan Procedure

Presenting Author: Morgan Buchanan; Emory University School of Medicine

Poster Number: 48

BUCHANAN, MORGAN, Emory University School of Medicine; Shyam, Adithi, Division of Cardiothoracic Surgery, Children's Healthcare of Atlanta/ Emory University School of Medicine; Slesnick, Timothy, Division of Cardiology, Department of Pediatrics, Children's Healthcare of Atlanta/ Emory University School of Medicine; Rosenblum, Joshua, Division of Cardiothoracic Surgery, Children's Healthcare of Atlanta/ Emory University School of Medicine; Shaw, Fawwaz, Division of Cardiothoracic Surgery, Children's Healthcare of Atlanta/ Emory University School of Medicine; Shashidharan, Subhadra, Division

of Cardiothoracic Surgery, Children's Healthcare of Atlanta/ Emory University School of Medicine; and Chai, Paul, Division of Cardiothoracic Surgery, Children's Healthcare of Atlanta/ Emory University School of Medicine

Background: The Y-graft modification of the Fontan procedure was hypothesized to provide more balanced hepatic blood flow to the lungs and decrease energy losses. The objective of our study was to investigate the midterm clinical outcomes of the Y-graft Fontan procedure.

Methods: A retrospective review of patients who underwent the Fontan procedure at our institution from 2008 to 2017 was performed. Patients were divided into three groups based on Fontan technique – extracardiac (EC), lateral tunnel (LT) and Y-graft. Baseline clinical characteristics and peri-operative variables were compared. The outcomes of interest were transplant-free survival, and rates of re-interventions and complications.

Results: Of 219 patients, 47 (21.5%) received Y-grafts at a median age of 3.62 years old and median weight of 14.1kg. Demographic, clinical, and pre-operative characteristics were comparable across the cohort, with the notable exception of more pre-Fontan PA banding in the LT group and Norwood operations in the EC group. Y-graft technique required longer cardiopulmonary bypass and cross-clamp times, and was accompanied by the highest proportion of additional procedures. 44.7% of Y-graft patients were readmitted within 30 days of discharge, which was significantly higher than other Fontan techniques. Protein-losing enteropathy (PLE) was the only complication more prevalent in the Y-graft population: 10.6% in the Y-graft group vs. 1.6% of EC patients. There were no significant differences in the presence of surgical complications or the need for Fontan reintervention. The Y-graft group had 97.9% overall survival: 1 of 15 total mortalities and 1 of 8 transplantation events were from the Y-graft group. Transplant-free survival was not significantly different between the three Fontan techniques ($p>0.05$). By multivariable analysis, only older age and ^{3} moderate AVV regurgitation were significant predictors of higher mortality ($p<0.05$).

Conclusions: Y-graft Fontan has comparable clinical outcomes to EC and LT Fontan at mid-term follow-up. The incidence of PLE was, however, highest in the Y-graft group. Continued longitudinal follow-up of this cohort is needed to determine the effect of Y-graft Fontan on morbidity and mortality as patients transition into adulthood and assess the viability of future configurations designed to address complex anatomy.

Bridging the Gap: HIV Testing in Pediatric Emergency Departments and Adolescent Preventative Resources

Presenting Author: Melissa Cameron; Emory University School of Medicine-Department of Pediatric Emergency Medicine

Poster Number: 49

CAMERON, MELISSA N., Emory University; Middlebrooks, Lauren, Emory University and Children's Healthcare of Atlanta; François, Sandy, Emory University; Bryant, Jordan E., Emory University; Wynn, Bridget A., Emory University; Brown, Sara P., Children's Healthcare of Atlanta; Thompson, Sarah, Children's Healthcare of Atlanta; Carter, Rebekah G., Children's Healthcare of Atlanta; DeNaples, Kelly, Children's Healthcare of Atlanta; Kandaswamy, Swaminathan, Children's Healthcare of Atlanta; Orenstein, Evan, Children's Healthcare of Atlanta; Camacho-Gonzáles, Andrés, Emory University and Children's Healthcare of Atlanta; Morris, Claudia R., Emory University and Children's Healthcare of Atlanta; and Griffiths, Mark A., Emory University and Children's Healthcare of Atlanta

Background: In 2019, the U.S. Department of Health and Human Services developed an initiative: Ending the HIV Epidemic in the United States (EHE) targeting a 90% reduction in new HIV infections by 2030 across 57 jurisdictions. Within Georgia, four counties—Cobb, Dekalb, Fulton, and Gwinnett—receive EHE resources. In alignment with The Centers of Disease Control and Prevention recommendation and to aid in EHE, Children's Healthcare of Atlanta (Children's) implemented emergency department-based opt-out HIV screening in adolescents ≥13 years receiving a venipuncture. This initiative is identifying adolescents living with HIV (ALHIV) and promoting routine HIV screening. The aim is to address HIV prevention and resource deficiencies for adolescents.

Methods: From July 2023 to March 2025, Children's electronic medical record EPIC and population discovery tool were used to identify newly diagnosed ALHIV, ages 13-24, and geocode patients' residences by zip code. Data was extracted, mapped, and trends were analyzed.

Results: Since July 2023, 4880 patients have been tested and 12 newly identified ALHIV were linked to care. Notably, 3366 (69%) reside in EHE counties; however, only 196 (4%) had previously undergone HIV testing. Among the 12 ALHIV, 9 (75%) reside in EHE counties, while 3 (25%) resided in Hall, Clayton, and Henry counties. Of the 12 patients identified, 10 (83%) had never previously been tested for HIV despite 75% residing in EHE counties.

Conclusion: Given that Georgia ranks among the top five states for HIV prevalence and adolescents are the least likely group to know their HIV status, this study highlights gaps in HIV awareness and access to services. The data suggest a need for expanded EHE efforts throughout Georgia to improve testing and education for adolescents, especially in regions where resources are available but underutilized. This initiative emphasizes the importance of targeted public health strategies to engage and support vulnerable populations in achieving the goals of the EHE initiative.

Assessing the Impact of Vaccine Administration on Routine Childhood Immunization Rates in Underserved Pediatric Patients in the Greater Augusta Area

Presenting Author: Amisha Chaudhary; Medical College of Georgia, Augusta University

Poster Number: 50

Chaudhary, Amisha, Medical College of Georgia; Russell, Beatrice, Medical College of Georgia; Ji, Andrew, Medical College of Georgia; Fleck, Emily, Medical College of Georgia; Malik, Abdul, Medical College of Georgia; Oh, Grace, Medical College of Georgia; Potnis, Cahil, Medical College of Georgia; Camelo, Ingrid, Johns Hopkins University School of Medicine; and Rivera Salva, Juan, Wellstar MCG

Background: Children from underinsured, uninsured, and low-income families face socioeconomic barriers to healthcare contributing to lower immunization rates. Asociación Latina de Servicios del CSRA (ALAS) Pediatric Clinic, a student-run free clinic partnered with the Medical College of Georgia, provides free healthcare to underinsured children belonging to families 200% below the federal poverty line. To address immunization barriers, the ALAS Pediatric Clinic established a partnership to offer free vaccines, administered by DPH-trained medical students. This study assesses changes in immunization after clinic visits.

Methods: This study analyzes 24 patients seen at ALAS Pediatric Clinic since January 2025 when vaccine administration began through a partnership with the Georgia Department of Public Health Vaccines for Children program. Patients were screened using the Georgia Registry of Immunization Transactions & Services database per CDC guidelines and offered due vaccines during their visit. Included vaccines followed CDC recommendations for ages 0-6 years (excluding RSV and Rotavirus) and 7-18 years (excluding Meningococcal B, Dengue, Monkeypox). Vaccination status was recorded before and after appointments, regardless of whether vaccines were accepted.

Results: Before clinic visits, immunization rates among patients aged 0-6 years were below national kindergarten averages for all evaluated vaccines with DTaP and MMR at 70% (vs. 92% and 93% nationally, respectively), Polio at 80% (vs. 93%), and Varicella at 80% (vs. 92%). Among patients aged 7-18 years with incomplete early childhood (0-6 years) vaccines, adolescent vaccine coverage was especially low, with HPV (0%) and MenACWY (30%). Influenza and COVID-19 vaccination rates were consistently low across all age groups, with 0% coverage in the 2024-2025 season. Following clinic visits, immunization rates increased across most early childhood vaccines, with patients aged 0-6 years reaching 100% coverage in four vaccine groups.

Conclusions: These findings highlight significant gaps in immunization rates among underserved pediatric patients compared to national and state averages, demonstrating the need for a novel method of vaccine delivery. Through ALAS Pediatric Clinic's partnership with the Georgia Department of Public Health, we have been able to provide these needed vaccinations to our patients and show a significant improvement in the vaccination rate of underinsured children in the community.

Exploring Biomechanical Regulation of CD8+ T Cell Activation Through Ptpn21 Knockout Mouse Model

Presenting Author: Angela Chen; Emory University

Poster Number: 51

Chen, Angela, Emory University School of Medicine, Department of Pediatrics; Chen, Chao, Emory University School of Medicine, Department of Pediatrics; and QU, CHENG-KUI, Emory University School of Medicine, Department of Pediatrics

Background: The biomechanical characteristics of cells are critical as they provide the fundamental shape, structure, and are essential for basic cellular response mechanisms to external signals. The cytoskeletal infrastructure serves as an active mechanical regulator in various types of immune cells, modulating cellular activation signals, cell behaviors, and cell-to-cell interactions. However, the role of cell mechanics in regulating CD8+ T cell function and its associated immune responses remains unexplored.

Methods: In this study, we aimed to examine the biomechanical properties of CD8+ T cells by utilizing wildtype Protein Tyrosine Phosphatase Non-Receptor Type 21 (Ptpn21+/+) and knockout (Ptpn21-/-) mouse models. Biomechanical analysis was performed to confirm cellular integrity and cytoskeletal structure. Both in vitro and in vivo experimentation was utilized to examine the phenotypical alterations in CD8+ T cells.

Results: Firstly, we observed marked differences in stiffness using atomic force microscopy, where Ptpn21-/- CD8+ T cells exhibited reduced biomechanical rigidity compared to the wild-type ones. This

reduced stiffness enabled Ptpn21-/- CD8+ T cells to demonstrate an enhanced capacity to deform and transmigrate through narrow pores in the Transwell migration assay. Mechanical softness in Ptpn21-/- CD8+ T cells also correlated with functional impairments, evidenced by reduced activation responses following stimulation by CD3/CD28 antibody. Additionally, lower proportion of Ptpn21-/- CD8+ T cells differentiates into central memory T cells, along with a decreased level of exhausted CD8+ T cells found in Ptpn21-/- populations. Supporting in vivo experiments demonstrate impaired circulation of Ptpn21-/- CD8+ T cells within the lymphatic system, with significantly fewer cells found in lymphoid organs, such as spleen and lymph nodes, post-transfer.

Conclusion: In conclusion, the mechanical softness may hinder effective antigen presentation and subsequent activation of CD8+ T cells, both in vitro and in vivo. Our findings underscore the importance of biomechanical integrity in preserving the optimal function of CD8+ T cells. The loss of this integrity initiates a cascade of functional deficiencies, notably in impaired activation. The results reveal the role of biomechanical regulation on CD8+ T cell functions, suggesting potential therapeutic directions for enhancing T cell responses.

Enhancing Oro-nasal Fistula Healing through Targeted Macrophage Delivery of Probiotic Bacterial Supernatant

Presenting Author: Keerthi Priya Chinniampalayam Sekar; Emory University

Poster Number: 52

Keerthi Priya Chinniampalayam Sekar1, Toma Afra2, Gacasan, Camilo Anthony Gacasan1, Hope Robinson2, Sundus Kaimari2, Tim cha2, Rheinallt M Jones 1,Steven L Goudy1* 1Department of Pediatrics, Emory University, Atlanta, Georgia, USA. 2Department of Gastroenterology, Emory University, Atlanta, Georgia, USA.*

Objectives: Oral cavity healing faces constant physical trauma and microbial challenges from bacteria, fungi, parasites, and viruses. This process is vital after traumatic injury, cancer resection, or correcting congenital anomalies like cleft palate, which affects 1/700 births. Up to 60% of cleft palate repairs result in adverse outcomes, including the formation of oro-nasal fistula (ONF), which is an opening between the mouth and nose that requires multiple corrective surgeries. We hypothesized that the oral microbiome may impact ONF healing.

Methods: A 1.5 mm ONF defect was created in C57BL/6 mice. A PEG-4MAL hydrogel containing Lactococcus lactis cremoris (LLC) probiotic supernatant-treated THP1 cultured cells (150k) was applied to the injury site. Lactobacillus rhamnosus GG (LGG) supernatant-treated THP1 cells (150k) were used as controls. Endoscopic images were taken on days 1, 3, 5, and 7, and ONF healing was assessed through endoscopic and histological evaluations. Cytokine production from LLC-treated ThP1 cells and RAW macrophages was quantified using multiplex assays, qPCR, and ELISA to assess anti-inflammatory cytokine levels.

Results: Mice infected with an ONF and treated with a hydrogel containing THP1 cells that were exposed to LLC supernatant showed 90% ONF healing, while THP1 cells that were exposed to LGG supernatant showed 75% ONF healing, compared to the control group treated with hydrogel only where 50% ONF healing occurred. LLC-stimulated ThP1 cells produced significantly higher levels of cytokines associated

with macrophage activation and dampening of inflammation including G-CSF (p=0.008), IL-10 (p=0.101), and IL-27 (p=0.008) compared to control.

Conclusion: This study highlights the role of Lactococcus lactis cremoris (LLC) in enhancing ONF healing. The LLC-THP1-hydrogel achieved a 90% healing rate, which was significantly higher than both LGG-THP1 and hydrogel-only groups. These results highlight the therapeutic potential of the oral microbiome in clinical applications, particularly for cleft palate repair. Active investigations identifying the underlying mechanisms of the oral microbiome's role in wound healing and its wider applications in regenerative medicine are underway.

Barriers to Timely and Accurate Follow-up Testing for Abnormal SCID Newborn Screening

Presenting Author: Jacqueline Comiter; Emory University School of Medicine

Poster Number: 53

COMITER, JACQUELINE, Emory University; Lee, Gerald, Emory University; Wittenauer, Angela, Emory University; Juca, Holly, Emory University; and Gambello, Michael, Emory University

Background: Abnormal Severe Combined Immunodeficiency (SCID) newborn screening (NBS) results require follow-up testing with repeat TREC PCR or lymphocyte subset test with CD45RA/RO for definitive diagnosis and timely treatment. However, delays in or errors obtaining follow-up testing can delay diagnosis and treatment of SCID.

Methods: The Georgia SCID NBS follow-up database from 2019-2023 was analyzed to determine the timeliness and accuracy of follow-up testing after an abnormal SCID NBS. A quality improvement project was then planned to address barriers to follow-up testing.

Results: From 2019-2023, 7,210 abnormal SCID NBS results required follow-up testing with either repeat TREC PCR or lymphocyte subset test with CD45RA/RO. When follow-up testing was indicated, the mean time between initiation of follow-up and the date repeat screening was obtained was 6.5 days. 4.8% of results required follow-up testing with lymphocyte subset test with CD45RA/RO, specifically. 13% of follow-up tests with lymphocyte subset test with CD45RA/RO were performed incorrectly. 79% of incorrectly performed lymphocyte subset tests were incorrect because they were missing CD45RA/RO. Other reasons for incorrectly performed lymphocyte subset tests include incorrect panel orders (e.g., leukemia, SCID gene, paroxysmal nocturnal hemoglobinuria, and Lyme disease panels), delayed collection, and collection that never took place.

Conclusions: Over 10% of SCID NBS follow-up testing with lymphocyte subsets was performed incorrectly from 2019-2023 in Georgia. The previous recommendation page faxed to offices included general background information followed by lab-specific ordering instructions. This document used the wording "flow cytometry," included instructions for labs that did not actually offer CD45RA/RO testing, and did not provide ordering instructions for Quest. Requiring all infants to have a lymphocyte subset with CD45RA/RO was found to be a potential barrier to timely and accurate follow-up in a 2021 study of 10 years of NBS for SCID in Massachusetts. Thus, the recommendation page was updated to minimize the number of incorrectly performed lymphocyte subset tests by removing the requirement for CD45RA/RO, omitting the words "flow cytometry" to avoid confusion with leukemia/lymphoma flow cytometry, and improving coordination with labs and providers to obtain testing.

The "Ready for Tonsillectomy" Mobile App for Child-Focused Perioperative Education

Presenting Author: Holly Cordray; University of Pennsylvania Perelman School of Medicine

Poster Number: 54

Cordray, Holly, University of Pennsylvania Perelman School of Medicine; Tsfoni, Ariella, Emory University School of Medicine; Wright, Emily A, Emory University School of Medicine; Arconada Alvarez, Santiago, AppHatchery – Georgia Clinical and Translational Science Alliance; Greenleaf, Morgan, AppHatchery – Georgia Clinical and Translational Science Alliance; Raol, Nikhila, Baylor College of Medicine and Texas Children's Hospital; and Prickett, Kara K, Emory University School of Medicine and Children's Healthcare of Atlanta.

Background: Patient education is central to Enhanced Recovery After Surgery protocols, but child-focused materials are lacking. We developed and piloted a mobile application to support accessible, interactive, and cost-efficient patient and caregiver education about pediatric tonsillectomy. A user-testing trial measured feasibility, usability, and patient-centered outcomes.

Methods: Thirty children 5-12 years of age who were preparing for tonsillectomy, their caregivers, and 6 attending otolaryngologists participated in a user-testing trial of a web-based prototype that they could access at home on personal devices. Patients and caregivers rated usability and likeability on the mHealth App Usability Questionnaire and responded to additional patient-centered outcome questions regarding use during recovery. Otolaryngologists rated content quality on the Mobile App Rating Scale, a multidimensional tool for assessing health-related mobile applications. The full mobile application, "Ready for Tonsillectomy," was subsequently developed for iOS and Android, incorporating improvements based on user feedback.

Results: Trial enrollment was 88.2% and retention was 90.0%; 96.3% of participants used the application. Mean ± SD patient ratings for usability/likeability were 6.3 ± 1.1 out of 7; caregiver ratings were 6.5 ± 1.1. In common themes from open-ended feedback, patients described the application as helpful and appealing, and caregivers described it as informative, easy to understand, calming, and easy to use. Among caregivers who used the application during recovery, 92.3% reported that it helped them manage their child's pain. Providers would recommend the application to many or all of their patients (mean 4.7 ± 0.5 out of 5). Mean provider ratings for domains of engagement, functionality, aesthetics, information quality, subjective quality, and app-specific value ranged from 4.1-4.8 out of 5.

Conclusion: The "Ready for Tonsillectomy" mobile application demonstrated high feasibility and usability according to families and otolaryngologists, who found the resource engaging, informative, and helpful in promoting positive coping. With further refinements based on user feedback, this tool offers a patient-centered solution that is readily scalable to other surgeries. The mobile application is available for free in the Apple App Store and Google Play Store, supporting education in English and Spanish.

Understanding the Impact of War and Trauma on Limb Injury in Children: Is there an Emerging Global Health Crisis

Presenting Author: Colleen Coulter; Children's Healthcare of Atlanta and Emory School of Medicine Adjunct Associate Professor

Poster Number: 55

SHAH, ZARIA, UNIVERSITY OF GEORGIA; COULTER, COLLEEN, CHILDRENS HEALTHCARE OF ATLANTA; ADAMKIEWICZ, TOM, PERIMETER PEDIATRICS; AND GILL, COREY SCOTTISH RITE CHILDRENS HOSPITAL

Background: According to the UN, in 2023 5,301 children were killed and 6,348 were maimed – a 35% increase from 2022. 63% of explosive weapon casualties are civilians (AOAV, 2024), 20% to > 40% are children. In 2017, over 90,000 children (0-14 years) suffered unilateral lower limb amputations due to conflict and terrorism – the 3rd leading cause globally 1. Children are innocent victims. Although the news reports pediatric amputations during conflicts, data is limited in peer-reviewed literature.

Methods: To better understand optimal medical, surgical, rehabilitation, short- and long-term outcomes, utilizing Prisma guidelines, the authors conducted a systematic review of the literature on pediatric limb injuries in armed conflicts. Articles were extracted from academic libraries/Medline/Google Scholar and references identified by Jain RP et al2. Key words searched included but not limited to "child, pediatric, amputation (severity and levels), global, trauma, war, conflict, surgical procedures, and rehabilitation." Additionally, a word cloud analysis was conducted on both groups of articles identifying frequency of words present in titles, abstracts, method, and result sections.

Results: Initially, 75 articles were identified, 62 peer reviewed, and 57 included limb injury/amputation in children during armed conflicts. 34 articles included data on children, with 27 articles including aggregated data on children and adults. Articles included similar frequent words (amputation, trauma, injuries, wound, patients). However, both groups of articles also differed, with the disaggregated reporting children, age, mortality, and location. The aggregated data group had more frequent mention of fracture, graft and nerve injury. This analysis indicates that both groups of articles provide different information requiring consideration. Barriers of care identified include access to appropriate medical care, long-term follow-up and care, and unreported data. Additional barriers identified include comorbidities; polytrauma support; complications, type of care facility (military, civilian, NGO), child specific resources medical supplies & equipment, high costs in conflict zones, lack of ortho/multidisciplinary expertise, prosthetic and rehab services, psycho-social family/community support, and systematic barriers (no trauma/limb loss registries, no/limited prevention strategies).

Conclusion: The purpose of the proposed systematic review is to identify the need for global resources and to increase awareness of the impact of conflicts on children.

References:
Global Burden of Disease; McDonald CL et al 2020
Delivering trauma and rehabilitation interventions to women and children in conflict settings: a systematic review. BMJ Glob Health. 2020 Apr 23;5(1)

Investigation of downregulated interferon-stimulated genes by HBV in primary human hepatocytes

Presenting Author: Georgios Dangas; Emory University

Poster Number: 56

DANGAS, GEORGIOS, Emory University; Sanders, Madeleine, Emory University; Moschogianni, Evgenia, Emory University; Athanasiadis, Antonis, Emory University; Li, Dar-Yin, Emory University; Maslarinou,

Anthi, Emory University; Levenson, Kenneth, Emory University; Zou, Chenhui, Weill Cornell Medicine; Zhou, Yichen, Weill Cornell Medicine; Ogata, Kosuke, Kyoto University; de Jong, Ype, Weill Cornell Medicine; and Michailidis, Lefteris, Emory University.

Background: Chronic hepatitis B virus (HBV) infections affect 300 million worldwide. A significant role in chronicity is attributed to the nuclear form of the HBV genome, termed covalently closed circular DNA (cccDNA). The cccDNA is the template of transcription of all viral mRNAs, and its maintenance and stability in infected hepatocytes is the target of curative therapies. Approved treatments against chronic HBV include nucleoside analogs and interferon alpha (IFNα). IFNα has moderate effects on HBV replication with severe side effects. However, in ~10% of individuals who receive IFNα, this can result in a functional cure. While there is a need for IFN-free regimens, understanding the molecular mechanisms of IFNα against HBV may lead to novel antiviral strategies.

Methods: To model chronic HBV in vitro, we developed a system based on culturing mouse-passaged primary human hepatocytes (mpPHH) isolated from HBV-infected humanized mice. A major advantage is that nearly all hepatocytes are infected and contain high levels of cccDNA. Furthermore, we established robust CRISPR-based methods in mpPHH to interrogate the impact of gene knockouts. Combined with highly sensitive proteomics analyses, we can now investigate the role of specific host factors and pathways on HBV lifecycle and IFNα activity.

Results: Infected and uninfected mpPHH displayed very distinct protein expression patterns. Forty-two proteins induced by IFNα in uninfected mpPHH were suppressed in HBV-mpPHH. These 42 hits are validated in CRISPR knockout to determine their impact on HBV infection. Understanding the mechanism of action of these proteins in terms of HBV replication is part of these efforts to identify novel druggable pathways toward eliminating/silencing the cccDNA.

Conclusions: Together, these data are expected to identify host factors crucial in chronic HBV and response to IFNα treatment. Moreover, the in vitro systems we developed, CRISPR-based applications, and systems biology analyses can be extended to other areas of HBV and liver-related diseases.

Deep Learning-based Nuclear Segmentation for Multiplexed Images: A Comprehensive Approach to Understanding Microenvironmental Differences in Crohn's Disease at the Single Cell Level

Presenting Author: Abhishek Dash; Emory University

Poster Number: 57

Dash, Abhishek, Emory University; Sompalli, Ajitesh, Emory University; Joshi, Gaurav, Nikon; Maddipatla, Sushma, Emory University; Dodd, Anne, Emory University; Cutler, David, Emory University; Yin, Hong, Childrens Healthcare of Atlanta; Matthews, Jason, Emory University; Kolachala, Vasantha, Emory University; Kugathasan, Subra, Emory University and Childrens Healthcare of Atlanta

Background: Crohn's disease (CD) is an inflammatory bowel disease that causes chronic inflammation of the entire GI tract, penetrating deeper layers of the intestine where most patients manifest as an inflammatory phenotype. Deep learning based spatial biology will further advance understanding of tissues at the single cell level.

Methods: Ileal and rectal biopsies were collected from consented patients undergoing colonoscopy at Children's Healthcare of Atlanta (non-IBD control and CD, ileum and rectum, n=4 each). Lunaphore COMET was used to perform highly multiplexed imaging of FFPE tissues with a 20-antibody panel. pathologist-selected regions of interest (ROIs, n=5) measuring 4500 x 3500 pixels were chosen from each sample. Nuclear cell segmentation was performed using CellSeg, a MASK-R convolutional neural net (NN) model, to generate channel-wise pixel quantification at the single cell level.Batch correction and dimensionality reduction (DR) were then performed using FastMNN (mutual nearest neighbors) and Harmony correction while clustering was performed using both RPhenograph and SNN (shared nearest neighbors). Cells were manually annotated using clustering and were compared against automatically annotated cells using ASTIR, another NN model. This was followed by single cell and spatial analysis to derive cell proportions and neighborhoods respectively.

Results: The manual annotations were consistent with automatic annotations. Automatic annotations showed a higher proportion of CD4+ and CD8+ T Cells in CD samples versus CTRL. B-Cells were slightly elevated in the CD samples over the CTRL samples. The epithelial cells were consistent in all samples except Ileum CTRL (20%), probably due to the higher number of unlabeled cells, as ROIs were chosen on the basis consistency across epithelial counts. Spatial analysis of labeled epithelial cells and immune cell populations corresponded to pathologist identified regions in the samples with colocalization of Epithelial Cells and CD8+ T-Cells, corresponding to their proximal clustering. Finally, neighborhood analysis led to the identification of six different neighborhoods with T-Cell rich regions (5 and 6) being enriched in the Ileum CD and Rectum CD samples.

Conclusions: Our results show that cell quantification from deep learning offers in-depth understanding of spatial localization and interactions between cells, leading to a deeper understanding of CD.

Using 3D Motion Capture and Deep Learning to Detect Motor Abnormalities in a Pediatric Infectious Disease Model

Presenting Author: Nisarg Desai; Emory University

Poster Number: 58

Desai, Nisarg, Emory University; Richardson, Rebecca, Emory University; van Schoor, Alex, Emory University; Love, Kaitlyn, Emory University; Ramsay, Gordon, Marcus Autism Center; Chahroudi, Ann, Emory University; and Raper, Jessica, Emory University

Background: Motor deficits in children—especially those stemming from neurodevelopmental disorders or prenatal viral exposures—can have lasting effects. Traditional motor detection methods, including the gold standard of human observation, are labor intensive and often miss subtle motor impairments. AI-powered video-based motion tracking offers a more efficient and precise alternative. Our preliminary data demonstrates increased balance losses in juvenile rhesus macaques (RM following postnatal ZIKV infection, providing a foundation for further investigation. Hence, our work aims to apply AI and pose estimation algorithms to detect motor abnormalities in juvenile that experienced Zika virus (ZIKV) infection postnatally.

Methods: We built a 12-camera setup capable of synchronized video capture of freely moving juvenile monkeys in a large social play cage. We manually annotated 10,000 frames extracted from these videos

with 17 joints on monkey bodies. We trained a deep learning model for 3D pose estimation that allows us to track changes in poses among frames in the video.

Results: Our pose detector (a Convolutional Neural Network) trained on the large, annotated dataset learns both the visual appearance of body landmarks (e.g., head, shoulders, knees etc.) and their spatial relationships in 3D. All joints are tracked with an error under 50 mm, demonstrating the overall robustness of our pose detection model. While performance varies across joints, the model achieves especially high accuracy for upper body landmarks—including the eyes, nose, head, neck, and shoulders. Lower body points such as the hips and tail are more challenging to detect consistently, but are still captured within acceptable error bounds.

Conclusion: We will use this model to investigate whether ZIKV infected macaques have increased balance losses than uninfected controls. We will validate the accuracy of the algorithm by comparing AI analysis against human expert observation. We hypothesize that these algorithms will not only accurately discern motor abnormalities in ZIKV-infected RMs compared to controls but also identify subtle impairments missed by humans. Importantly, our hardware and AI pipeline developed can be applied to other animal models of pediatric and neurodegenerative disorders (e.g. HIV infection, early life stress, anesthesia exposure, autism), broadening its impact beyond ZIKV-infected RMs.

Using a Humanized Transmigration Model to Investigate the Role of IL-13 in Allergic Asthmatic-Induced Lung Injury.

Presenting Author: Badiallo Diani; Georgia Tech/Emory University

Poster Number: 59

DIANI, BADIALLO, Georgia Institute of Technology (1)/Emory University (2); Stephenson, Susan, (2); Grunwell, Jocelyn, (2); Takayama, Shuichi, (1); Fitzpatrick, Anne, (2);

Background: Asthma is an airway inflammatory disorder that is the most common chronic disease leading to hospitalization in children, with about 8% of children in the U.S. being affected. Th2-high/Allergic Asthma is driven by type 2 inflammation, with notably elevated levels of the cytokine, IL-13. While IL-13 is known to be upregulated in Th2-high patients, its specific contribution to barrier dysfunction remains unclear. For example, it is linked to both airway remodeling and poor epithelial integrity in asthma. This study aims to (1) create a responsive, Th2-asthmatic in vitro lung model and (2) use receptor antagonists to evaluate a reversal of this effect, with the overall objective to better characterize the role of IL-13 in barrier dysfunction within Type 2 asthma.

Methods: Experimental allergic asthma was induced into a co-culture Transwell model using IL-13, enabling a dynamic, high-throughput study of Th2-driven barrier dysfunction. Barrier integrity will be assessed via TEER, neutrophil transmigration, and immunocytochemistry for tight junctions. A soluble antagonist will be used to determine whether these effects can be reversed.

Results: Preliminary results show a direct, statistically significant, dose-dependent relationship between IL-13 concentration and barrier degradation. Imaging further reveals this barrier dysfunction is prevalent in both the endothelial and epithelial layers, showing decreased presence of tight junction markers with increasing concentrations of IL-13. Furthermore, upon using IL-13 Receptor antagonists to block IL-13Rα1 and IL-13Rα2 receptors, respectfully, the antagonist against IL-13Rα1 statistically reduced the

barrier dysfunction in a dose-dependent way, while the antagonists against IL-13Rα2 was not seen to have the same effect.

Conclusion: While data collection/analysis is ongoing, the tentative interpretation of the statistical results supports a hypothesis that IL-13-driven barrier dysfunction is modulated through IL-13Rα1 signaling in the model, compared to IL-13Rα2, since barrier integrity was not impacted by the addition of IL-13Rα2-antagonist. This result is significant due to the lack of elucidation of IL-13's specific role in asthma and also correlates with clinical data that reveals upregulation of IL-13Rα1, downregulation of IL-13Rα2, and poor barrier function in allergic asthmatics. The next steps include analyzing neutrophil transmigration data, visualizing viral effects in the model, and conducting proteomics.

Bile acids as immunomodulatory signals in cystic fibrosis

Presenting Author: Samantha Durfey; Emory University, Department of Pediatrics

Poster Number: 60

DURFEY, SAMANTHA, Emory University; Ozuna, Hazel, Emory University; Moran, John, J., Emory University; Shrestha, Mahesh, K., Emory University; Miralda, Irina, Emory University; and Kopp, Benjamin, Emory University.

Background: Over the past decade CFTR modulators have revolutionized the treatment of cystic fibrosis (CF). Despite significant improvements in disease morbidity and mortality, chronic lung infections persist in people with CF (pwCF) after they begin modulators. Exposure to CF airway fluid reduces bacterial phagocytosis and killing in healthy macrophages, which suggests abnormal tolerance signals exist in the airways of pwCF. We propose bile acids as a contributing tolerance signal, as bile acids are dysregulated in the CF airway and can influence gut and liver immune cell function in healthy individuals. However, it is unknown whether healthy or CF airway macrophages respond to bile acids and if bile acids remain dysregulated after CFTR modulators.

Methods: Single cell RNA sequencing data from the Chan-Zuckerberg CellxGene database was mined to determine if bile acid receptors are expressed in lung-resident macrophages. Human macrophages were exposed to bile acids ex vivo, and bile acids' effects on bacterial growth and macrophage cell death were determined. Metabolomics (LC/MS followed by analysis with Compound Discoverer) was performed on plasma from healthy people and pwCF before and after starting the CFTR modulator, elexacaftor/tezacaftor/ivacaftor (ETI) to identify differences in bile acids following ETI.

Results: We found monocytes and macrophages in the lung and liver express bile acid receptors at similar levels. Plasma metabolomics revealed that two bile acids (glycocholic acid and glycochenodeoxycholic acid) are amongst the top 10 most differentially abundant molecules in pwCF compared to healthy people, and both remain elevated after ETI. Indeed, glycocholic acid was the second most differentially abundant molecule before and after ETI. Preliminary results revealed bile acids were not toxic towards bacterial CF pathogens (Pseudomonas aeruginosa, Staphylococcus aureus, and Burkholderia cenocepacia), but macrophage cell death was enhanced in the presence of deoxycholic acid.

Conclusion: We demonstrated the potential for bile acids to influence macrophage function in modulator-treated pwCF. Lung macrophages express bile acid receptors, and bile acids are amongst the

most differentially abundant molecules in CF, with persistent aberrations following modulator therapy. Ongoing work will assess the effects of bile acid exposure on bacterial killing by patient-derived macrophages in a coordinated gut-lung axis study.

A Prospective Cohort Analysis of the RSV Functional Antibody Profile of Mother-Infant Pairs in Kenya

Presenting Author: Gabriella Ess; Emory University

Poster Number: 61

ESS, GABRIELLA, Emory University; Lapp, Stacey, Emory University; Chappa, Prasanthi, Emory University; Njuguna, Irene, University of Washington; Jaspan, Heather, University of Washington; Wamalwa, Dalton, University of Nairobi; John-Stewart, Grace C., University of Washington; Day, Cheryl L., Emory University; Cranmer, Lisa Marie, Emory University; and Rostad, Christina A., Emory University

Background: Respiratory Syncytial Virus (RSV) is an important cause of acute lower respiratory tract infections and hospitalization in infants, with an especially high burden of disease in low- and middle-income countries. While novel maternal RSV vaccines have been introduced recently, there remains a need to better understand maternal antibody transfer through the placenta and breast milk to infants.

Methods: We prospectively enrolled maternal-infant pairs in Kisumu, Kenya from January to August 2014 and collected maternal and cord blood at delivery, maternal breast milk at 6 weeks postpartum, and infant blood at 10 weeks of life. We evaluated RSV antibody binding (total RSV F and G antibodies by ELISA) and function (neutralization, antibody-dependent cellular cytotoxicity (ADCC) by a mechanism-of-action assay (Promega), and antibody-dependent cellular phagocytosis (ADCP) by flow cytometry to calculate a phagocytosis score) from cryopreserved plasma specimens, and antibody binding and ADCP from breast milk supernatant specimens. We described total antibody levels in each sample type, cord blood-to-maternal ratio (CMR) of antibodies, and the durability of each antibody type in infants. Descriptive statistics, Pearson correlation, and mixed-effects analysis with Tukey's multiple comparisons tests were performed using GraphPad Prism 10.

Results: We assessed RSV antibody binding and function among 98 of 101 enrolled mother-infant pairs with available specimens. The CMR was >1 for all antibody assays analyzed. Maternal and cord blood antibody titers were highly correlated, with the strongest correlation observed for neutralizing antibodies. A significant decline in neutralizing antibody titers was observed from birth to 10 weeks of life in infants, but Fc-effector antibodies (ADCP) remained relatively stable over this period. All antibody types measured were detected in breast milk at 6 weeks postpartum.

Conclusions: RSV binding, neutralizing, and Fc-effector antibodies were detected in cord blood and breast milk and were present in infant plasma through 10 weeks of life. Future research should evaluate the role of functional antibodies in protection against RSV disease in infants, particularly in the context of maternal RSV vaccination.

A Simulation Education Intervention Teaching Palliative Care Communication to Pediatric Fellows

Presenting Author: Deborah Feifer; Emory University School of Medicine

Poster Number: 62

FEIFER, DEBORAH, Emory University School of Medicine; Tracewski, Meghan, Children's Healthcare of Atlanta Pediatric Palliative Care; Lee, Katherine, Aflac Cancer and Blood Disorders Center, Children's Healthcare of Atlanta; DeGroote, Nicholas, Aflac Cancer and Blood Disorders Center, Children's Healthcare of Atlanta; Hudson, Elisa Jo, Emory University School of Medicine, Human Simulation Education Center; and Brock, Katharine E., Emory University School of Medicine, Children's Healthcare of Atlanta Department of Pediatric Palliative Care, and Aflac Cancer and Blood Disorders Center

Background: Palliative care (PC) communication skills are essential to patient care, yet many pediatric fellows do not receive formal PC and end-of-life education. Where it exists, current training often relies on lecture and observation. Simulation-based training is an effective, experiential education tool that allows pediatric fellows to safely practice and debrief difficult conversations to improve their PC communication skills.

Methods: Pediatric fellows in hematology/oncology, critical care medicine, and neonatology completed biannual or annual half-day simulation sessions practicing PC communication throughout their three-year fellowship. Each session included three scenes with standardized patients (SPs) followed by debriefing with PC faculty, discipline-specific physicians, and the SP. Fellows completed surveys evaluating self-efficacy (range 23-115), adequacy of prior medical education (range 6-30), and curricula satisfaction at baseline and after each fellowship year. Additionally, observing faculty evaluated participants in nine communication domains (scale 1-5). Self-efficacy and medical education scores were analyzed across years. Faculty communication scores were averaged by fellow/year, and analyzed with linear mixed-effects regression models.

Results: Among 104 fellow participants, most were female (n=68, 67%), White (n=65, 64%), and non-Hispanic/Latino (n=91, 89%). Most participants led <5 PC discussions during residency (n=82, 80%), although many reported caring for >5 patients who died while on call (n=40, 39%). Participants' self-rated comfort with PC communication improved from baseline (67, SD=15) to year 3 (92, SD=10, $p<0.001$). Importantly, fellows did not improve in domains not taught in the curriculum (e.g. attending a patient's funeral). At baseline, most participants reported inadequate medical education in PC; this improved from baseline (16, SD=5) to year 3 (28, SD=2, $p<0.001$). Faculty also rated that fellows' communication competence improved, most notably between years 1 and 2 ($\Delta 0.42$, $p<0.001$) and years 1 and 3 ($\Delta 0.67$, $p<0.001$). Participants found the simulation-based trainings realistic (95%), useful (97%), and preferable to lecture-based education (87%).

Conclusions: Simulation-based communication training is an effective curriculum to bolster comfort and PC skills in pediatric fellows. This method enables fellows to safely practice navigating complex clinical situations as they prepare to become attending physicians. Expanding simulation to other disciplines and training programs can bolster PC education opportunities and ideally improve patient care.

Gonorrhea's Nemesis: Microneedle-Based Whole-Cell Vaccine Shows Promise Against Multidrug-Resistant Neisseria gonorrhoeae

Presenting Author: Amarae Ferguson; Mercer University

Poster Number: 63

FERGUSON, AMARAE, Mercer University; Bagwe, Priyal, Mercer University; Pasupuleti, Dedeepya, Mercer University; Zughaier, Susu, Qatar University; D'Souza, Martin J., Mercer University

Background: Neisseria gonorrhoeae, the causative agent of gonorrhea, is responsible for over 82.4 million cases annually worldwide. The rise in antibiotic resistance has compromised treatment efficacy, highlighting the urgent need for an effective vaccine. Previous vaccine efforts—such as pilin-based and whole-cell formulations—failed due to significant antigenic variability and limited immune protection. We developed a novel adjuvanted, whole-cell, formalin-inactivated gonococcal microparticulate vaccine administered via dissolving microneedles, designed to enhance humoral, cellular, and mucosal immunity while addressing strain variability.

Methods: The N. gonorrhoeae CDC-F62 strain was formalin-inactivated and encapsulated in a biodegradable albumin matrix with Alum and AddaVax™ adjuvants via spray drying, then loaded into hyaluronic acid-based microneedles. Mice were divided into four groups: one control and three vaccine groups receiving 50 µg, 100 µg, or 200 µg of antigen (each with 50 µg adjuvant). Immunizations were administered at weeks 0, 2, and 4. Serum IgG, IgM, IgG1, and IgG2a levels were assessed biweekly over 8 weeks. At week 10, mice were intravaginally challenged with 10^6 CFU/mL live N. gonorrhoeae. Vaginal washes were analyzed for mucosal IgA, and spleens/lymph nodes were assessed for $CD4^+/CD8^+$ T-cell responses via flow cytometry.

Results: All vaccinated groups mounted significant humoral, cellular, and mucosal immune responses. The 200 µg group showed the highest IgG and IgG2a response ($p < 0.01$ vs. control), with elevated vaginal IgA levels observed in both the 100 µg and 200 µg groups post-challenge. Cellular responses were dose-dependent, with the 200 µg dose eliciting the strongest $CD4^+$ and $CD8^+$ T-cell activation in spleens and lymph nodes. Bacterial clearance was significantly faster in the 100 µg and 200 µg groups (8 days vs. 12 days in controls).

Conclusion: This study demonstrates the efficacy of a microneedle-delivered whole-cell gonococcal vaccine in eliciting robust immune responses and accelerating bacterial clearance. The 200 µg dose provided optimal immunity, highlighting its potential to combat antibiotic-resistant strains. These findings support further clinical development to address the global gonorrhea burden.

Integrated Electrical Conditioning and Dynamic Flow Perfusion for 3D Bioprinted Developing Human Heart Models

Presenting Author: Sarah Fineman; Emory University

Poster Number: 64

Fineman, Sarah, Emory University; Jin, Linqi, Department of Biomedical Engineering, Georgia Tech and Emory; and Serpooshan, Vahid, Department of Biomedical Engineering, Georgia Tech and Emory

Background: The development of the human heart in embryos is a complex process susceptible to errors resulting in congenital heart defects (CHDs). Our research focuses on a severe CHD called Hypoplastic Left Heart Syndrome (HLHS), which has profound long-term complications despite postnatal surgical interventions. However, research remains limited on the factors that contribute to HLHS. Due to the limitations of studying in vivo embryonic human hearts, a perfusable 3D human heart model at linear heart tube stage (day 22) was created by computer aided design (CAD) and 3D bioprinting. HLHS

cardiomyocytes (CMs) were differentiated from human induced pluripotent stem cells (hiPSCs) and cultured in the 3D bioprinted heart models for studying cellular responses to the microenvironmental factor of flow hemodynamics and chronic external electrical conditioning. By increasing the microenvironmental accuracy for the embryonic heart model, our research works to uncover the factors that contribute to HLHS.

Methods: An idealistic human linear heart tube model was designed by CAD and 3D bioprinted via hydrogel based digital light processing (DLP). Customized 6-well plates were designed on CAD modeling software and 3D printed to facilitate the simultaneous delivery of dynamic flow perfusion and noninvasive electrical pacing. CM contractile function enhancement under chronic flow and pacing conditions over 5 days was evaluated through video-based contractile analysis obtained via brightfield microscopy. Immunofluorescence imaging was used to assess CM viability (cTnT) and expression of functional markers for voltage gated sodium channels (NaV1.5) and connexin 43 (CX43).

Results and Conclusions: The customized 6-well plate facilitated the simultaneous delivery of flow perfusion and pacing to CMs within a bioprinted scaffold. Significant differences in beats per minute (BPM), relaxation time, and beat rate variation were observed between pre and post chronic flow and pacing. Furthermore, there was no significant change in contractile stress. Immunofluorescence data was completed and markers for cTnT, NaV1.5, and CX43 were all visualized within the constructs. By adding simultaneous mechanical factors to the bioprinted model, the findings of this study will contribute to better simulating the 3D microenvironment of the embryonic human heart development and understanding HLHS pathogenesis.

Beyond step count: physical activity measurement with the activPAL™ in a child who is non-ambulatory

Presenting Author: Lisa Fraher; Mercer University

Poster Number: 65

FRAHER, LISA, Mercer University; and Wendland, Deborah, Mercer University

Background: Precision rehabilitation optimizes care by using an individual's characteristics to design the right treatment at the right time. Physical activity level is one such characteristic that can influence intervention decisions and patient outcomes. For children who are non-ambulatory, commercial activity monitors are unsuitable because they rely on step count. Research-grade accelerometers are valid for children who are non-ambulatory, but their high cost and complex data processing limit their clinical feasibility.

The activPAL™ activity monitor captures activity based on body posture and movement, offering a more individualized and comprehensive picture of activity patterns beyond stepping alone. It provides raw data and graphical representations of time spent in different postures and transitions between postures. These metrics support personalized clinical decision-making. While the activPAL™ has been validated in children who are ambulant and semi-ambulant, its accuracy in children who are non-ambulant remains untested. This case study seeks to describe the use of the activPAL™ as a precision tool for measuring physical activity in a non-ambulatory child with severe motor impairment.

Methods: A 7-year-old girl with cerebral palsy, functioning in GMFCS level V, participated in a 60-minute physical therapy session while wearing an activPAL™ monitor. Standard active events included standing, sit-to-stand transitions, and stepping, while standard inactive events included sitting and supine-lying. Non-standard active events included tall-kneeling and floor mobility. Raw monitor data were analyzed in Microsoft Excel to account for active time in non-standard positions and quantify total active time. The findings were compared to visual coding (gold standard).

Results: The activPAL™ indicated the child was active for 72.2% of the session, while visual coding indicated 67.7% active time. This was a 4.5% difference (~2.8 minutes) between the two measurement methods. The parent, child, and therapist reported acceptability with wearing the monitor.

Conclusions: Close agreement between activPAL™ data and visual coding suggests the device may be valuable for understanding physical activity in children with severe motor impairment. By providing this objective, highly accurate information, activPAL™ can support individualized intervention planning (precision rehabilitation). This case study underscores the need for further research to evaluate activPAL™'s clinimetric properties and feasibility in this population.

The Immune Checkpoint Siglec-15 In Tumor Microenvironment-mediated Immune Evasion In Hematologic Malignancies

Presenting Author: Dailia Francis; Emory University

Poster Number: 66

FRANCIS, DAILIA B, Emory University & Children's Healthcare of Atlanta; Dougan, Jodi, Emory University; Michaud, Marina, Emory University; Bhasin, Manoj, Emory University; and Porter, Christopher, Emory University & Children's Healthcare of Atlanta

Background: Primary refractory and relapsed (r/r) hematologic malignancies remain a challenge in pediatric patients. While hematopoietic stem cell transplant and novel immunotherapies such as immune checkpoint inhibitors and chimeric antigen receptor (CAR) T-cell therapy have shown some promise in this population of patients, outcomes in r/r remain dismal for many patients. This highlights the urgency to identify factors that drive refractory and/or relapsed disease that will address current therapeutic gaps and improve overall patient survival.

Siglec-15 (Sig-15), an immunoglobulin-like lectin, is a critical immune suppressor that is highly expressed in various human cancers and intra-tumoral myeloid cells. Importantly, inhibiting Siglec-15, either through genetic knockout or knockdown, had a restorative effect on local anti-tumor immune responses and abrogated tumor progression. While reported in solid malignancies, a role for Siglec-15 in promoting disease progression in hematologic malignancies has not yet been described.

Methods: We have evaluated Sig-15 expression in primary human lymphoma patient samples as well as various lymphoma (human and mouse) cell lines using western blot, quantitative PCR as well immunohistochemistry and immunofluorescence methods. Sig-15 expression was inhibited through genetic downregulation in the well-established murine lymphoma cell line A20 or the leukemia cell line BAML and injected into immune competent and immune deficient mice. Analysis of the immune microenvironment was performed using single cell RNA (scRNA) sequencing as well as multiparameter flow cytometry was on bone marrow, spleen and lymph nodes harvested at various time points.

Results and Conclusions: Sig-15 is highly expressed in lymphoma and leukemia cell lines as well as primary patient samples. Knockdown of Sig-15 in A20 cells abrogates disease progression is a in immune competent but not immunodeficient recipients, consistent with a role for Sig-15 in immune evasion in lymphoma. Our data demonstrates that there are Sig-15 dependent changes in the bone marrow and spleen by scRNA sequencing. Further, preliminary analysis by flow cytometry reveals significant changes in the immune microenvironment that suggests Sig-15 may promote aberrant myelopoiesis in murine models of B-ALL and lymphoma. Together, these data implicate Sig-15 as an immune checkpoint that may be inhibited therapeutically to promote an immune response to lymphoma cells

Defining molecular and environmental stressors that impact severity of cystic fibrosis-causing variants

Presenting Author: Emily Freestone; Emory University

Poster Number: 67

FREESTONE, EMILY, Emory University; White, Janiyah A., Emory University; Foye, Catherine, Emory University; Jackson, JaNise J., Emory University; Lopes-Pacheco, Miquéias, Emory University; Kopp, Benjamin T., Emory University; Alvarez, Jessica A., Emory University; Daley, Tanicia, Emory University; and Oliver, Kathryn E., Emory University.

Background: Genetic variants in the cystic fibrosis transmembrane conductance regulator (CFTR) result in defective or absent protein, leading to multi-organ dysfunction. Approximately 13% of these variants are premature termination codons (PTCs), with G542X being the most common. Patients harboring PTCs exhibit severe disease phenotypes and are ineligible for clinically approved CF modulator compounds. Moreover, PTCs are disproportionately represented among minoritized populations, who also experience greater risk for negative social determinants of health including reduced income, low diet quality, and pollution exposure. These groups also suffer from higher incidence of complications such as CF related diabetes (CFRD), accelerated pulmonary decline, and elevated mortality rates. The need remains for greater understanding of molecular mechanisms that contribute to CFTR PTC severity, including whether environmental stressors exacerbate the in vivo effects of these variants and contribute to racial/ethnic inequities in CF health outcomes.

Methods: We interrogated genetic and small molecule-based approaches for rescue of G542X-CFTR synthesis, together with elucidating efficacy of these interventions in the presence of dysglycemia (to mimic CFRD), unhealthy ratios of polyunsaturated fatty acids (PUFAs, to model poor nutrition quality), and exposure to perfluorooctane sulfonate (PFOS, a “forever” chemical). Fischer rat thyroid cells stably expressing G542X-CFTR cDNA and an extracellular horseradish peroxidase tag were employed to quantify cell surface localization. Prominent ‘hits’ from gene modifier screens were silenced ~50% with siRNA. Compounds with established effects on PTC fidelity, mRNA surveillance, and/or CFTR processing were applied. Cell viability was quantified using a commercial kit (Promega).

Results: Knockdown of ribosomal protein L12 or L8 augmented G542X plasma membrane density to similar levels achieved with PTC read-through agents (G418, Escin). Synergistic enhancement of G542X trafficking was observed with the combination of L12 suppression and elexacaftor-tezacaftor-ivacaftor (clinically approved CFTR modulators). Under hyperglycemic conditions, G542X cell surface localization was significantly decreased. When exposed to PUFAs or PFOS, G418-mediated rescue of G542X was robustly depleted.

Conclusions: Preliminary findings indicate that newly discovered genetic modifiers (L12, L8) can be targeted to improve CFTR PTC processing. This work also highlights the importance of addressing both internal and external factors that impact CFTR biogenesis, drug responsiveness, and patient outcomes.

Differentiating the Effects of Household Income and Maternal Education on Caregiver Interactive Behavior

Presenting Author: Aanya Ravichander; Emory University. Poster presented by Aiden Ford, Emory University School of Medicine.

Poster Number: 68

RAVICHANDER, AANYA, Emory University; Shultz, Sarah, Emory University School of Medicine, Dept of Pediatrics and Marcus Autism Center; and Ford, Aiden, Emory University School of Medicine, Dept of Pediatrics and Marcus Autism Center

Background: Dyadic interactions between infants and caregivers are an early platform for brain and behavior development. Caregivers adjust their interactive behaviors during interactions to reflect their perceived understanding of their infant's social ability, and prior research suggests that socioeconomic status may affect this bidirectional, mutually adapted learning process. Few studies, however, have investigated whether different socioeconomic factors, like household income and maternal education, have separable effects.

The goal of this study was to delineate how household income versus maternal education predict developmental change in caregiver greeting – a distinctive, infant-directed signaling behavior – in dyads with neurotypically developing infants.

Methods: Infants and their caregivers (n=78) completed longitudinal recordings of live, screen-mediated interaction at up to six timepoints from 0-6 months of age. The presence of the greeting behavior (simultaneous widening of the eyes, eyebrows, and mouth) was manually coded at the beginning of each interaction. Socioeconomic measures of household income and maternal education (binarized to graduate degree or not) were obtained upon study enrollment.

Generalized Additive Models (GAMs) were used to evaluate the predictive effects of maternal education and household income on the use of greeting behavior from 0-6 months. A mediation analysis was used to evaluate if the effects of maternal education were explained by the effects of household income.

Results: Evaluation of model fit (using summary statistics and MSE) indicates that the likelihood of greeting is best predicted by incorporating both household income and maternal education as fixed effects. Both were significant predictors in the final model (income: $z=2.78$, $p=0.005$, education: $z=2.27$, $p=0.015$). The likelihood of greeting was higher in families without graduate degrees and with greater incomes. The mediation analysis showed that maternal education predicted greeting likelihood separately from household income ($p=0.022$).

Conclusion: Multiple socioeconomic factors predict age-related changes in how caregivers engage their infants during early interaction. While maternal education and household income are associated with each other, maternal education predicts greeting likelihood outside of household income. Continued

studies investigating socioeconomic factors should incorporate multiple measures to more accurately capture the effects of socioeconomic status on infant learning and development.

Predicting Success with Nasoalveolar Molding Therapy

Presenting Author: Rebecca Gaillard; Children's Healthcare of Atlanta

Poster Number: 69

GAILLARD, REBECCA, DMD Children's Healthcare of Atlanta; Uston, Karen, DDS, MS, Children's Healthcare of Atlanta; Thomas, Jack, DDS, Children's Healthcare of Atlanta; Waters, Brittany, DMD, Children's Healthcare of Atlanta; and Shirley, J C, DMD, MS, MSc, Children's Healthcare of Atlanta

Purpose: The central objectives of this retrospective chart review and voluntary questionnaire are: 1) to identify barriers to completing nasoalveolar molding (NAM) therapy, 2) to determine predictive factors that lead to NAM therapy success and failure and 3) to assess caregiver experience and satisfaction with NAM therapy at Children's Healthcare of Atlanta (Children's) Center for Cleft and Craniofacial Disorders. Methods: The study consists of a retrospective chart review and a voluntary questionnaire completed by a primary caregiver of NAM therapy patients treated at Children's Center for Cleft and Craniofacial Disorders between January 1, 2021 and December 31, 2023. Information was obtained from EpicTM and DentrixTM, Children's electronic medical and dental record systems. The caregiver survey was administered, and data was analyzed using the Research Electronic Data Capture (REDCap) system. Results: Caregivers that became comfortable with inserting and taping the NAM appliance over time were more likely to complete therapy (p=0.008). Additionally, those that felt that the NAM appliance improved the esthetic surgical outcome were more likely to complete NAM therapy (p= 0.012 for lip and p= 0.041 for nose). Preterm births were a negative predictor for NAM therapy completion (p=0.016). Conclusion: Preterm infants face more barriers to successfully completing NAM therapy. Compliance may improve when caregivers are motivated by esthetic surgical outcomes and comfort level with appliance is increased.

A Bayesian Network Approach To Examine How Toddlers With And Without Autism Spectrum Disorder Learn From Watching Naturalistic Videos Of Same-Aged Peers

Presenting Author: Caius Gibeily; Emory University

Poster Number: 70

Gibeily, Caius, Emory University & Marcus Autism Center; Jones, Warren, Marcus Autism Center; and Shultz, Sarah, Emory University & Marcus Autism Center

Background: Autism spectrum disorder (ASD) is a lifelong neurodevelopmental condition characterized by altered social and communicative functioning. Eye-tracking methods have been successfully used to predict diagnostic status and behavioral outcomes in children with and without ASD. However, it is less well understood how early differences in visual biases between typically developing (TD) children and children with ASD contribute to divergent patterns of social visual engagement over time.

Methods: This study developed a modeling approach to examine how toddlers' viewing history influences subsequent gaze patterns using Bayesian networks (BNs). TD toddlers (n=150) and toddlers with ASD (n=216) were eye-tracked while watching videos of same-aged peers interacting in a daycare setting. Fixation density maps identified key visual targets, and dynamic viewing patterns were hierarchically clustered to reduce moment-by-moment variability. Group-level BNs were then fitted on the resulting low-dimensional viewing states.

Results: TD and ASD-dominant semantic target identities aligned with prior literature, showing biases toward facial and body regions, respectively. BN models captured both immediate (first-order) and delayed (higher-order) dependencies in gaze transitions. Additionally, within-group BN models incorporating prior viewing choices predicted subsequent gaze patterns above both a random baseline and across-group BN models. By quantifying the influence of specific dynamic viewing patterns, this approach identified visual stimuli with the greatest potential to shape group-specific learning trajectories.

Conclusion: Toddlers with ASD exhibit distinct patterns of visual engagement and learning when viewing naturalistic social scenes. These findings support the notion that early alterations in gaze behavior may shape social cognitive development and highlight the potential for better characterizing how children with ASD learn from visual stimuli. This approach may also help identify intervention targets. Thus, probabilistic modeling techniques offer deeper insights into the mechanisms underlying heterogeneous gaze behavior in ASD.

Assessment of Glymphatic Function in Pediatric-Onset Multiple Sclerosis (POMS) and Anti-Myelin Oligodendrocyte Glycoprotein Associated Disorder (MOGAD) Using DTI-ALPS

Presenting Author: Adam Goldman-Yassen; Emory University School of Medicine

Poster Number: 71

GOLDMAN-YASSEN, ADAM; Emory University; Gu, Quanquan, Emory University; McLaughlin, Madeleine, Emory University; Wheeler, Austin, Emory University; Morris, Morgan, Emory University; Mao, Hui, Emory University; Gombolay, Grace, Emory University

Background: Anti-myelin oligodendrocyte glycoprotein (MOG) associated disorder (MOGAD) is a neuroinflammatory disease that can mimic other demyelinating diseases, such as multiple sclerosis (MS). Dysfunction of the glymphatic system, a lymph-like system for the brain, may contribute to neuroinflammation. Diffusion tensor imaging (DTI) along the perivascular space (DTI-ALPS) can be used to evaluate glymphatic dysfunction. and has been used to assess glymphatic dysfunction in adults with MOGAD and in pediatric MS, but not in pediatric MOGAD. Here we measure glymphatic dysfunction using DTI-ALPS in children with MS and MOGAD.

Methods: A prospective, cross-sectional study was conducted involving pediatric patients diagnosed with pediatric-onset MS (POMS) or MOGAD, as well as control patients obtaining brain imaging without a diagnosed neurologic disorder. Consent and assent as applicable were obtained. DTI was added to the MRI protocol used in clinical care. ALPS indices were calculated using standard ROI placement in the projection and association fibers adjacent to the lateral ventricles. Univariate statistics, such as the Kruskal-Wallis, Mann Whitney, and Fishers exact test, were used when appropriate. Multivariable linear regression was also performed.

Results: We included 15 children with MOGAD, 15 with POMS, 17 pediatric controls in the final analysis. POMS patients were significantly older (median 17 years, IQR 15-18) than MOGAD (9 years, IQR7-15, p<0.001) and controls (14 years, IQR 8-16, p=0.004). There was no significant difference in sex or the field strength of MRI scanners used in clinical sites between the groups. POMS subjects had significantly lower right-sided ALPS index (1.40, IQR 1.24-1.50) compared with normal controls (1.55, IQR 1.43-1.68, p=0.002), although the ALPS index for MOGAD subjects was not significantly different than either group (1.51, IQR 1.36-1.57, p=0.08 and 0.10, respectively). No difference in left-sided ALPS index was seen between the groups (p=0.52). These associations were maintained with multivariable analysis, adjusting for age, sex, and scanner strength, with POMS associated with significantly lower ALPS index than controls.

Conclusions: Preliminary results demonstrate the changes of DTI-ALPS in patients with POMS, which may indicate impaired glymphatic function although further investigation with a large sample size and validations with different imaging and biological analysis are needed.

Understanding Provider Perspectives on the Integration and Adoption of a Novel Biomarker-Based Device to Aid in Autism Diagnosis

Presenting Author: Alexa Gonzalez Laca; Emory University

Poster Number: 72

GONZALEZ LACA, ALEXA , EMORY UNIVERSITY/MARCUS AUTISM CENTER; Kim, Justin, Emory University; Ransom, Lyric, Emory University/Marcus Autism Center; Menon, Nina Emory University and Kuhn, Jocelyn, Emory University/Marcus Autism Center

Background: EarliPoint, a biomarker-based diagnostic aide for autism, has the potential to improve the efficiency of autism evaluations, thereby alleviating waitlists and facilitating earlier access to care.This novel technology represents a significant shift in clinical practices, which early adopters have begun to use. Our mixed methods study aims to understand clinician perspectives on factors theorized to influence the spread of EarliPoint according to the Diffusion of Innovations Framework and identify implementation barriers, facilitators, and strategies to support implementation of EarliPoint that is most beneficial to families, clinicians, and systems.

Methods: Using snowball sampling, we recruited Primary Care Providers (PCPs), Developmental Behavioral Pediatricians (DBPs), and Psychologists. Participants engaged in a 90-minute session consisting of a demographic survey, an overview of EarliPoint and research behind it, the Perceived Characteristics of Intervention Scale (PCIS), and a semi-structured qualitative interview. De-identified transcripts were coded and analyzed using NVivo 15.

Results: Preliminary data from 25 providers suggest that PCPs (n=10) generally expressed openness and excitement about EarliPoint, identifying a primary implementation barrier of requiring additional training and resources to expand their scope of practice on autism. Psychologists (n=12) and DBPs (n=3) described a primary barrier of misalignment of processes and output of EarliPoint with their current practices. Many psychologists and DBPs expressed a preference to use it as an add-on to current assessment batteries as opposed to a replacement that would promote efficiency. The PCIS survey findings (1 Strongly Disagree – 5 Strongly Agree) display a trend of more positive perceptions of

EarliPoint among PCPs (M=3.65, SD=0.97) than psychologists (M=3.05, SD=0.99) and DBPs (M=2.95, SD=1.09), with nuances across the PCIS domains and qualitative findings.
Conclusion: Clinician perspectives are vital when studying the implementation of innovations that can bring significant implications to changes in workflow and clinical care. While PCPs reported a higher level of compatibility for adopting the technology into their practice, psychologists and DBPs were less motivated. These findings highlight the need for tailored training and careful considerations of appropriate service settings prior to implementation to optimize positive impact at the population level.

Evaluating the therapeutic potential and safety profile of Tankyrase inhibitors for HIV cure

Presenting Author: Riri Hamid; Emory University School of Medicine

Poster Number: 73

HAMID, RIRI RIZKIANTY, Emory University; Colvin, Alora, Emory University; and Mavigner, Maud, Emory University

Background: Despite the success of antiretroviral therapy (ART) at controlling viral replication, HIV persists in a reservoir of latently-infected memory CD4+ T-cells maintained through proliferation. While research efforts focus on reversing latency to promote infected cell clearance, achieving a cure for HIV for the 38.4 adults and 1.4 million children living with HIV will also likely require blocking reservoir cell proliferation. The Wnt/β-catenin signaling pathway that regulates T-cell proliferation and has been implicated in maintaining HIV persistence thus represents an attractive target for HIV cure. Here, we explored a novel approach targeting a major regulator of Wnt/β-catenin pathway with Tankyrase inhibitors (TNKSi).

Methods: We evaluated in vitro 6 TNKSi (Olaparib, Niraparib, Stenoparib, Nesuparib, Rucaparib, and Talazoparib) for their ability to reverse HIV latency (i) in the J-Lat 10.6 cell line containing a full-length integrated HIV genome expressing GFP upon activation and (ii) in primary CD4+ T-cells isolated from ART-suppressed SIV-infected rhesus macaques (RMs). Latency reversal was assessed by quantification of cell-associated HIV RNA levels by qRT-PCR and flow cytometric analyses of GFP expression. To assess the safety profile of Tankyrase inhibition in vivo, 2 healthy RMs were treated with daily oral doses of Niraparib (15 mg/kg) for 21 days. Longitudinal analyses included clinical evaluation of the RMs, complete blood counts, serum chemistries, T-cell immunophenotyping by flow cytometry and pathological review of bone marrow and rectal tissues.

Results: Latency reversal was observed in 3 out of the 6 TNKSi tested with minimal cytotoxicity and the greatest reactivation seen with Niraparib that was selected for evaluation in nonhuman primates. Oral administration was well tolerated by the RMs with no clinical adverse events reported. However, we note an infiltration of immune cells in the rectal lamina propria of 1 RMs treated with Niraparib. While minimal variations in T-cell subset frequencies were seen throughout the study, apoptosis was increased in memory CD4+ T-cells following TNKSi treatment in both RMs.

Conclusions: We identified Nirabarib as a novel latency reversal agent with a good safety profile in the nonhuman primate model. Ongoing work will establish the TNKSi antiproliferative potential and immunomodulatory activity.

Ethnoracial Disparities in Psychiatric Conditions, Criminal Legal Outcomes, and Case Processing among Youth in a Juvenile Court Diversion Program

Presenting Author: Mackenzie Hines-Wilson; Emory University Rollins School of Public Health and School of Medicine

Poster Number: 74

HINES-WILSON, MACKENZIE, Emory University; Stielow, Sean, Emory University; Sheerin, Kaitlin, Brown University; Modrowski, Crosby, Brown University; and Piper, Kaitlin, Emory University

Background: Over 700,000 youth are arrested in the U.S. every year, and Black youth are 2.3 times more likely to be arrested and 71% more likely to be rearrested in comparison to their non-Hispanic White peers. However, unlike non-Hispanic White youth, ethnoracial minority youth are less likely to be offered opportunities to join diversion programs, which aim to redirect offenders from the justice system, and are more likely to receive harsher sentences for similar offenses. Less is known about juvenile racial/ethnic disparities within youth diversion programs. Therefore, this study explores disparities in behavioral health conditions, legal outcomes, and case processing of youth with mental health needs from a statewide court diversion program.

Methods: Data was collected using a mixed methods approach via juvenile court record abstraction, surveys, and qualitative interviews with caregivers of youth with diversion program involvement (n=100). Most (58%) of the sample comprised ethnoracial minority youth.

Results: Bivariate analyses revealed no significant differences in legal system outcomes (e.g., offense severity) and behavioral health assessment scores between non-Hispanic White youth and ethnoracial minority youth in the diversion program. However, ethnoraical minority youth were significantly less likely to receive a mental health treatment mandate (n (%) =24 (41%) vs. 26(63%), p=0.031). In the final logistic regression model, race/ethnic differences in receipt of mental health treatment mandates were no longer significant after adjusting for behavioral health assessment scores and legal system outcomes. In qualitative interviews, families generally reported positive experiences with the diversion program. Although they did not experience discrimination within the diversion program, many caregivers recounted instances of discrimination and bias in other legal settings (e.g., policing and incarceration).

Conclusion: Ethnoracial minority youth were less likely to receive a treatment mandate compared to non-Hispanic White youth. These disparities are primarily driven by behavioral health assessment results rather than race/ethnicity suggesting the need for greater standardization in how assessments inform condition assignments, with consideration about how systemic inequities underscore the broader societal barriers faced by families of color involved in the legal system.

Investigating the Immunomodulatory Role of Plerixafor (AMD3100) on Mesenchymal Stem Cell Interaction with T cells

Presenting Author: Keenan Hogan; Mercer University School of Medicine

Poster Number: 75

HOGAN, KEENAN, Mercer University School of Medicine; Temple, Sara, Mercer University School of Medicine; and Chinnadurai, Raghavan, (Mentor), Mercer University School of Medicine

Background: Plerixafor (AMD3100) is an FDA-approved drug that causes hematopoeitic stem cell (HSC) mobilization from the bone marrow into peripheral blood to facilitate HSC transplantation in patients with hematological malignancies. Although its use is predominantly in adult populations, it is successfully used in pediatric patients with conditions such as non-Hodgkin lymphoma and multiple myeloma, where stem cell transplantation is a critical component of treatment. Of clinical interest is the identification of AMD3100's effect in modulating the immune microenvironment of bone marrow. Mesenchymal Stem/Stromal Cells (MSCs) are non-hematopoietic multipotent immunomodulatory stem cells primarily found in the bone marrow. MSCs are known to inhibit T cell-mediated inflammation. We investigated the effect of AMD3100 on modulating the immunosuppressive properties of bone marrow-derived MSCs on T cell responses.

Methods: MSCs were derived from bone marrow and Peripheral Blood Mononuclear Cells (PBMCs) from leukapheresis bags of 5 independent donors. PBMCs were stimulated with anti-CD3 and anti-CD28 to induce T cell proliferation in the presence and absence of MSCs and AMD3100. Co-cultures were incubated for 4 days and then stained for CD3 (T cell marker) and Ki-67 (T cell proliferation marker). Stained cells were acquired utilizing flow cytometry, from which the percentages of CD3+Ki-67+ T cells were determined. The results were analyzed with the FloJo software.

Results: We confirmed that unstimulated T cells did not display significant proliferation, while stimulation produced massive T cell proliferation noted by the upregulation of CD3+Ki-67+ T cell populations. In addition, we found that MSCs exhibit a dose-dependent immunosuppressive and inhibitory effect on T cell proliferation despite donor-dependent variations. We observed no effect of AMD3100 on MSC-mediated suppression of T cell proliferation at all concentrations. These results were confirmed with 5 independent donors.

Conclusion: Although AMD3100 does mobilize HSCs from the bone marrow to the peripheral blood, the drug may not have any substantial effect on the immune microenvironment of bone marrow. Hence, patients who are experiencing leukemic relapse post-HSC transplantation may not be due to the HSC mobilization drug.

Home Feeding Post Remission of Peanut Allergy at a Pediatric Academic Food Allergy Center

Presenting Author: Codi Horton; Emory University

Poster Number: 76

Codi Horton, CPNP 1, Chelsea Leef, DNP1, Shasha Bai, PhD2, Idil Ezhuthachan, MD1,2, Tricia Lee, MD1,2, Gerald Lee, MD1,2, Melinda Rathkopf, MD1,2, Brian P. Vickery, MD 1,2, 1Children's Healthcare of Atlanta, Atlanta, GA, 2Emory University, Department of Pediatrics, Atlanta

Home Feeding Post Remission of Peanut Allergy at a Pediatric Academic Food Allergy Center

Codi Horton, CPNP 1, Chelsea Leef, DNP1, Shasha Bai, PhD2, Idil Ezhuthachan, MD1,2, Tricia Lee, MD1,2, Gerald Lee, MD1,2, Melinda Rathkopf, MD1,2, Brian P. Vickery, MD 1,2, 1Children's Healthcare of Atlanta, Atlanta, GA, 2Emory University, Department of Pediatrics, Atlanta

Rationale: Following the publication of the IMPACT study, we offered early peanut oral immunotherapy (e-POIT) to children aged 6 months to 4 years. We aimed to capture home feeding of peanut in e-POIT patients who successfully completed food challenges (FC).

Methods: We implemented a data capture system with REDCap (Vanderbilt University Medical Center, Nashville) to capture home feeding of peanut products after FC. POIT patients who successfully consumed between 3 - 7 gm of peanut protein (PP) in the FC were offered four options of feeding at home: return to avoidance; continue POIT of 300 mg PP daily; ad lib feeding of a minimum 300 mg PP three times a week; or ad lib feeding of a minimum 2 grams of PP twice a week. Providers completed data entries at time of exit FCs and follow up POIT visits. Data collection regarding home dietary consumption is ongoing.

Results: From May 2023 through August 2024; 9 e-POIT patients successfully completed FCs, and 5 (56%) caregivers chose ad lib feeding of a minimum of 2 grams PP twice a week, while 4 (44%) chose ad lib feeding of a minimum of 300 mg PP three times a week. No adverse reactions have been reported with the new feeding regimens at home since exit FCs. No patients have stopped consumption.

Conclusions: All patients who reached remission chose to liberalize their diet by consuming more peanuts at home than prior. We have not observed adverse events or aversion from POIT patients that limited post-FC consumption.

References

Jones SM, Kim EH, Nadeau KC, et al. Efficacy and safety of oral immunotherapy in children aged 1-3 years with peanut allergy (the Immune Tolerance Network IMPACT trial): a randomised placebo-controlled study. Lancet. 2022;399(10322):359-371. doi:10.1016/S0140-6736(21)02390-4

Defining Focality of Temporal Interference Non-Invasive Intracranial Stimulation

Presenting Author: Richard Hou; Emory University

Poster Number: 77

HOU, RICHARD, Emory University; Acerbo, Emma, Emory University; Eggers, Thomas, Emory University; Laxpati, Neal Gordon; Emory University, and Gutekunst, Claire-Anne, Emory University;

Temporal Interference (TI) stimulation is a promising non-invasive alternative to Deep Brain Stimulation (DBS) for treating neurological disorders like pediatric epilepsy. TI uses two high-frequency electric fields generated from electrodes on the scalp with slight frequency offsets to create low-frequency amplitude-modulated waveforms, targeting deep brain regions without affecting surrounding healthy tissues. This treatment may have particular benefits for pediatric patients, particularly those who are unable to get a neuromodulatory device due to age or size. However, despite extensive computer modelling of the generated volume of stimulation, concerns about TI's precision and focality persist. In this study, we developed an artificial 3D skull model of the human brain and stimulated it with TI stimulation to determine the volume and focality of TI stimulation. We hypothesized that significant discrepancies may exist between computational simulations and experimental 3D skull models in terms of stimulation volume and focal precision.

This study evaluated TI focality using a 3D-printed skull model filled with agarose to mimic human brain texture and conductivity. Depth recording electrodes were inserted into an 80-hole grid, and TI stimulation was applied at 1.005 kHz and 1 kHz frequencies with a 2.5 mA amplitude. This configuration generated a 5 Hz amplitude-modulated signal at the targeted brain region. A MATLAB pipeline was built to quantify and visualize the stimulation foci of different coordinates of TI stimulation. Lastly, data from the 3D skull model were compared to computer simulations of the predicted TI volume activated derived from Sim4life.

Results showed consistent, reproducible stimulation patterns with less than 5% variance across trials. Experimental data revealed more localized, horizontally elongated foci, while computer simulations predicted broader volume loci. These discrepancies highlight the limitations of computational models in accurately predicting TI focality and the needs of 3D, “real world” skull modelling before implementing TI in actual patients.

Future work will need to attempt different stimulation coordinates, refine the 3D model, and apply Bayesian optimization to enhance predictive accuracy for safer, more effective clinical applications.

Using Social Media to Identify Patient Concerns About Xolair: A Reddit-Based Analysis

Presenting Author: Hui Huang; Pediatric Biostatistics Core, Department of Pediatrics, School of Medicine, Emory University

Poster Number: 78

HUANG, HUI, Emory University; Vickery, Brian, Children's Healthcare of Atlanta; and Bai, Shasha, Emory University

Background: Xolair (omalizumab), which was primary used in pediatric patients for asthma and chronic urticaria, was recently approved by the FDA for the treatment of food allergies (FA), highlighting its expanding role in managing allergic conditions. However, concerns from FA patients and caregivers regarding this novel treatment are not well understood. Social media platforms offer a unique opportunity to capture spontaneous, unfiltered, real-world patient perspectives that may influence treatment adherence and outcomes without the need conducting traditional surveys.

Methods: We extracted posts from the r/Xolair subreddit using the free-to-the-public 'RedditExtracto' package in R, which works by setting the desired subreddit or keywords and specifying the number of posts to retrieve. Topic modeling was performed using Term Frequency-Inverse Document Frequency (TF-IDF) and Latent Dirichlet Allocation (LDA) to identify major themes. A transformer-based natural language inference (NLI) model was then applied to categorize individual phrases within each theme. Additionally, TF-IDF and LDA were used to further analyze key concerns within each theme, and sensitivity analysis was conducted to adjust for potential biases in sentiment distribution.

Results: Six key themes from posts extracted between May 30, 2024, and January 15, 2025 were extracted by the model: personal experiences, side effects, long-term effects, alternative treatments, cost and insurance coverage, and treatment concerns. The most frequently discussed side effects included hives, fatigue, and injection site reactions. These findings highlight the necessity of developing relevant protocols and education materials for clinician-patient communication in the FA population.

Conclusions: Reddit serves as an easy to access social media platform for caregivers seeking understanding about patient preference, barriers to treatment without the need and costs of conducting a traditional survey. The findings revealed gaps in education, communication, and access to treatment and can help pediatric healthcare providers better understand caregiver concerns. Future work will expand this analysis to broader allergy-related subreddits to further explore pediatric perspectives.

Therapeutic Intervention with Meclizine Ameliorates Mitochondrial Ultrastructural Defects in the Phosphate Carrier Deletion Model of Primary Mitochondrial Cardiomyopathy

Presenting Author: Benjamin Huang; Emory University

Poster Number: 79

HUANG, BENJAMIN, Emory University; Ghazal, Nasab, Emory University; and Kwong, Jennifer, Emory University

Background: Mutations in mitochondrial proteins can alter their structure and function, disrupting cellular energy production and contributing to primary mitochondrial disorders. These disorders often affect tissues with high energy demands, such as the heart. Mitochondria-related heart failure accounts for 20%-40% of cases in children with mitochondrial disorders and remains incurable.

Our lab has previously developed a model of inducible cardiac mitochondrial energy dysfunction with the cardiomyocyte specific deletion of the mitochondrial phosphate carrier (SLC25A3, cKO mice). SLC25A3 encodes a mitochondrial transporter that imports inorganic phosphate into the mitochondrial matrix for ATP synthesis, and thus, is a critical component of the mitochondrial energy production machinery. Following onset of SLC25A3 deletion, cKO mice develop mitochondrial cardiomyopathy characterized by impaired mitochondrial ATP synthesis, mitochondrial hyperproliferation and ultrastructural disorganization, myofibril misalignment, and impaired heart function. Critically, despite reduced mitochondrial ATP synthesis, the total cardiac ATP levels are maintained, suggesting a protective upregulation energy production through glycolysis.

We hypothesize that strategies to upregulate glycolysis are protective in the context of primary mitochondrial energy dysfunction. In this study, we use meclizine, an FDA approved drug that was found to shift energy metabolism to glycolysis, to test its effect on mitochondrial energy dysfunction in the heart.

Methods: SLC25A3 deletion was induced with tamoxifen in 2-month-old SLC25A3 cKO mice and subsequently administered vehicle or meclizine by oral gavage for 12 weeks. Following treatment, hearts were collected and fixed in glutaraldehyde, post-fixed with osmium tetroxide, and embedded in resin for electron microscopy to examine mitochondrial ultrastructure and myofibril organization. ImageJ was used to measure mitochondria size and shape.

Results: Electron microscopy revealed that meclizine significantly ameliorated the myofibril disarray in SLC25A3 deleted hearts. Additionally, while SLC25A3 cKO hearts displayed disrupted mitochondrial ultrastructure and extensive mitochondrial hyperproliferation, these metrics were restored with meclizine treatment, proven by significant increase in mitochondrial area, perimeter and Feret's diameter.

Conclusions: Meclizine treatment reduces mitochondrial hyperproliferation and restore myofibril organization in the SLC25A3 cKO model of mitochondrial energy dysfunction and primary mitochondrial cardiomyopathy. Future identification of the mechanisms by which meclizine confers these protective effects may provide directions for therapy developing for primary mitochondrial disease.

Antenatal Sodium Butyrate Supplementation Increases Mucin 2 Expression in the Neonatal Murine Gut

Presenting Author: Merrick Hunter; Emory University

Poster Number: 80

Hunter, Merrick G., Emory University; Colarelli, Andrea M., Emory University School of Medicine and Children's Healthcare of Atlanta; Jones, Rheinallt M., Emory University School of Medicine; and Barbian, Maria E., Emory University School of Medicine and Children's Healthcare of Atlanta

Background: This study aims to investigate the effects of antenatal sodium butyrate supplementation (ABS), or butyrate supplementation during pregnancy, on neonatal gut development. Preterm infants are at risk of developing necrotizing enterocolitis (NEC), a serious intestinal infection with a high mortality rate. Our goal is to better understand the effects of ABS on Mucin 2 gene expression in the neonatal gastrointestinal tract. Butyrate increases the expression of Mucin 2 in the intestine; thus, we hypothesize that Mucin 2 expression will be increased following antenatal butyrate supplementation. Upregulation of Mucin 2 is associated with increased mucus production in the gut, which protects the gut against pathogenic bacteria and could decrease intestinal infections such as NEC. This information is critical to gain further insight into neonatal gut development to ultimately develop new strategies to prevent NEC in neonates.

Methods: This study utilizes a murine model, and data is analyzed via gene expression analysis. Mice are born with a premature intestine and therefore are useful to study the premature gut. Control (CT) mice received nonsterile water, and antenatal butyrate supplementation (ABS) group received sodium butyrate dissolved in their water (90mM) before and during pregnancy. Immediately after birth, ABS was discontinued, and mice in this group received nonsterile water thereafter. Each age group contained 8-10 mice from at least 3 different litters. Offspring were euthanized at 1, 2, 3, or 8 weeks of age for tissue collection. Jejunum, ileum and colon were collected for quantitative real time PCR. Student's t-test or ANOVA were used for statistical analysis.

Results: Our preliminary data has revealed that Mucin 2 expression naturally increases in the jejunum ($p=0.0005$) and colon ($p=0.03$) of control mice as they age from week 1 to week 8 of life. In addition, we found that ABS increases Mucin 2 expression in the ileum at 2 weeks ($p=0.03$) and 3 weeks of age ($p=0.02$), compared to the control mice.

Conclusions: These data suggest that the antenatal dietary supplementation with sodium butyrate upregulated Mucin 2 expression in the ileum of offspring after one week of age. This is clinically pertinent as necrotizing enterocolitis typically occurs in the ileum of preterm infants. Further work is necessary to determine the molecular mechanisms whereby ABS alters the expression of Mucin 2 in the neonatal gut and if it has a beneficial effect towards the prevention of NEC.

Strain-Specific Modulation of Host Stress Signaling by Outer Membrane Vesicles

Presenting Author: Shriya Iyer; Emory University

Poster Number: 81

Iyer, Shriya, Emory University; Luthra, Deepali, Emory University; and Tirouvanziam, Rabindra, Emory University

Background: Outer membrane vesicles (OMVs) play a critical role in bacterial-host interactions, influencing immune signaling and cellular responses. These OMVs influence host responses to bacterial infections, thereby regulating immunity and pathogenicity. This study investigates the differences in OMV production and host signaling activation between the laboratory-adapted strain Pseudomonas aeruginosa PAO1 and two clinically derived isolates.

Methods: PAO1 and clinical isolates were cultured under controlled conditions, and OMVs were isolated using size-exclusion chromatography. Nanoparticle tracking analysis (NTA) quantified OMV production, while a bioluminescence assay measured cAMP and calcium signaling activation in a THP-1 monocyte cell line through CREB and NFAT reporter systems.

Results: PAO1 exhibited a higher OMV yield per cell but showed a decreasing trend in production over time, whereas clinical isolates maintained relatively stable OMV output. Bioluminescence assays demonstrated that PAO1 OMVs elicited a consistent, dose-dependent activation of CREB and NFAT, aligning with expected cAMP and calcium stimulation. In contrast, the clinical isolates displayed more variable activation patterns, with fluctuations in NFAT and CREB responses.

Conclusion: These findings highlight strain-specific differences in OMV biogenesis and signaling capacity. The observed variation in cellular activation suggests that clinical isolates may have evolved distinct OMV-mediated strategies to modulate host responses. Further investigations into these mechanisms will provide insight into the evolutionary pressures shaping human immune responses to bacterial pathogens.

Applying Small Data Machine Learning to Create Targeted Interventions for Underserved Pediatric Patients in the Greater Augusta Area

Presenting Author: Andrew Ji; Medical College of Georgia

Poster Number: 82

Ji, Andrew, Medical College of Georgia; Chaudhary, Amisha, Medical College of Georgia; Rosenberger, Karson, Medical College of Georgia; Wolf, Abby, Medical College of Georgia; Chin, Rachel, Medical College of Georgia; Stone, Kathryn, Medical College of Georgia; Fleck, Emily, Medical College of Georgia; Malik, Abdul, Medical College of Georgia; Oh, Grace, Medical College of Georgia; Potnis, Cahil, Medical College of Georgia; Russell, Beatrice, Medical College of Georgia; Camelo, Ingrid, Johns Hopkins University School of Medicine; and Rivera Salva, Juan, Medical College of Georgia

Background: Children from low-income families face disproportionate and overlapping barriers to equitable wellbeing and social determinants of health (SDoH). In a primary care setting, pediatricians are

often unable to address these concerns within the community. Student-run free clinics (SRFC) bridge the gap between low-income patients and resources by increasing access to centralized care and addressing SDoH through outreach initiatives. Challenges remain in addressing barriers to holistic wellbeing, particularly nutritional concerns and environmental risks. With the increased application of artificial intelligence towards public health surveillance, machine learning models provide a promising toolkit for determining areas of need in driving advocacy.

Methods: In this paper, we utilized supervised and unsupervised learning models on a 17-question, pre-visit survey focusing on SDoH in a pediatric SRFC to identify trends and develop targeted interventions to address community health needs in the Augusta, Georgia area. Linear regression, random forest regression, and K-means clustering were performed on the dataset of 149 patients from March 2024 to April 2025, creating predictive and correlational models between school and GA House of Representative districts with distinct features including number of meals eaten in a day, flu vaccination status, and home conditions such as presence of mold, old-pipes, and pests. To expand on the food security metric, QGIS mapping software was used to visualize 'food swamps' and grocery store density on a district level.

Results: While K-Means clustering, linear regression, and lasso-methods were ineffective in characterizing trends, our preliminary results demonstrate coefficients of determination (R^2) ranging around 0.469 with interquartile range (IQR) at 0.133 in the K-Fold Random Forest Regression model, demonstrating moderate accuracy and variance with potential utility in guiding future clinic initiatives.

Conclusions: Our results suggest that machine learning is a valuable addition in the SRFC and community health model, utilizing a data-driven approach capable of predicting patient needs and acting as the framework to target interventions such as food insecurity at the school and local government levels. Future directions will include a prospective study with a more robust data set and refined results, increasing generalizability and the ability to investigate additional features, including exposure to environmental hazards.

Flow-Regulated Pathogenesis of Hypoplastic Left Heart Syndrome in a 3D Bioprinted Human Heart Tube

Presenting Author: Linqi Jin; Emory University

Poster Number: 83

Jin, Linqi, Emory University and Georgia Institute of Technology; Neelakantan, Sunder, Texas A&M University; Reza, Avazmohammadi, Texas A&M University; Bauser, Holly, Emory University and Georgia Institute of Technology; Serpooshan, Vahid, Emory University and Georgia Institute of Technology

Background: Hypoplastic left heart syndrome (HLHS) is a severe congenital heart defect (CHD) marked by the underdevelopment of the left heart. Despite the prevalent theories of genetic and hemodynamic perturbations being the potential causes, molecular mechanisms underlying the HLHS pathogenesis remain obscure. Recently, we reported a human induced pluripotent stem cell (hiPSC)-based 3D bioprinted embryonic heart tube (eHT) model that shows recapitulation of robust cardiac function and cardiogenic cellular activities upon hemodynamic flow initiation.

Methods: To delineate the individual and synergistic effects of genetic and hemodynamic perturbations in HLHS, we generated wildtype (WT) vs. HLHS cardiomyocytes (CMs) and endocardial cells (ECs) from

hiPSCs via WNT and BMP10 signaling modulation. 2D monocultures and 3D eHT perfusion cocultures were conducted and assessed for HLHS-associated gene expression, contractile function, and cellular structure and interactions using qPCR, video-based contractility analysis, single cell RNA-sequencing, and immunohistochemistry. Computational simulation characterized the hemodynamic-contractile coupling under varying contractility and flow conditions.

Results: Transcriptomic and immunohistochemistry analyses in 2D monocultures revealed intrinsic proliferation defects in CMs and novel endocardial defects in ECs derived from HLHS hiPSCs. In 3D, both WT and HLHS eHTs demonstrated long-term viability and cardiac function under flow perfusion. Further, preliminary data from flow perfusion suggested an effect of hemodynamic perturbations on cardiac developmental gene expression.

Conclusion: This study highlights the causal and exacerbatory interactions of intrinsic genetics and extrinsic hemodynamic perturbations in HLHS pathogenesis in a 3D bioprinted eHT model, suggesting novel therapeutic targets.

Investigating the Underlying Mechanisms of Clinician Burnout: A Network Perspective

Presenting Author: Laura Johnson; Emory University

Poster Number: 84

JOHNSON, LAURA, Pediatric Biostatistics Core, Emory University; Bottini, Summer, Marcus Autism Center and Department of Pediatrics, Emory University

Background: Clinicians working in disability settings often experience burnout (Slowiak & DeLongchamp, 2022; Slowiak & Jay, 2023), which negatively impacts clinicians themselves and the quality of care they provide (Kozak et al., 2013; Ransford et al., 2009). While numerous studies have established the prevalence of burnout in various behavioral health settings, interventions that attempt to address and ameliorate burnout's negative effects often fall short (Bottini et al., 2024). Further understanding of the mechanisms underlying burnout is needed to refine intervention approaches. We draw upon social network theory and methodology to evaluate the Burnout Assessment for Developmental Disability Settings (BADDS), a 39-item self-report measure of clinician burnout determinants that contains six dimensions: physical safety, supervisory issues, stakeholder interactions, professional development, stress management, and ethics. Method: Using a diverse sample of N=566 clinicians, we generated polychoric correlations to identify strong associations ($r > 0.40$) among BADDS items. These associations serve as the network 'edges' while individual scale items are the network 'nodes.' Using Gephi 0.10.1, the network was graphed visually and both network-level metrics (e.g., diameter, density) and node-level (e.g., degree, betweenness centrality) metrics were calculated. Results: At the network-level, diameter (i.e., distance across the network) was 5 and density was 0.29, indicating the proportion of actual ties relative to all possible ties. At the node-level, there were no isolates (i.e., disconnected nodes) in the network. The average degree (i.e., number of connections per node) was 11 (range: 3-21). Items within the supervisory issues and ethics domains of the BADDS had the largest average degree. Betweenness centrality (i.e., a node's importance in connecting other nodes across the network) was highest among items in the ethics and stress management BADDS domains. Professional development, stakeholder interactions, and physical safety were less central across a range of metrics. Conclusion: Social network analysis provides a new lens on understanding relationships among psychological constructs. The present analysis suggests that ethics, supervisory issues, and stress

management may provide strategic entry points for addressing burnout within behavioral health settings given their centrality in the overall network and their connections to other, less central determinants of clinician burnout.

Evolving Trends in Pediatric Opioid Overdose Hospitalizations: Fewer Intentional Cases, More Accidental Risks for Adolescents

Presenting Author: Dulcinea Jones; William Carey University College of Osteopathic Medicine

Poster Number: 85

Jones, Dulcinea, William Carey University College of Osteopathic Medicine and Fastring, Danielle, William Carey University College of Osteopathic Medicine

Background: Opioid-related overdose is a major public health issue in the U.S., with rising morbidity and mortality across all age groups, including children and adolescents (Gaither et al., 2016). While attention has focused on adults, pediatric exposures have also increased, often leading to severe outcomes and even death (Kane et al., 2018). Children may be exposed through unintentional ingestion, prescription misuse, or illicit use. Younger children more often experience unintentional overdoses, while adolescents more frequently use intentionally (Gaither et al., 2016). The opioid landscape continues to evolve, driven by synthetic opioids like fentanyl, racial and socioeconomic disparities, and changing youth substance use patterns (Friedman & Hansen, 2022). The COVID-19 pandemic heightened these vulnerabilities by disrupting access to healthcare and behavioral health services. This study examines pre- and post-pandemic trends in pediatric opioid overdose admissions, focusing on changes in age, intent, and racial disparities.

Methods: Data from the 2019 and 2022 Healthcare Cost and Utilization Project (HCUP) Kid Inpatient Database (KID) were analyzed to assess trends in opioid overdose admissions among U.S. children. Overdose was defined by ICD-10 codes for accidental or self-harm use of opioids. Demographic characteristics were calculated with frequency and percent in each category.

Results: From 2019 to 2022, hospitalizations for opioid poisonings per 100,000 children declined from 2.86 (95% CI, 2.74–2.99) to 2.25 (95% CI, 3.44–3.98), a 21.3% decrease ($Z = 7.31$, $p < 0.0001$). Admissions rose by 3.3% among 16–20-year-olds ($p = 0.0323$) and declined by 2.9% among 0–5-year-olds ($p = 0.0172$). Intentional overdoses decreased by 6.8% ($p < 0.0001$), while accidental overdoses increased by 7.0% ($p < 0.0001$). White youth admissions declined by 8.3% ($p < 0.0001$), while Black youth admissions rose by 4.1% ($p = 0.0004$). Both trends were most prominent in the 16–20 age group. Additionally, transfers to non-acute care facilities, including behavioral health centers, declined by 6.0% ($p < 0.0001$).

Conclusions: These findings underscore a shift in opioid overdose risks among youth, particularly older adolescents, marked by a rise in accidental overdoses. Targeted prevention efforts are needed, with emphasis on the growing threat of synthetic and contaminated substances.

Melatonin Regulates Oxidative Stress via Nrf2 Signaling in Placental Macrophages

Presenting Author: Tyana Joseph; Morehouse School of Medicine

Poster Number: 86

Joseph, Tyana T. , Morehouse School of Medicine; Kunnatha, Anjali, Agnes Scott College; Hossack, Daniel, Morehouse School of Medicine; Brewer, Kyra, Morehouse School of Medicine; Bashi, Alaijah, Morehouse School of Medicine, Thompson, Nia B., Morehouse School of Medicine; Dawning, Amber, Morehouse School of Medicine; Johnson, Erica L., Morehouse School of Medicine

Background: Melatonin, a hormone primarily known for regulating sleep, also exhibits potent anti-inflammatory and antioxidant properties that protect cells from inflammation and oxidative stress. Studies have demonstrated the presence of melatonin in the placenta and its ability to synthesize melatonin locally. In response to inflammatory stimuli, melatonin can counteract oxidative damage caused by invading pathogens. Studies have shown that melatonin plays a protective role in various viral infections, including COVID-19 and hepatitis. It exerts these protective effects in part through the NRF2 signaling pathway, activating Nrf2 and promoting its nuclear translocation, which enhances the expression of antioxidant enzymes in placental cells. Therefore, we propose that melatonin modulates Nrf2 expression to reduce oxidative stress in the placenta, thereby mitigating inflammation and supporting proper placental development and function.

Methods: With written informed consent, placenta from healthy women (>18 years) was collected from Grady Memorial Hospital in Atlanta, GA. We isolated decidual macrophages, and trophoblast from term placenta. Cells were treated with LPS alone, LPS in combination with varying concentrations of melatonin (1 nM, 10 nM, 100 nM, and 1000 nM), or melatonin alone at the same concentrations. Gene expression levels of NRF2, pNRF2, and antioxidant enzymes (SOD2 and GPx1) were assessed using RT-qPCR. Protein expression of NRF2 and pNRF2 was evaluated by Western blot. pNRF2 activation was determined through immunofluorescence, and cellular oxidative stress was measured using the H_2DCFDA assay.

Results: Data were collected to evaluate melatonin's ability to reduce oxidative stress during the inflammatory response in decidual macrophages. Our findings revealed that NRF2 activation occurred in cells treated with both LPS and melatonin, as well as melatonin and LPS. These treated cells also exhibited reduced oxidative stress compared to the LPS-only positive control. Together, these results suggest that melatonin attenuates oxidative stress during inflammation through activation of the NRF2 signaling pathway.

Conclusion: This data suggests that melatonin is an essential molecule in regulating oxidative stress at the maternal-fetal interface during inflammation. Understanding melatonin's role at the maternal-fetal interface during inflammation is crucial to develop therapeutic strategies to reduce adverse pregnancy outcomes.

Spinal Fluid and Brain Development Project – Children's Healthcare of Atlanta

Presenting Author: Jacqueline Joyce; Children's Healthcare of Atlanta

Poster Number: 87

JOYCE, JACQUELINE, Children's Healthcare of Atlanta; and CONSTANTINO, JOHN N, Children's Healthcare of Atlanta.

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by social and behavioral impairments, for which diagnosis continues to rest exclusively on clinical evaluation. A large epidemiological quasi-prospective study demonstrated that newborn CSF arginine vasopressin (AVP) levels identified babies who subsequently exhibited features of ASD (Oztan et al. PNAS 2020). This longitudinal prospective study was initiated as a replication attempt.

Eligible study participants include infants aged 0 to 3 months, who presented in the E.D. with minor febrile illness and underwent a standard-of-care lumbar puncture within 72 hours. Within the Children's emergency departments, CSF samples have been recovered following informed consent of the families rather than being discarded after 30 days. Children with documented infections of CSF in the neonatal period (i.e. meningitis) were excluded from this study. Family consent is contingent upon several factors, with quality of in-hospital interactions proving to be most influential. Infants are typically held in the hospital for 24-48 hours following a lumbar puncture and in-person engagement facilitates the acquisition of this biomaterial.

From February 2024 to March 2025, a total of 162 infants met eligibility criteria for study participation, of whom 37 enrolled and 31 samples available for proteomic analysis. Across all demographic subsets (site of sample acquisition, gender, race, and ethnicity), the enrolled population is representative of the eligible population. The enrolled cohort (n = 37; n = 13 females, n = 24 males), reflects a broader sex distribution relative to the sample reported by Oztan et al. (PNAS, 2020; n = 913 total, n = 33 assayed; n = 3 females, n = 30 males). Racial and ethnic composition of the sample was as follows: 62% White, 22% Black/AA, 24% Hispanic or Latino, and 16% other or unknown.

During enrollment, a biological family history questionnaire was administered to assess neurodevelopmental conditions. This process identified four second-degree relatives with a diagnosis of ASD. These individuals were screened using a symptom checklist with DSM-5 criteria for ASD. The presence of ASD in second-degree relatives enables stratification of CSF data by familial risk, providing a window into biological indicators associated with heritable risk for autism.

Investigating the Validity of Environmental Enrichment in Extended Alone Assessments

Presenting Author: Emily Kanderis; Emory University

Poster Number: 88

KANDERIS, EMILY, Emory University; Lee, Esther, Marcus Autism Center; and Scheithauer, Mindy, Emory University School of Medicine

Background: Autism Spectrum Disorder (ASD or autism) is a neurodevelopmental disorder characterized by restrictive and repetitive interests as well as delays in social communication.1 in 36 children in the United States are diagnosed with ASD (Maenner et al., 2023). Behaviors such as self-injury and destruction of property are more common among individuals with autism compared to their non-autistic peers, with some studies estimating as high as 70% (Figueiredo, Bernardes, & Serra-Pinheiro, 2021). Fortunately, treatments based in behavior analysis can effectively reduce these behaviors. The first step in these treatments is identifying the function of the behavior, or why the behavior is occurring. Behavioral assessments that include conditions where the environment does not change in response to the behavior, often referred to as extended alone or ignore conditions, are helpful for identifying whether the function of behavior is due to sensory input versus being mediated by social contingencies

(e.g., attention or escape from aversive settings; Querim et al., 2013). Historically, these assessments have been done in austere environments that may lack social validity or be nonpreferred by the client. It is unclear whether the assessments would remain valid in more enriched environments.

Methods: Eleven autistic youth (age 7 to 12) engaging in self-injury and destruction underwent assessments to determine if their behaviors were maintained by sensory stimulation (i.e., automatically maintained). Participants were exposed to conditions in both austere and enriched environments. Outcomes were compared across these conditions.

Results: Results were congruent between austere and enriched environments for over 80% of participants. That is, for most participants, the results of the assessment were the same whether the assessment was conducted in an austere environment replicating past research or an environment enriched with the presence of moderately-preferred toys.

Conclusions: Incorporating the use of toys to enrich the environment in extended alone conditions did not impact the validity of results and is likely to be more preferred for clients and other stakeholders. Additional research is needed to replicate findings with individuals with more severe and complex behaviors and to determine the impact of enriching the environment in other ways.

miR-21/METTL3 Axis Regulates CFTR Expression in CF Lung Disease

Presenting Author: Bum-Yong Kang; Division of Pulmonary, Asthma, Cystic Fibrosis, and Sleep, Department of Pediatrics, Emory University School of Medicine

Poster Number: 89

Kang, Bum-Yong; Yi, Erin; Ozuna, Hazel; Miralda Molina, Irina; Durfey, Samantha; Chris Lee; Ashley Murphy; Shrestha, Mahesh; Moran, John; and Kopp, Benjamin

Background: Cystic fibrosis (CF) results from mutations in the CF transmembrane conductance regulator (CFTR) gene, leading to pulmonary vascular impairments and progressive lung damage, particularly in aging populations. Emerging studies suggest that N6-methyladenosine (m6A) epitranscriptomic modification regulates RNA processing and metabolism, influencing downstream biological effects. Additionally, microRNAs (miRNAs) play key roles in pulmonary disease and regulate m6A-modifying factors. However, the molecular mechanisms by which the miRNA-m6A epitranscriptomic modification axis regulates CFTR expression remain unclear. We hypothesize that reduced CFTR levels increase miRNAs, which inhibits m6A modification, thereby impairing CFTR mRNA translation.

Methods: We reanalyzed our previous study using blood transcriptomic data from non-CF individuals and people with CF (pwCF, n=20 each, average age 22 years) to identify differentially expressed m6A modification factors (writers, erasers, and readers) and miRNAs. To validate our findings, we performed qRT-PCR on lung tissues from non-CF and pwCF. To determine whether CFTR depletion affects miR-21 and METTL3 levels, human umbilical vein endothelial cells (HUVECs) were transfected with scrambled (SCR) or CFTR-targeting siRNA. Additionally, HUVECs were transfected with SCR, miR-21 mimics, or METTL3-targeting siRNA to dissect the molecular mechanisms of miR-21-METTL3-CFTR circuit.

Results: Epitranscriptomic analysis revealed that m6A modification factors (writers, erasers, and readers) and miRNAs were differentially expressed between pwCF and non-CF groups. Notably, METTL3 (writer)

was downregulated, whereas YTHDF3 (reader) was upregulated in pwCF. We confirmed that METTL3 was decreased in pwCF lungs and in siCFTR-treated HUVECs. Among the screened METTL3-targeting miRNAs, miR-21 was significantly upregulated in pwCF. In silico analysis (TargetScan) predicted miR-21 binding sites in METTL3's 3'UTR, confirmed by increased miR-21 in pwCF lungs and siCFTR-treated HUVECs. miR-21 overexpression (miR-21 mimic) reduced both METTL3 and CFTR levels in HUVECs. In silico analysis (SRAMP) identified nine potential m6A binding sites in CFTR. Finally, siRNA-mediated METTL3 depletion decreased CFTR expression in HUVECs, supporting its role in CFTR regulation.

Conclusion: Our findings identify a novel CFTR-miR-21-METTL3 regulatory circuit in CF pathogenesis, providing new insights into the roles of miRNAs and m6A modification in CF lung disease.

SARS-CoV-2 Priming Exacerbates Influenza Severity and Mortality

Presenting Author: Meenakshi Kar; Emory Vaccine Center, Emory University, Atlanta, GA, USA

Poster Number: 90

KAR, MEENAKSHI, Center for Childhood Infections and Vaccines of Children's Healthcare of Atlanta, Department of Pediatrics, Emory University School of Medicine, Atlanta, GA, USA; Jain, Shilpi, Center for Childhood Infections and Vaccines of Children's Healthcare of Atlanta, Department of Pediatrics, Emory University School of Medicine, Atlanta, GA, USA; Floyd, Katharine, Center for Childhood Infections and Vaccines of Children's Healthcare of Atlanta, Department of Pediatrics, Emory University School of Medicine, Atlanta, GA, USA; Foster, Stephanie L., Center for Childhood Infections and Vaccines of Children's Healthcare of Atlanta, Department of Pediatrics, Emory University School of Medicine, Atlanta, GA, USA; Kohlmeier, Jacob, Department of Microbiology and Immunology, Emory University, Atlanta, GA, USA and Suthar, Mehul S., Center for Childhood Infections and Vaccines of Children's Healthcare of Atlanta, Department of Pediatrics, Emory University School of Medicine, Atlanta, GA, USA

Background: SARS-CoV-2 and influenza co-infection has been reported in 2.45–6% of cases and is associated with more severe disease, increased mortality, and higher need for mechanical ventilation in humans. The mechanisms underlying this increased severity remain poorly understood.

Methods: We investigated the temporal immune dynamics in mice sequentially infected with SARS-CoV-2 followed by influenza. Innate and adaptive immune responses were characterized using multi-dimensional flow cytometry across various time points post-infection. Viral RNA levels were assessed in lung and nasal tissues.

Results: Innate immune cells—including monocytes, macrophages, NK cells, dendritic cells, eosinophils, and neutrophils—peaked at day 3 post-infection and gradually declined by day 28, aligning with peak viral load and weight loss, both of which recovered by days 7–10. This initial response was followed by the accumulation of cytokine- and granzyme-producing virus-specific CD4+ and CD8+ T cells in the respiratory tract, persisting for up to a month. Mice previously infected with SARS-CoV-2 and then infected with influenza one month later experienced more severe weight loss lasting up to day 7 and reduced survival compared to single infections. However, viral RNA levels in the lungs and nasal cavities remained comparable across groups, indicating that enhanced disease severity was not due to increased viral replication. Rather, co-infected mice showed delayed and reduced recruitment of monocytes, macrophages, dendritic cells, and NK cells, with granulocyte counts nearly one log lower than in

influenza-only infections. These findings indicate a profoundly impaired innate immune response during co-infection.

Conclusions: Sequential SARS-CoV-2 and influenza infection in mice leads to increased disease severity and mortality, not due to enhanced viral replication, but likely driven by a blunted and delayed innate immune response. Our data suggest that prior SARS-CoV-2 infection may train or reprogram innate immunity, rendering hosts more susceptible to subsequent influenza infection by impairing early immune activation and tissue repair, thereby exacerbating lung inflammation and damage.

Investigating ER Stress-driven Vascular Remodeling in a Novel 3D-Bioprinted Pulmonary Arterial Hypertension Model

Presenting Author: Kaveeta Kaw; Emory University

Poster Number: 91

KAW, KAVEETA; Saadeh, Maher; DeBord, Wyatt; Parab, Manasvi; Vel, Suhana; You, Hyunseo; Serpooshan, Vahid; and Bauser-Heaton, Holly.

Background: Pulmonary arterial hypertension (PAH) is a progressive vasculopathy characterized by endothelial dysfunction, smooth muscle cell (SMC) proliferation, and vascular remodeling. Current therapies focus on vasodilation and do not target medial thickening, the earliest reversible stage of PAH remodeling. Bone morphogenetic protein receptor type II (BMPR2) mutations and hypoxia, key contributors to PAH, induce endoplasmic reticulum (ER) stress via the unfolded protein response (UPR). The PERK-UPR arm promotes SMC proliferation and vascular remodeling, while its inhibition reduces medial thickening in PAH models. Given their ability to reduce ER stress and restore endothelial function, glucagon-like peptide-1 (GLP-1) agonists may offer a novel therapeutic approach to mitigate vascular remodeling in PAH.

Methods: We developed a three-dimensional (3D) bioprinted pulmonary artery (PA) model that co-cultures endothelial and smooth muscle cells in distinct layers, mimicking the intimal and medial walls. Constructs are perfused at biomimetic flow rates. Using this model, we examined the effects of BMPR2 inhibition and hypoxia on UPR activation and SMC proliferation. To simulate late-stage PAH conditions, we biofabricated vessels with increased wall thickness to assess pressure-dependent remodeling. Future studies will use computational modeling and transcriptomic analysis to examine UPR activation, fibrosis, and the impact of GLP-1 agonists on vascular remodeling.

Results: Immunofluorescence confirmed distinct endothelial and SMC layers within the constructs. Live/Dead and AlamarBlue assays demonstrated sustained cell viability at days 3, 7, and 14. Micro-indentation testing showed that the construct's compressive modulus (9–12 kPa) mimics healthy PA tissue (11–14 kPa) and remains stable under perfusion. BMPR2 downregulation via siRNA was achieved in normoxia and hypoxia-treated monocultured SMCs. Ongoing studies will assess UPR activation and remodeling pathways in 3D constructs and determine the therapeutic potential of GLP-1 agonists.

Conclusions: This study establishes a novel 3D PAH model for investigating vascular remodeling and testing therapies. Findings will elucidate ER stress-driven remodeling and assess whether GLP-1 agonists can reverse medial thickening. This patient-relevant model bridges the gap between animal studies and clinical translation for PAH therapies.

Reaching deficits during moving target interception are related to altered prefrontal cortex activity patterns in children with cerebral palsy

Presenting Author: Owais A. Khan; University of Georgia

Poster Number: 92

Khan, Owais A., University of Georgia; Barany, Deborah, University of Georgia; Pottumuthu, Santosh, University of Georgia; Singh, Tarkeshwar, Pennsylvania State University; Modlesky, Christopher, University of Georgia

Background: Suppressed prefrontal cortex (PFC) activity in children with cerebral palsy (CP) is linked to reduced accuracy when reaching for stationary targets, but the magnitude and impact of PFC activity on moving target interception is unknown. This study aimed to concurrently assess interception performance and PFC activity during time-constrained interception of moving targets in children with CP. We hypothesized that interception performance in those with CP would be directly related to their PFC activity patterns.

Methods: Fifteen children with spastic CP (5-11y) and 15 age-, sex-, and race-matched typically developing control children performed rapid unimanual reaching with a robotic manipulandum (KINARM) to intercept horizontally moving targets projected onscreen. Task difficulty was modulated by varying target velocity (fast, slow blocks). Ten trials per block were performed, with 4 blocks within each arm. Magnitude and lateralization of PFC activity was assessed using mobile functional near-infrared spectroscopy devices.

Results: Children with CP exhibited impaired motor performance (lower accuracy, $d = 0.846$; greater spatial errors, $d = 0.929$) and preparedness (slower reaction time, $d = 0.993$), alongside more suppressed contralateral PFC activity ($d = 0.522$) and altered PFC laterality (ipsilateral dominance in CP vs. contralateral dominance in controls, $d = 1.073$) during non-preferred arm interception compared to controls (all $p < 0.05$). Children with CP displayed greater spatial errors ($d = 1.233$) and lower peak reaching velocity ($d= 0.756$) than controls during the more challenging fast condition. Greater contralateral PFC dominance in CP during the fast condition was also related to slower and more variable reaction times (Spearman rho (r) = 0.568 and 0.643 respectively, both $p < 0.05$). Conversely, greater contralateral PFC activity and dominance during preferred arm interception in controls were related to interception performance deficits (lower accuracy, higher and more variable spatial errors; r range = -0.600 to 0.823) and inefficient motor planning (more variable reaction times and initial movement angles, $r = 0.551$ and 0.719, respectively).

Conclusion: Impaired motor performance and atypical PFC activity during non-preferred arm interception highlight disrupted brain-behavior relationships in children with CP. Tailored neurorehabilitation strategies targeting aberrant PFC activity patterns may improve arm function in CP.

Music Therapy as a Potentiator of Gross Motor Intervention for Emerging Gait in Early Cerebral Palsy

Presenting Author: Caitlin Kjeldsen; Emory University School of Medicine

Poster Number: 93

KJELDSEN, CAITLIN, Emory University; Moran, Megan, Emory University; Baduni, Kanishka, University of Georgia-Athens; and Maitre, Nathalie, Emory University

Background: Cerebral palsy (CP), the most common neuromotor disorder in childhood, is characterized by impairments in functional movement due to altered neural pathways. Music may serve as a potentiator of targeted movement interventions in early CP by bypassing cognitive demands, sustaining engagement, and providing an external scaffold for movement. This study sought to assess the feasibility of music therapy as an adjunct to a gross motor intervention for early CP by examining intervention timing in relation to gait development.

Methods: Children with CP 9-36 months corrected chronological age (CCA) participated in a 5-day intensive program co-led by a multidisciplinary team including music (MT-BCs) and physical therapists. MT-BCs provided live music-based interventions using instruments and singing to engage participants and scaffold movement through spatiotemporal templating. To examine intervention timing in relation to gait development, participants were stratified by ambulation ability at 6-month follow-up assessment: those who were walking >3 steps with assistance versus those walking >5 steps independently. Developmental assessment subtests related to balance, postural control, and gross motor development from the Developmental Assessment of Young Children (DAYC-2), Early Clinical Assessment of Balance (ECAB), and Peabody Developmental Motor Scale (PDMS-3) were compared from baseline to post-intensive assessment using paired t-tests with Bonferroni correction.

Results: Fifteen of 22 participants met eligibility criteria – ability to bear weight in standing. Participant age ranged from 11-26 months CCA. In this cohort, 13/15 were born preterm, 6/15 were female, and Gross Motor Function Classification System (GMFCS) scores ranged from 1-4 (1 indicates highest level of function, 5 lowest). All measures related to motor development, balance, and postural control showed significant improvement over the 5-day intensive (all $p<.05$) while measures related to strength did not ($p=.413$). Importantly, this result held for those taking >3 steps with assistance and those taking >5 steps independently at 6-month follow-up.

Conclusion: Timing music-based intervention at early phases of gait development in children with CP is feasible and potentially beneficial, even for children with significant motor impairment. Music therapy may serve as a potentiator of established gross motor interventions; additional research is needed to optimize this potentiation.

Humanized L-Asparaginases Variants Exhibit Cytotoxicity in ALL Cell Lines and Show Potential for Reduced Immunogenicity

Presenting Author: Kristopher Knight; Emory University

Poster Number: 94

KNIGHT, KRISTOPHER, Emory University; Karpen, Matthew, Emory University; Spencer, H. Trent, Emory University; Doering, Christopher, Emory University; and Raikar, Sunil, Emory University.

Background: L-asparaginase (L-ASNase) is a key component of chemotherapy for acute lymphoblastic leukemia (ALL). Current clinical L-ASNases, derived from Escherichia coli or Erwinia chrysanthemi, share

only ~30% sequence identity with human L-ASNase, leading to significant immunogenicity. Immune reactions occur in 5–30% of patients, often necessitating treatment discontinuation and resulting in inferior disease-free survival. Therefore, a less toxic, humanized alternative is urgently needed. Here, we describe the use of ancestral sequence reconstruction (ASR), an innovative protein drug discovery and optimization platform, to generate novel humanized L-ASNase protein drug candidates. Guinea pig (GP) L-ASNase, which shares ~70% sequence identity with human L-ASNase whilst possessing favorable anti-leukemic and enzymatic properties, serves as the foundation for utilizing the ASR platform to develop more effective L-ASNase drug candidates.

Method: Ten An-L-ASNase candidates, spanning the phylogenetic lineage between guinea pig and human, were computationally inferred, synthesized, and expressed. Enzymatic activity was assessed using a modified Nessler's assay, while growth inhibition in ALL cell lines was measured via MTT assay. The number of immunogenic epitopes in each An-L-ASNase was assessed in silico in the context of the HLA-DRB1*07:01 allele, which is associated with the highest hypersensitivity risk. To further minimize immunogenicity, hybrid ancestral-human L-ASNases were engineered by replacing the ancestral C-terminal ankyrin repeat domain with its human counterpart.

Results: Among the ancestral drug candidates, An-104 and An-107 demonstrated enzymatic activities comparable to clinical L-ASNases. An-104 and An-107 exhibited effective cytotoxicity against both CCRF-CEM and MOLT-4, with IC50 values similar to E. coli L-ASNase. After accounting for human epitopes, all An-L-ASNases were predicted to have lower immunogenicity than bacterial L-ASNases, with An-104 and An-107 predicted to have ~ 3-fold lower immunogenicity. Hybrid ancestral-human proteins incorporating the non-functional human C-terminal domain achieved 90–99% sequence identity to human L-ASNase and are currently being characterized.

Conclusion: This study highlights ASR as a robust platform for bioengineering L-ASNase variants, generating An-L-ASNase candidates with comparable ASNase specific activity, similar cytotoxic activity against ALL cell lines and lower predicted immunogenicity risk compared to existing commercial ASNase products. These findings pave the way for advancing next-generation L-ASNases, addressing the limitations of existing therapies.

The Influence of Co-Occurring Anxiety Symptoms on the Evaluation of Autism Symptomatology

Presenting Author: Alexander Kolios; Emory University

Poster Number: 95

KOLIOS, ALEXANDER, Emory University; MYERS, SARAH, Emory University; Kemp, Megan, Emory University; Hann, McKenzie, Emory University; Walum, Hasse, Emory University; Klaiman, Cheryl, Emory University

Background: Symptomatology overlaps in anxiety and autism (ASD) make clinical distinctions challenging. Understanding the nature of these presentations and the components of ASD-evaluations most impacted by co-occurring anxiety symptoms is essential.

Methods: Clinician-evaluation analyses included 163 child-caregiver dyads, chosen based on completion of an Autism Diagnostic Observation Schedule (ADOS-2; child-assessment) Module 1, 2, or 3, and a Child Behavior Checklist (CBCL; parent-report). Caregiver-evaluation analyses included 6,262 dyads, chosen

based on completion of a Social Communication Questionnaire (SCQ; parent-report) and a CBCL. All children had an ASD diagnosis and were 7 to 12 years old. All dyads were recruited through the SPARK cohort. An exploratory factor analysis (EFA) was administered on the SCQ questions. Linear regressions were performed between caregiver-reported (CR) anxiety scores and both ADOS total scores and SCQ factors. Mediation analyses were also used to investigate variables that may contribute to the relationships between anxiety and ASD.

Results: The EFA on the SCQ questions revealed three factors, two of which resemble the ADOS-2 Social Affect (SA) and ADOS-2 Restricted Repetitive Behaviors (RRB) categories. Anxiety symptom scores were found be a significant predictor of the "RRB" SCQ factor ($\beta = .235$, $p < .001$, $R^2 = .0551$). Higher anxiety scores also significantly predicted lower ADOS SA scores and RRB scores ($\beta = -.225$, $p = .004$, $R^2 = .0504$; $\beta = .231$, $p = .003$, $R^2 = .0532$). CR "Obsessive Compulsive Problems" (OCPs) scores were shown to significantly mediate the relationship between CR anxiety scores and "RRB" factor scores on the SCQ (ACME = .017, $p < .001$).

Conclusions: While these findings indicate that co-occurring anxiety symptoms may influence clinicians' assessment of children, their own ratings of anxiety did not factor into this relationship, meaning they didn't attribute these differences to anxiety. Caregivers' tendency to rate children with higher levels of anxiety as having higher RRBs may be connected to their ratings of OCPs, which could reflect difficulty in differentiating RRBs and OCPs. These findings highlight the differential perceived presentations of children with co-occurring anxiety symptoms and ASD as well as the need for increased insight into the role that anxiety plays in ASD diagnosis.

Incidence and Characteristics of Children Experiencing Anaphylaxis During Treatment for Acute Lymphoblastic Leukemia

Presenting Author: Amanda Kuhn; Emory University/Children's Healthcare of Atlanta

Poster Number: 96

KUHN, AMANDA, Emory University & Children's Healthcare of Atlanta; Stevenson, Jason, Emory University & Children's Healthcare of Atlanta; Hawk, Ashleigh, Emory University; Hunt, Amy, Emory University & Children's Healthcare of Atlanta; Lee, Katherine, Children's Healthcare of Atlanta; Park, Yoonseo, Emory University; Schwartz, Michael, Emory University; Vajdic, Tyler, Emory University & Children's Healthcare of Atlanta; Khanna, Anjali, Emory University; and Miller, Tamara, Emory University & Children's Healthcare of Atlanta

Background: Anaphylaxis is an acute, severe allergic reaction that can be triggered by specific foods, medications, blood products, or insect stings. Children undergoing treatment for acute lymphoblastic leukemia (ALL) may experience anaphylaxis to blood products or medications received as part of their treatment. There is a wide range of reported rates of anaphylaxis in pediatric patients with ALL, but the true incidence is unclear, likely due to under-reporting in published data from clinical trials. Given that anaphylaxis is life-threatening and can have implications for treatment options, this study aimed to evaluate the incidence of and risk factors for anaphylaxis in children undergoing treatment for ALL.

Methods: A retrospective manual chart review was performed on 849 patients aged 1 to 21 years who received at least one chemotherapy course at CHOA between January 2010 and October 2022. Chart abstractors received rigorous training and followed a detailed chart abstraction guide for consistency.

Demographic data were extracted from the electronic health record. For each episode of anaphylaxis, data were abstracted on the onset, treatment course, causative agent, and highest grade (graded 3-5 according to the National Cancer Institute Common Terminology Criteria for Adverse Events v5.0 definitions). Analysis was performed using Excel.

Results: Of the 849 patients, 108 (12.7%) had at least one episode of anaphylaxis. Of the 3923 treatment courses, patients had at least one episode of anaphylaxis in 113 (2.9%) courses. Of the 116 episodes of anaphylaxis experienced, most were grade 3 (N=88, 75.9%) and occurred most often during consolidation (N=76, 65.5%). PEG-asparaginase was the most common causative agent overall (N=80, 69.0%) and platelets were the most common blood product to cause anaphylaxis (N=24, 20.7%).

Conclusions: Anaphylaxis frequently occurs during treatment for pediatric ALL. These results highlight the importance of close monitoring for and reporting of this adverse event to better understand risk factors and ensure proper safety protocols are used, as some patients may benefit from utilization of pre-medication. In the future, evaluation for statistical significance could help identify the most salient risk factors for anaphylaxis during the treatment of pediatric ALL and elucidate any disparities amongst population subsets.

Signals of Instability: Risk Factors for Emergent Transfer in Pediatric Cardiac Care

Presenting Author: David Kulp; Emory University School of Medicine

Poster Number: 97

KULP, DAVID, Emory University/CHOA; West, Zachary, Emory University/CHOA; Gleason, Michelle, CHOA; Braykov, Nikolay, CHOA; Chanani, Nikhil, Emory University/CHOA; and Muthu, Naveen, Emory University/CHOA

Background: In pediatric cardiac care, the cardiac acute care unit (CACU) serves as a bridge between home and intensive care. While many patients remain stable during their stay, a subset experience rapid clinical deterioration requiring emergent transfer (ET) to the cardiac intensive care unit (CICU). ETs are defined as necessitating interventions such as vasoactive support or intubation within 60 minutes of arrival. These events are associated with increased mortality and length of stay, emphasizing the importance of early risk stratification. This study aimed to identify clinical predictors of ET from CACU-to-CICU using logistic regression (LR) analysis, with the goal of informing real-time early warning models.

Methods: We conducted a single-center retrospective study using data from local Pediatric Acute Care Cardiology Collaborative/Pediatric Cardiac Critical Care Consortium (PAC3/PC4) registries. We analyzed CACU-to-CICU transfers between February 1, 2019 and May 9, 2024. Patients undergoing surgery or catheterization prior to transfer were excluded. Each CACU encounter was split into 12-hour shifts; shifts ending in ET were labeled “ET shifts.” Predictor variables included respiratory decline in the preceding 12 hours, congenital heart disease (CHD) complexity, surgical status, chromosomal/genetic abnormalities, and weight. A mixed-effects LR model was used to assess predictors, accounting for repeated measures per patient.

Results: Among 8,472 CACU encounters, 84 (1.0%) resulted in ET. Respiratory decline in the prior 12 hours was strongly associated with ET (OR 15.55, 95% CI 2.61–92.57, p=0.003). Univentricular physiology significantly increased risk (OR 4.67, 95% CI 4.64–4.69, p<0.001), and lower weight further amplified this

risk among patients with complex CHD (OR 0.63, 95% CI 0.63–0.63, p<0.001). Surprisingly, chromosomal/genetic abnormalities were associated with decreased odds of ET (OR 0.23, 95% CI 0.06–0.98, p=0.047). The model demonstrated high within-patient correlation (ICC=0.94), suggesting considerable patient-level variability.

Conclusions: Respiratory decline, univentricular physiology, and lower weight were strong predictors of ET from CACU to CICU. The unexpected protective association with chromosomal/genetic abnormalities warrants further study. While promising, predictive modeling for these rare events remains challenging. Future research will explore more granular data to inform machine learning approaches in enhancing early warning systems in pediatric CACU settings.

Mechanical Chest Compression Devices in Pediatric Patients: Prehospital Use and Implications

Presenting Author: Emily Labudde; Emory University School of Medicine

Poster Number: 98

Labudde, Emily, Emory University; Segars, James, Cincinnati Children's; McDonough, Shawn, Cincinnati Children's; Merkt, Brant, Cincinnati Children's; Pomerantz, Wendy, Cincinnati Children's; Schwartz, Hamilton, Cincinnati Children's; Zhang, Yin, Cincinnati Children's; Lee, Sang Hoon, Cincinnati Children's

Background: Mechanical chest compression devices (MCCDs) are used to facilitate chest compressions in adults with out-of-hospital cardiac arrest (OHCA). Advantages of MCCD use include freeing first-responders from the “compressor” role to perform other critical tasks and decreasing risk of infectious exposure. Few studies discuss use of MCCDs in children, namely case reports and simulation-based studies. Manufacturer guidelines for MCCDs do not provide pediatric-specific recommendations or settings; despite this, MCCDs are being used in pediatric-aged patients, especially if the patient appears “adult-sized.” The aim of this study was to describe the use of MCCDs in children with OHCA using a national database.

Methods: This was a retrospective study of children with OHCA from the 2021-2023 ESO Data Collaborative. All patients 1-18 years of age with OHCA and a documented type of CPR (manual vs MCCD) within the database were included. Descriptive analyses on patient demographics, characteristics of the arrest and resuscitation, achievement of ROSC, and agency information between groups (manual vs MCCD) were performed.

Results: There were 6022 encounters between January 2021 and December 2023 included for analysis; MCCDs were used in 18.6% of patients. Patients in the MCCD group were more likely to be male, older, and of larger weight (>93% weighing ≥40kg). There were no differences in race/ethnicity between groups. Etiology of arrest varied between groups, most commonly respiratory in the manual compressions group and trauma in the MCCD group. The MCCD cohort had a longer estimated time of arrest and were more likely to die without ROSC compared to those receiving manual compressions. Both groups had similar dispatch to arrival and transport times, but the MCCD group had longer on-scene time.

Conclusion: This study is the first to describe the use of MCCDs in pediatric patients. As expected, most pediatric-aged patients are older and larger, but a surprising number of smaller and younger patients received an MCCD attempt. It is unclear what effect this may have on patient outcomes, particularly in

this proportion of patients. Future research should assess patient outcomes to inform guidelines for use of MCCDs in children.

Pediatric Palliative Care Psychology: Moving Towards a Unified Model of Care

Presenting Author: Kelsey Largen; Children's Healthcare of Atlanta/Emory University

Poster Number: 99

LARGEN, KELSEY, Children's Healthcare of Atlanta/Emory University

Background: Pediatric psychologists have unique expertise to contribute to a palliative care team, including skills in assessment, intervention, and consultation. However, there are very few embedded palliative care psychologists in the country and a standard model of practice does not yet exist.

Methods: The present study describes the patient case load for an embedded pediatric psychologist in a palliative care team.

Results: The pediatric palliative care psychologist splits her time between three palliative care teams at two hospitals, providing interdisciplinary and psychological therapy follow up visits for patients and families while they are admitted as well as telehealth visits for patients and families that require ongoing care. Between October 2024 and March 2025, the palliative care psychologist completed 182 psychology visits and 58 interdisciplinary team visits across two inpatient settings as well as 23 telehealth visits. Approximately 50% of patients seen had an oncology diagnosis with the remainder representing a range of diseases including neurological and genetic syndromes. Sixty percent of psychology visits were conducted with patients while 35% of visits were conducted with parents. Fifty percent of patients and families seen were white, all patients and families identified as Non-Hispanic and the majority were English-speaking.

Conclusions: Palliative care psychologists have specialized skills that add value to palliative care teams. This initial study captured descriptive information regarding patient case load, including information regarding number of visits and patient and family characteristics. The results of this study help to further define the growing field of pediatric palliative care psychology as we move toward a more unified model of care in the field.

Smart Bioelectronic Pacifier for Real-Time, Continuous Monitoring of Salivary Electrolytes and Metabolites in Neonates

Presenting Author: Sung Hoon Lee; Georgia Institute of Technology

Poster Number: 100

Lee, Sung Hoon, Georgia Institute of Technology; Yeo, Woon-Hong, Georgia Institute of Technology

Continuous monitoring of physiological biomarkers is critical for neonates in the NICU, yet current blood-based diagnostics are invasive, stressful, and offer only intermittent data points. Recent salivary-based detection methods are promising alternatives, yet the existing devices are ineffective for real-time,

continuous monitoring of electrolytes due to their rigidity, bulky form factors, and lack of salivary accumulation. Here, we introduce a smart bioelectronic pacifier for real-time, continuous, and non-invasive monitoring of salivary electrolytes and metabolites, including sodium, potassium, lactate, and cortisol. The pacifier integrates ion-selective electrodes (ISEs), enzymatic sensors, and a flexible microfluidic system into a standard pacifier design, ensuring accurate saliva collection without external pumps or structural modifications. The device provides Nernstian responses of 52 mV/decade for sodium and 57 mV/decade for potassium, while the enzymatic lactate sensor demonstrates linearity within 0.1–5 mM and the cortisol sensor exhibits high sensitivity across 0.5–19 nM. The system wirelessly transmits continuous data to a mobile platform, enabling clinicians to track changes in salivary biomarkers in real time. Preliminary in vivo NICU validation confirms its feasibility and reliability for non-invasive electrolyte and metabolite monitoring, offering an innovative approach to improve personalized neonatal care and reduce reliance on painful blood draws.

Building Healthy Habits that will Last a Lifetime using AI-Powered Videos: Lighting up Children's Future towards a Healthy Mind and Body.

Presenting Author: Leigha Lee; Emory University

Poster Number: 101

Lee, Leigha, Emory University; Abadiotakis, Helen, Meng, Emory University; Williams, Tyler, Emory University; Agyepong, Stephen, Emory University; Myers, Kristin, RN, Emory University; and Pendley, Andrew, MD, Emory University

Introduction: Healthy lifestyle habits are an integral but often underemphasized part of a child's education, despite long-term impact on health outcomes. In Georgia, there is no standardized curriculum for healthcare education, leading to significant variability in delivery.

The Elementary Pediatric Health Curriculum (EPHC) addresses this gap through a longitudinal curriculum tailored for K-5 students. In partnership with Burgess Peterson Academy (BPA), an Atlanta elementary school (65% minority/31% economically-disadvantaged), EPHC delivers lessons over the academic year using its network of local healthcare-professionals/students.

EPHC seeks to expand this curriculum to students' families by creating accompanying take-home videos. These videos feature a cast of diverse characters designed to resonate with BPA families, transcending cultural/age barriers and ensuring critical health messages are reaching the broader Atlanta community.

Methods: EPHC has developed 11 lessons covering topics such as hydration and oral hygiene, delivered annually since 2018, and tailored to meet the developmental needs of students across grades K-5.

Recognizing the potential for greater scalability and inclusivity, EPHC is adapting these lessons into videos featuring fictional characters Robby and his mom, Dr. Robbowell. Using the AI-powered software Powtoon, our approach allows for rapid production while ensuring accessibility across literacy levels.

Initial production focuses on one pilot video, set to debut at BPA's PTA meeting in February 2025. Our group will seek feedback from parents/faculty to assess content relevance, cultural resonance, and perceived impact, before rolling out the first installment of 5-videos and optional survey to 100% of families in early spring, with Amazon gift card raffles to incentivize participation.

Results: Preliminary anecdotal evidence indicates students' ability to recall and apply these concepts across multiple grade levels, highlighting the curriculum's effectiveness.

The expansion to video format aims to amplify EPHC's impact on families, ensuring that habits can be reinforced outside of school. We anticipate preliminary engagement/adoption metrics to be available by the conference date.

Conclusions: By integrating innovative tools into health education, EPHC seeks to address systemic barriers to health literacy through scalable, sharable content. This initiative underscores the value of technology to transform lifestyle habits and deliver health communications at scale.

Evaluating Remission Following Early Peanut Oral Immunotherapy at a Pediatric Academic Food Allergy Center

Presenting Author: Chelsea Leef; Children's Healthcare of Atlanta and Emory

Poster Number: 102

Leef, Chelsea, Children's Healthcare of Atlanta; Horton, Codi, Children's Healthcare of Atlanta; Bai, Shasha, Emory University; Ezhuthachan, Idil, Children's Healthcare of Atlanta, Emory University; Lee, Tricia, Emory University; Lee, Gerald, Children's Healthcare of Atlanta, Emory University; Rathkopf, Melinda, Children's Healthcare of Atlanta, Emory University; and Vickery, Brian MD, Children's Healthcare of Atlanta, Emory University.

Rationale: Following publication of the IMPACT study, we launched an early peanut oral immunotherapy (e-POIT) clinical program for children aged 6 months-4 years, with the goal of enhancing odds of remission. We aimed to capture remission rates in all POIT patients through August 2024.
Methods: We implemented a provider-facing REDCap database (Vanderbilt University Medical Center, Nashville, TN) to capture POIT outcomes, including food challenges (FC), for quality improvement (QI). Patients were eligible for a remission FC once they completed 300 mg maintenance for ≥12 mo, had no adverse reactions while on maintenance, and had peanut-specific IgE (psIgE) ≤3 kU/L.
Results: Of 112 total POIT-treated patients, 21 e-POIT (median age 17 months) and 18 school-age (SA)-POIT (median age 72 months) completed 300 mg maintenance ≥12 mo. Eighteen patients, 13 e-POIT (median psIgE improvement from 2 at baseline to 0.3 kU/L and 5 SA-POIT (1 to 0 kU/L)) were eligible and offered a FC; 4 e-POIT challenges are pending, 1 SA-POIT challenge is pending and 1 SA-POIT declined. PsIgE trends in those ineligible were 14 to 9.4 kU/L and 69 to 22 kU/L, respectively. Nine (43%) e-POIT and 2 (11%) SA POIT patients tolerated between 3-7 grams of protein depending on age; while 1 SA-POIT patient had a mild reaction after ingestion of 7 grams of protein and continued daily POIT dosing afterwards. All e-POIT patients had non-reactive FC, were instructed to eat peanut ad libitum.
Conclusions: This preliminary real-world QI analysis suggests that, compared to SA-POIT patients, remission is more likely in e-POIT patients, who were younger and had lower psIgE levels.

Investigating the Role of Placental Development in Slc25a1-Associated Congenital Heart Disease

Presenting Author: Ethan Liu; Emory University

Poster Number: 103

Liu, Ethan H., Emory University; Ohanele, Chiemela Emory School of Medicine; Park, Austin S., Emory University; and Kwong, Jennifer Q., Emory School of Medicine

Background: Congenital heart disease (CHD) is one of the leading cause of neonatal mortality accounting for 11% of still births and approximately 35% of infant deaths. 22q11.2 deletion syndrome, a disorder caused by chromosomal 22q11.2 microdeletion, is a leading genetic cause of CHDs with approximately 60-80% of affected individuals experiencing CHDs. In recent work, we found that mitochondrial citrate carrier, Slc25a1, is a 22q11.2 gene found within 22q11.2DS critical deletion region, and has been shown to be required for cardiac morphogenesis in embryonic mice due to its regulation of critical metabolic transitions in the embryonic heart. Interestingly, Slc25a1 is haploinsufficient, with congenital hearts defects occurring in hemizygous deleted embryos, suggesting a cardiac intrinsic role for Slc25a1 in cardiac development. However, other groups suggest that Slc25a1deletion-associated congenital heart defects are due to loss of Slc25a1in the placental, as the placenta-fetal heart axis, and in particular, the placenta trophoblasts, play a critical role in regulating oxygen and nutrients exchange required for embryonic heart development. While CHDs were observed in our Slc25a1+/-, little is known about the role of the placenta in mediating CHDs observed in hemizygous deleted animals. Our research investigates whether placental abnormalities contribute to the CHDs observed in Slc25a1+/- embryos. We hypothesize that Slc25a1-dependent placental defects play a critical role in CHDs observed in Slc25a1+/- mice.

Methods: To assess the role of placental development on heart morphogenesis, we timed matings of Slc25a1+/- mice, sectioned, and performed histological analysis on placentas from Slc25a1+/+ and Slc25a1+/- embryos and quantified thicknesses of placental layers where trophoblast cells are enriched: the junctional zone and labyrinth.

Results: Placentas from Slc25a1+/- embryos showed no significant differences in junctional zone and labyrinth to whole placenta ratio when compared to Slc25a1+/+ controls.

Conclusions: These data suggest that the role of Slc25a1 role in regulating placental development is not required for cardiac morphogenesis. Furthermore, extra-placental tissues must be considered when exploring the role of Slc25a1 in congenital heart disease.

Comparing Moderation Analysis Methods in Propensity Score Matching: How Poverty Level Modifies the Association Between Insurance Type and Mental Health Service Use in Children with AHDH

Presenting Author: Katie (Kang-Ting) Liu; Emory School of Medicine, Pediatric Biostatistics Core

Poster Number: 104

Liu, Katie (Kang-Ting), Emory University

Background: Treatment effect differences may vary across subpopulations, such as by demographic characteristics or socioeconomic status. In pediatric observational studies, failure to account for moderation effects can lead to misleading or incomplete result interpretations. While propensity score (PS) matching is commonly used to reduce confounding and achieve covariate balance between treatment groups, traditional matching methods may not capture effect modification by subgroup

characteristics. Therefore, thorough consideration of different matching approaches is necessary to accurately assess potential interactions between treatments and moderators.

Methods: We utilized data from the 2022-2023 National Survey of Children's Health (NSCH) to identify children aged 3 to 17 with a current diagnosis of ADHD and continuous insurance coverage over the past year. The moderation effect of poverty level on the association between insurance type (private vs public) and use of mental health services was examined. Full matching was applied using a probit link, with matching covariates including age, sex, race/ethnicity, sampling stratum, ADHD severity, ADHD medication use, emotional difficulties, and treatment accessibility. Three matching approaches were compared: 1) full sample including poverty level as a matching covariate, 2) exact matching on poverty level, and 3) stratified PS matching within poverty subgroups. Outcomes were analyzed using marginal effects models with interaction between poverty and insurance type. Each approach was evaluated for covariate balance, matched effective sample size (ESS), effect estimates, and interpretability.

Results: When poverty level was included as a matching covariate, overall balance was achieved, but not within poverty subgroups. ESS and power were low. Public insurance was significantly associated with higher mental health service use only in the lowest poverty group (0-99%). Exact matching on poverty level improved subgroup balance and power slightly, with similar findings in the lowest poverty group. Subgroup matching yielded the highest EES and power, identifying differences in both 0-99 % and 200-399% poverty level subgroups, though findings were sensitive to covariate adjustment.

Conclusions: There are trade-offs in bias, power, and interpretability when applying different methods of moderation analysis in PS matching. This study highlights the importance of selecting appropriate matching approaches when assessing treatment effect heterogeneity in pediatric research.

Postnatal Zika virus exposure causes poor modulation in behaviors across varying threats levels

Presenting Author: Kaitlyn Love; Emory National Primate Research Center

Poster Number: 105

Love, Kaitlyn, Emory National Primate Research Center (ENPRC); van Schoor, Alex, ENPRC; Richardson, Rebecca, ENPRC; Suthar, Mehul, Dept of Pediatrics, Emory School of Medicine; Chahroudi, Ann, Dept of Pediatrics, Emory School of Medicine; and Raper, Jessica, Dept of Pediatrics, Emory School of Medicine

Background: Zika virus (ZIKV) is a mosquito-borne flavivirus endemic in many countries with over 900,000 cases reported since 2015. While most adult cases manifest as mild or asymptomatic, fetal exposure to ZIKV can have much more severe impacts. Prenatal ZIKV exposure can result in congenital defects such as microcephaly, brain structural abnormalities, visual impairments, cognitive deficits, and changes in socioemotional behavior. Little is known about the possible consequences of ZIKV exposure during infancy, despite postnatal development being a vulnerable period due to rapid brain growth during the first years of life. Our study sought to investigate the potential impact of ZIKV neurotropism during infancy on socioemotional behavior.

Methods: Twelve infant rhesus macaques (RMs) were randomly selected to be infected with the Puerto Rican ZIKV strain (105 pfu PRVABC59) at one month age. An additional twelve infant RMs served as controls for comparison. At six months of life, infants underwent a stress test to examine their ability to modulate emotional behavior towards an increasing threat of a novel person/intruder. Plasma samples

were collected before and after the stress test to examine levels of cortisol. Additionally, samples were collected at sunrise and sunset to measure diurnal cortisol rhythm.

Results: Both groups exhibited species-typical behavior on the stress test paradigm, such that they froze more in the low threat condition and were more hostile in the high threat condition. Unlike controls, ZIKV-infected RMs were unable to modulate their behavior based on the level of threat presented by the intruder. Poor modulation of emotional behaviors has been seen in infant RMs with temporal lobe damage (e.g. amygdala or perirhinal cortex) suggesting that ZIKV neuro-invasion during infancy may alter brain development and impact behavioral expressions. Additionally, the inability to modulate emotional behaviors may be attributed to differences seen in cortisol stress response.

Conclusion: Considering ZIKV is now endemic to many countries across the globe, it is important to gain a better understanding of the potential effects that ZIKV may pose on the developing brain.

Single-cell Profiling of Severe Crohn's disease Phenotypes across Ancestries Reveals Longitudinal Distinctions in Cellular Crosstalk and Mucosal Healing

Presenting Author: Sushma Maddipatla; Georgetown University

Poster Number: 106

Maddipatla, Sushma, Emory University; Murthy, Shanta, Emory University; Hwang, Yeonjoo, Emory University; Washburn, Savannah, Georgia Institute of Technology; Koti, Tarun, Emory University; Dodd, Anne, Emory University; Kolachala Vasantha, Emory University; Cutler, David, Emory University; Qiu, Peng, Georgia Institute of Technology; Matthews, Jason, Emory University and KUGATHASAN, SUBRA, EMORY UNIVERSITY

BACKGROUND: Crohn's disease(CD) affecting the distal gastrointestinal tract, particularly the rectum, is often associated with more complex and severe phenotypes, especially in African American ancestry(AA) patients compared to Europeans(EA). Perianal fistulizing CD(PCD), a severe form of CD, is characterized by complex mucosal damage and worse long-term outcomes, often requiring surgical intervention. Here, we examined the CD phenotypes to identify cellular and molecular signatures in the rectal mucosa that either indicate or explain CD progression. METHODS: Rectal mucosal biopsies were obtained from consented patients with PCD(n=18; 7 inflamed, 11 non-inflamed), CD(n=25, 10 inflamed, 15 non-inflamed) and non-IBD controls(n = 7) at Children's Healthcare of Atlanta. The cohort included an equal representation of African American(12 CD AA, 7 PCD AA) and European American(11 CD EA, 10 PCD EA) patients. Biopsies were processed for single-cell-RNA-sequencing, and bioinformatic analyses were conducted to identify cellular and molecular signatures.

RESULTS: Single-cell analysis(~260k cells) identified 27 distinct cell types and revealed key cellular and transcriptomic differences between CD and PCD. We confirmed that macroscopically inflamed samples from CD and PCD were also significantly transcriptomically inflamed. Inflamed PCD displayed elevated MHC-II and IFN-γ signaling in epithelial subpopulations, suggesting their role as non-conventional-antigen-presenting cells. Unlike CD, where epithelial cells present antigens to T cells, PCD is marked by increased epithelial-derived MHC-II signaling to macrophages. Contrary to the typical understanding of CD4 in T-cells, we found that macrophages in inflamed-PCD express CD4. Sub-clustering revealed CD4 in cycling monocytes/macrophages and dendritic cells, along with HLA-DRB1, CD68, and CD11c.

Ancestry-specific analyses revealed a decrease in cycling-B cells in AA patients with inflamed PCD, while non-inflamed AA PCD patients exhibited increased epithelial subpopulations(transit-amplifying and mature goblet) alongside reduced B and T-cells. Furthermore, inflammatory(IL1, MHC-II, IFN-γ, IL13), epigenetic(PKMTS-mediated histone-methylation), and NOTCH4/WNT signaling were enriched in EA CD patients compared to AA CD. Conversely, these pathways were more pronounced in AA PCD compared to EA PCD.

CONCLUSION: Active PCD is defined by a unique epithelial-immune axis, marked by epithelial-macrophage interactions, indicating a shift from classical T-cell–mediated responses. This pro-inflammatory environment is enriched in AA PCD populations, pointing to ancestry-specific molecular/cellular mechanisms in shaping disease severity.

Early Life Pain Alters the Response to an Immune Challenge in Adult Male and Female Rats

Presenting Author: Varsha Madishetty; Georgia State University

Poster Number: 107

Madishetty, Varsha, Georgia State University; Macik, Melani, Georgia State University; Harder, Hannah, Georgia State University; Gomez, Morgan, Georgia State University; and Murphy, Anne, Georgia State University;

Background: Infants born prematurely are sent to the Neonatal Intensive Care Unit (NICU), where they receive approximately 10-18 painful procedures every day with an average stay of 7-14 days. These procedures can range from heel lances and IV placements to more invasive procedures such as gastric suctioning with no anesthesia or analgesia during their stay. Infants born into the NICU also face a higher risk for inflammatory disease-related illnesses. Exposure to early life pain (ELP) has previously been shown to disrupt the development of the central nervous system (CNS), however, little is known on its impact on the immune response. Microglia are an essential part of the CNS and act as the resident “immune cells” that also regulate brain development and respond to injury. Here, we examine the effects of ELP on microglia in the anterior medial preoptic area (MPOA), a region critical for inflammatory fever responses. Activated microglia are known to become deramified in response to inflammation. Methods: To model ELP, male and female rats received an intraplantar injection of 1% carrageenan (an inflammatory agent) on the day of birth (P0). During adulthood (P60-P90), rats were injected with lipopolysaccharide (LPS) to induce an immune response then euthanized at one of two time points: 2 hours post-LPS (fever initiation) or 6/8 hours post-LPS (peak fever). We have previously shown that ELP rats of both sexes show increased peak fever temperature, with ELP females showing a delayed response in comparison to handled females. We labeled Cd11b+ microglia using fluorescent immunohistochemistry and imaged them on a confocal microscope. The 3D z-stack images were processed with Imaris to reconstruct and analyze the morphology of the microglia for measures of complexity and size, which are known to be related to their inflammatory state. Results: LPS resulted in microglia becoming more reactive, indicated by their morphology becoming de-ramified. Microglia from ELP rats had less complex morphology across multiple measures indicating more de-ramified microglia compared to HAN rats. This is in line with our previous findings that ELP rats have an exacerbated immune response to LPS and supports that microglia may modulate part of this response.

The Impact of Genetic Ancestry on Survival Outcomes in Pediatric Rhabdomyosarcoma: A Report from the Children's Oncology Group

Presenting Author: Christina Magyar; Baylor College of Medicine

Poster Number: 108

MAGYAR, CHRISTINA, Baylor College of Medicine; Onwuka, Ekene, Texas Children's Hospital/Baylor College of Medicine; Martin-Giacalone, Bailey, Washington University School of Medicine in St. Louis; Scheurer, Michael, Emory University; Marquez-Do, Deborah, Texas Children's Hospital/Baylor College of Medicine; Zobeck, Texas Children's Hospital/Baylor College of Medicine; Atkinson, Elizabeth, Baylor College of Medicine; Rudzinski, Erin, Seattle Children's Hospital/University of Washington; Arnold, Michael, Children's Hospital Colorado; Barkauskas, Donald, Keck School of Medicine of the University of Southern California; Hall, David, QuadW Childhood Sarcoma Biostatistics and Annotation Office, Children's Oncology Group; Khan, Javed, Center for Cancer Research/National Cancer Institute; Shern, Jack, Center for Cancer Research/National Cancer Institute; Scheet, Paul, University of Texas MD Anderson Cancer Center; Crompton, Brian, Dana-Farber/Boston Children's Cancer and Blood Disorders Center, Harvard Medical School; Linardic, Corinne, Duke University School of Medicine; Hawkins, Douglas, Seattle Children's Hospital/University of Washington; Venkatramani, Rajkumar, Texas Children's Hospital/Baylor College of Medicine; Mirabello, Lisa, National Cancer Institute; Huff, Chad, University of Texas MD Anderson Cancer Center; Richard, Melissa, Texas Children's Hospital/Baylor College of Medicine; and Lupo, Philip, Emory University

Background: Emerging evidence suggests genetic ancestry may influence childhood cancer outcomes, but its impact on pediatric rhabdomyosarcoma (RMS) is unknown. We explored genetic ancestry's impact on survival among children with RMS. Methods: This multi-center observational cohort study is a secondary analysis of previously collected biobanking, genomic, and clinical data. The study included 920 individuals with newly diagnosed RMS under 40 years of age enrolled from 2005 to 2017 under the COG soft tissue sarcoma biobanking protocol D9902. The primary endpoints were: 1) event-free survival (EFS), defined as the time from study enrollment to tumor recurrence/progression, secondary malignancy, or death from any cause; and 2) overall survival (OS), defined as the time from study enrollment to death from any cause. Genetic ancestry was estimated using Grafpop software, and Cox regression assessed the association between genetic ancestry and EFS and OS, considering RMS overall, by fusion status, and histologic subtype. Covariates included sex, age at diagnosis, tumor stage, and histology (except during stratified analyses). Results: In embryonal RMS and PAX3/7::FOXO1 fusion-negative RMS, individuals with South Asian or Asian-Pacific Islander ancestry showed worse EFS (HR: 2.06; 95% CI: 1.07-3.97; p = 0.03 and HR: 2.01; 95% CI: 1.07 - 3.76; p = 0.03, respectively) and OS (HR: 2.30; 95% CI: 1.09-4.84; p = 0.03 and HR: 2.33; 95% CI: 1.15 - 4.70; p = 0.020, respectively) compared to those with primarily European genetic ancestry. Conclusion: These findings suggest that genetic ancestry has potential to influence survival outcomes within RMS subtypes, and further understanding is warranted. It also underscores the value of global representation within clinical cohorts to more fully appreciate potential differences in outcomes. Without adequate subpopulation representation, it remains challenging to understand survival differences. Future efforts should aim to replicate these findings in suitable cohorts, and further studies have the potential to improve precision-medicine-based goals and RMS risk stratification.

Decade-Long Hypogammaglobulinemia following autologous HSCT with rituximab containing conditioning regimen for autoimmune disorders: Clues from B and T Cell Profiling and functional studies

Presenting Author: Sakshi Malik; Emory University

Poster Number: 109

SAKSHI MALIK, Emory University, Jamshidi Raehannah,Cincinnati Children's Hospital Medical Center,Seema R Patel, Emory University,Deepak Kumar, Emory University, Chengyu Prince, Emory university, Shanmuganathan Chandrakasan, Emory University

Background: Autologous hematopoietic stem cell transplantation (HSCT) utilizing rituximab and cyclophosphamide has been used in the management of refractory autoimmune disorders such as multiple sclerosis, systemic sclerosis, and other autoantibody-driven diseases. Rituximab (RTX) is effective in selectively depleting B cells and is generally considered safe. However, some patients may experience long-term hypogammaglobulinemia, requiring IVIG replacement. The mechanisms underlying persistent hypogammaglobulinemia remain poorly understood. In this report, we present immune profiling data from two unrelated female patients who developed persistent hypogammaglobulinemia more than a decade after receiving RTX and autologous HSCT for refractory systemic lupus erythematosus (SLE) and polymyositis.

Methods: Deep immunophenotyping was performed in one SLE and one polymyositis patient. Bulk RNA-seq of naïve-B cells and circulating T follicular helper cells (cTfh), as well as in vitro stimulation assay, were performed to assess immune dysregulation and naïve B cell maturation potential.

Results: We report that although both patients with persistent hypogammaglobulinemia recovered their B cell counts, they exhibited absence of class-switched memory B cells, while the frequencies of naïve B cells, transitional B cells, and double-negative B cells was comparable to that of healthy controls. cTfh cells were present at higher frequencies in both patients, with 60-70% skewed toward a $CXCR3^+$ Th1 phenotype, compared to 30-40% in controls. Bulk RNA sequencing of cTfh cells revealed an enrichment of genes associated with interferon responses, particularly IFN-γ. In vitro, B cells from patients exhibited intact class-switching when stimulated with IgM cross linking, CD40L and IL-21. However, when B cells were co-cultured with autologous cTfh cells, class switching was significantly reduced compared to controls. This suggests that impaired Tfh help from autologous cTfh cells, due to their biased $CXCR3^+$ phenotype, may contribute to the defective class-switching observed in these patients.

Conclusions: Our data show that the B-cell compartment in patients with persistent hypogammaglobulinemia contains quantitatively normal B cell numbers but exhibits an in-vivo B cell maturation defect. However, these B cells retain class-switching capability in-vitro when stimulated with T cell help factors. Additionally, Th1 skewed cTfh cells showed an increase in IFN-γ production upon stimulation. We propose that the higher frequency of $CXCR3^+$ cTfh cells may impair class-switching due to their limited helper function and altered migratory capacity.

Promoting Awareness of Vitamin D Supplementation Effectiveness in Preventing Youth-Onset type 2 Diabetes: An Integrative Review

Presenting Author: Claudine Malonga; Emory University

Poster Number: 110

Malonga, Claudine, Emory University; Moore, Shawana, Emory University

Background: The incidence of Youth-Onset Type 2 Diabetes Mellitus (Y-O T2DM) in the U.S. continues to rise owing to an increasing prevalence of at-risk adolescents, mainly those with obesity. Over the last decade, vitamin D deficiency has arisen as a risk determinant for T2DM, and its supplementation has been hypothesized as a prospective diabetes risk-lowering strategy. Various trials have recently published results on vitamin D's impact on preventing diabetes in people with prediabetes, mainly in adults, but results are contradicting. Hence, more current studies on the pediatric population are needed. This study aimed to evaluate and promote pediatric providers' awareness of vitamin D supplementation effectiveness in reducing glycemic markers in at-risk pediatric populations.

Methods: This integrative literature review involved all pediatric studies published within the last 10 years and collected from four databases: PubMed, CINAHL, Embase, and Scopus. The Covidence PRISMA flowchart was used for study retrieval and selection, applying exclusion/ eligibility criteria. An evidence synthesis table, including quality and level of evidence appraisal, and an annotated bibliography were used for data analysis.

Results: Of 145 articles identified, only 10 were included. Five studies (50%) reported that Vitamin D supplementation reduced glycemic markers (HbA1, FBG, fasting insulin, or HMA-IR) in youth at risk for T2DM, with or without obesity. Additionally, three studies (30%) also mentioned in glycemic markers' reduction in youth already with T2DM; another study (10%) reported glucose reduction in individuals with normal vitamin D levels. Nevertheless, some studies still mentioned no glucose reduction.

Conclusion: Half of the studies indicated that vitamin D supplementation in youth with hypovitaminosis significantly reduced glycemic markers, helping to counteract the progression to T2DM in at-risk pediatric populations, including those without obesity. The sample size was small due to the paucity of articles; further research with larger participant groups, particularly randomized controlled trials, could be valuable in validating these findings. Given the emerging, although not universally proven, beneficial effects, providers should be encouraged to routinely screen for and correct low vitamin D levels, not only in youth with obesity but in all youth, especially those with high glycemic markers, to help prevent Y-O T2DM.

Developmental Differences in Infant Gaze Patterns as a Cue for Caregiver Greeting Between Neurotypically Developing Infants and Infants Later Diagnosed with Autism

Presenting Author: Harleigh Markowitz; Emory College of Arts and Sciences

Poster Number: 111

Markowitz, Harleigh, Emory College of Arts and Sciences, Center for the Study of Human Health; Patel, Hely, Marcus Autism Center; Shultz, Sarah, Emory University School of Medicine, Department of Pediatrics and Marcus Autism Center; Ford, Aiden, Emory University School of Medicine, Department of Pediatrics and Marcus Autism Center

Background: The infant-caregiver dyad is a mutually adaptive relationship in which caregivers intuitively adjust their behavior to scaffold their infant's emerging social capabilities, such that both infant and

caregiver behaviors, and their relationship to each other, change through early development. A distinctive, interactive behavior unique to early infancy is caregiver greeting, an infant-directed cue characterized by the caregiver opening their mouth, widening their eyes, and raising their eyebrows. It is hypothesized that caregiver greeting engages infants in social interaction by prompting them to shift their gaze toward the eyes of their interactive partner. Differences in infant attention to the eyes (eye-looking) in response to caregiver greeting in autism may provide insight into how divergent interactions with caregivers during infancy relate to emergent social disability in autism. This study explores the temporal relationship between infant eye-looking and caregiver greeting, investigating whether this relationship changes as a function of infant age and differs between dyads with neurotypically developing infants (NT) and dyads with infants later diagnosed with autism (AUT).

Methods: This hypothesis was tested using prospective, longitudinal data from 42 dyads with infants aged 2-3.4 months (20 NT, 22 AUT) and 44 dyads with infants aged 5.1-6.5 months (22 NT, 22 AUT), corresponding to the age groups where greeting and infant eye-looking show their greatest increase and peak in magnitude, respectively (Ford et al., 2024; Jones & Klin, 2013). Peristimulus time histograms computed the temporal linkage between infant eye-looking and caregiver greeting.

Results: Significant linkages between infant eye-looking and caregiver greeting were comparable in duration and magnitude in the younger and older AUT samples. No linkage was found in the younger NT sample, but a robust linkage unfolding over seconds was found in the older NT sample. Thus, the temporal linkage between infant eye-looking and caregiver greeting only showed age-related differences in the NT dyads.

Conclusion: These findings provide novel insight into changes in the relationship between infant eye-looking and caregiver greeting in the first six postnatal months, fostering a greater understanding of brain and behavior informed by early neurodiversity.

Tracking Episodes of Care to Review Population Health Analytics and Track Unmet Needs for Behavioral Health Patients

Presenting Author: Kayla Mays; Children's Healthcare of Atlanta

Poster Number: 112

Kayla Mays, DNP, APRN, PMHNP-BC, Children's Healthcare of Atlanta; Katie Daniel, DNP, APRN, PMHNP-BC, Children's Healthcare of Atlanta; Hillary Henderson, MSc, LSSBB, Children's Healthcare of Atlanta; Naveen Muthu, MD, Children's Healthcare of Atlanta, Atlanta, GA, Emory University, Atlanta, GA; and John Constantino, MD, Children's Healthcare of Atlanta, Atlanta, GA, Emory University, Atlanta, GA

Background: In 2023, Children's Healthcare of Atlanta opened the Zalik Center, an outpatient facility focused on behavioral and mental health. Leadership recognized the need for improved tracking of recommended treatment and outcomes due to limited discrete data collection specific to behavioral and mental health (BMH). Capturing discrete data is essential for understanding population trends, assessing program effectiveness, and identifying unmet mental health needs.

Currently, provider notes mostly consist of natural language, making data analysis challenging. As a temporary measure, providers complete a basic Microsoft Form weekly, documenting new patients' medical record numbers and unmet needs, such as psychotherapy interventions. This form only provides

basic data on patient numbers and pressing unmet needs, but its unstructured nature complicates analysis. Additionally, the form is time-consuming and often incomplete due to providers forgetting to fill it out.

Methods: To address this, our team developed a SmartBlock within Epic to collect discrete data on patient program participation, evidence-based intervention needs, and accountability. This allows for seamless integration into provider notes and facilitates data reporting and trend analysis. The SmartBlock aims to standardize documentation of patient participation and intervention recommendations, as well as improve reporting of unmet BMH needs.

Results: Initial feedback from psychiatry providers was positive, with many expressing enthusiasm about using it for all patient encounters. Providers appreciated the "menu list" of interventions, which helped them consider options they might not have thought of independently.

Success criteria include documenting necessary interventions for all new patients, clearly identifying accountable providers for each patient, and achieving a 10% increase in documentation of unmet needs. Over the coming months, we anticipate that the SmartBlock will enhance understanding of recommended treatments, whether patient needs are met, and reasons for unmet needs, such as family barriers or insurance denials. This information will guide decisions on program funding, personnel hiring, community partnerships, and legislative efforts against mental health parity violations.

Conclusion: Attendees will learn about the SmartBlock build process and its application in tracking patient populations across various settings, assessing the impact of prescribed interventions.

Procalcitonin Levels in Hospitalized Children with Sickle Cell Disease (SCD) During Acute Vaso-Occlusive Pain Episodes (VOE)

Presenting Author: Giorgi Maziashvili; Emory University

Poster Number: 113

Maziashvili, Giorgi, Emory University; Hatabah, Dunia, Emory University; Korman, Rawan, Emory University; Brown, Lou Ann, Emory University; Harris, Frank, Emory University; Rees, Chris A., Emory University and Children's Healthcare of Atlanta; Dampier, Carlton, Emory University and Children's Healthcare of Atlanta; and Morris, Claudia R., Emory University and Children's Healthcare of Atlanta.

Background: Procalcitonin (PCT) is a marker of systemic inflammation that helps distinguish bacterial infection from other sources of fever. Given its elevated levels during serious bacterial infections(SBI), standardized PCT cutoff levels are commonly used to guide antibiotic stewardship. Functional asplenia puts children with SCD under increased SBI susceptibility. However, differentiating the source of fever during SCD-VOE remains challenging.
Aim: Assess the plasma PCT levels in patients hospitalized for SCD-VOE and its association with various clinical/lab parameters, including fever and acute chest syndrome(ACS).
Methods: We conducted a secondary analysis of samples from a pharmacokinetics/pharmacodynamics study and Phase-2 randomized controlled trial of IV arginine therapy in patients aged 3-21 years with SCD-VOE. Plasma PCT was measured at emergency department (ED) presentation & hospital discharge(DC). Non-SCD SBI studies classify PCT levels ≥0.5ng/mL as elevated and ≥2ng/mL as high risk. Associations between clinical/lab variables and PCT were analyzed.

Results: The study included 102 patients (mean age 13±4 years; 49% male; 66% HbSS genotype; 68% receiving hydroxyurea). There were no differences in patient demographics or clinical/laboratory parameters. Fever ≥38.0ºC was present in 14% of patients at ED presentation, while 18% developed fever during hospitalization. Three patients were diagnosed with ACS at ED presentation and eight developed ACS during hospitalization. Mean PCT at presentation was (1.2±0.8 ng/mL) with PCT ≥0.5ng/mL in 69% of patients, among which 9% had PCT ≥2ng/mL. Although PCT levels remained ≥0.5 at discharge in 60% of patients, levels dropped significantly between ED presentation and discharge (1.2±0.8 vs 0.9±0.8, p=0.002). No correlation between PCT and arginine levels was noted.
Conclusion: Plasma PCT is elevated in children with SCD, likely reflecting systemic inflammation that persists at discharge and is unrelated to bacterial infection. PCT≥0.5 did not correlate with fever, ACS, chest pain, white blood cell count, or other assessed clinical/laboratory parameters. Notably, no patients in this cohort had SBI. While PCT shows promise for antibiotic stewardship in healthy populations, its predictive value in SCD require more research. Although the role of PCT to identify SBI risk in SCD is unclear, PCT levels<0.5ng/mL may suggest low risk, potentially allowing for antibiotic stewardship in the future.

Pain, Pulsed Waves, and Parenting: Pulsed Shortwave Therapy Supporting Pain Management in a Young Parent

Presenting Author: Andrew McReynolds; Emory University

Poster Number: 114

MCREYNOLDS, ANDREW, Emory Unviersity; Lucas, Emily, Children's Healthcare of Atlanta; Davenport, Mary Grace, Children's Healthcare of Atlanta; Flynn, Emilee, Emory University; and Bansal, Vipin, Emory University

Background: Pain is a common symptom in patients with metastatic solid tumors. Pain management can often be complicated by side effects, adversely affecting a person's intersectional roles and threatening parental identity for young parents. Pediatric Palliative Care (PPC) teams may find satisfactory pain management challenging and should work collaboratively within the team and with consulting services.

Methods/Case Presentation: CJ was a 24-year-old with progressive, high-risk metastatic neuroblastoma who was readmitted with severe refractory pain. She struggled to manage her pain at home while continuing to care for her three-year-old daughter. This was further challenged following development of spinal cord tumor infiltration and cord compression with resulting paraplegia. Multi-agent pharmacotherapy including very high dose hydromorphone (peaking at >2,600mg/day), methadone, ketamine and lidocaine intravenous infusions, steroids, and NSAIDs failed to provide adequate analgesia while contributing to sedation and preventing her from meaningfully engaging with her daughter. Interventional or surgical treatments were limited secondary to underlying disease burden and were not expected to restore function or allow her to fulfill her familial role.

Results: A pulsed shortwave therapy and electromagnetic neuromodulation device (PSWT) applied to her back provided relief within hours of activation and significantly reduced demand for all other pharmacologic medications without side-effects. Subsequent worsening of pain correlated temporally with the device's battery expiration, with relief upon replacement. This multimodal approach and utilization of PSWT allowed her to plan and attend her daughter's birthday party in the hospital before declining further and ultimately dying under palliative sedation.

Conclusions: PPC teams must consider social and family roles in developing a pain management plan for young parents and should collaborate with other teams in searching for treatments that both relieve pain and support patient's intersectional identities. Non-pharmacologic treatments, including pulsed shortwave therapy and electromagnetic neuromodulation, can be powerful tools in relieving complex plan in some cases of advanced cancer while allowing a patient to maintain their parental role.

Health-Related Quality of Life of Adolescent and Young Adult Pediatric Brain Tumor Survivors

Presenting Author: Rebekah Mekonnen; Emory University

Poster Number: 115

MEKONNEN, REBEKAH, Emory University; Ingerski, Lisa, Emory University; Janss, Anna, Children's Healthcare of Atlanta; and Mazewski, Claire, Children's Healthcare of Atlanta

Background: Existing literature supports the negative impact of a pediatric brain tumor (PBT) on long-term health-related quality of life (HRQoL); however, research regarding the HRQoL of adolescent and young adult (AYA) PBT survivors is scarce. Evaluating the effect of treatment-related factors is critical for promoting positive HRQoL outcomes in this unique population. It was hypothesized that AYA PBTs are more likely to experience negative HRQoL outcomes due to the intensity of treatment they receive.

Methods: Data were collected as part of a larger, IRB-approved, retrospective study of HRQoL in pediatric brain tumor survivorship. Self-reported and parent-proxy reported Pediatric Quality of Life Inventory (PedsQL) scores administered as part of standard clinical care were extracted from the electronic medical record. The PedsQL is a widely used HRQoL measure that has been reliability and validly used in pediatric oncology. Previously published minimal clinically important difference (MCID) values were used to define impairment across each individual PedsQL subscale and the total score.

Results: HRQoL subtest values were available for 39 PBTs (53.85% female, 13.68±2.40 years old at treatment initiation). Results suggested a percentage of AYAs experienced impaired HRQOL across both child- and parent-proxy reports respectively:, 43.59% and 46.15% (Physical), 38.46% and 43.59% (Emotion), 38.46% and 46.15% (Social), 43.59% and 48.72% (School), 38.46% and 56.41% (Psychosocial), and 46.15% and 61.54% (Total) of AYA survivors fell in the impaired range. Additional multivariate analyses will investigate specific treatment-related factors (e.g., surgery, radiation, chemotherapy) related to impaired outcomes.

Conclusion: Results suggest that while many AYA PBT survivors do not demonstrate HRQoL impairments, there are a number of AYAs whose HRQoL falls below the MCID. Understanding potentially modifiable factors that could improve long-term outcomes for those PBT AYA survivors experiencing clinically significant impairments in HRQoL can aid in navigating their lives post-treatment in addition to maximizing the betterment of their well-being.

Acute COVID-19 in Hospitalized Children: The Role of Viral Co-Infections

Presenting Author: Sophia Menozzi; University of North Carolina at Chapel Hill

Poster Number: 116

Menozzi, Sophia, University of North Carolina at Chapel Hill; Vazquez, Jesus, University of North Carolina at Chapel Hill; Pizzuto, Matthew, University of North Carolina at Chapel Hill; Smith, Melissa, University of North Carolina at Chapel Hill

Background: The presence of multiple respiratory viruses in hospitalized children has been shown to be associated with worse outcomes prior to the COVID-19 pandemic. Isolated COVID-19 infections have led to hospitalization in a subset of pediatric patients. It is unclear if viral co-infection with COVID-19 is associated with worse health outcomes compared to those with isolated COVID-19 infection in hospitalized children.

Methods: This was a single center review of hospitalized children with acute COVID-19 infection from April 2020 through February 2024. Children with moderate to severe disease were compared to those with mild disease to determine if viral co-infection and other health and socio-demographic characteristics led to higher disease severity. A secondary analysis based on hospital length of stay was performed.

Results: Out of 102 patients, 31 had moderate to severe disease and 22 had viral co-infection (COVID-19 plus and an additional viral infection). Overall, the median hospital length of stay was 4 days and the number alive at discharge was 98. The most common co-infection virus was rhinovirus, seen in 12 of the 22 instances of co-infection. Children with COVID-19 and one additional viral infection had 1.47 (95% Confidence Interval: 0.52-3.99; p=0.46) times the odds of moderate to severe illness compared to those with only COVID-19. Non-Hispanic children had 2.74 (1.04, 8.18; p=0.04) times the odds of moderate to severe illness when compared to Hispanic children, however, on the adjusted analysis this association was no longer significant. Longer hospital stays were observed in children with moderate to severe disease, comorbidities, and males. Additionally, a non-linear relationship between hospital length of stay and age was observed.

Conclusions: Disease severity and length of stay in hospitalized children with acute COVID-19 infections were not found to be exacerbated by the presence of co-infection. However, both outcomes varied by health and sociodemographic characteristics.

Hidden in plain sight: Discovering the role of Mast Cells in Cystic Fibrosis

Presenting Author: Irina Miralda Molina; Emory University

Poster Number: 117

MIRALDA, IRINA, Emory University; Moran, John J, Emory University; Shrestha, Mahesh K, Emory University; Ozuna, Hazel, Emory University; Durfey, Samantha, Emory University; Kopp, Benjamin T, Emory University

Background: CFTR modulator therapy has significantly improved clinical outcomes and quality of life for people with Cystic Fibrosis (pwCF); however, persistent immune dysfunction and bacterial infections

remain significant challenges in managing Cystic Fibrosis (CF) disease. Mast cells (MC) are tissue-resident immune cells with critical roles in lung homeostasis and disease. Despite their low abundance, dysregulated MC activation in the airways is linked to asthma, chronic obstructive pulmonary disease (COPD), and fibrotic lung diseases. The role of MC in CF pathology is not well defined, and it remains unclear whether CFTR mutations lead to intrinsic dysregulation of MC function or how CFTR modulator treatments affect MC activity.

Methods: Peripheral blood CD34+ progenitors from healthy controls (HC) and pwCF were differentiated into MC in vitro. We measured CFTR expression and function, changes in MC markers and phenotypes, and changes in MC activation using CF-relevant pathogens (Pseudomonas aeruginosa and Staphylococcus aureus). Calcium influx, degranulation, and cytokine production were used as readouts for MC activation. To determine transcriptional changes in MC with abnormal CFTR compared to HC MC or other innate immune cells, we analyzed published single-cell RNA sequencing data from nasal brushings of HC and pwCF before and after CFTR modulator treatment (Loske et al, AJRCCM, 2024).

Results: Primary human MC express functional CFTR, and ETI treatment partially restores CFTR expression in CF MC. CF MC are also smaller (FSC-A), less complex (SSC-A), and express more c-kit (Stem Cell Factor receptor) but fewer FCεRIα (High affinity IgE receptor) than HC MC, which could have major functional consequences. This is supported by the result that CF MC have elevated intracellular calcium at baseline, but upon activation, calcium influx is not as robust as in HC MC. Additionally, CF MC were less efficient at controlling bacterial growth compared to HC MC and impair macrophage phagocytosis. Finally, ETI drives monocytes and neutrophils toward a transcriptional state closer to homeostasis, but ETI induced a distinct transcriptional signature in MC that remains divergent from HC.

Conclusions: Together, these data demonstrate that MC are dysfunctional in CF and play an underappreciated role in inflammation and innate defenses in CF.

Safety, Reactogenicity, and Acceptability of a Placebo Dissolving Microneedle Patch in Infants and Children

Presenting Author: Anna Mitchell; Emory University

Poster Number: 118

Mitchell, Anna, Emory University; Kao, Carol M., Emory University; Rostad, Christina A., Emory University, Children's Healthcare of Atlanta; Kettle, Peggy, Emory University; Tippett, Ashley, Emory University; Yi, Jumi, Emory University; Yildirim, Inci, Emory University; Stephens, Kathy, Emory University; Glover, Felicia, Emory University; Korski, Chelsea, Emory University; Pollack, Brian P., Atlanta Veterans Affairs Health Care System, Emory University; Prausnitz, Mark, Micron Biomedical, Inc.; McAllister, Devin V., Micron Biomedical, Inc.; Henry, Sebastien, Micron Biomedical, Inc.; Rouphael, Nadine, Emory University; and Anderson, Evan J., Emory University, Children's Healthcare of Atlanta

Background: Dissolving microneedle patches (dMNPs) offer a promising alternative to traditional needle-and-syringe vaccination, potentially improving accessibility, reducing needle-related anxiety, and enhancing compliance. However, safety and acceptability data in pediatric populations remain limited.

Methods: This single-center, unblinded study at Emory University evaluated the safety, reactogenicity, and acceptability of placebo dMNPs in healthy infants and children 6 weeks to 24 months of age.

Participants received 1 dMNP applied to the wrist on Day 1 with optional second and third applications on Day 8 to different anatomical sites to assess site-specific tolerance. Solicited local and systemic adverse events (AEs) were collected for 7 days post-application. Unsolicited AEs, serious adverse events (SAEs), and new-onset medical conditions (NOMCs) were monitored through the trial (4 weeks after the last dMNP application). Parental acceptability was assessed using structured surveys.

Results: Between August 2018 and April 2019, 25 participants were enrolled. All received one placebo dMNP applied to the wrist, 23/25 received second and third applications at alternative sites. Overall, dMNPs were safe and well tolerated with minimal local reactogenicity independent of anatomical site. Mild systemic reactogenicity was reported, though two participants experienced Grade 2 irritability after application of the first patch and one experienced grade 3 irritability after application of the second/third patches. No SAEs or NOMCs occurred. Parental acceptability of dMNPs was high, and parents reported that having a dMNP administered by a healthcare worker would increase their likelihood of obtaining a recommended vaccine for their children.

Conclusions: A placebo dMNP was safe and well-tolerated in infants and young children with high parental acceptability. These data support the ongoing development and implementation of dMNP vaccines for infants and young children.

Let's Huddle! Addressing Discharge Barriers and Improving Patient Flow

Presenting Author: Gargi Mukherjee; Emory University/Children's Healthcare of Atlanta

Poster Number: 119

SHERRY, WHITNEY, Emory University/CHOA;MUKHERJEE, GARGI, Emory University/CHOA;

Introduction: As families returned to work/school following the COVID-19 pandemic, our institution, like many others, faced high patient volumes and increased boarding in the Emergency Department. This quality improvement project aimed to streamline discharge processes by implementing a multidisciplinary discharge huddle to enhance awareness of discharge needs.

Objective: The primary aim was to increase the percentage of pediatric hospital medicine patients discharged by noon by 15% over 12 months. Secondary aim included reducing the time from discharge order to discharge completion. The process measure focused on improving communication and awareness of discharge needs among the multidisciplinary team. Length of stay (LOS) was chosen as our balancing measure.

Methods: This single-center quality improvement project was conducted in a pediatric hospital medicine service at a tertiary care center where patients are admitted across multiple floors. Nurses, case managers, and social workers were floor-based, while physicians and pharmacists were not. Multidisciplinary huddles were created to address key drivers of discharge delays, including medication authorizations, patient education, durable medical equipment arrangements, and discharge criteria. The huddles, initially implemented on one floor, were expanded to three and included nurses, physicians, case managers, social workers, pharmacists, and patient experience representatives. Additional interventions involved changing the time of meeting, developing standardized scripts for reporting information, and creating shared documentation within Epic. Statistical process control charts tracked the percentage of patients discharged by noon, discharge completion time, and LOS. Surveys were

administered at two intervals to evaluate participant feedback on communication and proactive identification of discharge needs.

Results: No significant variation was seen in discharges by noon (mean: 13.7%) or LOS (mean: 2.5 days). The time from discharge order to discharge completion was reduced by 10 minutes, but this change was not sustained. Two surveys were conducted, with 14 and 42 participants, respectively. In both surveys, over two-thirds of participants agreed or strongly agreed that the huddles improved proactive identification of patient needs and enhanced communication among team members.

Discussion/Conclusion: Although the project did not result in an increase in discharges by noon, it successfully fostered proactive discharge planning and improved communication within the multidisciplinary team.

Trends in Pediatric Gunshot Wounds to the Head

Presenting Author: Makda Mulugeta; Children's Healthcare of Atlanta

Poster Number: 120

MULUGETA, MAKDA, Children's Healthcare of Atlanta; Reisner, Andrew, Children's Healthcare of Atlanta; Lepard, Jacob, Children's Healthcare of Atlanta; and Blackwell, Laura, Children's Healthcare of Atlanta

Background: Gunshot Wounds to the Head (GSWH) is a devastating injury not well studied in pediatrics despite its prevalence. This study examines trends in pediatric GSWH demographics, social determinants of health (SDH), injury circumstance, severity, and outcome.

Methods: Retrospective review of patients with GSWH aged 0-18 ($\bar{x}$=8.64±4.770) from 2014-2022 in two tertiary children's hospitals (N=74). Child Opportunity Index (COI), an indicator of neighborhood resource quality, and insurance were used as SDH. Chi-square, Mann-Whitney U, Fisher's exact test, and Binary Logistic Regression were performed.

Results: Majority of patients were Black (66.2%), male (73%), publicly insured (56.8%), and lived in very low to low opportunity areas (71.6%). Most were injured on a weekday (68.9%) and at home (70.3%). Almost half had a GCS of 3 (41.9%), 54.1% received neurosurgery, and 33.8% died. Of those who survived (n=49), 46.9% received inpatient rehabilitation. Increasing age associated with decreasing likelihood of neurosurgery and rehabilitation (OR=.897, 95% CI:.807-.998, p=.045; OR=.843, 95% CI:.732-.970, p=.017). White patients had lower rates of rehabilitation than Black patients (18.2% vs. 58.8%, p=.036), and White race neared significance of associating with decreased likelihood of rehabilitation (p=.057). Public insurance or no insurance associated with decreased likelihood of mortality (OR=.164, 95% CI:.033-.810, p=.027; OR=.101, 95% CI:.012-.831, p=.033). Higher opportunity associated with increasing likelihood of mortality (OR=1.025, 95% CI:1.001-1.050, p=.039).

Conclusions: Results depict age-related differences in treatment following pediatric GSWH as well as insurance- and opportunity-related differences in mortality. Further research is needed to determine risk factors, improve treatment, and inform prevention.

Disability perspectives on participation in research and studying positive health

Presenting Author: Melissa Murphy; Emory University School of Medicine

Poster Number: 121

MURPHY, MELISSA M, Emory University; Aschner, Judy, Hackensack Meridian Health; Ryals, Paige S, Emory Unversity; Barahona, Ana Joselyn, Emory University; Lyman, Jennifer, Cerebral Palsy Foundation; Whaley, Ashley Harris, Cerebral Palsy Foundation; Byrne, Rachel, Cerebral Palsy Foundation; and Maitre, Nathalie L, Emory University and Children's Healthcare of Atlanta

Background: Prevalence estimates in the US suggest disability affects 15.7 million children and 67 million adults, yet individuals with disabilities are typically under-represented in clinical research. The current study integrates disability community perspectives on research inclusion and use of positive health as an outcome in the context of childhood-onset disability. We then derive a stakeholder-driven action plan for researchers.

Methods: A quantitative national survey was followed by facilitated focus groups with disability community stakeholders, which were analyzed thematically based upon transcripts of cloud recordings. Qualitative analyses were conducted using MAXQDA following well established procedures for thematic analysis, including familiarization with source data, inductive identification of initial themes followed by discussion and refinement. Consensus among experienced coders was obtained to ensure theme salience, interconnectivity of ideas, and maximize robustness and validity of revised themes.

Results: Nationally, 26.0% of people with disabilities and 23.2% of parent/caregivers reported participating in not disability specific research; and 22.6% of adults and 30.2% of caregivers report being excluded because of a disability, despite more than 80% perceiving research on environmental determinants of health as important. Disability stakeholders unanimously express the need to reframe positive health in a disability context, provide guidance on how to reframe it as a research outcome that empowers people with disability lived experience, and provide a roadmap for what to do/avoid to improve disability inclusion in research assessing and promoting positive health.

Conclusions: A paradigm shift is needed in how positive health is framed in research to enhance the relevance of positive health research for people with disabilities. Stakeholders provide the reason for and actions to accomplish this paradigm shift that align with ethical principles of human research. Researchers can consider these actions as a pragmatic approach to strengthen the relevance, generalizability and impact of their research.

mTOR-LPL-Driving Dysregulation of Lipid Metabolism in Human Microglia of Tuberous Sclerosis Complex Leads to Aberrant Neuronal Development and Hyperexcitability

Presenting Author: Weibo Niu; Department of Psychiatry and Behavioral Sciences

Poster Number: 122

NIU, WEIBO, Emory University; Yu, Shaojun, Emory University; Chu, Mengqi, St. Jude Children's Research Hospital; Guo, Jidong, Emory University; Michalski, Christina, Emory University; Li, Xiangru, Emory University; Wang, Zhen, St. Jude Children's Research Hospital; Jahangiri, Arman, Emory University; Zohdy, Youssef, Emory University; Chern, Joshua J, Emory University; Qin, Zhaohui, Emory University; Jin, Peng, Emory University; Gambello, Michael J, Emory University; Peng, Junmin, St. Jude Children's Research Hospital; and WEN, ZHEXING, Emory University

Background: Tuberous sclerosis complex (TSC) is an autosomal dominant disorder caused by heterozygous pathogenic variants in either TSC1 or TSC2. Emerging evidence suggests a connection between microglia activation and epilepsy as well as cognitive impairment in TSC patients. However, the impact of the causal variants of TSC1/2 genes on human microglia and their contribution to TSC's neurological symptoms remain largely unexplored. Methods: In this study, we generated human microglia from induced pluripotent stem cells (iPSCs) from a TSC patient cohort. Through extensive multi-omic and cellular analysis of TSC microglia, including transcriptomics, proteomics/phosphoproteomics, and lipidomics. Results: We found that heterozygous TSC2 pathogenic variants were sufficient to cause aberrant lipid metabolism marked by increased glycerophosphocholines and fatty acyls. These metabolic changes resulted in enhanced phagocytosis and inflammation. Strikingly, the dysregulated lipid metabolism in TSC microglia is driven by a hyper-activated mTOR-lipoprotein lipase (LPL) pathway. Further, cellular and electrophysiological assessments of neuron/microglia co-cultures revealed that TSC microglia directly affect neuronal development, excitability, and neuronal network activity, which could be largely ameliorated by mTOR/LPL inhibition. Conclusions：Collectively, our research unveiled the molecular and cellular abnormalities in TSC microglia affecting neuronal development and function, and highlighted the mTOR-LPL pathway as a novel potential therapeutic target for the neuropathology of TSC.

Soft Wearable Stethoscope for Continuous Monitoring of Pediatric Patients with Asthma

Presenting Author: Saewoong Oh; Georgia Institute of Technology

Poster Number: 123

Oh, Saewoong, Georgia Institute of Technology; Guglani, Lokesh, Emory University School of Medicine; and YEO, WOON-HONG, Georgia Institute of Technology

Pediatric asthma is a significant health concern, affecting 6.1 million children in the U.S., according to the 2021 National Health Interview Survey. Effective monitoring is crucial, yet traditional stethoscopes provide only intermittent assessments, lacking real-time monitoring capabilities. Additionally, asthma diagnosis relies on highly skilled professionals and momentary auscultation, making consistent and accurate detection challenging. This underscores the urgent need for improved, everyday auscultation methods to enhance pediatric asthma management.

To address this need, we developed a lightweight, soft wearable stethoscope tailored for pediatric use, with a compact 2.5 cm diameter and a weight of only 10 g. The device incorporates an internal acoustic enhancement structure that amplifies lung sound frequencies in the 500–1500 Hz range, while an integrated orthoplanar spring ensures stable skin contact, minimizing external noise interference. This design allows the detection and classification of key respiratory sounds, including wheezing and other abnormalities critical for early asthma diagnosis. Compared to conventional stethoscopes, our wearable device demonstrated a higher signal-to-noise ratio, especially during movement and daily activities, facilitating continuous, high-fidelity lung sound monitoring in both clinical and daily environments. With this device, key clinical features such as respiratory rate, breathing intensity, and cough detection can be extracted from lung sounds, enabling effective assessment of asthma patients. This allows for continuous monitoring of enrolled patients during hospitalization, aiding in the evaluation of treatment progress and optimizing asthma management.

Future research will focus on large-scale clinical validation and the integration of artificial intelligence algorithms for automated early detection of asthma exacerbations and assessment of treatment effectiveness. By leveraging machine learning models, we aim to enhance both classification and predictive capabilities, enabling proactive asthma management. Ultimately, this wearable stethoscope provides a promising approach to improving pediatric respiratory care by offering continuous, reliable, and real-time auscultation for asthma monitoring.

Mitochondrial citrate carrier SLC25A1 is a dosage-dependent regulator of metabolic reprogramming and morphogenesis in the developing heart.

Presenting Author: Chiemela Ohanele; Emory University

Poster Number: 124

OHANELE, CHIEMELA, Emory University; Peoples, Jessica N., Emory University; Karlstaedt, Anja, Cedars-Sinai Medical Center; Geiger, Joshua T., University of Rochester; Gayle, Ashley, Emory University; Ghazal, Nasab, Emory University; Sohani, Fateemaa, Emory University; Brown, Milton E., Emory University; Davis, Michael E., Emory University; Porter Jr., George A.University of Rochester; Faundez, Victor, Emory University ; and Kwong, Jennifer Q, Emory University.

Background: While congenital heart defects (CHDs) are the most common type of birth defect and account for >20% of all deaths in the first year of life, the etiology of most CHDs remains unknown. One common genetic cause of CHD is 22q11.2 deletion syndrome (22q11.2DS), where ~75% of 22q11.2DS patients present with CHD. Identification of additional genes within 22q11.2DS required for cardiac development is needed to enhance screening and therapeutic approaches to reduce deaths due to CHDs. SLC25A1, a gene found within the 22q11.2DS deletion region, encodes for the mitochondrial citrate exporter which is regulates citrate distribution required for metabolic processes including oxidative phosphorylation and cytosolic Acetyl-CoA production. As the developing heart is a dynamic metabolic environment that undergoes several physiological and morphological transitions before birth, we hypothesize that SLC25A1 plays a key role in metabolic processes that are required for cardiac development.

Methods: In developing a knockout mouse model to study the in vivo functions of SLC25A1, we uncovered unexpected congenital heart defects as well as perinatal lethality. We assessed the role of SLC25A1 in cardiac morphogenesis by performing histologically analyses across cardiac development. To further understand the mechanism underlying these cardiac derangements, we performed mitochondrial TEM and oxygen consumption studies, transcriptomics, and ChIP-qPCR. These studies allowed us to assess the role of SLC25A1 in mitochondrial function, gene expression, and epigenetic regulation.

Results: Hearts from Slc25a1 knockout embryos displayed a striking array of cardiac malformations. Analysis of mitochondrial structure and function reveal that loss of Slc25a1 causes mitochondrial ultrastructural defects and decreased oxygen consumption. Transcriptomics analyses of metabolism-related genes revealed that Slc25a1 deletion causes widespread alterations in metabolic gene expression in a dosage-dependent manner. Moreso, metabolic modelling predicted that loss of SLC25A1 downregulated the metabolic flux of oxidative phosphorylation, while upregulating flux of glycolysis. As SLC25A1 function promotes cytosolic Acetyl-CoA production, we found that loss of SLC25A1 decreases

H3K9 acetylation levels globally and at promoter regions of dysregulated metabolic genes from our transcriptomics analysis.

Conclusions: Mechanistically, SLC25A1 may link mitochondria to transcriptional regulation of metabolism through epigenetic control of gene expression to promote metabolic remodeling in the developing heart.

Implementation of Three-Dimensional Echocardiography: A Quality Improvement Intervention and Process Analysis

Presenting Author: Daniel O'Meara; Emory University

Poster Number: 125

O'MEARA, DANIEL; Truong, Dongngan; Pernetz, Maria Alexandra; Edwards, Tara; Dunaway, Parker; Ro, Sanghee; Lundell, Brittany; Norman, Jessica; and Wilson, Hunter

Background: Three-dimensional transthoracic echocardiography (3D echo) has emerged as a useful tool to evaluate specific cardiac structures. Uptake of 3D echo has been slowed by various factors, including cost, training, and workflow.
Methods: We performed a quality improvement intervention to increase 3D echo performance in patients with anatomy known to benefit from the technology. After iterative discussion among stakeholders, we aimed to complete 3D imaging in >80% of patients with the following lesions and associated interventions undergoing pre-procedural echocardiograms: atrial septal defect (ASD) repair, atrioventricular valve (AVV) repair, atrioventricular septal defect (AVSD) repair, and pre-Fontan procedure (3D imaging of AVV). The implementation period extended from 5/1/2024 to 1/31/2025, with 6 months of pre-implementation data collected as a baseline. Multiple educational and logistical interventions were undertaken during implementation. 3D and total imaging performance and interpretation time were collected at baseline and during implementation as balancing measures. We collected survey data from stakeholders before and after the intervention.

Results: Over the study period, there were 209 eligible echocardiograms (mean = 15 per month, range = 9-24), including 77 pre- and 132 post-implementation: 85 were pre-Fontan, 80 pre-ASD repair, 38 pre-AVSD repair, and 6 pre-AVV repair. Following implementation, the percentage of eligible patients receiving 3D echo increased each month, reaching a maximum of 90.9% in September 2024. There was a decrease in 3D echo after transitioning to a new hospital in October 2024, although the percentage of patients with 3D echo completed remained significantly increased compared to baseline. There was no significant change in echo performance or interpretation time. At the end of the intervention, 66.7% of cardiologists, 47.1% of cardiology fellows and sonographers, and 25.0% of cardiothoracic surgeons reported increased comfort with 3D echo, with no responders reporting decreased comfort.

Conclusions: 3D echo performance in targeted populations increased at our institution following intervention with minimal impact on workflow. Sustainable implementation of 3D echo depends on broad support from all involved stakeholders.

Studying NSBPR participants at Children's Healthcare Of Atlanta from Enrollment to Follow up visit

Presenting Author: Nahal Orak; Children's Healthcare Of Atlanta

Poster Number: 126

Nahal Orak

Introduction: National Spina Bifida patient Registry is a Nationwide Study initiated by CDC to better understand patients with Spina Bifida and support health management of this population. Children's Healthcare Of Atlanta has joined the study in 2023. This poster primarily serves as a descriptive and qualitative overview of participants at CHOA during their annual visit. Secondarily, this poster suggests ways to better understand condition management of this population with the continuation of the study.

Method: Chart review was performed for 30 participants who were enrolled in the study in 2023 and have had annual follow-up visit next year.

Results: A total of 30 Participants charts have been reviewed. Age ranged from 18 months to 21 years during follow up visit. 77% had MMC, 23% had Lipo-MMC. Weight ranged from 4.5 kg to 67 kg. 60% had school accommodations. 80% had lumbar, and 20% had sacral level of lesion. 17% were non ambulator, 20% were household ambulator, and 63% were community ambulator. 43% used wheelchair for their transportation. 33% had no bladder management. This ranged from 12 y/o to 18 y/o. 47% of participants used bracing which was only AFO among them. 3 patients had creatinine abnormality, 1 had high level of creatinine and 2 had low. Furthermore, ultrasound of kidneys was done, for which hydronephrosis was mild for two patients, and moderate for one patient, the rest had normal findings. Additionally, 6 patients had surgeries within a year from enrollment to follow up. Surgeries were as follows: Bilateral posterior medial release, bilateral clubfoot extensive reconstruction, Hip dislocation and skin surgeries, Tethered Cord Release with indication of change in ambulation, Acquired calcaneus and Leg Length Discrepancy surgeries, and shunt revision. Lastly, in terms of their insurance, 10 had Medicaid only,13 commercial only, and 17 both Medicaid and commercial

Conclusion: These data studies participants with Spina Bifida Condition in CHOA clinic during their annual visit between 2023 to 2024, or early 2025. Further studies should explore healthcare accessibility, including distance to clinic, correlation between distance to missed visits, and ER visits, and the role that type of insurance plays in this population.

Aberrant catecholamine utilization by macrophages in cystic fibrosis

Presenting Author: Hazel Ozuna; Emory University

Poster Number: 127

OZUNA, HAZEL, PhD, Emory University; Moran, John J., Emory University; Shrestha, Mahesh K., Emory University; Murphy, Ashley T., Emory University; Miralda, Irina, PhD, Emory University; and Kopp, Benjamin T., MPH, MD, Emory University

Background: Cystic fibrosis (CF) macrophages have deficits in critical intracellular functions such as autophagy and reactive oxygen species production, resulting in defective bacterial killing. Although, elexacaftor/tezacaftor/ivacaftor (ETI) therapy improves clinical outcomes, persistent bacterial infection

and ongoing inflammation suggests that additional mechanisms contribute to phagocytic dysfunction and immune dysregulation in people with CF (pwCF). Catecholamines (CAT), such as epinephrine (epi) and norepinephrine, have a role in modulating different immune responses, including macrophage activation, cytokine secretion and phagocytosis. Elevated systemic CAT levels are reported in pwCF, yet the capacity of CF macrophages to synthesize, store, and release CAT remains largely unexplored. We propose that dysregulated immunohormonal signaling contributes to defective phagocytosis in CF.

Methods: Peripheral blood monocytes were isolated from pwCF and healthy controls (HCs) and differentiated into monocyte-derived macrophages (MDMs). MDMs were stimulated for 4 hours at 37°C with concanavalin A, lipopolysaccharide (LPS), phytohemagglutinin (PHA), interferon-β (IFNβ), and PHA + IFNβ. Collected culture supernatants (released epi) and cell lysates supernatants (stored epi) were used to measure epinephrine levels by ELISA.

Results: Compared to HC, CF MDMs released significantly less epinephrine across all stimuli tested, while accumulating significantly higher levels intracellularly, suggesting a deficiency in CAT release. This in turn, may reflect a defect in vesicular trafficking or exocytosis pathways. Ongoing studies have incorporated stimulation with heat-killed Pseudomonas aeruginosa, C5a, and IL-4 over a 24-hour time course, as well as detection of different CAT and biosynthetic enzymes such as tyrosine hydroxylase and dopamine β-hydroxylase via targeted metabolomics from pwCF airway specimens. Spatial omics analyses for integrated signaling and CyTOF to examine specific adrenergic receptors and activation receptors involved in the aberrant signaling are also ongoing.

Conclusion: Our findings confirm that CAT dynamics is altered in CF macrophages, marked by reduced epinephrine release and increased intracellular retention. This hints at a potentially important mechanism of immune dysfunction in CF, offering new insight into immuno-hormonal dysregulation. Understanding how catecholamine dynamics impact phagocytic function may uncover novel therapeutic strategies to enhance host defense in pwCF.

The Psychological Scope of Practice of Pediatric Palliative Care within Pediatric Oncology

Presenting Author: Hee Su Park; Emory University School of Medicine

Poster Number: 128

Park, Hee Su, Emory University School of Medicine; Brock, Katherine, Children's Healthcare of Atlanta; Lee, Katherine, Children's Healthcare of Atlanta; Korsah, Karyn, Children's Healthcare of Atlanta; and RADBILL, LINDA, Children's Healthcare of Atlanta

Background: A childhood cancer diagnosis can have serious psychological impact on both patients and families. While psychological and psychiatric providers bring unique and distinct expertise, they are not routinely integrated into pediatric palliative care (PPC) teams across the U.S. This study aims to outline the psychological domains addressed by PPC providers during inpatient and outpatient visits for children and adolescents with cancer.

Methods: This secondary analysis stems from a retrospective cohort study of patients 0-27 years with cancer seen by inpatient or outpatient subspecialty PPC within an academic pediatric oncology center between 2017-2022. During each PPC visit, documenting clinicians selected the topics addressed within each domain (Goals of Care, Symptom Management, and Care Coordination). Among all domains, the

subdomains related to psychological and psychiatric needs of patients (as determined by PPC, psychiatry, and psychology experts) were included. Data were abstracted from the electronic health record, PPC clinic database, and cancer registry. Differences in the frequency of domains were analyzed by demographics, location of PPC service, visit type, diagnosis group, proximity to the end-of-life, billing time, and race/ethnicity.

Results: Across 467 PPC-recipients, there were 7548 billable PPC visits, of which 89.8% discussed at least one psychological domain and 40.8% discussed two or more psychological domains. The top five psychological domains were wellbeing (79%), anxiety (27%), fatigue/tiredness (14%), sleep difficulties (11%), and depression/sadness (9.0%). Outpatient visits addressed these top five psychological domains more often than inpatient encounters ($p \leq 0.001$). Follow-up visits also addressed psychological symptoms like anxiety (28% vs. 18%, $p<0.001$) and depression/sadness (9.7% vs. 5.3%, $p<0.001$) more frequently than initial visits. The number of psychological domains was positively associated with the number of physical symptoms managed in a PPC visit ($p<0.001$).

Conclusions: In an overwhelming majority of visits, PPC clinicians address various psychological symptoms. The psychological scope of PPC practice is wide-ranging, and likely incompletely recognized by PPC providers. This study highlights a gap in the recognition, formal assessment, and management of psychological and psychiatric challenges in children with cancer, and advocates for increased integration of pediatric psychology and psychiatry experts within PPC teams.

Methods to Assess the Impact of Combined Pharmacologic and Transfusion Therapies on Red Cell Deformability

Presenting Author: Abhinav Pasupuleti; Georgia Tech

Poster Number: 129

Pasupuleti, Abhinav, Emory University; Patwardhan, Akshay; Emory University; Oshabaheebwa, Solomon, Case Western; Delianides, Christopher A., Case Western; Sekyonda, Zoe, Case Western; Evans, Erica, Emory University; Abel, Lindsey, Emory University; Suster, Michael A., Case Western, Mohseni, Pedram, Case Western; Gurkan, Umat A., Case Western; and Sheehan, Vivien; Emory University

Background: Sickle cell disease (SCD) is an inherited blood disorder; hemoglobin (HbS) polymerizes, creating ridged cells. RBC deformability can be measured by oxygen gradient ektacytometry (LoRRca), or Microfluidic Impedance Red Cell Assay (MIRCA). The MIRCA is a microchannel assay that measures deformability under mechanical stress and provides occlusion values under normoxia (NOI) or hypoxia (HOI).

SCD patients on chronic transfusion therapy (CTT) may be symptomatic despite HbS suppression to <30%. We will test RBC deformability over a range of %HbS using the LoRRca and MIRCA to measure deformability, and determine if the hemoglobin oxygen affinity modifier osivelotor, now in clinical trials for SCD, can modify sickle RBC when added in vitro.

Methods : 117 peripheral blood samples from adult and pediatric individuals were collected in EDTA. Transfused RBC samples were treated with 1.66mM osivelotor dissolved in DMSO or with DMSO alone, incubated at 25°C for 1 hour, and run on the LoRRca and the MIRCA within 24 hours of collection.

Results: Scatter-plots of %HbS against either NOI or HOI showed a non-linear relationship consisting of three segments. HOI and NOI values decreased as HbS increased to 39%. HbS>40% showed increasing HOI and NOI values with a steeper incline from HbS>=90%. Scatter-plots of %HbS against LoRRca were linear.
HOI values in transfused patients with %HbS<40% declined with osivelotor exposure (p=0.06). HOI values for osivelotor exposed samples were not significantly different from that of HbA individuals (p=0.11).

Discussion: The MIRCA was able to capture endogenous poorly deformable RBC despite CTT; the LorRRCa instead averaged the HbAA and HbSS containing RBC. In vitro addition of osivelotor modified endogenous RBC. Osivelotor-modified RBC had similar MIRCA deformability values to healthy controls. Future work will involve the use of MIRCA to monitor the effectiveness of combining CTT and drug therapy to optimize RBC quality and clinical outcomes. The LoRRCa cannot be used for this purpose, given the lack of measurement of endogenous RBC among donor RBC. We will also determine if transfusions can be reduced in frequency without sacrificing RBC quality, and if clinical outcomes can be improved by modifying the remaining endogenous HbS containing RBCs.

Mapping Developmental Change in Caregiver Interactive Behavior in Response to Infant Eye-Gaze

Presenting Author: Hely Patel; Emory University

Poster Number: 130

Patel, Hely, Marcus Autism Center and Emory University; Markowitz, Harleigh, Emory College of Arts and Sciences; Shultz, Sarah, Emory University School of Medicine, Dept. of Pediatrics and Marcus Autism Center; Ford, Aiden, Emory University School of Medicine, Dept. of Pediatrics and Marcus Autism Center

Background: This study explores caregiver greeting, an exaggerated, infant-directed expression used by caregivers to initiate social interaction with their young infants (Stern, 1974). The greeting behavior is hypothesized to designate the infant as the caregiver's interactive partner (Stern, 1974) and is used differently in dyads with an infant later diagnosed with autism (Ford et al., 2024). Given that eye-looking may be a cue by which infants signal their own interactive intent to their caregivers (and is known to differ in infants later diagnosed with autism), this study investigates whether the occurrence of caregiver greeting precedes and/or follows infant attention to their caregiver's eyes, and how that relationship may change across the first 6 postnatal months in dyads with neurotypically-developing infants (NT) and infants later diagnosed with autism (AUT). Through this project, we aim to better understand how caregivers may coordinate or anticipate infant engagement over development—and how this coordination may differ in autism.

Methods: This hypothesis was tested in a prospective, longitudinal study of infant-caregiver dyads when infants were 2-3.4 months (20 NT, 22 AUT), 3.5-5 months (33 NT, 31 AUT), and 5.1-6.5 months (22 NT, 22 AUT). The occurrence of greeting and infant eye-gaze were manually coded from recordings of screen-mediated face-to-face dyadic interactions. Peristimulus time histograms were generated to assess whether caregiver greeting precedes and/or follows infant eye-looking.

Results: Significant time-locked linkages between caregiver greeting and infant eye-looking were observed in AUT dyads across all age groups, with increases in greeting before and after infant eye-looking. In NT dyads, no linkage was found in the 2-3.4-months and 3.5-5 months groups, while in the

5.1-6.5-months group, greeting increased prior to infant eye-looking and significantly decreased one second after infant eye-looking.

Conclusion: These developmental shifts in timing emphasize how the temporal alignment of caregiver behavior and infant attention evolves throughout the first six months of life. By investigating the timing of caregiver greeting in relation to infant eye-looking, this study reveals how caregivers may use greeting in an anticipatory manner to scaffold infant attention—and how this coordination emerges differently across diagnostic groups.

FTY720P-Treated Macrophage-Derived Extracellular Vesicles to Promote Oral Wound Healing

Presenting Author: Helly Patel; Emory University

Poster Number: 131

PATEL, HELLY (KRISHNA) A, Emory University; Shah, Daniel, Georgia Tech; Robinson, Hope, Emory University; and Dr. Goudy, Steven, Emory University

Background: Chronic oral wounds remain a clinical challenge due to persistent inflammation and disrupted tissue regeneration. Macrophages are central to wound healing, with their ability to shift between pro-inflammatory (M1) and anti-inflammatory (M2) phenotypes. Extracellular vehicles (EVs) have emerged as promising cell-free therapeutic tools capable of modulating immune responses. FTY720-phosphate (FTY720P), an immunomodulatory sphingosine-1-phosphate analog, may influence macrophage polarization and alter the bioactive content of secreted EVs. This project aims to investigate whether EVs derived from FTY720P-treated macrophages promote wound healing by enhancing M2 polarization and fibroblast migration.

Methods: RAW 264.7 murine macrophages will be treated with 10 µM FTY720P. EVs will be isolated from conditioned media using ultracentrifugation and characterized by western blotting for canonical EV markers (CD63, CD81, TSG101). Gene expression of macrophage polarization markers (M1: TNF-α, INOS; M2: IL-10, CD206) will be evaluated by qRT-PCR to assess the immunomodulatory impact of FTY720P. Scratch assays using human gingival fibroblasts will be performed to assess the effects of FTY720P-EVs on cell migration.

Conclusion: This pilot study proposes a novel strategy to modulate the immune environment and support oral wound healing using extracellular vesicles derived from pharmacologically treated macrophages. By exploring the impact of FTY720P on macrophage polarization and EV bioactivity, this work aims to lay the foundation for EV-based regenerative therapies for chronic wounds.

Evaluation of Melatonin Oral Dissolving Film Administered via the Buccal Route

Presenting Author: Dhruvi Patel; Mercer University

Poster Number: 132

Patel Dhruvi, Mercer University; Siddiqui Atiya, Mercer University; Akkineni Snehitha, Mercer University and Uddin Mohammad, N, Mercer University.

Background: In recent years, the incidence of sleep disorders and circadian rhythm disturbances are increasingly prevalent due to modern lifestyle factors such as stress, late-night screen exposure, and erratic sleep schedules. Melatonin, a naturally occurring hormone that regulates sleep-wake cycles, is commonly used to treat insomnia and jet lag. However, conventional oral melatonin formulations suffer from poor bioavailability due to extensive first-pass metabolism in the liver. Buccal delivery via oral dissolving films (ODFs) presents a promising alternative, offering rapid onset, enhanced absorption, and improved patient compliance. Furthermore, they are especially beneficial for pediatric, geriatric, and dysphagic patients who face difficulty swallowing tablets or capsules.

Method: Melatonin-loaded ODFs were developed using the solvent casting technique. Hydroxypropyl Methylcellulose (HPMC) was used as the primary film-forming polymer, while Polyethylene Glycol (PEG 2000) served as a plasticizer to enhance flexibility and mechanical strength. The formulation was optimized for thickness, uniformity, disintegration time, and drug release. Evaluations included physical parameters (thickness, weight variation, pH), disintegration time, and in vitro drug release. Uniform mixing of components and proper drying conditions were ensured to obtain consistent film characteristics.

Results: The optimized melatonin ODFs demonstrated desirable physical and functional characteristics. The films exhibited a uniform thickness of 0.500 mm and a consistent weight of 0.212 g. The surface pH was found to be neutral (pH 7.0), indicating compatibility with the buccal mucosa and minimizing the risk of irritation. The films showed a rapid disintegration time of 90 seconds, ensuring quick release in the buccal cavity. In vitro drug release studies indicated efficient release of melatonin within 30 minutes, suggesting the potential for faster onset of action compared to conventional oral formulations.

Conclusion: The developed melatonin oral dissolving films provide a novel and patient-friendly approach for the buccal delivery of melatonin. Their favorable mechanical properties, rapid disintegration, and efficient drug release profile suggest improved bioavailability which bypasses first-pass metabolism. These ODFs hold significant promises for managing sleep disorders and jet lag, offering a convenient and effective therapeutic option. Future studies involves ex vivo permeation through buccal mucosa will further confirm their potential for clinical application.

Proposed Use of the Microfluidic Impedance Red Cell Assay (MIRCA) to Identify Individuals with Sickle Cell Disease in Need of Second Line Therapies

Presenting Author: Akshay Patwardhan; Emory University School of Medicine

Poster Number: 133

PATWARDHAN, AKSHAY, Emory University; Pasupuleti, Abhinav, Emory University; Patel, Ashwin, Emory University; Oshabaheebwa, Solomon, Case Western Reserve University; Delianides, Christopher, Case Western Reserve University; Sekyonda, Zoe, Case Western Reserve University; Evans, Erica, Emory University; Abel, Lindsey, Emory University; Suster, Michael, Case Western Reserve University; Mohseni, Pedram, Case Western Reserve University; Gurkan, Umut, Case Western Reserve University; and Sheehan, Vivien, Emory University.

Background: Individuals with sickle cell disease (SCD) have red blood cell (RBC) functional abnormalities that contribute to disease complications. Hydroxyurea (HU) is a fetal hemoglobin (HbF) inducer and a mainstay SCD therapy. Typically, second-line drugs are added to HU only after clinical worsening. We hypothesize that worsening RBC function may indicate need for a second-line therapy initiation before clinical decline occurs.

RBC deformability can be measured with the MIRCA (Microfluidic Impedance Red Cell Assay), which measures the ability of RBCs to squeeze between micropillars. The device reports an occlusion index (OI) under normoxia (NOI) or hypoxia (HOI). Here we validate the MIRCA in monitoring second-line therapy need in SCD individuals on HU.

Methods: 119 adult and pediatric peripheral SCD blood samples were collected under an Emory University IRB-approved protocol and were analyzed on the MIRCA and an ADVIA hematology analyzer. Vaso-occlusive events (VOE), acute chest syndrome (ACS) and SCD complications (retinopathy, nephropathy, priapism, splenic sequestration, chronic pain) were determined by chart review. Acute event included any VOE or ACS in the past year, and chronic disease complications were recorded as a composite variable. HU maximum tolerated dose was defined as HU ≥ 35 mg/kg/day or absolute neutrophil count < 4000/µL.

Results: Higher NOI was associated with chronic complications ($p = 0.02$) after adjusting for SCD genotypes and dense RBCs (DRBC). Higher NOI was associated with more acute events ($p = 0.02$), but this association was lost after adjusting for HbF and age. Individuals on HU at MTD had 6.9% lower HOI than those not at MTD ($p = 0.04$). HOI was directly associated with neutrophil count and DRBC. NOI was directly associated with hemoglobin. NOI and HOI were inversely associated with hemoglobin.

Conclusions: Higher NOI values were associated with chronic disease complications after adjusting for covariates; rising NOI could be predictive of increased SCD complication risk. Our cohort included 71 subjects on HU (39 at MTD), indicating that OI could identify high-risk, HU-optimized patients that could benefit from second-line therapies. Future studies plan to use MIRCA alongside traditional clinical laboratory tests to predict the need for additional therapeutic intervention.

Dissecting the Clinical and Molecular Impact of TCF20 Variants in Neurodevelopmental Disorders

Presenting Author: Lingxi (Livia) Peng; Emory University

Poster Number: 134

Peng, Lingxi, Department of Biology, Emory University; Dominguez, Gaea, Department of Human Genetics, Emory University School of Medicine; Wu, Yongji, Department of Human Genetics, Emory University School of Medicine; Lin, Weilan, Department of Human Genetics, Emory University School of Medicine; Li, Hong, Department of Human Genetics, Emory University School of Medicine, Department of Pediatrics, Emory University School of Medicine; and Zhou, Jian, Department of Human Genetics, Emory University School of Medicine, Department of Pediatrics, Emory University School of Medicine, Marcus Autism Center.

Background: Transcription Factor 20 (TCF20) is a transcription factor that regulates gene expression, with key functions in brain development. Pathogenic variants in TCF20 have been implicated in a spectrum of neurodevelopmental disorders (NDDs) characterized by intellectual disability, behavioral abnormalities, and craniofacial dysmorphisms. Despite the known genetics, the detailed genotype-phenotype correlation of TCF20-associated NDDs remain poorly understood. Moreover, there are currently no effective strategies to evaluate the impact of TCF20 variants identified in patients, particularly those classified as variants of uncertain significance (VUS).

Methods: To investigate the clinical and molecular impact of TCF20 variants and establish genotype-phenotype correlations, we conducted a comprehensive literature review compiling phenotypic data from 83 individuals across eight published studies. To investigate the functional consequences of TCF20 mutations and establish a novel platform for molecular diagnosis, we performed luciferase reporter assays using wild-type (WT) and patient-derived TCF20 VUS (S74C, Q233R, K1710R, and H1909Y). cDNAs encoding the WT and mutant TCF20 proteins were cloned into a pcDNA3.1 expression vector and co-transfected with a BDNF promoter-luciferase reporter construct into HEK293T cells. Luciferase activity was measured to assess transcriptional regulation, serving as an indicator of potential loss- or gain- function effects of TCF20 VUS.

Results: Our result identified the most prevalent clinical features among individuals with TCF20 mutations were intellectual disability (88%), craniofacial dysmorphisms (71%), movement disorders (67%), speech concerns (64%), and learning disabilities (58%). Functionally, WT TCF20 robustlyactivated BDNF promoter activity. The H1909Y mutant showed elevated luciferase activity relative to WT despite lower protein expression, suggesting altered protein stability and regulatory function. In contrast, the K1710R variant showed decreased activity, consistent with a potential loss-of-function effect. The S74C and Q233R maintained mildly increased activation compared to WT, indicating potential gain-of-function or dysregulation. These results indicate that TCF20 variants have diverse effects on transcriptional regulation.

Conclusion: These findings highlight the phenotypic heterogeneity and functional diversity of TCF20 variants in NDDs. Our results support a variant-specific model of TCF20-related dysfunction and emphasize the importance of functional assays in interpreting the pathogenicity of patient mutations. This work provides a foundation for improved molecular diagnosis and future therapeutic exploration.

The Impact of Microplastics Ingestion During Pregnancy on Offspring Outcomes: A Scoping Review

Presenting Author: Cassidy Pham; ETSU Quillen College of Medicine

Poster Number: 135

PHAM, CASSIDY, ETSU QUILLEN COLLEGE OF MEDICINE; Kalasikam, Mrinmoyee, UTHSC College of Medicine; Malik, Madeeha, UTHSC College of Medicine; and Rogers MD, DrPH, MA, Anna Joy, UTHSC College of Medicine

Background: From the consumption of plastic water bottles to the use of disposable serviceware, plastics consumerism has become an innate part of our daily lives. Processing and degradation can reduce plastics to microplastics (MPs) and nanoplastics (NPs), which have been identified in many compartments of the human body. Despite growing evidence that the incidental ingestion of MPs and

NPs during pregnancy may have detrimental effects, few studies have systematically evaluated the breadth of evidence. This scoping review was conducted to map the available research on the effects of MPs and NPs on offspring outcomes.

Methods: This review employed a comprehensive search strategy spanning CINAHL, Embase, Pubmed, and Scopus to identify relevant studies. All results were exported to Covidence for deduplication and screening. Abstracts were included or excluded based on pre-determined criteria by 2 screeners. Articles that passed through abstract screening underwent full-text review and extraction.

Results: Of 458 abstracts, 54 studies underwent extraction. 14 were experimental and focused on outcomes of the offspring of exposed pregnant mice or rats, specifically body weight, organ functionality and behavioral changes. Four studies reported a significant increase in body weight in exposed groups, while two studies found a decrease or no change. Several studies investigated changes in behavior, spatial learning, memory, and anxiety-like behavior with exploration of the underlying biochemical pathways impacted. One study found several alterations in offspring fertility. The remaining studies explored organ morphology and functionality, finding alterations in brain weight and neurotransmitter concentrations and retinal cell and gastrointestinal morphology and function.

Conclusions: This scoping review explores the various offspring outcomes impacted by MP and NP exposure during pregnancy. While the available research provides evidence for detrimental effects of exposure on the brain and gastrointestinal tracts of offspring, less is known about other organ systems and the corresponding mechanisms through which MPs and NPs may effect change. Additionally, as polystyrene nanoplastics were the most common exposure particle, further research should explore the effects of other plastics and particle sizes. Finally, there is a critical gap in understanding how these experimental studies may correlate with human physiology, highlighting the importance of clinical studies.

Development of a 3D Bioprinted Vascularized Model of Neuroblastoma Tumor Microenvironment

Presenting Author: Adithya Pillai; Georgia Tech

Poster Number: 136

Pillai, Adithya, Wallace H. Coulter Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of Technology; Salar Amoli, Mehdi, Wallace H. Coulter Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of Technology; Shim, Jenny, Department of Pediatrics, Emory University School of Medicine; Jonus, Hunter, Department of Pediatrics, Emory University School of Medicine; Barbour Alexander, Krista, Department of Pediatrics, Emory University School of Medicine; McCraw, Morgan, Department of Pediatrics, Emory University School of Medicine; Tomov, Martin, Wallace H. Coulter Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of Technology; Rezapourdamanab, Sarah, Wallace H. Coulter Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of Technology; Singh, Yamini, Wallace H. Coulter Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of Technology; Howard, Emmah, Wallace H. Coulter Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of Technology; Wade, Margaret, Wallace H. Coulter Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of Technology; Sivakumar, Divya, Wallace H. Coulter Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of

Technology; Goldsmith, Kelly, Department of Pediatrics, Emory University School of Medicine; and Serpoosan, Vahid, Wallace H. Coulter Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of Technology;

Background: Neuroblastoma (NB) represents the most common pediatric extracranial solid tumor, with high risk cases (HR-NB) characterized by a high morbidity (~50%) despite advances in treatment methods[1, 2]. Among a variety of different parameters, physical, mechanical and biological properties of the tumor microenvironment (TME) have been shown to promote cancer survival and restrict anti-tumor immune cell infiltration[3-5]. The mechanisms underlying cancer progression and resistance to therapy are understood only to a limited extent, partially due to a lack of robust in vitro models. Consequently, this study employs advanced 3D bioprinting and perfusion bioreactor technologies to develop tunable in vitro models of NB microenvironments, establishing a platform for studying the impact of ECM properties on NB growth, aggression, and therapy response.

Methods: Models were designed using 3D Computer aided design (CAD) software, and included a vascular channel and an NB spheroid housing. Methacrylated gelatin (GelMA) was bioprinted using a BioX (Cellink) extrusion bioprinter in an embedded bioprinting process in a support bath of gelatin microparticles. Print fidelity and mechanical properties of the constructs were evaluated. Human umbilical vein endothelial cells (HUVECs) were seeded into the bioprinted vascular channels (1x107 million/mL). Human derived NB cell line IMR-5 cells were grown into spheroids in neurobasal medium and seeded in the housing along with peripheral blood mononuclear cells (PBMCs). Cellular models were cultured under static and dynamic perfusion conditions at 100 µL/min flow rate. The constructs were then analyzed using brightfield microscopy, live/dead imaging, flow cytometry, and immunohistochemistry.

Results: The constructs displayed high fidelity. Seeded HUVECs displayed high viability and proliferation in dynamic and static conditions after 3 days. Seeded cells were assessed and showed good confluency and viability, confirming the ability of the 3D engineered TME in maintaining viable and functional multicellular components.

Conclusion: The study presents a developed perfusable in vitro model that can be used to interrogate mechanism underlying therapy resistance in NBs. Future steps will focus on incorporating other NB TME elements, such as cancer associated fibroblasts, and evaluating therapy resistance and response in NBs based on stratified mechanical and physical properties.

References

1. Yan, P., et al., Comparison of Incidence and Outcomes of Neuroblastoma in Children, Adolescents, and Adults in the United States: A Surveillance, Epidemiology, and End Results (SEER) Program Population Study. Med Sci Monit, 2020. 26: p. e927218.
2. Friedman, D.N., et al., Long-Term Morbidity and Mortality Among Survivors of Neuroblastoma Diagnosed During Infancy: A Report From the Childhood Cancer Survivor Study. Journal of Clinical Oncology, 2022. 41(8): p. 1565-1576.
3. Domingo-Fernandez, R., et al., The role of genetic and epigenetic alterations in neuroblastoma disease pathogenesis. Pediatric Surgery International, 2013. 29(2): p. 101-119.
4. Horwacik, I., The Extracellular Matrix and Neuroblastoma Cell Communication-A Complex Interplay and Its Therapeutic Implications. Cells, 2022. 11(19).

5. Gavin, C., et al., Neuroblastoma Invasion Strategies Are Regulated by the Extracellular Matrix. Cancers (Basel), 2021. 13(4).

A scoping review of robotic assessments of reaching in children with cerebral palsy

Presenting Author: Simin Rahman; University of Georgia

Poster Number: 137

RAHMAN, SIMIN, University of Georgia; Khan, Owais, University of Georgia; and Modlesky, Christopher, University of Georgia;

Background: Sensory-motor impairments in children with cerebral palsy (CP) vary depending on the type and extent of brain injury and can significantly impact function. Robotic technologies offer objective and precise measurement of upper limb deficits, addressing limitations of traditional clinical tools. This review aimed to identify robotic outcome measures used to assess upper limb reaching in children with CP and examine links among robotic, clinical, and imaging outcomes to understand the neural basis of these deficits.

Methods: A systematic search was conducted across seven databases. Two reviewers independently screened abstracts and performed full-text reviews. Included studies used robotic devices to assess reaching in children with CP aged 3–20 years. Studies in infants and older adults, reviews, and methodological investigations were excluded. Reporting followed PRISMA-ScR guidelines.

Results: 350 individuals with CP were pooled across 12 studies, with sample sizes ranging from 3 to 50 participants. Most individuals exhibited unilateral CP (n = 334, 95.4%). Only one study included other types of CP, specifically spastic bilateral (n = 1) and ataxic (n = 1), while another mentioned only spastic CP without specifying the type. Most studies employed unimanual tasks (n = 10, 83%), of which four focused on sensory deficits during reaching.

Two studies used bimanual tasks to assess coordination. Half of the studies reported data on both dominant and non-dominant arms, while 34% reported only dominant arm data. Robotic assessments revealed significant deficits in children with CP, particularly those with perinatal arterial stroke, compared to typically developing peers. Deficits included increased movement path variability, prolonged reaction and movement times, and reduced accuracy and speed. Robotic outcome measures correlated with clinical and imaging outcomes, highlighting the utility of robotic devices in clinical applications. Structural neuroimaging linked impairments to corticospinal tract and dorsal column-medial lemniscus disruptions, while functional imaging showed altered sensorimotor connectivity and reduced prefrontal cortex activation during tasks.

Conclusions: Robotic outcomes revealed substantial reaching impairments in CP. Neuroimaging and clinical data corroborate these findings and offer insight into the disruptions underlying the deficits. Standardized protocols integrating robotic, clinical, and imaging assessments can enhance our understanding and guide targeted interventions.

Examining the Impact of Adverse Childhood Experiences on Emotional Regulation and Fear Expression in Childhood

Presenting Author: Kritika Ramesh; The University of Texas at Austin

Poster Number: 138

RAMESH, KRITIKA, The University of Texas at Austin; Klinginsmith, Megan, The University of Texas at Austin; and Quiñones-Camacho, Laura, The University of Texas at Austin

Background: Adverse childhood experiences (ACEs) are linked to long-term emotional and physiological dysregulation. However, it is unclear how ACEs influence early emotional talk and physiological responses when children experience stressful situations. This study examines the relationship between ACEs, respiratory sinus arrhythmia (RSA) as a marker of emotional regulation, and fear/anxiety-related emotional talk during a stress-inducing task. It is hypothesized that children with higher ACE scores will exhibit lower RSA, indicating greater physiological arousal and poorer emotional regulation. Additionally, they will demonstrate a longer duration of verbal expressions of fear/anxiety during the Novel Mask Task.

Methods: Participants were (N=20) 4- to 7- year olds (Mage= 5.58, 75% female) from central Texas in the ongoing Caregiver-Child Dynamics and Socioemotional Development Project. Participant's caregivers completed the CYW ACE-Q, a questionnaire assessing exposure to ACEs. Physiological emotional regulation was measured using RSA, captured via Mindware Mobile devices and analyzed with Mindware HRV Software. Fear/anxiety-related emotional talk was coded using a modified version of Lunkenheimer's Dyadic Interaction Coding Manual. During the Novel Mask Task, children encountered a masked stranger, providing a standardized context to assess verbal expressions of fear and anxiety.

Results: Preliminary pairwise correlation analyses show a non-significant positive relationship between ACEs and RSA during the stress-inducing task (r=0.30, P=0.586), indicating higher ACEs were associated with higher RSA during the task. ACEs and the duration of fear/anxiety emotional talk show a non-significant negative relationship (r=-0.15, P=0.586).

Conclusion: These findings do not support the hypothesis, children with more ACEs showed higher RSA during the task, typically indicative of better emotion regulation and expressed less emotional words related to fear/anxiety. Results include a community-based population with a limited number of ACEs and small sample size may have influenced the results. Children with ACEs may be more likely to withdraw from the stress-inducing situation, previous evidence shows this may be an adaptive coping strategy for children with ACEs. Exploring coping strategy use is a future direction of this project. These early trends highlight the importance of further investigating how childhood trauma may differentially affect emotional expression and regulation.

GGT as a Biomarker for the Diagnosis of MASLD in Younger than 12 Years Old

Presenting Author: Cristian Sanchez-Torres; Emory University

Poster Number: 139

RAMIREZ TOVAR, ANA, Emory University; Chatman, Kelsey, Emory University; Sanchez-Torres, Cristian, Emory University; Huneault, Helaina, Emory University; Bai, Shasha, Emory University; Liu, Katie, Emory

University; Alazraki, Adina, Children's Healthcare of Atlanta; Khanna, Geetika, Children's Healthcare of Atlanta; Knight-Scott, Jack, Children's Healthcare of Atlanta and Vos, Miriam B, Emory University.

Background: The incidence of Metabolically Associated Steatotic Liver Disease (MASLD) in the pediatric population has risen dramatically in recent years. Detection has become fundamental for prompt treatment at an early age. Though non-invasive biomarkers, like Alanine aminotransferase (ALT) and Aspartate aminotransferase (AST), have been studied for diagnosis and monitoring of MASLD, little is known about the role of other hepatic biomarkers like gamma-glutamyl transferase (GGT) in the pediatric population This study describes the relationship between GGT levels and MASLD diagnosed via magnetic resonance imaging derived proton density fat fraction (MRI-PDFF) in a pediatric cohort.

Methods: Retrospective chart review of all patients who had an MRI-PDFF at Children's Healthcare of Atlanta from 2017 to 2024. MRI-PDFF results were collected from the electronic medical record along with BMI, GGT, ALT, glucose, hemoglobin A1c, and other biomarkers, if available. Statistical analysis was performed using GraphPad Prism 10.2.2 and R; non-parametric tests were used due to the sample's non-normality.

Results: Out of 221 patients, 37% of the patients were female, 81.5% were Hispanic. Average age was 10.96 ±3.8 (mean ± standard deviation). BMI and BMIp were 27.9 ±8.7 and 90.8 ±18.58, respectively. 64.7% of subjects had Hepatic Steatosis (hepatic fat ≥5% on MRI-PDFF). Average GGT was 34.52 ±31.5, ALT was 68.48 ±80.2, and MRI-PDFF was 11.94 ±9.8. A sub-group analysis was performed by age group (<12 or ≥12 years old). Spearman correlation between GGT and MRI-PDFF results was statistically significant for the younger population (0.67, $p<0.0001$). For those <12 years, GGT and ALT showed a statistically significant correlation of 0.67 ($p<0.0001$) and 0.71 ($p<0.0001$). AUC for GGT vs hepatic steatosis on MRI-PDFF was 0.55 ($p=0.56$) for ≥12 years old compared to 0.80 ($p <0.0001$) in <12 years old with the best cutoff at 20 UI/dL with a sensitivity of 83.6% and specificity of 69.7%. No statistically significant findings within the sexes.

Conclusion: GGT is associated with hepatic steatosis greater than 5% for patients younger than 12 and could be used alone or with ALT and medical history to assess patient diagnosis of MASLD. Validation of the results prospectively are needed.

Multidisciplinary Studies of HIV-1 Reverse Transcriptase Mutants with Nucleoside Analogs

Presenting Author: Shreya Ravichandran; Emory University

Poster Number: 140

Ravichandran, Shreya, Emory University; Snyder, Alexa, Emory University; Wen, Xin, Emory University; Kirby, Karen, Emory University; and Sarafianos, Stefan, Emory University

Background: 40 million people live with human immunodeficiency virus (HIV) (UNAIDS 2024), and 75% access antiretroviral therapy (ARTs) treatments. HIV reverse transcriptase (RT) is a common ART target, with multiple classes of inhibitors. Two classes are nucleoside analogs that bind the polymerase active site: nucleoside reverse transcriptase translocation inhibitors (NRTTIs) and nucleos(t)ide reverse transcriptase inhibitors (NRTIs). Islatravir (ISL; EFdA) is the first NRTTI, potently targeting RT; meanwhile,

tenofovir (TFV) is an FDA-approved NRTI routinely used in ARTs. Although both are efficacious, a common RT mutation is the recurrent M184V conferring low resistance to ISL but hypersusceptibility to TFV, exacerbated by the presence of the A114S mutation. As both inhibitors are adenosine analogs that bind the same site, it is perplexing how M184V/A114S RT has contrasting profiles to these compounds.

Methods: To determine structural features causing these resistance profiles, we enlist X-ray crystallography and cryogenic electron microscopy in solving structures of M184V and/or A114S RT, nucleic acid substrate, and either compound. To assess the mechanisms causing these contrasting resistance profiles and to identify the compounds' IC50s against the mutants, we use primer extension assays. Furthermore, we determine the EC50s of ISL and TFV within the TZM-GFP cell line subjected to single-round infection by virus-like particles (VLPs).

Results: We have currently solved four crystal structures: (1) M184V, (2) A114S, and (3) M184V/A114S RT with EFdA-TP and (4) M184V/A114S with TFV-DP, all with double-stranded DNA substrate. Additionally, we find deficiencies in DNA substrate extension among the mutants, visible in primer extension assays. Moreover – in agreement with previous studies of the M184V/A114S mutations – we observe less effective inhibition of M184V/A114S VLP infection upon ISL treatment and more potent inhibition by TFV treatment using our TZM-GFP reporter system.

Conclusion: In ongoing efforts, we report correlative changes in RT biochemistry and infection capabilities derived from the M184V/A114S mutations. Through structural studies, we see changes in the catalytic site due to these mutations potentially explaining decreased catalytic efficiency observed through biochemical studies; these differences are corroborated by primer extension assays. Our studies provide a multidisciplinary perspective to suggest compatible ART combinations as novel HIV treatments.

Comparison of Pairing Procedures to Establish Conditioned Reinforcers

Presenting Author: Amulya Rekapalli; Georgia Institute of Technology

Poster Number: 141

REKAPALLI, AMULYA, Georgia Institute of Technology & Marcus Autism Center; Green, Naomi, Marcus Autism Center & Children's Healthcare of Atlanta; Gerencser, Nina, Emory University School of Medicine & Marcus Autism Center; Yosick, Rachel, Emory University School of Medicine & Marcus Autism Center; Jimenez-Gomez, Corina, University of Florida; Sansing, Elizabeth, VIA Centers for Neurodevelopment; and Argueta, Tracy, Emory University School of Medicine & Marcus Autism Center

Background: Establishing conditioned reinforcers is crucial for individuals diagnosed with neurodevelopmental disorders. Conditioned reinforcers can increase engagement and adaptive behaviors. Several studies have explored different methods for establishing conditioned reinforcers, including stimulus-stimulus (S-S) pairing, response-stimulus (R-S) pairing, and operant discrimination training (ODT). However, no studies have directly compared these three procedures. This study aimed to evaluate and compare the three methods in conditioning neutral toys as reinforcers for an autistic child.

Methods: A single-case experimental design was used to assess the effects of S-S pairing, R-S pairing, and ODT on establishing toys as conditioned reinforcers. The participant underwent each of the phases in a randomized order.

During S-S pairing, the participant was exposed to a neutral toy immediately followed by an edible reinforcer without requiring a response in order to acquire reinforcing through contiguous exposure to an edible reinforcer(e.g. cookie). During R-S pairing, the participant was prompted to complete a simple response (i.e., tapping a shape), after which they were given access to the neutral toy and the edible reinforcer immediately after. ODT involves presenting the neutral toy and then delivering the edible reinforcer as a consequence for completing the task in the presence of the neutral toy. Task completion is not reinforced if the neutral toy has not been presented.

Results: The findings indicated that both S-S and R-S pairing successfully established toys as conditioned reinforcers. After the completion of these two conditions, many of the neutral toys functioned as reinforcers in subsequent reinforcer assessments. This suggests a potential generalization effect, as toys that were not directly paired with edibles demonstrated reinforcing properties. Due to this unexpected generalization, the ODT phase was not implemented, as no additional neutral toys could be identified.

Conclusions: These results highlight that S-S and R-S pairing can be effective at establishing conditioned reinforcers. Additionally, the results suggest that S-S and R-S pairing's effects can generalize to non-targeted stimuli. The implications of these results will be discussed.

Elucidating JAGGED1 Downstream Pathways Involved in Craniofacial Bone Regeneration

Presenting Author: Mary Robinson; Emory University

Poster Number: 142

M. Hope Robinson, Paige Pieterick, Meghana Sivabalan, Archana Kamalakar, Sundus Kaimari, Andres García, Levi Wood, Hicham Drissi, Shelly Abramowicz, Steven Goudy

Background: Craniofacial abnormalities, whether due to congenital issues or traumatic injuries, pose significant challenges in surgery and wound healing. Our previous research has demonstrated that JAGGED1 (JAG1), a ligand in the NOTCH signaling pathway, has the potential to enhance bone regeneration, exhibiting strong osteoinductive properties in both in vitro and in vivo models. Mechanistic investigations into JAG1's downstream signaling pathways indicate the activation of non-canonical NOTCH pathways and RNA-seq transcriptional profiling resulted in the identification of differentially regulated genes by canonical versus non-canonical NOTCH pathways. Notably, the up-regulated genes included key GO Terms related to RUNX2, cytokine signaling, NF-κB, AKT, and the cell cycle. Our current research focuses on elucidating and exploiting the NOTCH non-canonical downstream pathways activated by JAG1 to develop safer and more effective bone regeneration strategies.

Methods: Mouse calvarial cell line MC3T3 and human bone osteoblast-like (HBO) cells generated from pediatric bone were utilized for in vitro studies evaluating JAG1 protein and inhibitors for signaling proteins implicated in our previous studies. We employed mineralization assays, quantitative real-time PCR, Luminex assays, and cytokine assays to assess signaling pathway involvement in JAG1-induced mineralization.

Results: As previously reported, we observed increased phosphorylation of several signaling proteins, including STAT5, AKT, P38, and ribosomal protein S6 kinase beta-1 (p70 S6K), in HBO cells treated with JAG1. We further interrogated these JAG1 non-canonical pathways by sequentially inhibiting downstream phosphoproteins including AKT, p70 S6K, and p38/MAPK. Inhibition of p70 S6K with S6K-18

resulted in significantly lower mineralization ($p<0.0001$) while inhibition of AKT with MK2206 and p38/MAPK with SB203580 resulted in no significant changes in mineralization.

Conclusion: Our findings suggest that JAG1-induced non-canonical NOTCH signaling likely operates through p70 S6K independently of both the AKT and the p38/MAPK pathways in JAG1-induced mineralization. Future studies involve interrogating additional pathways to tease apart the crucial pathways involved in JAGGED1 induced mineralization.

Innovative Approaches to Improve Vaccination Rates in Uninsured and Underinsured Children: A Student-Run Free Clinic's Successful Public Health Partnership

Presenting Author: Beatrice Russell; Medical College of Georgia at Augusta University

Poster Number: 143

Beatrice Russell, Medical College of Georgia; Amisha Chaudhary, Medical College of Georgia; Andrew Ji, Medical College of Georgia; Abby Wolf, Medical College of Georgia; Karson Rosenberger, Medical College of Georgia; Emily Fleck, Medical College of Georgia; Abdul Malik, Medical College of Georgia; Grace Oh, Medical College of Georgia; Cahil Potnis, Medical College of Georgia; Ingrid Camelo, Johns Hopkins University School of Medicine; Juan Rivera Salva, Wellstar MCG.

Background: Early childhood vaccinations are essential for protection from severe disease and prevention of the spread of disease throughout our communities. As of 2022, according to the Georgia Department of Public Health, only 71.5% of children aged 19-35 months in Richmond County, Georgia were up to date with the combined seven-vaccine series. The ALAS Student-Run Free Pediatric Clinic aims to improve vaccination rates in Richmond County by implementing the CDC Vaccines For Children (VFC) program through a novel program of partnership with the Georgia DPH. The ALAS clinic was established to serve uninsured or underinsured children living at or below 200% of the poverty line. Through this partnership, the clinic is able to acquire and administer childhood vaccines free of charge to the most vulnerable members of the Richmond County community.

Methods: After identifying a local need, the ALAS clinic initiated contact with the Georgia Department of Public Health and was connected with the Regional Immunization Consultant, who guided enrollment in the VFC program and Georgia Registry of Immunization Transactions and Services (GRITS), Georgia's statewide immunization database used to track and record vaccine administration. Vaccine storage and handling supplies were purchased using fundraising sales and community grant funding. A Wi-fi-enabled data logger was installed to remotely monitor and log daily refrigerator temperatures to remain compliant with VFC safety standards. Medical student volunteers completed the CDC "You Call the Shots" training to learn proper storage and administration of vaccines. Vaccines were administered to patients during a comprehensive clinic visit with no cost.

Results: Since January of 2025, 30 vaccines have been successfully administered to 9 children ages 15 months to 16 years. 4 patients are scheduled for next doses.

Conclusions: The ALAS clinic has a unique advantage in childhood vaccine administration due to its access to a strong rapport with vulnerable children and parents in the community, opportunities for learning for medical students, and ability to provide comprehensive services completely free of charge.

This model may be replicable in other student-run or community-based clinical settings to address vaccine disparities in underserved patient communities.

Features of Developing Saccade Control Are Differentially Predicted by Maturation in Cortical White Matter Tracts

Presenting Author: Moura Saad; Emory University

Poster Number: 144

SAAD, MOURA, Emory University; Shultz, Sarah, Ph.D., Emory University; Jones, Warren, Ph.D., Emory University and Ford, Aiden, Ph.D., Emory University

Background: Saccade control (SC) development is a significant process in early infancy, permitting increased visual selectivity, efficiency, and ultimately, learning. By 2-3 months, infants begin following objects with their eyes and require fewer saccades to reach targets. However, while literature has characterized large-scale changes in SC, there is limited understanding of how cortical maturation is related to SC in early infancy. This study leverages longitudinal measures of infant white matter development and volitional SC to identify white matter tracts associated with different features of SC.

Methods: Longitudinal diffusion-weighted imaging and calibration-based eye-tracking data were collected from the same 73 neurotypically developing infants, at up to 3 and 5 timepoints, respectively. From the eye-tracking data, three measures of SC were extracted: saccade amplitude, percent of targets reached, and number of saccades to targets. Seven white matter tracts associated with visual processing and/or motor control were delineated using probabilistic tractography: Anterior Thalamic Radiation (ATR), Body, Genu, and Splenium of the Corpus Callosum (CCb, CCg, and CCs), Inferior Fronto-occipital Fasciculus (IFOF), and motor and somatosensory subdivisions of corticofugal tracts (M1 and S1).

Developmental trajectories of white matter maturation (indexed via fractional anisotropy) and change in SC measures were constructed using Functional Principal Component Analysis, and brain-behavior relationships between trajectories were modeled using Functional Linear Regression (Yao and Wang 2005a,b).

Results: Exploratory FLR models show that maturation of the CCg and CCs were predictive of saccade amplitude from 0-6 months ($p<=0.1$) and maturation of S1 was predictive of percent of targets reached ($p<=0.1$). Time-varying R2 functions showed that the CC tracts explained the most variance in saccade amplitude from 2-3 months and S1 explained the most variance in percent of targets reached from 4-6 months.

Conclusion: Different white matter tracts are associated with different features of SC. Saccade amplitude, which shows the least developmental change, was associated with two areas of the corpus callosum (CCg and CCs). Percent targets reached, which shows a rapid increase from 0-6 months, was associated with S1. Future analyses will incorporate SC measures from additional timepoints to determine how white matter maturation predicts not only concurrent but future SC.

Inactivation of Influenza A/B using methods provided by Zeptometrix

Presenting Author: Courtney Sabino; Emory University

Poster Number: 145

SABINO, COURTNEY, EMORY UNIVERSITY. Bowers, Heather, Emory University. Sullivan, Julie, Emory University. Lam, Wilbur, Georgia Tech and Emory University. Schinazi, Raymond, Emory University. Rao, Anuradha, Emory University. Bassit, Leda, Emory University.

Background: As a part of the RADx/ITAP program, Emory evaluates and determine efficacity of SARS-CoV-2 / Flu A&B multiplex assays. In many Point-of-Care facilities where molecular tests are being used to diagnose patients, inactivated virus is the only option. Emory was prompted with determining just how much, if anything, different methods inactivation affect Influenza A and Influenza B on antigen-based tests. Common inactivation methods were considered to be evaluated, and it was determined that heat inactivation was an easily accessible option to many laboratories. Additionally, a commercially available option was also selected to be evaluated. Finally, the protein levels each virus were determined.

Methods: Influenza A H3N2 obtained from BEI and Influenza B obtained from BEI was given to Zeptometrix so they can perform their proprietary inactivation methods. Once inactivated, the stocks were then sent back to Emory along with an aliquot of the still infectious live virus. Each virus was serially diluted so that a limit of detection can be determined. We obtained Ct values using our laboratory determined tests (LDT), obtained ELISA data to determine pg/mL of protein levels, and tested them on an antigen-based LFA to determine any differences.

Results: While influenza A experienced little to no changes between live, heat inactivation, and PROtrol, influenza B was heavily affected by heat inactivation when it comes to LFA detection.

Conclusions: Heat inactivation severely affects Influenza B detectability when using an antigen-based LFA. However, PROtrol remains a viable option for laboratorys looking to work with inactivated influenza B virus without losing any antigen sensitivity. Both heat inactivation and PROtrol can be used as an inactivated alternative to live influenza A when tested LFAs.

Maximizing Opt-out HIV Testing in Adolescent Patients within a Pediatric Hospital System

Presenting Author: Annie Sadler; Emory University School of Medicine

Poster Number: 146

Sadler, Anne, Emory University; Mukherjee, Gargi, Emory University; Bryant, Jordan, Emory University; Cameron, Melissa, Emory University; Francois, Sandy, Emory University; Wynn, Bridget, Emory University; Thompson, Sarah, Children's Healthcare of Atlanta; Yarahaun, Julia, Emory University; Kandaswamy, Swaminathan, Emory University; Orenstein, Evan, Emory University; Camacho-Gonzalez, Andres, Emory University; Griffiths, Mark, Emory University; Middlebrooks, Lauren, Emory University; and Morris, Claudia, Emory University

The Centers for Disease Control and Prevention (CDC) recommends universal, opt-out human immunodeficiency virus (HIV) screening for all persons ≥13 years. Our metro-region has HIV rates 8-times the national average, and adolescents are the least likely to know their status. The screening guideline was implemented in our pediatric emergency departments (ED) in July 2023; however, most

adolescents admitted to the pediatric hospital medicine (PHM) service did not receive a HIV test in the ED. We aimed to determine if offering opt-out HIV testing in the inpatient setting would increase overall HIV screening.

In this pre-post intervention study, our healthcare system's population discovery tool was utilized to compare testing rates of ≥13-year-olds admitted to PHM five months pre- (Feb-Jun 2024) and post-implementation (Jul-Nov 2024). Inpatient providers received education on HIV screening guidelines and opt-out language and were encouraged to include HIV screening in the confidential psychosocial assessment. If screening was not offered by the inpatient team, adolescents were counseled on CDC recommendations by a study investigator, regardless of parent presence. Patient characteristics were collected. Comparisons were made with chi-square test and Welch's t-test. This was IRB exempt, given the designation non-human subjects research.

Post-implementation, 533 patients were eligible for HIV screening. Of those eligible, 148 adolescents (64% female, mean age 15.8 years) were approached for HIV screening: 60 by the study investigator, 78 by psychosocial assessment, and 10 for medical work-up. Overall, 91 HIV tests were ordered (17.1% of eligible), identifying one patient living with HIV. There was a 138% increase in testing compared to the five months pre-implementation (12.4% screened of 492 eligible; p=0.04). Adolescents were significantly more likely to agree to testing when approached by the study investigator than during the confidential psychosocial assessment (p=0.004). There was no difference in sex, race, or ethnicity between adolescents who agreed to vs declined screening. Parental presence did not negatively impact adolescent participation.

Adopting universal, opt-out HIV screening in the inpatient setting significantly increased testing volumes. The most effective and sustainable approach to incorporating opt-out screening remains to be studied. Gaining insight into adolescent and parental perspectives will be valuable.

Medication Adherence in African American Adolescents and Young Adults: A Systematic Review of Literature

Presenting Author: Sonique Sailsman; Georgia Baptist College of Nursing of Mercer University

Poster Number: 147

SAILSMAN, Sonique, Georgia Baptist College of Nursing of Mercer University; Randolph, Justus, Georgia Baptist College of Nursing of Mercer University; Heo, Seongkum, Georgia Baptist College of Nursing of Mercer University

Background: It is critical to identify factors influencing medication adherence and effective interventions to improve medication adherence in African American (AA) adolescents and young adults. Poor medication adherence is prevalent among AA adolescents and young adults with chronic illnesses. The factors impacting medication adherence and the effects of interventions on medication adherence in these populations may differ from those in other races and adults, given their developmental stages and socioeconomic environments. However, these aspects have not been systematically examined. The purpose of this study was to examine factors affecting medication adherence and intervention effects in AA adolescents.

Methods: In this systematic review, five databases were searched using keywords, such as African American, adolescents, medication, compliance, and adherence.

Results: Age, family routine, perceived benefits/risks, cognitive illness representations, medication knowledge, asthma education, challenges in organizing time, and setting priorities were associated with asthma medication adherence or self-management in four studies. Self-efficacy, decisional balance, motivational readiness, depressive symptoms, integration of HIV into identities, transition to adulthood, and substance use were associated with HIV medication adherence in three studies. In one out of four studies (five articles), a long, time- and effort-intensive, and tailored intervention showed significant effects on asthma medication adherence. Both observational and intervention studies had several limitations in the study designs, settings, sample sizes, and instruments.

Conclusions: Various factors were associated with asthma or HIV medication adherence in AA adolescents and young adults, and interventions were generally ineffective in improving medication adherence, except in one study. Further studies with more rigorous designs, appropriate sample sizes, reliable and valid instruments, and more effective interventions are needed to enhance medication adherence in these populations. Clinicians who serve this population in all healthcare settings should be mindful of factors that impact adherence behaviors and develop and provide more effective interventions.

The Degree of Adiposity Enhances the Effect of the PNPLA3 rs738409 on Hepatic Steatosis in Prepubertal Hispanic Children

Presenting Author: Cristian Sanchez-Torres; Emory University

Poster Number: 148

SANCHEZ-TORRES, CRISTIAN, Emory University; Ramirez Tovar, Ana, Emory University; Gillespie, Scott, Emory University; Huneault, Helaina, Emory University; Knight-Scott, Jack, Children's Healthcare of Atlanta; Alazraki, Adina, Children's Healthcare of Atlanta; Khanna, Geetika, Children's Healthcare of Atlanta; Yaranga, Claudia, Emory University; Santoro, Nicola, Yale University; Aguayo, Liliana, Emory University; Bai, Shasha, Emory University; Welsh, Jean, Emory University; and Vos, Miriam B, Emory University.

Background: PNPLA3 rs738409 is associated with hepatic steatosis (HS) and worst liver-related outcomes. In adults adiposity significantly amplifies the effect of PNPLA3 on HS; however, synergism between PNPLA3 and adiposity on HS in younger populations needs to be tested.

Methods: Preliminary, secondary analysis of data from an ongoing clinical trial (NCT05292352) enrolling Hispanic children aged 6-9 years. At baseline, liver fat quantification was completed using MRI-PDFF, and DNA was genotyped for rs738409. All body measurements were performed twice by trained staff, and body mass index, BMI percentile (BMIp), and z-scores were calculated using pediatric CDC criteria. Univariable and multivariable logistic regression were conducted to assess the association between PNPLA3 G-allele (CC vs. CG vs. GG) and BMI z-score on HS (hepatic fat ≥5%) after controlling for covariates.

Results: At baseline, 98 out of 122 (80%) enrolled children had PNPLA3 rs738409 genotype: 20% CC, 50% CG and 30% GG. Groups did not differ significantly by age, Hispanic origin, or gender. The association of

the GG polymorphism with HS increased with BMIp. Among children with BMIp<85th, median HS was less than 5% overall. Among children with a BMIp >95, median HS of the GG carriers was more than double that the CC carriers (8.10% vs. 3.40%). After controlling for sex, age, and BMI z-score, PNPLA3 GG carriers were nearly 20 times more likely to have HS (Odds Ratio [OR] 19.93, p=0.003) and CG carriers nearly 6 times (OR 5.61, p=0.069) than CC carriers. A multivariable model that included PNPLA3 polymorphism, BMI z-score, and ALT levels demonstrated an Area Under the Curve of 0.91. The interaction between PNPLA3 and BMI z-score did not reach statistical significance (p=0.13).

Conclusion: The association of the PNPLA3 rs738409 variants with risk of HS was stronger among children with obesity. Our findings suggest a potential need for patient-oriented, precision intervention in genetically predisposed children. Further analysis to test the interaction between PNPLA3, BMI and other variables in the final sample will be performed. Analysis in larger and more racially and ethnically diverse populations will be needed to confirm and understand the generalizability of these findings.

Improving Pediatric Dentists' Access to Mutual Patients' Electronic Medical Records

Presenting Author: Laharee Shah; Children's Healthcare of Atlanta

Poster Number: 149

Laharee Shah, DMD; Jack Thomas, DDS; Brittany Waters, DMD; J C Shirley DMD, MS, MSc

Background: Pediatric patients with cardiovascular conditions require coordinated care to ensure safe dental management. Their medical histories are often complex, making accurate and up-to-date information essential. Existing literature supports that caregiver-reported histories may lead to incomplete or inaccurate data, potentially compromising patient safety. This retrospective chart analysis highlights the importance of pediatric dentists having direct access to medical records. Our findings suggest that relying solely on caregiver-reported information may not always yield accurate records, regardless of socioeconomic background.

Methods: This retrospective chart review included 84 pediatric cardiology patients who receive both medical and dental care at Children's Healthcare of Atlanta. Patients were seen in the CHOA Pediatric Dentistry Clinic between July 1, 2023 and July 31, 2023. Records were reviewed using Dentrix (dental electronic health record) and Epic (medical electronic health record). Data collection was completed by a single examiner trained in both systems.

Patient demographics included age at the time of visit. The accuracy of caregiver-provided medical information on standardized dental forms in Dentrix was compared to records in Epic. Recorded medical data included cardiac diagnoses, medications, allergies, and surgical history. Socioeconomic data collected included need for English interpretation, insurance type, and median income by ZIP code. ZIP codes were sourced from government-issued IDs scanned into the dental chart, and median income data were obtained from the U.S. Census Bureau.

Results: Of 84 caregiver-reported records, 33 (39.3%) were accurate. English interpretation had lower odds of reporting accurate histories, though not statistically significant (p = 0.103). Patients with private insurance were nearly twice as likely to provide accurate information compared to those with state

insurance (p = 0.196). Median income by ZIP code was not significantly associated with reporting accuracy (p > 0.05).

Conclusion: While no individual socioeconomic factor was significantly associated with reporting accuracy, trends suggest variability, particularly among families with limited English proficiency or public insurance. This study supports the need for pediatric dentists to access EHRs to enhance information accuracy, improve care quality, and reduce caregiver burden—especially when managing patients with complex special healthcare needs like cardiac conditions.

Examining the therapeutic effect of TBL1/beta-catenin targeted combination therapies on MYC-driven osteosarcoma

Presenting Author: Katherine Shelmidine; Emory University

Poster Number: 150

SHELMIDINE, KATHERINE, B.A., Emory University; Dou, Juan, MD/MPH, Emory University; Nomura, Motonari, MD/Ph.D., Osaka University; Patel, Tajhal, Ph.D., Baylor College of Medicine; Yustein, Jason, MD/Ph.D., Emory University

Background: Osteosarcoma (OS) is the most prevalent pediatric bone cancer and treatment outcomes and survival rates have not changed in decades. Patients with metastatic or relapsed/refractory disease face five-year survival rates below 30%, with no salvage therapies available after standard of care failure. Dysregulation of the Wnt signaling pathway, particularly through TBL1-mediated nuclear translocation of β-catenin and transcription of target genes promoting metastasis, correlates with poor prognosis in OS. Tegavivint, a novel first-in-class small molecule inhibitor that selectively binds TBL1XR1, has shown promising antitumor activity in preclinical models and is currently in clinical trial. However, therapeutic resistance to Tegavivint monotherapy necessitates identification of effective combination approaches.

Methods: A high-throughput drug screen was performed on high-risk patient-derived xenograft (PDX) OS cell lines using Tegavivint to identify synergistic agents. IC50 values were determined for Tegavivint and lead candidates, Ponatinib (multi-tyrosine kinase inhibitor) and Vorinostat (histone deacetylase inhibitor), both as monotherapies and in combination synergy assays in vitro. Cell viability was assessed in 2D and 3D culture systems. In vivo efficacy of Tegavivint was examined using two high MYC-expressing PDX models which represent a high-risk disease state in NSG mice. TBL1 and MYC expression levels were evaluated in our PDX cell lines using qPCR and Western blot.

Results: Tegavivint and the candidate drugs demonstrated IC50 values below 1.5µM, indicating high sensitivity of PDX OS cells to these agents. Combination treatments exhibited additive and synergistic effects, reducing cell viability at lower Tegavivint concentrations compared to single-agent. In 3D spheroids, Tegavivint treatment decreased cellular ATP levels without visible spheroid size reduction. In vivo studies with Tegavivint monotherapy revealed decreased average primary tumor volume in both high-MYC PDX models compared to controls, with one study demonstrating complete inhibition of metastasis in the treatment group.

Conclusions: Our findings suggest that targeting the TBL1/β-catenin axis with Tegavivint in combination with either Ponatinib or Vorinostat may provide more effective treatment for high-risk OS compared to

monotherapy. These combinations represent promising therapeutic strategies to overcome resistance mechanisms and improve outcomes for patients with limited treatment options.

Establishing Social Determinants of Health Screening to Improve Pediatric Diabetes Patient Outcomes

Presenting Author: Margaret Shepherd; University of Tennessee Health Science Center

Poster Number: 151

Adams, Blake, Le Bonheur Children's Hospital; SHEPHERD, MARGARET, University of Tennessee Health Science Center; Caldwell-Jones, Fatina, Le Bonheur Children's Hospital; and Nelson, Grace, University of Tennessee Health Science Center

This project's objective was to begin implementing social determinants of health (SDOH) screening for our clinic's type 1 and 2 diabetes patients with the goal of screening 10% of these patients while providing resources and referrals to those screening positive.

Using the "Partners in Care" survey, we screened pediatric diabetes patients with a diagnosis of greater than 6 months who had an A1C of 9.5% or greater, had not been seen in the clinic for 6 months or longer, or were within a 3-month window of the anniversary of their diagnosis date. Patients who screened positive for issues such as food insecurity, housing instability, transportation barriers, healthcare financial strain, inability to meet utility payments, lack of childcare, and social isolation were referred to a medical social worker and connected with appropriate resources.

We successfully increased the SDOH screening rate of our pediatric diabetes patients from 0% to 4.3%. Of the 126 patients eligible for screening, 51.6% (65) completed screens, 38.5% (25) of the completed screens were positive, and 84.0% (21) of those who screened positive were offered a referral to social work and/or appropriate resources. Of those screening positive, 76% were non-Hispanic Black, 20% were non-Hispanic White, and 4% were Hispanic. The average A1C of patients screening positive compared to those screening negative was 10.8% and 9.4% respectively. CGM utilization was found to be decreased in patients screening positive at 44% when compared to CGM utilization in patients screening negative, which was 70%. Only 12% of positively screening patients used an insulin pump compared to 30% of negatively screening patients. Food insecurity was the top SDOH category screened for. The most common reason for survey non-completion was appointment no show, which was responsible for 49% of the non-completed surveys.

Standardizing our SDOH screening process was helpful in increasing our SDOH screening rate of pediatric diabetes patients; however, we did not reach our goal of 10%. While we transition to a different electronic medical records system that will ease our ability to administer the survey to patients annually, we will focus only on screening patients with an A1C over 9.5%.

Higher Pulmonary Arterial Pressure at Fontan Is Associated with Worse Long-Term Quality of Life

Presenting Author: Caroline Shi; Emory University

Poster Number: 152

SHI, CAROLINE, EMORY UNVERSITY; Yang, Yanxu, Emory University; Knight, Jessica, University of Georgia; Oster, Matt, Emory University and Children's Healthcare of Atlanta; and Kochilas, Lazaros, Emory University and Children's Healthcare of Atlanta

Background: Higher mean pulmonary arterial pressure (mPAP) at Fontan completion has been linked to worse transplant-free survival. We investigated whether elevated mPAP is also associated with long-term quality of life (QOL) in adult Fontan survivors.

Methods: The Congenital Heart Disease Project to Understand Lifelong Survivor Experience (CHD-PULSE) surveyed adults (>18 years) across 11 U.S. centers in the Pediatric Cardiac Care Consortium, a US-based registry of pediatric cardiac interventions performed between 1982–2011. Conducted from 2021–2023, the survey incorporated validated instruments assessing medical, neurocognitive, and psychosocial outcomes from national datasets, the Childhood Cancer Survivor Study, and PROMIS measures. mPAP at Fontan was analyzed as a continuous variable and in tertiles: low (6–10 mmHg), middle (11–12 mmHg), and high (13–21 mmHg). Analyses included chi-square, Fisher exact, Kruskal-Wallis tests, and logistic regression adjusting for sex, Fontan year, and systemic ventricle type.

Results: Among 3,133 survey respondents, 60 (40% female, 52.5% with systemic LV) underwent lateral tunnel or extracardiac Fontan with documented mPAP. Median follow-up post-Fontan was 20.3 years (IQR 18.4, 23.4), while median age at survey was 24.0 years (IQR 22.3, 27.1). Median mPAP was 11.0 mmHg (IQR 9.0, 13.0). Poor/fair general health was more common in the high mPAP group (29.4%) compared to middle (10%) and low (0%) (p=0.030). High mPAP was associated with lower global physical health (47.8±6.8) and mental health (43.4±7.6) scores compared to middle (51.8±8.0, 45.0±7.7) and low tertiles (53.9±7.4, 51.1±9.6) (both p=0.027). Similar but non-significant trends were observed for physical function, cognition, anxiety, and depression. A 1-SD (3 mmHg) increase in mPAP was associated with higher odds of poor physical health (T-score <50) (aOR 1.80; 95% CI: 1.00–3.23, p=0.049), greater likelihood of receiving disability benefits (aOR 2.60; 95% CI: 1.24–5.46, p=0.010), and lower likelihood of having or planning to have biological children (aOR 0.44; 95% CI: 0.22–0.89, p=0.023).

Conclusions: Elevated mPAP at Fontan is associated with worse long-term physical health and adverse socioeconomic outcomes. These findings support mPAP as a potential therapeutic target to optimize both survival and quality of life in the Fontan population.

Analysis of Georgia Medicaid Reimbursement Rates for Dental Services for Children with Cleft and Craniofacial Disorders

Presenting Author: Jay Shirley; Children's Healthcare of Atlanta / Emory University School of Medicine

Poster Number: 153

SHIRLEY, JC, Children's Healthcare of Atlanta, Emory University School of Medicine

Background: Participation in the Medicaid dental program has decreased in Georgia since managed care firms have administered the Medicaid program. Reimbursement rates have traditionally been lower than the usual fees. Fewer providers result in children being without access to dental services. Changes with contracts associated with the CMOs and dental sub-contractors, including changes in reimbursement rates created uncertainty. and the number of dentists participating in Medicaid declined significantly.

The aim of this evaluation was to evaluate current dental reimbursement for Georgia Medicaid plans for services provided for young children with cleft and craniofacial disorders.

Methods: Reimbursement rates from three Medicaid managed care dental plans and a Medicaid Fee for Service (FFS) plan were compared with non-Medicaid rates for 12 common procedures for children with cleft and craniofacial disorders from birth-8 years of age. A weighted average for the twelve procedure codes was created to determine the index for each of the codes. The weights for each CDT code were created as the proportion of all procedures. Information from the dental plans contracted by the Medicaid Care Managed Organizations (CMOs) and Department of Community Health (DCH) data were used to compare to recent American Dental Association (ADA) Survey of Dental Fees data. Results Average reimbursement from CMOs was only 31% of ADA Survey Fees or the non-Medicaid dental fee group. Medicaid FFS rates were only 35% of the non-Medicaid dental rates. When all Medicaid plans were compared, they were still only 32% of non-Medicaid dental rates. One CMO provided higher reimbursement to providers in rural locations versus providers in urban locations. The three procedures with the most significant discrepancy between Medicaid and non-Medicaid rates were: orthodontics, extractions, and two surface composite restorations.

Conclusions: Medicaid reimbursement rates for dental services for young children with cleft and craniofacial disorders are significantly lower than non-Medicaid rates. Low reimbursement rates have impacted provider participation and the overall performance of the Georgia Medicaid program. Improvement efforts should be directed at creating reimbursement schemes that are more competitive with non-Medicaid reimbursement and provide incentives for providers who provide care for certain special needs populations.

A Model Multi-Systems Approach for Understanding the role of the PIX Pathway in Cardiac Muscle and Dilated Cardiomyopathy

Presenting Author: Luke Shoemaker; Emory University

Poster Number: 154

SHOEMAKER, LUKE, Emory University; Ghazal, Nasab, Emory University; Moody, Jasmine, Emory University; Qadota, Hiroshi, Emory University; BENIAN, GUY M., Emory University; and KWONG, JENNIFER Q., Emory University

Cardiomyopathies represent a substantial burden on the global healthcare system. When genetically based, mutations in genes encoding sarcomeric and desmosomal proteins can be identified in about 50% of cases. However, for the remaining 50%, the underlying mutation is unknown, highlighting the need to discover new cardiomyopathy-causing genes. Previously, we reported that loss-of-function mutations in PIX-1, a guanine nucleotide exchange factor (GEF) for Rac, result in a unique phenotype characterized by the loss of integrin adhesion complexes (IACs) at muscle cell boundaries in C. elegans. Here, we report that cardiac-specific knockout of PIX-1's mouse ortholog, beta-PIX, leads to dilated cardiomyopathy by eight months of age. To gain insight into the mechanisms by which cardiac knockout of beta-PIX results in cardiomyopathy, we used confocal microscopy to localize beta-PIX to intercalated disks, costameres, Z-disks, and blood vessels. This localization pattern closely resembles that of PIX-1 in C. elegans muscle.

LAP it up: The role of LC3 Associated Phagocytosis (LAP) in Cystic Fibrosis (CF)

Presenting Author: Mahesh Shrestha; Emory University

Poster Number: 155

MAHESH K. SHRESTHA, Ashley Murphy and BENJAMIN T. KOPP

Background: Autophagy is defective in CF and therapeutic approaches to augment autophagy can be difficult due to its broad role in physiology. LC3-associated phagocytosis (LAP) is an alternate pathway to autophagy, which requires specialized initiating molecules independent of autophagy. LAP depends on the correct assembly of the NADPH oxidase complex (NOX) and recruitment of NOX to the LAP phagosome (LAPosome). NOX assembly is decreased in CF macrophages due to a phosphorylation defect. RUBICON helps to stabilize the NOX2 complex for ROS production and helps key molecules on the LAPosome for the progression of LAP. LAP has been implicated in several infectious and autoimmune diseases but has not been studied as a target for CF.

Methods: Monocyte derived macrophages (MDMs) were isolated from people with CF and healthy controls (HC) and infected with CF clinical bacterial isolates. RUBICON expression during infection was measured by western blotting and LAPosome associated LC3II and NOX2 were measured by confocal microscopy in response to a fluorescently labeled LAP stimulus, zymosan. ROS production and phagocytosis by CF and non-CF macrophages were analyzed by flow cytometry. Cells were treated with bavituximab, a human-mouse chimeric monoclonal antibody against phosphatidylserine (critical component of receptor-mediated LAP induction), during LAP induction by CF macrophages during infection.

Results: RUBICON expression was decreased in CF macrophages compared to non-CF at baseline and demonstrated minimal responses to infection with Burkholderia cenocepacia or stimulation with the NOX agonist PMA. Compensatory increases in LAP during autophagy inhibition were also absent in CF. CF macrophages had decreased ROS generation, LAPosome-associated LC3II, and phagocytosis compared to non-CF. Treatment with Bavituximab increased bacterial killing of clinical isolates of Pseudomonas aeruginosaby CF-macrophages.

Conclusion: LAP is reduced in CF macrophages leading to decreased bacterial killing and increase in inflammation. Bavituximab has emerged as a potential therapeutic candidate to increase the efficacy of CF macrophages in clearing infection and inflammation in people with CF by restoring LAP.

Designing and Evaluating Thin Film Dosage Formulation to Deliver Dimenhydrinate via Buccal Administration

Presenting Author: Atiya Siddiqui; Mercer University

Poster Number: 156

Siddiqui Atiya(Mercer University), Pasupuleti Dedeepya (Mercer University), Mukti Mohsina (Mercer University), Akkineni snehitha(Mercer University), Patel Dhruvi (Mercer University) and Uddin, Mohammad N (Mercer University)

Background: Motion sickness is a common and complex condition triggered by actual or perceived movement. It can present with various symptoms, including gastrointestinal issues, central nervous system effects, and autonomic responses. The currently available medications are antihistamines, including dimenhydrinate (Dramamine) and meclizine (Antivert), often used to reduce nausea and dizziness. However, patients of different age groups, including geriatric and pediatric patients, experience swallowing challenges. Therefore, oral dissolving film (ODF) is the dosage form that provides a convenient pathway to overcome swallowing challenges in geriatric and pediatric patients. The advantage of rapid dissolving film is that it can bypass the first pass effect without degradation in the GIT and provides a quick onset of action.

Method: An oral dissolving film (ODF) dosage form of dimenhydrinate was prepared for buccal administration. An ionic liquid, 1-4 Diazabicyclooctane (DABCO), was incorporated as a permeability enhancer. Other excipients used in the film were Hydroxypropyl Methylcellulose (HPMC), Polyethylene Glycol (PEG 2000), Kollidon 90F, and Kollidon VA64 polymers. Films were evaluated for physical characterizations such as appearance, surface pH, disintegration time, weight variation, thickness, folding endurance, and tensile strength. A release Study evaluated the release percentages at different time points. An ex vivo permeability study was conducted using porcine buccal membranes and a Franz Cell.

Results: The results showed that the films were opaque with a surface pH of 6.82, disintegration time of 73.33 sec, average weight variation of 56.33 mg, average thickness of 0.053 mm, and average tensile strength of 3.2N. The release study results showed that 100% of the drug was released within 60 minutes. The permeability was detectable starting from the 10-minute point. The permeability is higher and faster when ionic liquid DABCO has been used as a permeability enhancer.

Conclusion: The physical characteristics showed that the films were stable. The dimenhydrinate oral dissolving film showed satisfactory drug release results, and the ex vivo study showed that the ionic liquid enhanced the drug's permeability.

Sex-based Differences in Macaque Models of HIV Pathogenesis and Persistence

Presenting Author: Soham Sonawane; Emory University

Poster Number: 157

Endrias, Kedan, Emory University; SONAWANE, SOMA, Emory University; Singh, Vidisha, Emory University; Amara, Rama Rao, Emory University; Bosinger, Steven E., Emory University; Paiardini, Mirko, Emory University; Velu, Vijayakumar, Emory University; Silvestri, Guido, Emory University; and Chahroudi, Ann, Emory University.

Background: Women make up the majority of people living with HIV globally but remain underrepresented in cure research. Biological sex influences HIV pathogenesis, as women often show stronger immune responses and lower viral set points during acute infection. However, studies on viral persistence during antiretroviral therapy (ART) have produced inconsistent results, highlighting the need for more research into how sex impacts HIV outcomes and the development of effective cures.

Methods: We conducted a meta-analysis of 18 studies to explore the impact of biological sex on viral persistence in the rhesus macaque (RM) SIV/SHIV infection model. Inclusion criteria included infant or adult studies of SIV or SHIV infection and daily ART treatment with data on viral dynamics and reservoir size. Data were extracted from 296 RMs, 70% (207) male, and 86% (142) adults. Variables included viral strain, plasma viral load (PVL), ART duration, and reservoir measures in peripheral blood (PB), lymph node (LN), and gastrointestinal (GI) tract. We compared peak PVL, cell-associated viral DNA, and intact proviral DNA levels by sex.

Results: Female adult macaques had significantly higher peak PVL compared to males (median 1.8x107 versus 1.3x107 copies/ml plasma, p=0.0062). Among SIV-infected RMs treated with suppressive ART, females had significantly higher SIV DNA levels in CD4+ T-cells from PB (2.1x103 versus 3.4x102 copies/million cells, p<0.001), LN (median 2.1x103 versus 4.4x102 copies/million cells p=0.0164), and GI tract (median 3.3x101 versus 7.7 copies/million cells, p=0.0004). Levels of CD4+ T-cells with intact provirus were similar in females and males (PB: 1.2x103 versus 8.8x102 copies/million cells, p=0.1604; LN: 1.2x103 versus 9.2x102 copies/million cells, p=0.7074). No significant differences were observed in SHIV-infected RMs.

Conclusion: These analyses revealed that, compared to males, females have higher viral loads prior to ART, a greater number of infected cells in multiple tissues during ART, but similar intact viral reservoir size. Underlying drivers may include enhanced viral spread pre-ART due to increased immune activation combined with clearance of intact reservoirs during ART due to better antiviral immunity in females. Our data support increased inclusion of women in HIV cure research for more accurate assessment of the impact of cure-directed interventions on virus persistence.

Developing a Dual-Targeting CAR T-cell Strategy Against Pediatric Mixed Phenotype Acute Leukemia (MPAL)

Presenting Author: Emily Sullivan; Emory University

Poster Number: 158

Sullivan, Emily, Emory University; Patel, Vishva, Emory University; La Fuente, Moira, Emory University; Branella, Gianna, Emory University; and Raikar, Sunil, Emory University

Background: Mixed phenotype acute leukemia (MPAL) accounts for 2-5% of acute leukemias and is characterized by the presence of both lymphoid and myeloid phenotypes. Expression of lymphoid and myeloid lineage markers can either be in a biphenotypic pattern (expressed on the same cell), or a bilineal pattern (multiple lineage specific blast populations), or a combination of both. Furthermore, MPAL blasts have been reported to undergo lineage plasticity, switching between lymphoid and myeloid immunophenotypes. This heterogeneity of MPAL has led to a lack of standard treatment, and there remains an unmet need for MPAL-specific therapeutics. We aimed to develop a dual antigen-targeting chimeric antigen receptor (CAR) T cell approach, targeting both the B-lymphoid antigen CD19 and the myeloid antigen CD33, to effectively target pediatric B/myeloid MPAL.

Methods: A mixed biphenotypic/bilineal MPAL was recapitulated in the form of the CD19/CD33-expressing B/myeloid MPAL JIH-5 cell line, while a uniquely bilineal model was created by coculturing the B-ALL RS4-11 and AML MV4-11 cell lines. Pediatric primary patient samples were assessed for

CD19/CD33 surface expression. Lineage plasticity was examined via flow cytometry using our JIH-5 cell line. We created a pooled dual-targeting CAR T cell approach, targeting CD19 and CD33, and assessed its cytotoxicity against our models of biphenotypic and bilineal MPAL.

Results: Flow cytometry analysis of pediatric B/myeloid MPAL primary patient samples confirmed the heterogeneous expression pattern of CD19 and CD33 in blast cells necessitating a dual-antigen approach. JIH-5 MPAL blasts that were single-positive for CD19 were sorted from their double-positive CD19/CD33 counterparts became double-positive over time, confirming lineage plasticity. Our pooled CAR approach exhibited superior cytotoxicity to either single CAR approach against both the JIH-5 model and the bilineal model; however, both single CAR approaches exhibited impressive antigen-nonspecific killing of tumor cells, termed “bystander effect”.

Conclusion: Our studies show that a dual lymphoid/myeloid antigen targeting CAR approach is needed to overcome blast heterogeneity in B/myeloid MPAL. The optimal dual CD19/CD33 CAR strategy is currently being investigated, and we plan to validate our approach in both cell line and patient derived xenograft models of B/myeloid MPAL.

Good bugs vs. bad bugs: exploring the immunological impact of bacterial extracellular vesicles during recovery from cleft palate surgery

Presenting Author: Lucas Tangpricha; Emory University

Poster Number: 159

TANGPRICHA, LUCAS, Emory University; Sekar, Keerthi Priya Chinniamapalyam, Emory University; Kumar, Prashant, Emory University; Jones, Rheinallt, Emory University; Tirouvanziam, Rabindra, Emory Unversity; and Goudy, Steven, Emory University

Background: Cleft palate is a common congenital anomaly and leading indication for orofacial surgery. Recent studies suggest that the oral microbiota, particularly bacterial species, play a key role in tissue repair mediated by host immune and structural cells following surgery. However, the role of extracellular vesicles (EVs) as mediators of bacteria-to-host signaling during this process is poorly understood. This study investigates the role of EVs from oral bacteria in modulating inflammation and wound healing in an experimental system mimicking cleft palate repair.

Methods: To explore the impact of both beneficial and pathogenic oral bacteria on cleft palate repair, we derived EV-rich and poor fractions from the culture supernatant of four bacterial strains: Porphyromonas gingivalis, Enterococcus faecalis, Staphylococcus aureus, and Lactococcus lactis subsp. cremoris (LLC). Murine macrophage RAW 264.7 cells were exposed to these EV-rich vs. poor fractions to assess induced immunomodulatory responses. EVs were isolated using size exclusion method, and their size and morphology characterized by nanoparticle tracking analysis (NTA) and transmission electron microscopy (TEM). Immune mediator secretion, including TNF-α, IL-1β, and IL-6, was quantified by ELISA and qPCR.

Results and conclusions: Our findings suggest that EVs from pathogenic bacteria, particularly P. gingivalis, E. faecalis, and S. aureus, significantly upregulated the secretion of pro-inflammatory cytokines by RAW 264.7 cells. By contrast, EVs from the non-pathogenic LLC strain exhibited a more neutral immune mediator secretion profile. EV-poor fractions showed a dampened effect on immune mediator secretion, further supporting the notion that bacterial EVs can modulate immune response of host macrophages.

Future studies should focus on understanding the molecular mechanisms by which bacterial EVs influence human macrophage activation and their potential therapeutic applications in improving cleft palate repair via host immune and structural cell polarization.

Readability of Patient and Parent Education Materials in Solid Organ Transplant Clinic - A Single Center Study

Presenting Author: Shaan Thomas; Atlanta International School

Poster Number: 160

THOMAS, SHAAN, Atlanta International School; Brasch, Jennifer, Children's Healthcare of Atlanta; Romero, Rene, Emory University and Children's Healthcare of Atlanta; and Garro, Rouba, Emory University and Children's Healthcare of Atlanta

Background: The National Institutes of Health recommend that patient education material be written between a 4th- and 6th-grade level. In the U.S, 36% of adults have basic or below-basic health literacy. As such it is crucial that health-related materials created for patients should not exceed a 6th grade reading level, so as to remain accessible to a wide variety of patients and families. The aim of this study is to review the readability of patient materials used in a single pediatric transplant center to evaluate its accessibility for patients with low health literacy.

Methods: We evaluated 18 different patient education materials used by pediatric transplant team. There is significant variation in types of material used- from power point presentations to instruction manuals and patient forms. The Flesch Reading Ease Score (FRES), Flesch-Kincaid Grade Level (FKGL), and the percentage of passive voice present in the text was calculated for all patient materials. The Flesch Reading Ease Score provides a 1-100 scale to measure the readability of a given text, with larger values indicating easier, higher readability. The Flesch-Kincaid Grade Level value shows the estimated reading level of a given text in the context of grade levels.

Results: The average Flesch Reading Ease Score (FRES) was 48.9, which corresponds to “difficult” in readability and the median FRES was 53.1 corresponding to "fairly difficult". The average Flesch-Kincaid Grade Level (FKGL) was 10.7, indicative of 10th grade reading level and the median FKGL was 8.8, indicativeof late 8th grade reading level.

Conclusions: This data shows that patient materials are often at a level that exceeds the standards that need to be met for such materials to be accessible to a broad spectrum of patients. This may affect their understanding of the content and ability to follow management expectations. We are working on a quality improvement project to align all patient education materials to recommended readability standards.

Brain Tumors Cooperate With Astrocytes In The Tumor Microenvironment To Metabolize Homocysteine, Enabling Tumor DNA Methylation And Nucleotide Synthesis.

Presenting Author: Andrey Tikunov; Emory

Poster Number: 161

Tikunov, Andrey, Emory; Breitenfeld, Nim, Emory; Macdonald, Jeff, UNC; Gershon, Timothy, Emory

Tumor cells adapt their metabolism to support rapid growth. Current models assume self-sufficiency. However, we found a metabolic process where medulloblastoma cells collaborate with local astrocytes of non-tumor origin. This collaboration enhances tumor robustness and may be therapeutically exploited with new chemotherapies.

To identify tumor-specific metabolic patterns, we analyzed brain and tumor metabolism in mice genetically engineered to develop Sonic Hedgehog (SHH)-subgroup medulloblastoma. We used spatially resolved LC-MS (MALDESI), conventional LC-MS, and NMR to analyze sections containing brain and medulloblastomas. We followed up with fluxomics studies, where stable isotope-labeled precursor metabolites, including 13C,15N glycine, 13C methionine and 13C glucose, were injected into tumor-bearing mice. Tumors were harvested after a short interval (30-60 minutes) and the labeled metabolites in the tumor and brain were analyzed using MALDESI and LC-MS.

Through these methods, we discovered that medulloblastomas accumulate cystathionine, a methionine metabolite that is comparatively low concentration in the adjacent brain. Eukaryotic cells can only generate cystathionine through the transsulfuration pathway, where the enzyme cystathionine beta synthase (CBS) complexes homocysteine with serine. Transsulfuration requires astrocytes, as only astrocytes express CBS. Increased cystathionine in medulloblastomas indicates tumor-astrocyte cooperation.

Gene expression analysis using single-cell RNA sequencing and immunohistochemistry revealed that tumors and astrocytes expressed key enzymes supporting observed metabolic patterns. Astrocytes were the only cell type in tumor tissues that expressed CBS. Tumor cells expressed homocysteine-generating DNA methylases, SHMT1/2 and TYMS, needed to methylate folate and channel methylated folate to thymidine synthesis.

We propose a model of intracellular collaboration within tumor tissue: tumor cells prioritize fueling the folate cycle using serine via SHMT1/2 for purine/thymidine synthesis, down-regulating Methylenetetrahydrofolate Reductase to suppress folate-dependent recycling of homocysteine. The methionine cycle, responsible for DNA methylation, runs linearly from dietary methionine to homocysteine. Tumor cells shunt homocysteine to astrocytes, where it conjugates with serine to form cystathionine, a non-toxic compound used for glutathione synthesis. Astrocytes re-synthesize serine from glycine via SHMT2 and GCS.

This metabolic division of labor optimizes nucleotide synthesis and DNA methylation in proliferative tumor cells, making them vulnerable to new combinations of novel and established chemotherapies.

Clinical Profile And Selected Viral Genome Sequence Analysis Of Sars-Cov-2 Infected Pediatric Patients In A Tertiary Military Hospital In Quezon City From January 2021 – July 2023: A Cross Sectional Study

Presenting Author: Deen Mark Toroy; Armed Forces of the Philippines Medical Center, Philippine General Hospital - University of the Philippines, West Visayas State University

Poster Number: 162

TOROY, DEEN MARK K

Background: SARS-CoV-2 displays distinct characteristics in terms of virulence and disease severity in pediatric population. Hence, patient's clinical profile and viral genome may contribute to patient's symptoms and disease severity.

Methods: This is a single center cross sectional study determining the SARS-CoV-2 infected pediatric patients clinical profile consisting of age, sex, residence, comorbidities, presenting symptoms, hospitalization and disease severity. Selected samples were subjected to next generation sequencing to analyze the SARS-CoV-2 genome sequence. All data were recorded with utmost confidentiality.

Omicron leads to less disease
place the stat and the p value
place the omicron as the most dominant
place the severity of the omicron (ilan nag mild and ilan moderate)
no significant association with age
do not put place significant difference, may place CONTRIBUTE / AFFECT to the disease severity

Results & Conclusion: From January 2021 to July 2023, a total of 630 pediatric patients who got tested for SARS-CoV-2 RT-PCR were confirmed to have SARS-CoV-2. Two hundred thirty nine (239) were included in this study. Among the study population, 61.51% were male, more than 60% were less than 4 years old and residing in Quezon City. In terms of clinical presentation, 78% had mild symptoms, 20% had radiologic findings of pneumonia, 40% presented with fever, 12% with diarrhea, and 8% with dyspnea. Ten percent (10%) of patients had concomitant seizure disorder. More than 70% were admitted to the hospital and all of the study subjects recovered from the illness. Only ten samples were subjected to next generation sequencing and all were Omicron variants. Majority of the SARS-CoV-2 virus belong to Clade 22B and 23E; and identified pangolin lineages were BA.5.2, BA.2.3.20, XBB.1.5, GJ.1.2 and FL.23.2.

Exploring ACE-Related Vascular Consequences: A Systematic Review

Presenting Author: Chloe Trifaux; Mercer University

Poster Number: 163

Trifaux, Chloe, Mercer University; McCullough, Mary Beth, Mercer University

Background: Adverse childhood experiences (ACEs), including conflict, abuse, and familial instability, are significant predictors of negative health outcomes, such as increased cardiovascular disease (CVD) risk (Wade, Klassen, & Andrade, 2019). Early adolescence is a critical period where the physiological effects of ACEs begin to emerge due to the ongoing maturation of the cardiovascular and endocrine systems, which are particularly vulnerable to stress-induced dysregulation (Carr er al., 2024; Kellum et al., 2023). Inflammatory biomarkers linked to ACEs have been associated with early cardiovascular risk factors (Su et al., 2015), while recent research suggests ACE-related telomere shortening, a marker of cellular aging, may contribute to long-term health deterioration (Kliewer & Robins, 2021). In order to gain a comprehensive understanding of the cumulative impact of ACEs on cardiovascular health, a systematic review was conducted. This review synthesizes current evidence on ACE-related vascular changes and their implications for long-term CVD risk.

Methods: A systematic literature search was conducted using GALILEO, incorporating PsycINFO and PubMed. Search terms included “adverse childhood experiences,” “vascular change,” “heart disease,” “cardiovascular disease,” and “childhood adversity.” Inclusion criteria required peer-reviewed studies examining the relationship between ACEs, vascular changes, and cardiovascular risk in late childhood/early adolescence. The final review included 12 relevant articles.

Results: Findings indicate that ACEs are consistently associated with vascular changes, including increased arterial stiffness and endothelial dysfunction, both early markers of CVD (Rafiq et al., 2020; Rodriguez-Miguelez et al., 2022). Recent studies have identified pulse wave velocity (PWV) and augmentation index (AIx) as key metrics, with higher ACE exposure correlating with elevated PWV and AIx in adolescents (Andrade et al., 2021; Kellum et al., 2023). Longitudinal research suggests these vascular changes persist into adulthood, reinforcing the lasting cardiovascular impact of ACEs (Zachariah et al., 2021).

Conclusions: Children with high ACE-exposure exhibit early vascular changes that increase long-term CVD risk. Future research should explore protective factors, such as resilience-building interventions and stress mitigation strategies, to counteract these effects and improve cardiovascular outcomes in at-risk populations.

Evaluating Coagulation Parameters and Prognostic Scoring Systems to Develop a Hybrid Model for Predicting Mortality in Pediatric Gunshot-Induced Traumatic Brain Injury

Presenting Author: Jai Trivedi; Georgia Institute of Technology

Poster Number: 164

TRIVEDI, JAI, Georgia Institute of Technology; Blackwell, Laura, Children's Healthcare of Atlanta; Reisner, Andrew, Children's Healthcare of Atlanta; and Mulugeta, Makda, Children's Healthcare of Atlanta

Background: Pediatric gunshot-induced traumatic brain injury (pGTBI) is rare but fatal, necessitating mortality prediction tools. Existing prognostic systems such as the adult-based Baylor and SPIN Scores lack validation in pGTBI; SPIN includes coagulation parameters (INR). The pGTBI-specific St. Louis Score has limited validation, restricting its generalizability. Coagulation parameters (INR, PT, PTT, Platelet Count), while predictive in adult GTBI and general pTBI, remain under investigated in pGTBI and are absent from pGTBI-specific models. This study addresses these gaps by evaluating coagulation parameters and prognostic scores individually.

Methods: A cohort of 62 patients with GTBI (ages 0–16, mean = 8.64; 51% White, 20% Black, 2.7% Asian, 1.4% Other; 73% male) presenting to CHOA EDs between January 2014 and April 2023 was analyzed. Point-biserial correlations and univariate and multivariate (controlled for age, gender, race, and ethnicity due to coagulation relevance) logistic regression models were conducted between each prognostic value and mortality. Receiver operating characteristic (ROC) curves with area under the curve (AUC) values and confusion matrix metrics were calculated. A hybrid model including the St. Louis Score and INR Composite (STIC) Score was developed. The STIC Score was created by standardizing and combining INR and St. Louis Scores via linear regression modeling. Analyses were performed in R (v4.2).

Results: INR was the strongest coagulation predictor (univariate OR = 2.739, p = 0.044; AUC = 0.672, 95% CI: 0.5264–0.8176) with a mortality cutoff at INR = 1.25, showing high specificity. PT, PTT, and platelet

count showed limited predictive ability. Among prognostic scores, the St. Louis Score was most predictive (univariate OR = 1.473, p << 0.001; AUC = 0.847, 95% CI: 0.7539–0.9396) with high sensitivity and specificity. The STIC Score showed strong predictive performance (multivariate OR = 3.4142, p << 0.001; AUC = 0.838, 95% CI: 0.7368–0.9388) with superior confusion matrix metrics.

Conclusion: The STIC Score is the most robust predictor of mortality in pGTBI, integrating INR's coagulation-specific utility and the St. Louis Score's assessment. INR remains valuable for early risk stratification, while the St. Louis Score is reliable independently.

CYP3A5 Polymorphisms and Neuropathy During Treatment for Pediatric Acute Lymphoblastic Leukemia

Presenting Author: Tyler Vajdic; Emory University School of Medicine

Poster Number: 165

Vajdic, Tyler, Emory University School of Medicine and Aflac Cancer and Blood Disorders Center at Children's Healthcare of Atlanta. Stevenson, Jason, Emory University School of Medicine and Aflac Cancer and Blood Disorders Center at Children's Healthcare of Atlanta. Byers, Beth, Emory University School of Medicine and Aflac Cancer and Blood Disorders Center at Children's Healthcare of Atlanta. Kuhn, Amanda, Emory University School of Medicine and Aflac Cancer and Blood Disorders Center at Children's Healthcare of Atlanta. Bergsagel, Daniel, Emory University School of Medicine and Aflac Cancer and Blood Disorders Center at Children's Healthcare of Atlanta. Castellino, Sharon, Emory University School of Medicine and Aflac Cancer and Blood Disorders Center at Children's Healthcare of Atlanta. Miller, Tamara, Emory University School of Medicine and Aflac Cancer and Blood Disorders Center at Children's Healthcare of Atlanta. Porter, Christopher, Emory University School of Medicine and Aflac Cancer and Blood Disorders Center at Children's Healthcare of Atlanta. Khanna, Anjali, Emory University School of Medicine. Hawk, Ashleigh, Emory University School of Medicine. Huerta, Jazmin, Emory University School of Medicine. Alao, Oyin, Emory University School of Medicine. Lee, Katie, Aflac Cancer and Blood Disorders Center at Children's Healthcare of Atlanta.

Background: Vincristine, metabolized by CYP3A5 enzymes, is a key therapy for pediatric acute lymphoblastic leukemia (ALL). Children receiving vincristine may develop peripheral neuropathy (PN). Prior studies show variation in both CYP3A5 polymorphisms and development of neuropathy by race. However, these studies have been limited by small sample sizes, underrepresentation of Black patients, and binary assessment of CYP3A5 expression.

Objective: To evaluate CYP3A5 genotypes and clinician-reported PN in a diverse cohort of children with ALL and determine whether CYP3A5 genotype is associated with neuropathy type or severity.

Design/Method: This retrospective cohort study included patients aged 1–19 years with ALL treated at Children's Healthcare of Atlanta from 2018-2022. Detailed, rigorous chart abstraction identified presence, highest grade, and type of PN (sensory and/or motor) per Common Terminology Criteria for Adverse Events v5.0 definitions at any point during therapy. Age, sex, race, and ethnicity were extracted from the Electronic Health Record. Patients had OneOme testing sent at the time of ALL diagnosis that identified CYP3A5 polymorphisms as normal (CYP3A5*1 diplotypes), intermediate (CYP3A5*1 haplotype), or poor (lacking CYP3A5*1 allele) metabolizers. Statistical analyses were performed using R.

Results: The patient cohort included 233/332 (70%) White patients and 65/332 (20%) Black patients. Among them, 16/332 (4.8%) were normal metabolizers, 88/332 (27%) intermediate, and 228/332 (69%) poor. There was a statistically significant association between race and metabolizer category (p<0.01); the majority of poor metabolizers were White (188/228, 82%), while the majority of normal

metabolizers were Black (10/16, 63%). PN was present in 207/332 (62%) patients. There were no significant differences in incidence, grade, or neuropathy type by race or CYP3A5 metabolizer status (all p>0.05).

Conclusion: Using a large, diverse cohort of children undergoing treatment for ALL, this study confirmed prior findings of differences in CYP3A5 expression by race and adds stratification by "intermediate" CYP3A5 haplotype status to the comparison. Unlike previous studies, there were no differences in the frequency, type, or grade of neuropathy when stratified by race or CYP3A5 metabolizer status. Analyses are ongoing to compare course-level rates, time to development, treatment, and resolution of PN by race and CYP3A5 metabolizer status.

The Role of Burnout on Early Intervention Providers' Self-Efficacy Delivering Evidence-Based Parent-Mediated Interventions

Presenting Author: Marycruz Valdivia Acosta; Emory University

Poster Number: 166

Valdivia Acosta, Marycruz, Emory University; and Islam, Nailah, Emory University; and Kuhn, Jocelyn Dr., Emory University; and Pickard, Katherine Dr., Emory University

Introduction: Part C Early Intervention (EI) systems serve a large number of toddlers with or at high likelihood of autism. Although EI systems provide a critical access point to services and have been a focal point of implementation efforts, intervention quality is variable.1 Early intervention quality may be driven by providers' varied backgrounds and experiences,2 in addition to turnover and other internal challenges, such as emotional exhaustion3,4 and burnout.3,4 However, limited work has been conducted on the role of burnout in providers within early autism intervention service systems. Our study attempts to bridge this gap by examining factors that drive EI provider burnout and the impact of burnout on the implementation of an evidence-based parent-mediated intervention, Project ImPACT5.

Objectives: (1) How do provider characteristics and support systems predict EI provider burnout? (2) How does EI provider burnout relate to their self-efficacy delivering Project ImPACT?

Methods: Preliminary data from the current study comes from an ongoing contract with Georgia's Department of Public Health and Part C system. Sixty-nine participating EI providers were trained in Project ImPACT, an evidence-based parent-mediated intervention supporting social communication skills in toddlers with autism.5 Prior to training, providers completed measures of (1) demographic characteristics, including years of experience in the EI field and age, (2) providers' sense of cohesion8 and organization support ,9 and (3) burnout and strain.6 Post training, providers completed measures of (1) their self-efficacy delivering Project ImPACT5 and (2) their attitudes towards Project ImPACT.7 Research staff kept records of providers' training participation as measured by percent attendance in training activities. Linear regression models were calculated using R Studio and SPSS to evaluate the extent to which provider characteristics predicted variance in EI providers' reported burnout and self-efficacy delivering Project ImPACT.

Results: Although provider burnout was related to perceptions of organizational support (β =-0.66; p=0.03), provider age, sense of cohesion, and years of experience in the EI field were not. The full regression model did not explain a significant amount of the variance in EI provider burnout (F(4,14) =

1.590, R2 = 0.312; p=0.23). Similarly, although providers' years of EI experience related to their sense of self-efficacy in delivering Project ImPACT (β =0.60; p=0.03), providers' age, sense of cohesion, burnout, and organizational support did not. The full model also did not predict a significant amount of the variance in Project ImPACT self-efficacy (F(5,13) = 1.285; p=0.33).

Conclusion: Preliminary findings revealed that higher levels of perceived organizational support were associated with lower burnout among EI providers. Additionally, years of experience in EI was associated with higher self-efficacy delivering Project ImPACT. Linear regression models evaluating the role of several provider characteristics on provider burnout was not significant, nor was a model evaluating the role of burnout on provider self-efficacy. Further analyses will include a larger sample of providers and the relationship between burnout, training participation, attitudes, and Project ImPACT fidelity. Study limitations and implications will be discussed.

References

1. Rieth, S. R., Dickson, K. S., Ko, J., Haine-Schlagel, R., Gaines, K., Brookman-Frazee, L., & Stahmer, A. C. (2022). Provider perspectives and reach of an evidence-based intervention in community services for toddlers. Autism : the international journal of research and practice, 26(3), 628–639. https://doi.org/10.1177/13623613211065535
2. Aranbarri, A., Stahmer, A. C., Talbott, M. R., Miller, M. E., Drahota, A., Pellecchia, M., ... & Rogers, S. J. (2021). Examining US public early intervention for toddlers with autism: Characterizing services and readiness for evidence-based practice implementation. Frontiers in Psychiatry, 12, 786138.
3. O'Connor, K., Muller Neff, D., & Pitman, S. (2018). Burnout in mental health professionals: A systematic review and meta-analysis of prevalence and determinants. European psychiatry : the journal of the Association of European Psychiatrists, 53, 74–99. https://doi.org/10.1016/j.eurpsy.2018.06.003
4. Pickard, K., Islam, N., Demitri, B., Hendrix, N., Davies, H., Yohannes, M., Buck, A., Doernberg, E., & Kuhn, J. (2024). Using an evaluative lens to characterize the implementation outcomes of an NDBI within an early intervention system. Early Childhood Research Quarterly, 68, 225-234. https://doi.org/10.1016/j.ecresq.2024.05.009
5. Ingersoll, B., & Dvortcsak, A. (2019). Teaching social communication to children with autism and other developmental delays (2-book set): The Project ImPACT guide to coaching parents and the Project ImPACT manual for parents. Guilford Publications.
6. Glisson, C., Landsverk, J., Schoenwald, S., Kelleher, K., Hoagwood, K. E., Mayberg, S., Green, P., & Research Network on Youth Mental Health (2008). Assessing the organizational social context (OSC) of mental health services: implications for research and practice. Administration and policy in mental health, 35(1-2), 98–113. https://doi.org/10.1007/s10488-007-0148-5
7. Cook, J. M., Thompson, R., & Schnurr, P. P. (2015). Perceived Characteristics of Intervention Scale: Development and Psychometric Properties. Assessment, 22(6), 704-714. https://doi.org/10.1177/1073191114561254
8. Bollen, K. A., & Hoyle, R. H. (1990). Perceived cohesion: A conceptual and empirical examination. Social Forces, 69(2), 479-504. doi:10.1093/sf/69.2.479
9. Institute of Behavioral Research. (2009). TCU Organizational Readiness for Change (ORC-D4). Fort Worth: Texas Christian University, Institute of Behavioral Research. Available at ibr.tcu.edu

"A Little Ray of Hope": Experiences of Spanish-Speaking Latino Caregivers in a Culturally Responsive Autism Support Group

Presenting Author: Selena Valladares Ortiz; Emory University

Poster Number: 167

Valladares Ortiz, Selena, Emory University School of Medicine; Guerra, Karen, Children's Healthcare of Atlanta; Pickard, Katherine, Emory University School of Medicine; and DuBay, Michaela, University of Virginia

Background: Disparities in obtaining an autism spectrum disorder (ASD) diagnosis and services have been documented for Spanish Speaking (SS) Latino children and other racial/ethnic minorities (Luelmo, Kasari, & Fiesta Educativa Inc., 2021). SS Latino children with ASD from SS homes face a myriad of unique challenges and inequities in education and healthcare. For example, when SS Latino children are diagnosed, they are more likely to have co-occurring intellectual disability. Following diagnosis, SS Latino children and their parents receive fewer evidence-based treatments and less medical specialty care than non-Latino White counterparts (Zuckerman, 2020).

Method: 13 SS Latino parents of children with ASD (ages 2-19) were recruited from two ongoing Spanish-language autism support groups. Families participated in virtual support groups facilitated by a SS Latina speech-language pathologist and SS Latina parent facilitator. One support group met weekly for 60-minute sessions over the span of 2 _ months (10 sessions). A second support group met once a month for 60-minute sessions, for a total of 10 months (10 sessions). Both groups provided parents with education on autism basics, service navigation, developing routines, sleep, bilingualism, and self-care. Parents completed an optional exit interview regarding their experiences in the support group. Exit interviews were transcribed and coded by bilingual speakers using thematic analysis.

Results: Participants noted that the presence of a SS Latina facilitator and other SS Latino parents was important and fostered cultural identity and support. Parents revealed that having sessions in Spanish facilitated their learning and connection to other parents. Despite having children with different needs, parents found shared experiences helpful in anticipating future challenges, navigating institutional systems, and advocating for appropriate autism related services.

Conclusion: This study highlights the need to address disparities in autism care for SS Latino families by developing culturally responsive autism support groups. Findings following exit interviews revealed parental increased knowledge regarding ASD service navigation and accessibility. Additionally, parents reported high satisfaction with virtual Spanish led groups and emphasized the need for more accessible and culturally responsive care in other settings and across the autism lifespan.

Targeted Knockout of SIX1 and EYA2 in Jurkat Leukemia Cells to Elucidate Their Role in T-ALL Leukemogenesis

Presenting Author: Suhani Varma; Emory University

Poster Number: 168

Varma, Suhani, Emory University; Shen, Huifeng, Emory University School of Medicine; Alexander, Lyndsey, Emory University School of Medicine; Wechsler, Dan, Children's Healthcare of Atlanta, Emory University School of Medicine and Aumann, Waitman, Children's Healthcare of Atlanta, Emory University School of Medicine

Background: The CALM-AF10 fusion is a recurrent chromosomal translocation found in aggressive leukemias, including T-cell acute lymphoblastic leukemia (T-ALL) and acute myeloid leukemia (AML). This fusion disrupts hematopoiesis by aberrantly activating the HOXA gene cluster, which plays a key role in stem cell self-renewal and differentiation. CALM-AF10 leukemia is associated with poor prognosis, necessitating the development of targeted therapies. We previously identified SIX1 as a potential downstream target of CALM-AF10, with high SIX1 expression correlating with worse survival in T-ALL and AML. Since SIX1 requires its cofactor EYA2 for transcriptional activation, this study aimed to assess the functional impact of SIX1 and EYA2 in CALM-AF10 leukemia using Jurkat cells.

Methods: Single-guide RNAs (sgRNAs) targeting SIX1 and EYA2 were cloned into lentiviral vectors containing a blue fluorescent protein (BFP) reporter. Plasmids were amplified in Stbl3 E. coli and purified before electroporation into Jurkat cells that stably express Cas9 (Jurkat -Cas9). Transfected cells were isolated via fluorescence-activated cell sorting (FACS) using BFP, expanded in culture, and analyzed for gene knockout by Western blot, PCR, and Sanger sequencing. Cell growth was monitored over 72 hours to assess proliferation differences.

Results: We successfully cloned 5 sgRNAs each targeting SIX1 and EYA2, along with a scramble control into lentiviral vectors. Following electroporation, ~75% of cells were BFP-positive. Following expansion, Western blotting revealed decreased SIX1 protein expression in 2 independent lines, with Sanger sequencing confirming successful knockout. Cells with reduced SIX1 expression exhibited slower growth compared to controls. However, we were unable to achieve effective EYA2 knockout in this model, suggesting possible essentiality for cell survival or resistance to editing.

Conclusion: The successful knockout of SIX1 in Jurkat-Cas9 cells provides a foundation for studying their role in leukemogenesis. Inability to knock out EYA2 may indicate its critical function in T-ALL cell viability with future studies potentially clarifying its role. By elucidating the roles of SIX1 and EYA2 in CALM-AF10-driven leukemias, this research may help identify novel therapeutic targets. Targeting SIX1 and EYA2 could offer a new avenue for precision medicine approaches aimed at improving outcomes for patients with CALM-AF10-positive leukemia.

Enhancing Long-Term Follow-Up in Pediatric Traumatic Brain Injuries Research: Challenges, Trends, and Future Directions

Presenting Author: Meena Verma; Children's Healthcare of Atlanta

Poster Number: 169

Meena S. Verma, Children's Healthcare of Atlanta, Atlanta, GA, USA; Andrew Reisner, Children's Healthcare of Atlanta, Atlanta, GA, USA, Emory University School of Medicine, Atlanta, GA, USA; Laura Blackwell, Children's Healthcare of Atlanta, Atlanta, GA, USA , Emory University School of Medicine, Atlanta, GA, USA; and Makda Mulugeta, Children's Healthcare of Atlanta, Atlanta, GA, USA

Background: Long-term follow-up (LTFU) is essential in clinical trials to assess safety, efficacy, and patient-centered outcomes over time. Pediatric trials present unique challenges that contribute to LTFU, including age-specific vulnerabilities, developmental transitions, ethical complexities, and the involvement of families in care decisions. This study evaluated LTFU rates in two recent pediatric traumatic brain injury (TBI) studies, with the goals of identifying predictors of LTFU and assessing strategies used to improve retention.

Methods: We analyzed two prospective pediatric TBI studies conducted at a single academic institution using telephone-based follow-up. Study 1 (May 2018–January 2021) enrolled patients aged 0–17 years with TBIs of all severities, with a single 6-month follow-up (N=165 over 3 years). Study 2 (January 2021–September 2022) enrolled children aged 5–17 years with mild TBI (GCS 13–15), with follow-up assessments at 1 week and 4 weeks post-injury (N=152 over 1.5 years). We examined follow-up completion rates and evaluated demographic and clinical factors including age, race, gender, insurance status, injury severity, and completion of baseline questionnaires. Statistical analysis was performed using Chi-Square, Fisher's Exact, and Mann-Whitney U tests.

Results: In Study 1, 45.5% (n=75) completed the 6-month follow-up, excluding 4.2% (n=7) who died. Completion of baseline questionnaires strongly predicted successful follow-up (64.8% vs. 25.7%, $p<0.001$). Higher injury severity was also significantly associated with LTFU ($p=0.002$). In contrast, Study 2 achieved substantially higher retention: 81.6% (n=124) completed the 1-week follow-up, and 80.9% (n=123) completed the 4-week follow-up. Between studies, protocol changes were implemented, including the addition of virtual follow-up visits, more flexible scheduling options, and the provision of financial incentives. No significant differences in LTFU were observed based on race, sex, or insurance status in either study.

Conclusions: LTFU in pediatric clinical research can be significantly improved through targeted strategies such as virtual visits, flexible scheduling, and financial compensation. These adaptations were associated with higher retention in the second study. Future work will explore additional barriers and facilitators to follow-up in pediatric populations to inform best practices for long-term engagement in clinical trials.

Characterization of the Food Allergic Omalizumab Early Adopter Population in a Pediatric Academic Medical Center

Presenting Author: Brian Vickery; Emory University

Poster Number: 170

Byars, Jackson, Children's; Bai, Shasha, Emory; Ezhuthachan, Idil, Emory and Children's; Horton, Codi, Children's; Lee, Gerald, Emory and Children's; Leef, Chelsea, Children's; Rathkopf, Melinda, Emory and Children's; Vickery, Brian, Emory and Children's

Background: Identification of real-world food allergy patients suitable for omalizumab treatment following its February 2024 approval remains an important knowledge gap.

Methods: A matrixed clinical project team at a single academic tertiary care food allergy center systematically captured all candidate patients, and descriptive statistics were used to summarize the population. Tree nut(s) counted as a single allergy.

Results: As of August 2024, caregivers of 44 patients (11F, 33M), with mean age 8.8 years (range 1-20), median total IgE 556 (range 29-6016) and 2.7 (range 1-6) food allergies, expressed serious interest in omalizumab. Sixteen (36%) were approved and dosing, 19 (43%) are under review, 5 (11%) were considered ineligible, and 4 (9%) withdrew; of these 9 ineligible/withdrawn, 2 had IgE>1850. No prior authorizations have been denied. Five most common allergens were peanut (N=35), tree nuts (22), egg (15), milk (11), and sesame (9). Twenty-five (57%) have had at least one oral food challenge in clinic.

Fifteen (34%) and 20 (45%) had comorbid asthma and eczema, respectively. Forty-one (93%) have private commercial insurance. Race was self-reported: 32 (73%) white, 6 (14%) Black/African-American, 3 (7%) Asian, and 3 (7%) multi-racial. Median distance between residential ZIP code and the medical center was 7.85 miles (range 1–267).

Conclusions: The typical early adopter patient seeking omalizumab therapy was a school-age white male with multiple common food allergies, who had private insurance and lived relatively close to the medical center. In this population, insurance authorization was not a barrier but equitable access to food allergy therapies will require further efforts.

Childhood Anemia Initiative at Ethnē Health Community Clinic

Presenting Author: Sophie Vo; Emory University School of Medicine

Poster Number: 171

FLETCHER, LYDIA and VO, SOPHIE (both first authors), Emory University School of Medicine; Stewart, Kimberly, Ethnē Health; Boden, Laurie, Ethnē Health

Background: Clarkston, GA is home to a vibrant refugee community, with residents from over 40 different countries. The refugee population is particularly impacted by childhood anemia, with an estimated prevalence of 36.54 among refugee children globally. We worked with Ethnē Health Community Clinic to address the growing frequency of iron deficiency discovered during well child visits. The aim of our project was to investigate the dietary habits of Clarkston's residents, identify potential interventions, and evaluate the feasibility of current dietary recommendations. Ultimately, our goal was to create a culturally sensitive educational tool to assess and recommend steps to improve a child's current iron intake.

Methods: We conducted home nutrition visits for five families from Afghan, Karen, and Eritrean backgrounds. We gathered observations about their meals and most frequented grocery stores to identify accessible, iron-rich foods that could be incorporated into each culture's diet. The intervention focused on iron-deficiency anemia, the most prevalent form of nutritional deficiency in the pediatric population at Ethnē. The first part of the initiative consisted of making an interactive pamphlet of iron-rich grains, vegetables, meat, fruits, and nuts that families could circle. A detailed breakdown of the iron content for one, ½, and ¼ cup of each food item was provided so that physicians could calculate patients' iron intake. The second part of our initiative involved creating a compendium of pictures from local grocery stores of iron-rich food items and providing familiar examples of the food items listed in the pamphlet.

Results: Personalized, culturally sensitive nutrition education better equips families with the knowledge to ensure their children have adequate iron intake. Pamphlets enhanced nutrition assessment and education by providing a quick estimate for iron intake. Ethnē is a site for the Community Learning Social Medicine longitudinal course at Emory SOM, so the nutrition initiative will be continuously assessed and refined.

Conclusion: Clarkston is a diverse community encompassing a wide variety of cultural backgrounds. Consequently, it is important to understand each patient's culture before suggesting dietary

interventions. Conducting home visits gave us insight beyond patient lab values into accessible and desirable iron-rich foods for patients.

Acute Renal Antiviral Responses to Synthetic Viral dsRNA

Presenting Author: Giacynta Vollmer; University of Alabama at Birmingham

Poster Number: 172

Vollmer, Giacynta, University of Alabama at Birmingham; Laprocina, Karly, University of Alabama at Birmingham; Bolisetty, Subhashini; University of Alabama at Birmingham; and Odum, James D, University of Alabama at Birmingham

Background: Viral infections are a major contributor to pediatric mortality, particularly in the setting of bacterial coinfection. Viral priming is an evolutionarily conserved response to viral infections that alerts host cells to viral perturbations through interferon signaling cascades. As seen in sepsis, overexaggerated antiviral responses can contribute to multiple organ dysfunction including acute kidney injury (AKI). Host cells recognize dsRNA viruses via toll-like receptor 3 (TLR3) and melanoma differentiation-associated protein-5 (MDA-5), responding with increased type I interferon expression. As these antiviral mechanisms are not well understood in the setting of AKI, we leveraged polyinosinic-polycytidilic acid (poly(I:C)), a synthetic analog to viral dsRNA, to unmask the mechanisms of renal-specific response to viral priming.

Methods: We challenged male 8-week-old C57Bl/6J mice with 2.5 mg/kg poly(I:C) or 0.9% saline. At 4, 12, and 48h-post poly(I:C), we collected blood, kidney, and spleen. We analyzed whole blood cell counts via Veterinary Hematology Analyzer. We analyzed plasma for IFN-α and IFN-β via ELISA. We probed kidney and spleen via Western blot for TLR3, MDA-5 and type I IFN transcription factors MAVS and IRF3. We performed immunohistochemistry (IHC) to localize these proteins in kidney. Analysis employed Student's t-test ($\alpha<0.05$).

Results: Challenge with poly(I:C) resulted in significant lymphopenia at 4h (3.830±0.3224 vs. 1.408±0.1297 103/µL, p=0.0001) and 12h-post poly(I:C) (3.830±0.3224 vs. 0.9500±0.1834 103/µL, p<0.0001) compared to vehicle. Plasma type I interferons peaked at 4h-post poly(I:C) compared to vehicle (IFN-α: 0.00±0.00 vs.106.6±26.96 pg/mL, p=0.0042; IFN-β: 1.819±1.351 vs. 1896±154.9 pg/mL, p<0.0001). Western blot of kidney and spleen demonstrated that TLR3 is present in bulk spleen, but not kidney. However, we observed MDA-5, MAVS, and IRF3 in kidney, with increased expression in mice primed with poly(I:C). We localized these proteins via IHC in renal endothelial and tubular epithelial cells.

Conclusions: The observations of lymphopenia and increased plasma type I interferons acutely after poly(I:C) administration demonstrate the host response to viral priming. The increased kidney expression of both MDA-5 and type I interferon transcription factors, along with the absence of TLR3, further supports the role of MDA-5 in the renal antiviral response to viral dsRNA.

Mapping the HPV16 E6 Affinity Interactome

Presenting Author: Kathleen Weimer; Emory University

Poster Number: 173

WEIMER, KATHLEEN, Emory University; Zambo, Boglarka, Institut de Génétique, Biologie Moléculaire et Cellulaire (IGBMC); Trave, Gilles, IGBMC; Gogl, Gergo, IGBMC; Murray, Kristy

Protein interaction networks encompass the entirety of a cell's protein-protein interactions, creating dynamic networks that are temporal, often transient, and contextual by nature. These networks, or interactomes, determine cellular function and regulation, thus underpinning the development of disease. This places interactomes at a critical crossroads, linking genotype and phenotype and holding key insights into pathogenesis. Human Papilloma Viruses (HPVs) have often been subject to interactomic studies as they are highly diverse, both genotypically and phenotypically, resulting in clinical presentations that range from transient and asymptomatic to persistent and cancer-causing. HPVs, with >200 isotypes, repeatedly infect people of all ages in the skin, genitals, and throat. While prophylactic vaccination against high risk-HPV (hr-HPV) types has made strides in reducing morbidities from HPV-related pathologies, most causal infections are acquired during adolescence. This results in nearly 690,00 annual cases of HPV-induced cancers, with low-and-middle income countries disproportionately affected. By conducting a high throughput quantitative interatomic study of the HPV16 virally encoded oncoprotein, E6, we've gained new insights into pathways involved in HPV driven carcinogenesis and identified potential therapeutic strategies for targeting hr-HPV infections. Here, we've applied a novel approach, known as the native holdup, to measure approximately 4500 affinities between 16E6 and endogenous host proteins present in HaCaT (HPV-) and HeLa (HPV+) cell lines. With this, a 16E6 affinity profile was generated, identifying 100 partners of interest, including both previously characterized 16E6 partners, UBE3A, and TP53, and novel partners such as PTPN14, an established target of the other major oncoprotein E7. By combining this affinity profile with the quantified proteome, we were able to model the probability of these interactions occurring at different stages of infection and identify critical pathways involved in carcinogenesis. Further investigation of the 16E6-UBE3A interaction revealed the involvement of UBE3A oligomerization, which represents a unique biophysical feature of HPV infections that can be exploited to develop highly specific host-directed therapeutics. In taking a quantitative approach to interactomics, we were able to characterize the 16E6 interactome at a depth and complexity never seen before.

Bridging the Gap: Effectiveness of Referral-Based HIV and Syphilis Screening in a Pediatric Emergency Department

Presenting Author: Alleigh Wettstein; Medical College of Georgia at Augusta University

Poster Number: 174

WETTSTEIN, ALLEIGH, Medical College of Georgia; Chung, Ana-Sophia, Medical College of Georgia; Godfrey, Danielle, Children's Hospital of Georgia; Levkowitz, Eilan, Children's Hospital of Georgia; Baer Ellington, Aimee, Children's Hospital of Georgia and Seeyave, Desiree, Children's Hospital of Georgia

Background: Human immunodeficiency virus (HIV) and syphilis remain significant public health concerns, particularly among adolescents and young adults. In 2023, Georgia ranked fourteenth in the country for new syphilis diagnosis rates, and Georgia has consistently higher HIV incidence compared to the Southeast and the country as a whole. Adolescents and young adults account for over half of these cases. Unfortunately, HIV and syphilis blood screening remains inconsistent across Pediatric Emergency Departments (PEDs) for high-risk patients already undergoing STI urine screening. At the studied

institution, HIV and syphilis screening was limited to sexual abuse patients; other patients were referred to the health department upon discharge for these tests. This study evaluates patient adherence to health department referrals, highlighting the need for structured PED-based screening programs.

Methods: This prospective, IRB approved survey study was conducted at a single Southeastern U.S. PED. Adolescents aged 13–21 who underwent urine STI screening for gonorrhea, chlamydia, or trichomonas were eligible. Exclusions included sexual assault cases and those with known recent HIV or syphilis exposure. Written consent was obtained.

Participants were informed of a follow-up telephone questionnaire at two weeks post-visit, with a second call at four weeks if testing remained incomplete. The questionnaire assessed adherence to recommended HIV and syphilis testing and potential barriers to follow-up.

Results: Of 29 recruited participants, 12 completed the questionnaire. The majority of the participants were non-Hispanic, African American females. Nearly half (45%) did not answer follow-up calls, and 14% withdrew upon follow-up call. Among those, four completed HIV and syphilis testing—two at the health department, one at a county hospital, and one at a primary care provider. Only 14% of consented participants confirmed further testing, highlighting a gap in follow-up adherence.

Conclusion: Findings suggest poor patient adherence to follow-up testing. The most commonly reported reason for non-completion was unawareness of its necessity, despite documented provider instructions. Implementing on-site screening could improve HIV and syphilis screening rates. Of note, the high rates of loss to follow-up in this study highlight the need for alternative follow-up strategies in adolescents as methods such as text-based communication may be more effective.

Cerebrospinal Fluid Stroke Volume is Decreased in Pediatric Chiari 1 Patients

Presenting Author: Brice Williams; Emory University

Poster Number: 175

Williams, Brice, Emory University; Uribe, Bliss, Emory University; Oshinski, John, Emory University

Introduction: Studies using Phase Contrast Magnetic Resonance (PCMR) have shown that peak cerebrospinal fluid (CSF) velocity is increased in patients with Chiari Malformation I (CM-I) compared to normal subjects, and that peak CSF velocity decreases after posterior fossa decompression surgery. However, peak velocity has not gained clinical acceptance as a diagnostic marker because noise, aliasing, and potential contamination of CSF measurements with vascular flow have hindered its applicability in practice. The volume of fluid that moves forward (or backward) through the foramen magnum per heartbeat – CSF stroke volume – is a more robust metric to assess CSF dynamics as it integrates velocity across the entire CSF cross-sectional area. We hypothesized that CSF stroke volume would be lower in pre-surgical CM-I patients than in control patients and would increase following surgery.

Methods. 49 pediatric CM-I patients (age 9.4 +/- 4.7) underwent MR imaging as part of normal clinical care. 15 patients underwent decompression surgery and 10 patients had follow-up MRI at 6 months. 8 additional volunteers (age 7.8 +/- 5.4), who underwent MRIs for non-specific headache symptoms, and were determined to be normal in structure and function by a neuroradiologist were used as control subjects. ECG-gated 2D phase-contrast magnetic resonance (PCMR) scans were acquired in the axial

orientation at the foramen magnum (FM) and at C6 spinal vertebra. CSF stroke volume was calculated from flow by separately integrating positive and negative flow, then averaging.

Results. The stroke volumes in the pre-surgical CM-I subjects at FM were lower than the control subjects (n=46, p=0.028). Stroke volumes at FM were not significantly different in post-surgical CM-I subjects compared to controls (n=19, p=0.156). Pre-surgical stroke volumes were not different than unpaired post-surgical stroke volumes at FM or C6 (n=44). However, pre-surgical stroke volumes were lower than paired post-surgical at C6 (n=6, p=0.007). Additionally, paired pre-surgical volumes between FM and C6 were different (n=34, p=0.029) while paired post-surgical volumes were not different (n=8, p=0.394).

Conclusion. Pediatric control subjects had higher CSF stroke flow volume than CM-I patients. Sub-occipital decompression surgery increased CSF stroke volume in CM-I patients to values equal to normal control subjects. Paired pre- and post-surgical volumes showed significant differences while unpaired did not, suggesting each patient must serve as their own baseline for comparison. Further investigation is necessary to determine if patient demographics (age, height, weight) can serve to stratify stroke volumes.

Tuning Ribosomal Protein Expression as a means to Rescue Different Sub-Types of Cystic Fibrosis-Causing Variants

Presenting Author: Ashlyn Winters; Emory University

Poster Number: 176

WINTERS, ASHLYN G., Emory University; Freestone, Emily, Emory University; Jackson, JaNise J., Emory University; Foye, Catherine, Emory University; Lopes-Pacheco, Miquéias, Emory University; Santos, Sean, University of Alabama at Birmingham; Rodgers, John W., University of Alabama at Birmingham; Hartman IV, John L., University of Alabama at Birmingham; Sorscher, Eric J., Emory University; and Oliver, Kathryn E., Emory University.

Background: Cystic fibrosis (CF) is a lethal autosomal recessive disorder caused by mutation of the CF transmembrane conductance regulator (CFTR). Gene variants confer defects in the encoded epithelial chloride and bicarbonate channel, together with pathological findings in numerous tissues that to date, have not been completely restored by clinically approved drugs (i.e. “CFTR modulators”). More effective therapeutic interventions are needed to enhance quality and quantity of life for individuals living with all forms of CF. Previously with collaborators, we established a yeast phenomic system to model distinct sub-types of CFTR variants such as premature termination codons (PTCs) and processing variants. Gene deletion screens yielded several ribosomal ‘hits’ that rescued functional expression of mutations analogous to the following CFTR variants: W1282X, G542X, N1303K, or F508del.

Methods: In the present study, evolutionary conservation of gene-gene interactions discovered in yeast were assessed in the established CF cell model, Fischer rat thyroid (FRT) airway epithelia. Cells were stably transduced with W1282X- or N1303K-CFTR, together with an in-frame, C-terminal Nano-Luciferase cassette to quantify stop codon read-through, or a horseradish peroxidase (HRP) tag to detect CFTR cell surface localization. Mammalian homologs of ribosomal targets identified in yeast (RPL12, RPL8, RPL21, RPL23, RPL24) were suppressed using siRNA knockdown.

Results: Disrupting these RPLs is anticipated to alter translation speed, ribosome fidelity, and/or mRNA quality control to confer mutant CFTR rescue. Preliminary findings demonstrate that partial silencing (~50%) of RPL12 or RPL8 significantly augments W1282X-CFTR read-through and plasma membrane localization (~2-3 fold). Interestingly, depletion of RPL12, RPL21, RPL23, or RPL24 significantly augments N1303K cell surface trafficking (~4-8 fold) and is associated with ~20% increase in CFTR mRNA levels.

Conclusions: Tuning expression of specific ribosomal proteins in the large 60S subunit represents a potential therapeutic strategy for individuals carrying different sub-types of CFTR variants. This approach could be utilized to address mutations (e.g. W1282X) that do not benefit from currently available drugs, and/or be combined with CFTR modulators to amplify their rescue of on-label variants (e.g. N1303K). This work will inform future studies designed to examine feasibility, efficacy, and tolerability of targeting ribosomal 'hits' in CF cells and animal models.

Scalable Telehealth Sprint- Intensity Interval Training to Improve Cardiorespiratory Fitness in Children with Cerebral Palsy: Pilot RCT Design and Preliminary Analysis

Presenting Author: Ashley Wright; University of Alabama at Birmingham

Poster Number: 177

Wright, Ashley, University of Alabama at Birmingham (UAB); Davis, Drew, UAB; Bright, Larsen, UAB; Young, Raven, UAB; Hutchinson, Bailey, UAB; Rimmer, James, UAB; Lai, Byron, UAB

Purpose: To investigate the potential effects of a seated, 12-week arm-based sprint-intensity interval training (SIT) program on indicators of cardiorespiratory fitness and cardiometabolic health among children with cerebral palsy (CwCP).

Methods: This phase 1 pilot randomized controlled trial includes a 2-armed parallel group design, where 50 physically inactive CwCP (aged 6-17 years) will be randomly allocated into either an immediate start (IS) or a waitlist control (WC) group. The SIT prescription includes 3 tele-supervised sessions per week with 30 repeated sequences of 4 seconds of maximal arm exercise, with active recovery (approximately 20-minute sessions). SIT includes guided videos with child-themed arm routines and music. Outcomes are measured at pre- and post-intervention include peak oxygen consumption, via graded exercise test; high-sensitivity C-reactive protein and blood insulin, hemoglobin A1c, triglycerides, and cholesterol using a finger stick dried blood spot test; blood pressure, using a sphygmomanometer; body composition using dual x-ray absorptiometry. Preliminary analyses were conducted using repeated measures ANCOVA with 12-week physical activity levels as a covariate.

Results: Analyses from 27 CwCP demonstrated a statistically significant time*group interaction (F=8.27, p=0.009) but no significant group or time effect for peak oxygen consumption (IS n=11, WC n=15). There was no statistically significant findings for DEXA (IS n=10, WC n=14) or blood related outcomes (IS n=8, WC n=13). Visual trends were observed for improved % fat and blood insulin, in favor of the IS group. Conclusions: A low dose SIT program, that is accessible for children with mobility disabilities and low-cost, may improve aerobic capacity and some indicators of cardiometabolic health among CwCP.

Future Directions: There are limited evidenced methods for engaging children with mobility disabilities in health-enhancing aerobic exercise. Findings warrant replication and comparison to moderate-intensity aerobic exercise interventions.

Acknowledgments: This project is supported by the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institutes of Health (award R21HD109358). Laboratory equipment was supported by the Human Performance Laboratory in the Wellness Health and Research Facility at the University of Alabama at Birmingham. Medical alert devices provided by the American District Telegraph.

A Tale of Two Mutations: How PHF14 Loss and Gain Variants Disrupt Brain Development

Presenting Author: Yongji Wu; Emory University, School of Medicine, Human Genetics

Poster Number: 178

Yongji Wu, Emory University; Gaea Dominguez, Emory University; Eskender Seyoum, Emory University; Weilan Lin, Emory University; Jian Zhou, Emory University, Marcus Autism Center

Background: Plant Homeodomain Finger Protein 14 (PHF14) is an epigenetic regulator with critical roles in cell proliferation and differentiation, cancer, fibrosis, and neurodevelopmental disorders (NDDs). As a chromatin-associated protein, PHF14 modulates gene expression by interacting with its key protein partners, TCF20 and MeCP2—the causal genes for Rett Syndrome (RTT) and TCF20 associated NDD, respectively—within the TCF20/PHF14 complex. We previously identified a PHF14 missense variant (c.964T>G, p.C322G) in an NDD patient presented with clumsy gait, developmental delay/intellectual disability, speech delay, and an RTT-like regression in gross motor skills and balance. This mutation disrupts the interaction between PHF14, TCF20, and MeCP2 within the complex. Our clinical and biochemical finding highlights the strong link between the TCF20/PHF14 complex and NDD pathogenesis; however, the underlying neuronal and molecular mechanisms remain unclear.

Methods: To understand the role of PHF14 in brain development, we generated Phf14 knockout (KO) and Phf14-C322G knock-in mouse models. We collected the brain tissue at various developmental stages to assess the impact of PHF14 mutations on neurodevelopment both at cellular and molecular levels, employing Western blot, immunostaining, and RNA-sequencing analyses.

Results: During early brain development, we found that Phf14 deletion decreases SOX2 protein level in the brain at E17.5, indicating impaired mitotic activity. Additionally, we observed significantly reduced PHH3- and Satb1/2-positive cells in the Phf14 KO brain, suggesting that PHF14 plays an important role in regulating the proliferation and differentiation of neural progenitor cells in the cortex. At the molecular level, loss of Phf14 disrupts key neurodevelopmental pathways, including neuropeptide signaling pathway, cell-cell signaling, and neurogenesis. Furthermore, Phf14 KO mice exhibit neonatal lethality at P0, highlighting its essential role in development.

Notably, homozygous Phf14C322G/C322G mice exhibit an even earlier embryonic lethality at E15.5, whereas compound heterozygous (Phf14-/C322G) mice remained viable into adulthood, suggesting that the C322G mutation is a potential gain-of-function variant by enhancing ectopic PHF14 functions rather than causing a complete loss of function.

Conclusion: Our study established PHF14 as a key regulator in brain development and reveals novel molecular mechanisms underlying both loss- and gain-of-function effects of PHF14 mutations, shedding light on its role in neurodevelopmental disorder pathogenesis.

Mechanisms to overcome disease-causing nonsense variants such as W1282X-CFTR

Presenting Author: Yolanda Yang; Emory University

Poster Number: 179

YANG, Yolanda, Emory University; Winters, Ashlyn G., Emory University; Freestone, Emily, Emory University; Jackson, JaNise J., Emory University; Foye, Catherine, Emory University; Lopes-Pacheco, Miquéias, Emory University; and Oliver, Kathryn E., Emory University.

Background: Premature termination codons (PTCs) are linked to more than 2,400 human disorders such as cystic fibrosis (CF), a lethal autosomal recessive condition caused by loss-of- function of the CF transmembrane conductance regulator (CFTR). CFTR PTCs are associated with severe disease phenotypes as they elicit degradation of the encoded mRNA and protein, i.e. aberrations that do not respond to clinically available drugs. Our earlier work suggests that partial suppression of distinct ribosomal proteins (RPL12, RPL8) rescues synthesis of a relatively common CFTR PTC, W1282X, potentially through slowed translation speed, reduced ribosome fidelity, and/or interference with mRNA surveillance. For the present study, our objective is to determine whether ~50% depletion of RPL12 or RPL8 alters W1282X transcript stability and/or full-length protein production; thus, offering novel insights into potential therapeutic strategies.

Methods: Using the Fischer rat thyroid (FRT) CF cell model, effects of ribosomal protein suppression were measured following treatment with siRNA. FRT were stably transduced with W1282X-CFTR and short introns flanking the affected exon ("exon mini-genes") to render transcripts susceptible to mRNA decay. Immunoblotting and qRT-PCR analyses were employed to confirm knockdown of RPL12 or RPL8 expression, as well as ascertain the impact on W1282X processing. Tests of additivity/synergy with ribosomal knockdown were conducted with established inhibitors of translation efficiency (G418, SMG1i) and clinically approved CFTR modulators (elexacaftor-tezacaftor-ivacaftor).

Results: Western blots reveal that W1282X produces truncated portions of the immature, endoplasmic reticulum-retained glycoform ("band B") and the mature, fully-glycosylated protein ("band C"). Preliminary data show that RPL12 silencing increases expression of these truncated bands through an 'amplifier' effect, as well as synthesis of full-length band C by PTC read- through. RNA analyses demonstrate that RPL12 or RPL8 depletion significantly augments W1282X transcript abundance, albeit to a modest degree (~20%).

Conclusions: Early findings indicate partial depletion of RPL12 or RPL8 may interfere with mRNA surveillance machinery – such as nonsense-mediated decay or no-go decay factors – to stabilize transcripts and enhance PTC read-through. Ongoing work aims to interrogate whether RPL12 or RPL8 represent suitable targets for small molecule or nucleotide-based therapeutic approaches to benefit patients carrying PTCs in CFTR and potentially other disease-associated genes.

Development of MRI-Compatible Laser-Powered Microcatheters for Pediatric Cardiac Intervention

Presenting Author: Yusuf Yaras; Georgia Institute of Technology

Poster Number: 180

Ching, Henry, Georgia Institute of Technology; Sabbagh, Ali, Georgia Institute of Technology; Whitehill, Robert, Children's Healthcare of Atlanta; Degertekin, F. Levent, Georgia Institute of Technology; Bauser-Heaton, Holly, Emory University - Children's Healthcare of Atlanta; and YARAS, YUSUF, Georgia Institute of Technology

Background: Congenital heart diseases (CHDs) and arrhythmias in neonates and young children demand timely and precise interventions; however, current catheter-based tools are often too large and incompatible with MRI, limiting both safety and efficacy in this vulnerable population. Standard cardiac ablation catheters typically range from 7F to 9F, posing substantial risks to delicate pediatric cardiovascular structures. This study presents the early development of a novel class of MRI-compatible, laser-powered microcatheters specifically miniaturized for use in neonates and small children. These devices aim to enable safer, image-guided cardiac interventions under real-time MRI, addressing a critical gap in pediatric interventional cardiology.

Methods: The proposed microcatheter features fiber optic cables and a laser-activated heating tip, integrated with temperature and contact force sensors. The engineered heating tip converts laser energy into precise thermal ablation, while the sensors at the distal tip provide real-time feedback to control lesion size and conditions. The 2–4F form factor permits access to small vasculature, and the all-dielectric construction ensures MRI compatibility. Design optimization is being guided by finite element analyses (FEA) for optical absorption, thermal transfer, and mechanical performance. Prototype evaluation includes benchtop and ex-vivo porcine heart studies to assess heating dynamics, lesion formation, and perforation capability. Lesion characterization is performed using both gross tissue inspection and histological analysis, including 2,3,5-triphenyltetrazolium chloride (TTC) staining to distinguish viable from non-viable tissue. MRI safety testing is planned using standard gel phantoms under 3T MRI according to ASTM F2182-11a protocols.

Results: Initial prototypes with temperature sensors demonstrated promising thermal response and feasibility for clinical application. Lesion assessments are currently carried out using both gross and histopathological methods. Preclinical data from ex-vivo evaluations are expected to be available for presentation. The next-generation prototype integrates force sensors in addition to temperature sensor. Analytical studies are promising and prototypes will be tested in ex-vivo studies using porcine heart model for ablation and perforation capabilities, lesion characterization, and MRI safety.

Conclusion: This laser-powered, MRI-compatible microcatheter represents a promising advancement in pediatric cardiac intervention, offering a safer and more precise tool for treating CHDs and arrhythmias. Ongoing preclinical studies support its potential for future clinical translation.

The Effects of Virtual Reality Tele-exergaming on Cardiometabolic Indicators of Health Among Youth With Cerebral Palsy: Protocol for a Pilot Randomized Controlled Trial

Presenting Author: Raven Young; University of Alabama at Birmingham

Poster Number: 181

Young, Raven, University of Alabama at Birmingham (UAB); Lai, Byron, (UAB); Davis, Drew, (UAB); Wright, Ashley, (UAB); Wen, Huacong, (UAB); Swanson-Kimani, Erin, (UAB); Wozow, Cynthia, (UAB); Chaviano, Kelli, (UAB); Gower, Barbara, (UAB); Rimmer, James, (UAB).

Background: Youth with cerebral palsy (YwCP) often lack enjoyable, accessible, and scalable exercise options to help them independently manage their cardiometabolic health. This study investigated the preliminary efficacy of a 12-week home-based virtual reality (VR) tele-exergaming intervention aimed at improving cardiometabolic health in YwCP, compared to a waitlist control group.

Methods: A parallel group randomized controlled trial was conducted with 32 inactive YwCP, randomly assigned to either an immediate start group (n=17) or a waitlist control group (n=15). The immediate start group participated in 12 weeks of VR exergaming with tele-physical education, while the control group maintained their usual activity levels. Cardiometabolic health indicators, including high-sensitivity C-reactive protein (hsCRP), blood insulin, hemoglobin A1c (HbA1c), triglycerides, and cholesterol, were measured at baseline (week 0), week 6, and week 12 using at-home blood spot tests with caregiver assistance. Blood pressure, lung function, and body weight were self-measured using consumer devices. Statistical analyses were conducted to compare outcomes within and between groups.

Results: The average age of participants was 17 ± 3.7 years in the immediate start group and 16.4 ± 3.8 years in the waitlist group. Physical activity levels, assessed by the Godin Leisure-Time Exercise Questionnaire, showed significant effects for group ($F=9.71$, $p=0.0028$), time ($F=9.11$, $p=0.0004$), and group-by-time interaction ($F=8.56$, $p=0.0005$), in favor of the immediate start group. For fasting insulin levels, there were statistically significant effects for the immediate start group ($F=4.11$, $p=0.047$) and group-by-time interaction ($F=4.14$, $p=0.0207$). However, no significant differences were found for weight, hsCRP, HbA1c, blood pressure, blood lipids, spirometry, or pain and fatigue levels.

Conclusions: This study demonstrates the potential of a home-based VR exergaming program for improving physical activity in YwCP. Findings suggest the program could be scalable, low-cost, and easily integrated into health care settings, with potential for wider application in future trials aimed at enhancing YwCP's health and well-being.

An Analysis of Safety, Equity and Efficiency of Direct Admissions in a Large Quaternary Children's Hospital

Presenting Author: Caroline Young; Emory University School of Medicine Graduate Medical Education, Children's Healthcare of Atlanta

Poster Number: 182

YOUNG, CAROLINE, Emory University, Children's Healthcare of Atlanta; Hames, Nicole, Emory University, Children's Healthcare of Atlanta; and Muthu, Naveen, Emory University, Children's Healthcare of Atlanta

Background: Direct admissions account for about 25% of pediatric hospitalizations nationwide. The 2023 American Academy of Pediatrics Policy Statement on Direct Admissions recommends institutions evaluate outcomes for patients admitted directly, bypassing the Emergency Department. Despite this, few have done so. Our pediatric health system accepts direct admissions but has not previously assessed their outcomes. This retrospective study examines the safety, equity, and efficiency of direct admissions in our system.

Methods: We conducted a retrospective review of electronic health record data from May 1, 2019, to May 1, 2024, including all unplanned pediatric admissions. Admissions were categorized as direct or from the emergency department, based on case management review. Exclusions included planned admissions, those lacking case management determination, and admissions to critical care units. This resulted in 135,500 eligible encounters. Data included patient demographics and outcomes such as length of stay and emergent transfers (ETs) to the PICU. ETs were defined as PICU transfers requiring > three 20cc/kg fluid boluses, inotrope initiation, and/or intubation within 1 hour of arrival. Descriptive statistics and univariate logistic regression were used to assess associations.

Results: Among 135,500 encounters, 11,765 (8.7%) were direct admissions. Adolescents, adults, and patients with government insurance were more likely to be directly admitted. Black and other non-White, non-Hispanic patients were less likely to be directly admitted, while Hispanic patients were more likely. Direct admissions were associated with a more than twofold increase in the odds of an ET to the PICU (OR 2.25, CI 1.56–3.18, $p < 0.001$). They were also less likely to result in short stays (<12 hours) (OR 0.62, CI 0.56–0.67, $p < 0.001$).

Conclusion: These findings raise concerns about safety and equity in direct admissions. The increased rate of emergent transfers suggests potential issues in prehospital screening. Demographic disparities point to possible inequities that merit further investigation. Next steps include exploring contributing factors to ETs, evaluating practice differences across hospitals, and using multivariate models to control for confounders.

Health-related Quality of Life Outcomes from a Biofeedback Enhanced Cognitive Behavioral Therapy Intervention in Youth with Chronic Gastrointestinal Disease

Presenting Author: Taylor Younginer; Children's Healthcare of Atlanta + Emory University Pediatric Institute

Poster Number: 183

S. TAYLOR YOUNGINER, PhD, Emory University + Children's Healthcare of Atlanta Pediatric Institute; Adrianna Westbrook, MPH, Emory University School of Medicine; Jessica Buzenski, PhD; Emory University + Children's Healthcare of Atlanta Pediatric Institute; and Bonney Reed, PhD, Emory University + Children's Healthcare of Atlanta Pediatric Institute

Background: Pediatric patients with chronic gastrointestinal (GI) conditions including inflammatory bowel diseases (IBD) and irritable bowel syndrome (IBS) experience a high disease burden and on average endorse lower health related quality of life (HRQOL) than their healthy counterparts. Though distinct diagnoses, both are conceptualized as products of the brain-gut-axis and impacted by stress responsivity and disease coping. Disease-tailored treatments addressing stress and disease coping have the potential to improve HRQOL for both patient groups. This study examined the effect of a virtual, heart rate variability (HRV) biofeedback enhanced coping skills intervention on HRQOL in pediatric patients with IBD and IBS.

Methods: Patients (13-18 years) diagnosed with IBD (N = 51) and IBS (N = 21) were grouped by diagnosis and randomized to either immediate treatment or waitlist control groups. The intervention consisted of 6 virtually delivered, weekly group sessions combining cognitive behavioral therapy (CBT) with HRV

biofeedback training. Outcomes included youth and parent-rated measures of HRQOL and GI symptoms. Assessments were conducted at baseline and post-intervention.

Results: Post-intervention and compared to controls, youth with IBD endorsed improved overall HRQOL as well as improvements in physical, emotional, school, and psychosocial subdomains. No significant changes emerged for youth with IBS post-intervention compared to controls. Within the treatment condition, parents of youth with IBD reported improved emotional HRQOL, meanwhile parents of youth with IBS reported improved physical and overall HRQOL.

Conclusions: This study offers preliminary support for a biofeedback-enhanced, coping skill intervention in improving patient-reported HRQOL outcomes in youth with IBD. Future studies are needed to understand mechanisms of change for patients with IBD and how the intervention could be tailored to better address HRQOL in patients with IBS.

Experimental CD8 cell depletion in ART-suppressed SIV-infected rhesus macaque infants to define the role of CD8+ T cells in pediatric HIV reservoir maintenance

Presenting Author: Shahab Zaki Pour; Emory University

Poster Number: 184

ZAKI POUR, SHAHAB, EMORY UNIVERSITY; COLVIN, ALORA, EMORY UNIVERSITY; Rizkianty Hamid, RIRI, EMORY UNIVERSITY; KEELE, BRANDON, Frederick National Laboratory for Cancer Research, Frederick; SILVESTRI, GUIDO, EMORY UNIVERSITY; CHAHROUDI, ANN, EMORY UNIVERSITY AND MAVIGNER, MAUD, EMORY UNIVERSITY

Background: Despite antiretroviral therapy (ART) reducing morbidity and mortality in children living with HIV, there is no cure for HIV that persists in a latent reservoir. Mounting evidence implicates CD8+ T cells in controlling HIV persistence in adults. However, the influence of CD8+ T cell antiviral activities on HIV reservoir in infants is largely unknown. Given the distinct features of the developing immune system, pediatric studies are warranted. Here we conducted a proof-of-principle in vivo study to assess the impact of experimental CD8+ T cell depletion on the viral reservoir in a model of ART-treated perinatally SIV-infected rhesus macaques (RM) infants.

Methods: Sixteen RMs were infected i.v. with 5,000 IU of barcoded SIVmac239M and initiated on ART 4 weeks post-infection (wpi). After >3 months of plasma viral load (PVL) suppression on ART, animals are divided in 2 groups: 6 RMs are maintained on ART only and serve as controls while 10 RMs receive the experimental treatment consisting of a dose of the anti-CD8α-depleting antibody MT807R1 at 50 mg/kg alone or in combination with weekly doses of the latency reversing agent AZD5582 at 0.2 mg/kg for 5 weeks. A comprehensive assessment of serum chemistries, complete blood counts, body weight, PVL, and flow cytometric immunophenotyping are performed throughout the study.

Results: All infant RMs were successfully infected after one SIVmac239M challenge with a peak PVL of 1.3.107-2.5.108 SIV RNA copies per ml of plasma at 1-4 wpi. ART initiation was followed by a drastic reduction in PVL, reaching a first undetectable value in most animals by 12 wpi. The experimental treatment was initiated in 4 RM infants including 2 RMs that received the CD8 depleting antibody alone and 3 RMs that received MT807R1 and AZD5582. No adverse events were observed in these animals. A depletion of >99% of peripheral CD8+ T cells was observed 1-day after MT807R1 administration.

Conclusions: In this study, administration of an anti-CD8α-depleting antibody, alone or with the latency reversal agent AZD5582 in ART-suppressed SIV-infected RMs was well-tolerated and resulted in a significant CD8+ T cell depletion, providing a model to investigate the role of CD8+ T cells in pediatric SIV/HIV persistence.

Revealing the Scarcity of AI/ML-Enabled Medical Devices for Children

Presenting Author: Grzegorz Zapotoczny; Lurie Children's Hospital of Chicago

Poster Number: 185

ZAPOTOCZNY, GRZEGORZ, Lurie Children's Hospital of Chicago; Goyal, Ansh, University of Colorado; Qazi, Shahida, Lurie Children's Hospital of Chicago; Christmas, Madison, Lurie Children's Hospital of Chicago; and Espinoza, Juan, Lurie Children's Hospital of Chicago

Background: Over the past 3 decades, medical devices have incorporated artificial intelligence and machine learning (AI/ML) into their function. In August 2024, the FDA published a list of 950 AI/ML-enabled devices it had cleared or approved to date. Little is known about the development, availability, applicability, and safety of AI/ML-enabled devices for children.

Methods: Using the publicly available FDA list to identify unique devices, we sought to evaluate pediatric labeling and clinical evidence for marketed AI/ML-enabled medical devices. Descriptive statistics were used to summarize the data.

Results: The first AI/ML-enabled device was cleared in 1995, but 2016 marked a dramatic increase in their entry to market. The majority of devices were developed in Radiology (75.9%), Cardiovascular (10.4%), and Neurology (3.57%). Among all AI/ML-enabled device records, 63% were silent on age in their Indications for Use statement, meaning, they do not specify the age group the device is for. Regarding clinical validation, ~45% of all records did not include any clinical validation, while ~30% was insufficient in detail to interpret age data.
Only 42 (4.5%) devices were specifically indicated for the use in children (0-17yo). Of these, 33 (79%) presented data (10 -prospective patient recruitment study, 23 -retrospective data analysis). An additional 86 (9%) devices mentioned pediatrics in general, but only 5 (5.9%) presented clinical evidence with specific pediatrics ages; in fact 44 (51%) were devoid of any clinical data (pediatric or adult).

Conclusions: Pediatric AI/ML-enabled medical devices are few, and even fewer present clinical data to substantiate their indications for use. The rapid increase in AI/M-enabled devices has not met the needs of all populations equally, with children in particular being left behind. Regulatory and legislative efforts are needed to create appropriate incentives and requirements to drive pediatric-specific innovation.

Characteristics of Patients With Sickle Cell Disease Who Received a Pediatric Palliative Care Consult

Presenting Author: Adam Zbib; Medical College of Georgia

Poster Number: 186

ZBIB, ADAM, Medical College of Georgia; and Fisher, Beth, Augusta University College of Nursing

Background: Pediatric palliative care (PPC) is an interdisciplinary field of medicine designed to help manage symptoms, provide psychosocial support, and enhance communication and coordination of care between patients, families, and healthcare providers. The prognosis of patients with Sickle Cell Disease (SCD) is closely linked with multidisciplinary care and psychosocial factors. PPC can potentially address deficits in care that still exist in the pediatric sickle cell patient population; however, there is limited data on PPC in managing SCD. The authors analyzed multiple characteristics of patients with SCD who received a PPC consult to potentially provide insight into PPC's role in SCD care.

Methods: The authors conducted a retrospective chart review of patients with SCD who received a formal PPC consult at one academic institution in the Southeast. They identified patients using a catalog of PPC patients. From the initial PPC consult note, the researchers collected data related to demographics, reason for consult, SCD severity, and psychosocial factors.

Results: The researchers identified 12 patients with SCD who received a PPC consult. Most consults were related to inadequate pain relief and/or inappropriate opioid use. All patients identified as Black and between the ages of 9-17, with a majority being male (83%). Nine patients (75%) reported severe complications related to Sickle Cell Disease, most commonly acute chest syndrome, followed by avascular necrosis, stroke, and pulmonary hypertension. Ten patients (83%) had signs of familial distress in the form of a single-parent household, living with an aunt or uncle, or living with a disabled parent. Four patients (33%) reported signs of anxiety or depression related to their health. Lastly, patients averaged 2.3 SCD-related admissions in the year leading up to the PPC consult, and 8 (66%) patients required patient-controlled analgesics at the most recent admission before PPC consultation.

Conclusions: Common themes among SCD patients who received a PPC consultation included the absence of at least one parent at home, a history of SCD-related complications, and inadequate pain management. Obtaining a comprehensive medical and social history in patients with SCD can help identify patients who may potentially benefit from multidisciplinary, family-centered PPC services.

Per- and Polyfluoroalkyl Substances (PFAS) Exposure Induces Cardiotoxicity and Mitochondrial Dysfunction in Human Induced Pluripotent Stem Cell-derived Cardiomyocytes

Presenting Author: Wenhao Zhang; Emory University

Poster Number: 187

Zhang, Wenhao, Emory University; Wang, Zeyu, Georgia Institute of Technology; Reid, Olivia, Emory University; Harris, Frank, Emory University; Man, Kun, Emory University; Wang, Matthew, Emory University ;Armand, Lawrence C., Emory University; Du, Yuhong, Emory University; Wu, Ronghu, Georgia Institute of Technology; Brown, Lou Ann, Emory University; Caudle, William, Emory University; Xu, Chunhui, Emory University

Background: Per- and polyfluoroalkyl substances (PFAS) are synthetic environmental contaminants commonly used in consumer and industrial products. Growing evidence links PFAS exposure to cardiotoxic effects, particularly during fetal development. However, the cardiotoxic potential of combined PFAS exposure, which more closely reflects real-world environmental conditions, remains poorly understood. This study aims to investigate the cytotoxic, mitochondrial, and molecular effects of

combined PFAS exposure using an in vitro cardiac toxicity model developed with human induced pluripotent stem cell-derived cardiomyocytes (hiPSC-CMs).

Methods: hiPSC-CMs were exposed to a mixture of three common PFAS compounds—perfluorohexanesulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorodecanoic acid (PFDA)—for up to 14 days. Cytotoxicity, mitochondrial function and redox balance were evaluated using TMRM, MitoTracker Red, and Redox assays. Immunocytochemistry was employed to examine fibrosis and cardiomyocyte markers. Additionally, proteomic profiling was performed to identify pathways disrupted by PFAS exposure.

Result: Combined PFAS exposure induced synergistic cytotoxicity, significantly reducing hiPSC-CM viability after 5 or 10 days of exposure. Mitochondrial assessments revealed dose-dependent disruptions in membrane potential and content, with 150 µM PFAS exposure causing substantially reduced mitochondrial membrane potential and content. Redox analysis showed a shift in cysteine metabolism, potentially indicating an adaptive response or precursor to oxidative stress after 10 days of exposure. After 14 days of exposure, combined PFASs enhanced vimentin expression in cultures as detected by immunostaining, indicating fibrotic remodeling. Proteomics profiling revealed that PFAS mixture exposure induced differential protein expression patterns, with significant upregulation of proteins involved in ECM remodeling, cholesterol homeostasis, and oxidative stress response pathways, while downregulating proteins associated with mitochondrial function and ribosomal subunit.

Conclusion: These findings demonstrate that short-term exposure to combined PFASs induces pronounced cytotoxic and mitochondrial damage in hiPSC-CMs, with molecular signatures of fibrosis, metabolic dysregulation, and a shift in cysteine metabolism potentially indicative of an adaptive response to oxidative challenges. The results underscore the importance of evaluating PFAS mixtures to better understand cardiovascular risks associated with environmental exposure.

Key Words: Per- and polyfluoroalkyl substances, cardiotoxicity, hiPSC-derived cardiomyocytes, mitochondrial dysfunction, fibrosis, proteomics

Machine Learning Pipeline to Identify Clinical and Metabolomic Risk Factors Predicting Post-Traumatic Seizures in Pediatric Patients

Presenting Author: Sirui Zhou; Emory University

Poster Number: 188

Sirui Zhou, Emory University; Makda Mulugeta, Children's Healthcare of Atlanta; Andrew Reisner, Emory School of Medicine & Laura Blackwell, Emory School of Medicine

Background: Post traumatic seizures (PTS) is a significant and common sequela of TBI with long-term outcomes. Many metabolites and clinical features have been identified as biomarkers of specific traits; however, there are inconsistent findings regarding suitable features for prediction of PTS. Given the heterogeneity of pediatric TBI, accurate risk prediction is essential for directing preventative resources. Machine learning (ML) offers a novel approach to leverage initial biomarker and clinical assessments for early PTS prediction.

Objective: In this study, we sought to develop an ML-derived EPTS risk prediction model using initial risk features.

Methods: This is a prospective cohort study conducted between March 2017 and June 2021 on pediatric patients presenting with head injury to two EDs at a tertiary children's hospital. EPTS was defined as seizures occurring within 7 days of injury. 19 risk features, including demographics (e.g., sex, race, age), neurosurgical intervention, acute clinical symptoms (e.g., anoxia, hypoxia) and blood biomarkers (e.g., Osteopontin, Tau, etc), were used in the prediction models. Supervised, classification-based ML models (Support Vector Machine, Gradient Boosting, XGBoost, and Random Forest) were evaluated and compared using the area under the receiver operating characteristic curve (AUC - ROC), area under the precision-recall curve (AUPRC), positive likelihood ratio, and positive predictive value.

Results: A total of 39 of the 373 patients (10.5%) developed EPTS. The median age was 10 (0.2, 19.9), the median Glasgow Coma Scale (GCS) score was 15 (2, 15), and 68% were male. Among the ML models, the Random Forest (RF) model had the highest performance (AUPRC 0.87; AUC-ROC 0.97; PPV 0.75; NPV 0.99) for EPTS prediction. Feature importance analysis revealed prior seizure history, antiepileptic drug usage, injury severity score, and biomarkers Tau and Osteopontin as important predictors of EPTS.

Conclusion: Using biomarker and clinical assessments collected upon admission, all four models predicted EPTS in a pediatric population with TBI. Further work is needed to validate these findings for integration into clinical workflows for real-time PTS risk stratification.

Author Index