



2023

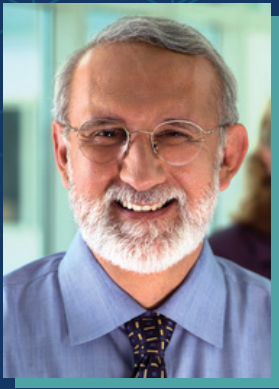
Research Day

CLINICAL AND TRANSLATIONAL SCIENCE INSTITUTE

FRIDAY, APR. 14 | 11 A.M. - 5 P.M.

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**Dr. Thomas A. and Joyce E. Pearson
Endowed Lectureship**

KEYNOTE PRESENTATION

Sergio Aguilar-Gaxiola, M.D., Ph.D.
UC Davis Health | Founding Director
Center for Reducing Health Disparities (CRHD)

About Dr. Aguilar-Gaxiola

Sergio Aguilar-Gaxiola, MD, PhD is a Professor of Clinical Internal Medicine at the School of Medicine, University of California, Davis. He is the Founding Director of the Center for Reducing Health Disparities at UC Davis Health and the Director of the Community Engagement Program of the UCD Clinical Translational Science Center (CTSC). He was co-chair of the NIH/CTSA Community Engagement Key Function Committee, co-chair of the Collaboration/Engagement Domain Task Force Lead Team, co-chair and member of the Lead Team of the Collaboration & Engagement Enterprise Committee's Health Disparities Workgroup. He is a past member of the National Advisory Mental Health Council (NAMHC), the National Institute of Mental Health (NIMH). He is currently a member of the NIH/National Advisory Council of the NIH National Center for Advancing Translational Sciences (NCATS), a member of the National Advisory Council of the Substance Abuse and Mental Health Administration (SAMHSA) – Center for Mental Health Services (CMHS), a member of the and board member of the California Health Care Foundation, Physicians for a Health California, and the Public Health Institute. In early 2022, he was appointed to the Governor's Advisory Council on Physical Fitness and Mental Well-Being and is the Chair of the Best Practices Subcommittee. He is a national and international expert on health and mental health comorbidities on diverse populations. Over the last 28 years, he has held several World Health Organization (WHO) and Pan American Health Organization (PAHO) advisory board and consulting appointments and is currently a member of the Executive Committee of WHO's World Mental Health Survey Consortium (WMH) and its Coordinator for Latin America overseeing population-based national surveys of Mexico, Colombia, Peru, and Argentina and a regional survey of Brazil, and two surveys of the city of Medellin, Colombia.

Dr. Aguilar-Gaxiola's applied research program has focused on identifying unmet health and mental health needs and associated risk and protective factors to better understand and meet population health and mental health needs and advance equity in health and mental health disparities in underserved populations. He is also very active in translating health, mental health, and substance abuse research knowledge into practical information that is of public health value to consumers and their families, health providers, service administrators, and policy makers.

Dr. Aguilar-Gaxiola is the author of over 190 publications. He is the recipient of multiple international, national, state, and local awards. Dr. Aguilar-Gaxiola was a member of the Institute of Medicine (IOM/NRC) Committee on Depression, Parenting Practices, and the Health Development of Young Children (2007-2009) report and a member of the IOM/NRC Women's Health Research: Progress, Pitfalls, and Promise (2010) report. Since March 2019, Dr. Aguilar-Gaxiola has been serving as co-chair of the Steering Committee of the National Academy of Medicine (NAM) Assessing Meaningful Community Engagement in Health and Health Care. Dr. Aguilar-Gaxiola was a member of the Institute of Medicine (IOM/NRC) Committee on Depression, Parenting Practices, and the Health Development of Young Children (2007-2009) report and a member of the IOM/NRC Women's Health Research: Progress, Pitfalls, and Promise (2010) report. Since March 2019, Dr. Aguilar-Gaxiola has been serving as co-chair of the Steering Committee of the National Academy of Medicine (NAM) Assessing Meaningful Community Engagement in Health and Health Care

**CTSI Research Day is made possible in part by funding
from the Dr. Thomas A. and Joyce E. Pearson Endowed
Lecture**

Agenda

11:00 am

WELCOME AND OPENING REMARKS

Duane Mitchell, MD, PhD

CTRB Room #2161

KEYNOTE SPEAKER

Sergio Aguilar-Gaxiola, M.D., Ph.D.

CTRB Room #2161

12:30 pm

BREAK

2:00 pm

INTERACTIVE POSTER SESSION

CTRB Lobby

3:30 pm

OPEN POSTER SESSION AND RECEPTION

CTRB Lobby

5:00 pm

CLOSING

Open Poster Session

UF BIOTILITY



UF Department
Center for Excellence for Regenerative Health Biotechnology
UF CTSI

Translating Research to Careers

Biotility at the University of Florida (UF Biotility) is an education and training center within the university, the Clinical and Translational Science Institute, established to develop workforce talent for Florida's bioscience industry. Functioning at the intersection of academia and industry, UF Biotility is proximal to the cluster of biotechnology companies in the Gainesville/Alachua area. Operating nationally, UF Biotility's efforts include 1) Industry training and certificate short-courses; 2) Secondary and postsecondary education program development and support, including teacher training and certification; and 3) Administration and maintenance of the industry-recognized Biotechnician Assistant Credentialing Exam (BACE).



JENNIFER BROWN, DNP, BSN

Graduate
College of Nursing, Adult-Gerontology Acute Care
Mentor: Elida Benitez, DNP

Improving Documentation of the CAM-ICU

Delirium remains a major cause of mortality and morbidity within the United States and has been associated with increased healthcare costs, poor functionality, and increased treatment needs. It has been estimated that the impact of inpatient delirium on the national budget is between \$6.6 billion and \$82.4 billion. Hence, identifying delirium early and understanding risk factors can greatly reduce the impact and prevalence of delirium. Furthermore, the routine monitoring of delirium using the CAM-ICU is considered the most reliable and valid tool for adult ICU patients. Therefore, increasing the bedside nurse's understanding of delirium, and how to assess and document the CAM-ICU is needed. This quality improvement project's aim was to determine if delirium education would increase delirium awareness and CAM-ICU documentation.



JASON CORY BRUNSON, PHD

College of Medicine,
Pulmonary/Systems Medicine

NOBEL CHOWDARY MANDEPUDI

College of Medicine,
Pulmonary/Systems Medicine



Mentor: Reinhard Laubenbacher, PhD

Efficient Modeling of Individualized COVID-19 Mortality Risk

Clinical decision support (CDS) tools integrated into electronic health record (EHR) systems aspire to what might be called a “triple-aim”: informativeness (including predictive accuracy), efficiency, and trust. These aims are supported by tools that are both personalized—to the environment, community, setting, and physiology of the individual patient—and evidence-based—equipped with the methodological rigor of clinical trials or retrospective studies. Methods: Localized modeling, an approach that interpolates between CBR and whole-population models, is a promising avenue to meet these aims. It has shown performance improvements while preserving interpretability, in contrast to so-called “black-box” models. However, localized models suffer from high memory and runtime costs. Our goal in this project is to prototype an efficient and flexible implementation of localized modeling using EHR data. Results: Based on a scoping review, we will survey the terminology, settings, and tasks to which localized models have been applied and propose a flexible general framework. We will report experimental results that demonstrate, using a machine learning workflow, improved predictive performance and explore inferential uses such as risk factor profiling. Conclusion: We will detail ongoing work funded by a CTSI Precision Health Pilot Award: We will describe how tools from computational topology and category-theoretic software allow us to design and build more memory- and runtime-efficient implementations. These will be used on a large EHR database to gain insight into the clinical outcomes of patients infected with COVID-19.



JACLYN HALL, PHD

Pilot awardee/Precision Public Health
College of Medicine, Health Outcomes and Biomedical Informatics

Does Having Type 2 Diabetes Increase the Odds of Cervical Cancer Diagnosis? A Nested Case-Control Study of a Florida Statewide Multisite EHR Database

Our aim was to elucidate the relationship between Type 2 Diabetes (T2D) and cervical cancer diagnosis and to examine whether the intersectionality of race/ethnicity and T2D plays a role in cervical cancer diagnosis. Methods: We analyzed statewide electronic health records (EHR) data from the OneFlorida+ Data Trust and used an optimal matching algorithm to create a 1:4 nested case-control dataset. Cases were defined as the patients with cervical cancer in the period 01/01/2012 to 12/31/2019. Controls were patients without a diagnosis of cervical cancer. We used conditional logistic regression to estimate the unadjusted and then the adjusted odds ratios (ORs) and associated 95% confidence intervals (CIs) to examine the association between cervical cancer and T2D. Results: The proportion of T2D among the population with and without a cervical cancer diagnosis was 2.3% and 2.8%, respectively. A multivariable model examining the intersection of race/ethnicity and T2D status showed that after adjusting for sociodemographic characteristics, Non-Hispanic Black women with T2D had 58% higher odds of cervical cancer compared to non-Hispanic White women with T2D (OR: 1.58, 95% CI (1.41-1.77)). Conclusions: Intersected with race, T2D is a significant predictor of getting a cervical cancer diagnosis. Non-Hispanic Black women who have T2D had significantly higher odds of cervical cancer diagnosis compared to non-Hispanic White women with T2D. Black women with T2D may be especially vulnerable to cervical cancer, highlighting the need to address this burden with screening and other preventive interventions.



DAVID JENSEN, DMD

Resident

College of Dentistry, Orthodontics

Mentor: Divakar Karanth

A Novel Method For Predicting The Efficacy Of Oral Appliance Therapy In Obstructive Sleep Apnea: A Pilot Study

Oral Appliances (OA) used in the treatment of Obstructive Sleep Apnea (OSA) may improve the minimal axial area of the airway through mandibular advancement. A more predictable model for OA therapy prescription success is currently needed. An index using discrete values was constructed by analyzing morphologic factors in successful OA use. Materials and Methods: A random sample of subjects (n=20) diagnosed with OSA and prescribed OAs were selected for airway imagery with and without OA placement. Cross-sectional axial airway areas were calculated and divided into “good” and “poor” responders ($\geq 16\%$ or $< 16\%$ respectively) for airway change. Cephalometric measures of jaw position were used. An Oral Appliance Efficacy Index (OAEI), using discrete scoring methods was constructed to evaluate the effectiveness of OA usage and provide a predictive model for each responder type. Results: Using the OAEI, “good” and “poor” responders for minimal axial airway area increase were predicted at a 70% accuracy ($p=.02$). Conclusion: Discrete scoring using cephalometric measures and middle pharyngeal muscle vector length change was used to predict an OA palliative pharyngeal airway increase. A 75.5% predictability for OSA subjects achieving a minimal cross-sectional axial airway area increase greater than or equal to 16% using an OA device was found.



MANOJ KAMBARA

University scholar program undergraduate researcher

College of Medicine, Health Outcomes and Biomedical Informatics

Mentor: Dominick Lemas, PhD

The impact of maternal obesity on perinatal cancer outcomes using electronic health records

Cancer is one of the leading causes of mortality for women of reproductive age. Obesity is one of the most common risk factors for cancer; however, population-level data suggest that cancer patients that are either overweight or obese have lower mortality rates. Despite this observation, there are limited population-level investigations to understand the relationship between obesity and cancer risk. The objective of this project is to investigate the impact of perinatal cancer on maternal and infant outcomes. We used electronic health record (EHR) data available through the Integrated Data Repository (IDR) with linked maternal-infant health records spanning 2011 to 2021. Maternal obesity status is the primary predictor and was estimated from pre-pregnant BMI and BMI recorded at the time of delivery. Perinatal cancer status was estimated using ICD9/10 codes. Our analysis included statistical tests to study perinatal cancer and maternal and infant outcomes. In our preliminary analysis of 28,530 records, we identified 280 deliveries with at least one cancer outcome. Our results showed that mothers diagnosed with cancer had significantly lower BMI, and infants born to mothers with cancer had significantly lower birth weight and gestational age compared to those without cancer. Our preliminary results demonstrate that obesity is associated with perinatal cancer outcomes. Furthermore, we have shown that cancer diagnosed during and after the pregnancy negatively impacts child outcomes. Our results have translational impact to improve clinical management of cancer patients in perinatal populations with obesity.



RACHANA KANDRU

Literature director of Equal Access Clinic, undergraduate
College of Public Health and Health Professions, Nephrology

Mentor: Ajay Mittal

Understanding COVID-19 Vaccine Perceptions Among Parents of Differing Socioeconomic Backgrounds through Health Literacy

Vaccines act as an effective measure against the outbreaks of major diseases and, therefore, are a highly regarded form of protection in the field of public health. Currently, there is controversy surrounding parental decisions about childhood vaccination. Much of this controversy stems from misinformation and negative perceptions around the COVID-19 vaccines. With the rise of the COVID-19 pandemic, the COVID vaccine was rapidly created and dispersed, stoking new waves of vaccine hesitancy, and igniting sects of the anti-vaccine movement. Parental hesitancy to vaccinate their children has become a significant public health concern during the COVID-19 pandemic. Studies have identified a range of factors that may contribute to parental vaccine hesitancy. We aim to focus on the factors that contribute to vaccine hesitancy amongst parents from varying socioeconomic backgrounds by examining the effects of health disparities and health literacy. It is crucial to address the concerns of parents and ensure that they have the information and resources they need to make informed decisions about the COVID-19 vaccine for themselves and their children. The purpose of this literature review is to discuss and analyze the impacts of educational background and socioeconomic status that contribute to differing vaccine perceptions among parents.



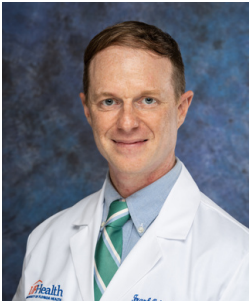
DIVAKAR KARANTH, BDS, MDS, MS, MORTH, RCS

Faculty

College of Dentistry, Orthodontics

Resorbable 3D printed scaffolds for Craniofacial Bone Regeneration

We examine the development of 3D-printed scaffolds for craniofacial bone regeneration. We will, in particular, highlight our work using Poly(L-lactic acid (PLLA) and collagen-based bio-inks. Materials and Methods: This paper describes the materials used for scaffold fabrication by 3D printing. We will also describe two types of scaffolds that we designed and fabricated. Poly(L-lactic acid (PLLA) scaffolds were printed using fused deposition modeling technology. Collagen-based scaffolds were printed using a bioprinting technique. These scaffolds were tested for their physical properties and biocompatibility. Results: Work in the emerging field of 3D-printed scaffolds for bone repair is briefly reviewed. Our work provides an example of PLLA scaffolds that were successfully 3D-printed with optimal porosity, pore size, and fiber thickness. The compressive modulus was similar to, or better than, the trabecular bone of the mandible. PLLA scaffolds generated an electric potential upon cyclic/repeated loading. The crystallinity was reduced during the 3D printing. The hydrolytic degradation was relatively slow. Osteoblast-like cells did not attach to uncoated scaffolds but attached well and proliferated after coating the scaffold with fibrinogen. Collagen-based bio-ink scaffolds were also printed successfully. Osteoclast-like cells adhered, differentiated, and survived well on the scaffold. Efforts are underway to identify means to improve the structural stability of the collagen-based scaffolds, perhaps through mineralization by the polymer-induced liquid precursor process. Conclusion: 3D printing technology is promising for constructing next-generation bone regeneration scaffolds. We describe our efforts to test PLLA and Collagen scaffolds produced by 3D printing. The 3D-printed PLLA scaffolds showed promising properties akin to natural bone. Collagen scaffolds need further work to improve structural integrity. Ideally, such biological scaffolds will be mineralized to produce true bone biomimetics. These scaffolds warrant further investigation for bone regeneration.



FRANK A. ORLANDO, MD

Faculty

College of Medicine, Community Health and Family Medicine

Addressing patients' social needs in primary care

Social risk factors, such as food insecurity, housing instability, and financial strain increase healthcare costs and negatively impact health outcomes. Health systems and patients can benefit from processes that identify patients' social risk factors and connect them to appropriate social and community services. However, data collection limitations (e.g., questionnaire time burden on healthcare providers, patients declining to answer sensitive questions) contribute to uncertainty surrounding the reliability and validity of such questionnaires. Our objective was to assess the validity and reliability of a commonly-used EHR-based screening questionnaire against a "gold standard" validated social risk factor questionnaire. In collaboration with Indiana University and the University of Florida, we concurrently administered REDCap social risk questionnaires to patients during primary care visits or via phone/email after their visit. For housing instability and financial strain, the prevalence from the EHR-based screening questionnaire was significantly lower than from validated, single-domain questionnaires ($P < .001$ for both). Prevalence was not significantly different for food insecurity. The EHR screening questionnaire for food insecurity had an AUC of 0.938 and both high sensitivity (94.5%) and specificity (93.1%), while the performance of both housing instability and financial strain was lower, with high specificity but low sensitivity. EHR-based social screening questionnaires accurately identified patients with food insecurity but under-identified those with housing instability or financial strain. Although the results may not be generalizable, performance assessment is the beginning at understanding the utility and implications of screening results and can guide future studies on which and how such screening tools should be used.



YARA MOHAMED, MBBS, MD, MPH

Clinical research coordinator

College of Medicine, Pediatrics - PoRCH

Mentor: Carla Zingarelli, MD

Veterans with Muscular Dystrophy Diagnoses

Early diagnosis of a chronic neuromuscular disease such as muscular dystrophy generally excludes an individual from active-duty military service. However, it is not known whether veterans are sometimes diagnosed with mild forms of muscular dystrophy at a later time point. **Methods:** The study population included veterans with the clinical diagnosis and genetic confirmation of muscular dystrophy seen at dystrophy at the North Florida/South Georgia Veterans Health System between 2008 to 2019. **Results:** 10 patients with genetically confirmed muscular dystrophy were identified. 5(50%) cases had myotonic dystrophy, 2(20%) had oculopharyngeal muscular dystrophy (OPMD), 1(1%) had Becker muscular dystrophy (BMD), 1(10%) had distal muscular dystrophy (DD), and 1(10%) had facioscapulohumeral muscular dystrophy (FSHD). The median age of onset of symptoms was 43 years, and the median age at the time of diagnosis was 53 years. **Discussion:** There is a paucity of literature on diagnoses of muscular dystrophy among persons who have served in the United States military. This study highlights the importance of knowledge about muscular dystrophy among neurologists working in Veterans Affairs and Veterans Health Systems for timely management. Veteran Health Systems should be included as a data source of muscular dystrophy when conducting research surveillance.



MARTIN NOGUERA, MS

Research administrator
College of Medicine, Anesthesiology
Mentor: Nikolaus Gravenstein, MD

"Eek!ology" of the Beard: Initial Findings from a Prospective Feasibility Study Investigating Potential Variables of Microbial Influence on the Beard Microbiome

Culture-based methods of identification are limited and discriminate against unculturable microorganisms. Using 16S rRNA genomic sequencing, we investigated habitat heterogeneity via bacterial relative abundance of those with and without beards. We predict an ecological model of biodiversity exists as well as a reduction of bacterial relative abundance and diversity due to decolonization, from shaving, which may be recovered once a beard is grown. What is discovered, might surprise you.

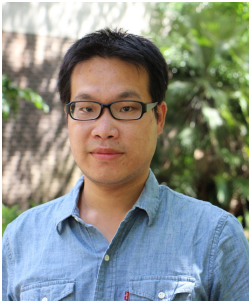


LAKSHMIDEVI PERSAUD

Doctor of nursing practice
College of Nursing, DNP
Mentor: Staja Booker, PhD, RN

Understanding and Reducing Polypharmacy in Older Adults in Primary Care

As the prevalence of polypharmacy in older adults increases in America, a quality improvement project was conducted with the goal of raising awareness and reducing the incidence of polypharmacy in older adults. A screening questionnaire called the Revised Patient Attitudes Toward Deprescription (rPATD) was implemented to educate and identify older adults who may benefit from deprescription. Methods: This project is a survey quality improvement study that was conducted over a time span of three months. It utilized a convenience sample of adults (≥ 65 years old) currently taking five or more medications according to their recorded medication list. Patients ($N = 54$) answered the rPATD questionnaire before their visit with their general physician to assess their willingness to deprescribe. Results: The average age of the sample was 73.8 years with an equal amount of male and female participants. This project showed a significant increase in knowledge of polypharmacy before and after the education that occurred with the administration of the questionnaire. 77% of respondents answered the post-questionnaire knowledge assessment correctly versus 0% pre-education. There were more deprescriptions at the time of the visit versus one month after the visit with the average number of medications removed being 2.03 versus 1.75 respectively.



HUILIN TANG

PharmD

College of Pharmacy, Pharmaceutical Outcomes and Policy

Mentor: Serena Jingchuan Guo, MD, PhD

Sodium-Glucose Cotransporter 2 Inhibitors and Risk of Dementia in People with Type 2 Diabetes: A Population-Based Cohort Study

Sodium-glucose cotransporter 2 (SGLT2) inhibitors have shown a promising association with decreased risk of dementia, especially in people with type 2 diabetes (T2D); nevertheless, it is unclear which population subgroups will benefit the most. We aimed to estimate the heterogeneous treatment effects (HTEs) of SGLT2 inhibitors on dementia risk in people with T2D. Methods: Using real-world data from the OneFlorida+ clinical research network including electronic health record (EHR) data linked with administrative claims data, we identified individuals with T2D (aged ≥ 50 years) who initiated SGLT2 inhibitors or sulfonylureas from 2016-2021. The study outcome was incident dementia. We applied a causal machine learning approach – doubly robust learning – to estimate the conditional average treatment effects (CATEs) in the overall population and then the HTEs of subgroups based on the identified important features using a summary decision tree model. Results: Among 36,756 individuals with T2D in OneFlorida+, 3.2% in the SGLT2 inhibitor group (n=9,106) while 6.4% in the sulfonylureas group (n=27,650) developed dementia over a 3.4-year follow-up. In the overall cohort, SGLT2 inhibitors were associated with a lower risk of dementia (Risk difference [RD], -10.3%; 95% confidence interval [CI], -12.0% to -8.6%) compared to sulfonylureas. We identified four subgroups with varying risks for dementia, determined by traumatic brain injury, ever-smoking, and epilepsy. Among the 4 subgroups, the RD of dementia risk ranged from -19.3% (95% CI: -25.4% to -13.1%) in those with ever-smoking and no traumatic brain injury to 15.2% (95% CI: 0.6% to 29.7%) in those with traumatic brain injury and epilepsy. Conclusion: SGLT2 inhibitors showed a lower risk of dementia in people with T2D, with significant variability across subgroups. Data-driven subgroup analyses may guide personalized treatment for diabetes care.



JOSEPH TEBOU

Undergraduate researcher

College of Medicine, Health Outcomes and Biomedical Informatics

Mentor: Dominick Lemas, PhD

Maternal Obesity and Perinatal Cancer: Mapping the Mechanistic Impact Using OMOP

Maternal obesity is associated with adverse perinatal outcomes, including an increased risk of cancer for both mothers and offspring. This study aimed to use ontology-driven phenotypes derived from electronic health record (EHR) data and the OpenMRS-OMOP (OMOP) platform to map the relationship between maternal obesity and perinatal cancer outcomes. UFHealth EHR data from 2011 to 2021 was used, with maternal obesity status determined by BMI recorded prior to and at the time of delivery, and perinatal cancer status determined by ICD9/10 codes. Rabbit in the Hat and White Rabbit were used to extract files and map the data. Analysis of 28,530 records showed 78% had BMI readings, and 713 individuals with at least one cancer outcome were identified, with breast cancer the most prevalent. Logistic regression showed no significant relationship between BMI and cancer diagnosis. Understanding the mechanistic impact of maternal obesity on perinatal cancer outcomes can improve care for affected individuals and serve as a model for future research.



LAUREN WIELE, MA, CF-SLP

SLP clinical fellow

College of Public Health and Health Professions, Speech, Language and Hearing Sciences

Mentor: Emily Plowman, PhD, CCC-SLP

Swallowing Safety Profiles in Amyotrophic Lateral Sclerosis: Impact of Bolus Viscosity and Volume

Dysphagia is common in persons with Amyotrophic Lateral Sclerosis (pALS). This highlights a need to understand factors that improve swallowing safety and prevent aspiration in pALS. We aimed to examine the prevalence of unsafe swallowing and determine the impact of bolus viscosity and volume on swallowing safety. 109 pALS underwent a standardized videofluoroscopic exam of 11 Varibar bolus trials. Three 5cc trials were administered for thin liquid, thin honey, and pudding plus a single cracker trial. For thin liquids, two additional trials were given that included a cup sip and a serial swallow trial. 1,685 bolus trials were assessed by duplicate, independent, blinded raters using the Penetration-Aspiration Scale (PAS) with 100% agreement. Descriptives, Kruskal-Wallis, Pearson's chi, and Fisher's exact tests were conducted. Of the 1,685 bolus trials examined, 77.5% were safe, 13.1% were penetrators, and 9.4% aspirators. A main effect for PAS by IDDSI level was observed. In rank order, PAS scores were higher for 5cc thin liquid, 5cc thin honey, 5cc pudding, and cracker trials. Post hocs revealed PAS scores significantly differed between each bolus type, except cracker vs. pudding. Aspiration status significantly differed by bolus volume on thin liquid trials. In rank order, aspiration was observed on serial swallow trials (22.1%), 5cc thin (16.7%), and cup sip thin (12.3%). A main effect was noted for PAS by thin liquid volume. Post hocs revealed the serial swallow had a higher PAS (3, IQR: 1, 5) compared to both 5cc thin (2, IQR: 1, 3; $p < 0.0001$) and cup sip thin (1, IQR: 1, 3; $p < 0.0002$) trials. These data denote that both bolus viscosity and volume impact swallowing safety in pALS.



JENNA YUNGMAN

Undergraduate researcher

College of Agricultural and Life Sciences, Microbiology and cell science

Mentor: Shifeng Wang, PhD

O-Antigen Mutations Affect the Tumor Targeting Ability of Salmonella

As a gram-negative bacterium, Salmonella has been proven to be an effective immunotherapy agent that induces tumor regression against cancers through multiple mechanisms in mice. Despite this conducted research, clinical trials showed that the targeting efficiency of the live bacterium needs to be increased. A strain that displays an OmpA fused with PLZ4 peptide on the surface of Salmonella was developed to increase the targeting ability of bladder cancer cells. This research focuses on further surface modification and mutations to potentially increase Salmonella tumor targeting via tissue culture cell assay. The OmpA porin is located on the outer membrane of the surface of Salmonella to assist with peptidoglycan linking and is covered by LPS, a molecule composed of lipid A, an inner core, an outer core, and an O-antigen. While the deletion of lipid A is lethal, reducing the LPS-O antigen and cores has the potential to strengthen the exposure of OmpA to the cell. Thus, this research compares the ompA3 Ω plz4 strain with various core and O-antigen mutations to test for increased efficiency. The mutations introduced into the Salmonella ompA3 Ω plz4 strain included Δ waaL, Δ waaC, and Δ waaG and were compared to the parent strain. The attachment to and invasion of human carcinoma urinary bladder cells (5637), mouse bladder tumor cells with different genetic complexities (BBN963), and urothelial carcinoma bladder fibroblast cells (MB49) in culture were also observed to further determine the tumor targeting efficiency. As a result, some mutations and surface modifications resulted in a more significant effect on cell attachment and invasion than others, and an increase in tumor-targeting efficiency was seen. This research is significant in increasing the effectiveness of immunotherapy agents in tumor regression and future animal studies will be performed.



BRITTANY BRUGGEMAN, MD

KL2 Scholar

College of Medicine, Pediatrics

Mentor: Martha Campbell-Thompson

Chronic pancreatitis and acinar atrophy by histopathology characterize young nPOD donors with reduced pancreas organ weight and may precede this finding in the progression to type 1 diabetes

Prior studies have found reduced relative pancreas weight (RPW; PW [g]/body weight [kg]) in type 1 diabetes (T1D) and islet autoantibody positive (AAb+) organ donors and increased pancreatitis in T1D donors. However, the relationship between these findings is not known. We aimed to determine the prevalence of exocrine pathology in T1D, single AAb+, multiple AAb+, and control subjects and its association with RPW. We hypothesized that exocrine pathology would be increased in multiple AAb+ and T1D donors and would be associated with reduced RPW. All Network for Pancreatic Organ Donors with Diabetes (nPOD) subjects with T1D (n=116), single AAb+ (n=17), multiple AAb+ (n=7), and controls (n=139) available through June 2022 whose age at death was ≤ 25 years were included. Histopathologic images were reviewed for insulin positivity, insulinitis, acute and chronic pancreatitis, acinar atrophy, fatty infiltrate, and interstitial fibrosis. Subjects with chronic pancreatitis ($p=0.016$) and acinar atrophy ($p<0.0001$) had smaller RPW both generally and within T1D donors ($p=0.0012$ & $p=0.04$). Donors with multiple AAb+ were more likely to have chronic pancreatitis ($p=0.01$) and acinar atrophy ($p=0.03$) but not smaller RPW. T1D donors were more likely to have acute pancreatitis ($p=0.0005$), chronic pancreatitis ($p<0.0001$), acinar atrophy ($p<0.0001$), and smaller RPW ($p<0.001$); with a longer diabetes duration correlated with smaller RPW ($r=-0.43$, $p<0.0001$). Acinar pathology was present in donors with multiple AAb+ despite a lack of difference in RPW, suggesting that inflammatory changes within acinar tissue may precede loss of pancreas volume.



COLLEEN GUTMAN, MD

KL2 Scholar

College of Medicine, Emergency Medicine

Mentor: Rosemarie Fernandez, MD

A Mixed Methods Analysis of Disparities in the Management of Low-Risk Febrile Infants

Background: Febrile infants are a model population for exploring communication, implicit bias, and health disparities in the pediatric emergency department. We used mixed methods to assess disparities and physician-parent communication. **Methods:** This is a multicenter cross-sectional study of low-risk febrile infants from 2018-19 across 34 institutions. The primary outcome was receipt of ≥ 1 additional intervention. Predictor variables were 1) race and ethnicity, and 2) language for medical care. We performed logistic regression, controlling for a priori identified potential confounders and hospital-level clustering. We concurrently performed in-depth semi-structured interviews with physicians to identify the assumptions that physicians make that inform their approach to communication and medical decision making when caring for febrile infants in the pediatric emergency department. **Results:** Of 4199 low-risk febrile infants, 24.8% received the primary outcome. There was no association between race and ethnicity (Reference: non-Hispanic White; non-Hispanic Black: adjusted odds ratio [aOR] 1.05 [95% confidence interval 0.81-1.36]; Hispanic: aOR 0.84 [0.64-1.10]; Other: aOR 1.01 [0.75-1.38]) and the primary outcome. Compared to children from families that use English, children from families that use languages other than English were more likely to receive additional interventions (aOR 1.34 [1.01 - 1.75]). Interviewed physicians described assumptions in three areas that informed communication and medical decision making: 1) the parent's social capabilities, 2) the parent's affect, and 3) physician's authoritative role. **Discussion:** Language, but not race and ethnicity, were associated with the management of low-risk febrile infants. Physician assumptions and communication strategies may represent modifiable targets for interventions promoting health equity.



MILES CAMERON

MD-PhD Student

College of Public Health and Health Professions, Physical Therapy

Mentor: Andy Judge PhD

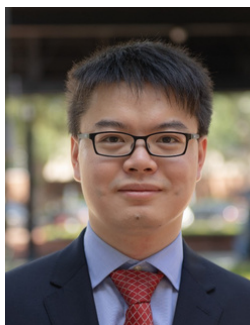
Respiratory Muscle Pathology in Patients with Esophagogastric Adenocarcinoma

Introduction: Esophageal adenocarcinoma (EGA) is increasing in incidence and mortality rate. Treatment is difficult, multidisciplinary and complicated by the presence of cancer cachexia, largely characterized by skeletal muscle atrophy and dysfunction. These factors contribute to the poor prognosis experienced by EGA patients. We hypothesized that respiratory muscles from EGA patients would display histological signs of pathology that associate with weight loss and cachexia status.

Methods: Individuals with biopsy-proven EGA were recruited to donate diaphragmatic crus and intercostal muscle during surgery (N=26). Tissue was stained with hematoxylin-and-eosin and Masson's trichrome to characterize morphology and collagen content. Fibrosis was quantified as collagen percent using ImageJ software. Clinical data, including pulmonary function testing and tumor variables, were compared to measurements.

Results: Most patients (78.3%) lost more than 5% body weight in the six months preceding surgery. Collagen content in diaphragm samples significantly correlated with weight loss ($R=0.4857$, $p=0.0188$), while collagen content in intercostal muscle samples tended to associate with weight loss ($R=0.3880$, $p=0.0910$). Both respiratory muscles displayed similar collagen content (9.91% v. 7.66%, $p=0.2859$). Fibrosis did not associate with age. Diaphragm collagen content significantly correlated with peak expiratory flow ($R=-0.6273$, $p=0.0163$) and tended to associate with forced expiratory volume in one second ($R=-0.4571$, $p=0.1003$). After neoadjuvant therapy, subjects with residual tumor (21.4% v. 9.86%, $p=0.0145$), lymph node metastases (22.4% v. 9.71%, $p=0.0069$), lymphovascular invasion (21.8% v. 11.4%, $p=0.0464$) and perineural invasion (26.6% v. 9.95%, $p=0.0005$) lost significantly more weight. Furthermore, diaphragm collagen content was increased in subjects with perineural invasion (14.6% v. 8.06%, $p=0.0338$).

Conclusion: Respiratory muscle fibrosis is a key phenotype of cachexia in EGA patients. We demonstrate herein that collagen deposition in diaphragm samples correlates to weight loss, cachexia status and pulmonary function. These findings highlight the need to study mechanisms that lead to respiratory muscle pathology in tumor bearing hosts.



AOKUN CHEN, PHD

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Mentors: Yonghui Wu, PhD

GatorTron: A Large Clinical Language Model to Unlock Patient Information from Unstructured Electronic Health Records

There is an increasing interest in developing artificial intelligence (AI) systems to process and interpret electronic health records (EHRs). Natural language processing (NLP) powered by pre-trained language models is the key technology for medical AI systems utilizing clinical narratives. However, there are few clinical language models, the largest of which trained in the clinical domain is comparatively small at 110 million parameters (compared with billions of parameters in the general domain). It is not clear how large clinical language models with billions of parameters can help medical AI systems utilize unstructured EHRs. In this study, we develop from scratch a large clinical language model - GatorTron - using >90 billion words of text (including >82 billion words of de-identified clinical text) and systematically evaluate it on 5 clinical NLP tasks including clinical concept extraction, medical relation extraction, semantic textual similarity, natural language inference (NLI), and medical question answering (MQA). We examine how (1) scaling up the number of parameters and (2) scaling up the size of the training data could benefit these NLP tasks. GatorTron models scale up the clinical language model from 110 million to 8.9 billion parameters and improve 5 clinical NLP tasks (e.g., 9.6% and 9.5% improvement in accuracy for NLI and MQA), which can be applied to medical AI systems to improve healthcare delivery.



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Dynamic networks of methicillin-resistant *Staphylococcus aureus* in communities drive hospital transmission as revealed by whole-genome sequencing

Modern methicillin-resistant *Staphylococcus aureus* (MRSA) transmission pathways have been characterized separately in hospital and community settings. Given the blurring of the traditional location-based distinctions of MRSA, the genomic epidemiology between these interfaces was investigated using whole-genome sequencing approaches. In brief, we conducted serial cross-sectional community and hospital MRSA sampling within the UF Health catchment area between 2010 and 2019. Community sampling included patients presenting to the emergency department with acute skin or soft tissue infection (SSTI) and hospital sampling included specimens from hospital-acquired MRSA infections collected as part of standard-of-care procedures. Transmission dynamics were assessed using a joint application of epidemiological approaches and phylodynamic analysis of whole genomic sequencing data. After whole-genome sequencing on community (n=42) and hospital (n=37) isolates, multiple independent introductions of MRSA lineages from the community to the hospital setting were observed. Community MRSA transmission was sustained without influence from hospital isolates and geographic clustering was increased beyond the urban center compared to methicillin-susceptible isolates. Subjects residing in rural areas and those reporting recent livestock exposure were more likely to have MRSA SSTI compared to non-MRSA SSTI. In conclusion, MRSA transmission in hospital settings was introduced from MRSA species with ancestral origins in community settings. Nosocomial MRSA outbreak prevention strategies should target unique aspects of the community rather than focusing solely on the hospital, with particular attention given to the identification of community hot spots, risk behaviors, and possible strain reservoirs.



JOHN FIGG, BS

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College of Medicine, Cancer biology, Neurosurgery

Mentor: Catherine Flores, PhD

Elucidating the cellular mechanisms of therapeutic benefit underlying adoptive cellular therapy in models of glioma

Among pediatric cancers, malignancies of the brain carry significant morbidity and mortality, harboring dismal prognosis and often poor outcomes. Our group has previously shown that adoptive cellular therapy (ACT) provides therapeutic benefit against central nervous system (CNS) malignancies, including medulloblastoma and high-grade glioma. In this study, we characterized cell cycling differences of immune sub-populations in peripheral lymphoid and tumor tissue compartments in vivo. ACT was conducted in orthotopic KR158 luciferase tumor-bearing mice, a syngeneic murine glioma model. Five days following intracranial implantation of tumor cells, mice were treated with ACT which included the following elements: total body irradiation, hematopoietic stem cell transplantation, one dose of tumor-activated splenocytes and three weekly doses of dendritic cells that had been electroporated with tumor-derived ribonucleic acid. One week after the completion of ACT, bromodeoxyuridine (BRDU) was administered to mice 12-hours prior to tissue collection and flow cytometry was utilized to measure the level of BRDU incorporation. 7-aminoactinomycin-D was used in conjunction with BRDU to provide insight into all phases of the cell cycle. We observed significant differences in cycling populations of myeloid derived suppressor cells (MDSC) and T-cells. In ACT-treated-mice, MDSCs found in secondary lymphoid tissues were significantly more proliferative. In the tumor microenvironment (TME), proliferating MDSCs were significantly reduced compared to mice that did not receive treatment. Frequencies of proliferating CD4+ and CD8+ T-cells were significantly increased in cervical lymph node and TME but reduced in spleen. These findings suggest that ACT alters immune cycling in peripheral lymphoid tissues and TME to potentially promote antitumor T-cell responses and minimize MDSC-mediated immunosuppression. While ACT-mediated alterations to immune cell cycling are likely a major contributor to the therapy's benefit, it is unlikely to be the sole mechanism. Further exploration into other functional pathways, namely migration, is needed to explain changes to immune populations following ACT.

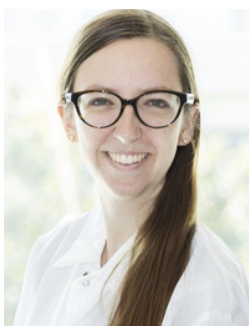


KARTIK MOTWANI

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Mentors: Todd Brusko, PhD

Modulation of Monocyte MHC Class II by HLA-DR4 in Type 1 Diabetes

Type 1 Diabetes (T1D) is an autoimmune disease characterized by destruction of pancreatic beta cells, with multifactorial etiology including genetic predisposition and environmental triggers. Genome wide linkage analysis and prior clinical studies implicate the human MHC gene locus in numerous autoimmune diseases, in which the MHC Class II haplotype HLA-DR4/DQ8 carry the majority of genetic risk associated with T1D. Our prior studies suggest a gene dosage effect of HLA-DR4 haplotype on monocyte surface expression of MHC Class II. The chaperone molecule CD74 (CLIP) is a peptide cleavage product of MHC Class II-associated invariant chain and is essential for assembly and stabilization of the peptide-MHC II complex during endocytic antigen processing. Using peripheral blood mononuclear cells (PBMCs) from patients with T1D, first degree relatives, and controls with no history of autoimmune disease, we examined monocyte surface phenotype considering cryopreservation state, response to in vitro stimulus, and DR4 genotype. While we did not observe a statistically significant HLA-DR4 gene dosage effect on HLA-DR expression with frozen PBMCs, we observe increased CD86 on unstimulated monocytes with increasing HLA-DR4 gene dose (all and classical monocyte subsets, DRX/X>4/X and DR4/X>4/4; $p < 0.01$). With in unstimulated monocytes, we also found homozygous HLA-DR4 subjects express decreased classical monocyte CD74 (all monocytes, DRX/X>DR4/4, $p < 0.05$; and classical monocyte subsets, DRX/X>4/4 and DR4/X>DR4/4, $p < 0.01$) and HLA-DQ (all monocytes, DRX/X>4/X; $p < 0.05$). Stability of antigen processing and presentation by class II MHC may be affected by sequence-level polymorphisms associated with the HLA-DR4/DQ8 haplotype, which is a subject of continuing investigation. These findings have implications for our understanding of the genetic basis of autoimmune disease, considering the essential role of MHC II in both central and peripheral tolerance, and could serve as the basis for design of promising therapeutic interventions.



HOLLY RYAN

MD-PhD Student
Herbert Wertheim College of Engineering, Biomedical Engineering
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An in vitro model to study effects of monocyte Toll-like receptor activation on endothelial branching

Systemic lupus erythematosus is a chronic autoimmune disease that causes inflammation in many tissues throughout the body, including the microvasculature. In this study, we have designed an in vitro model of microvascular inflammation in order to better understand how SLE-related dysfunction in immune cells may contribute toward vascular complications in this disease. Monocytes, endothelial cells, and pericytes, which are a type of microvascular support cells, are co-encapsulated in a polyethylene glycol hydrogel to observe the effects of monocyte activation on endothelial structure morphology. In this preliminary work, monocytes were obtained from healthy donors, and an SLE-like phenotype was induced via treatment with the Toll-like receptor (TLR) 7/8 agonist resiquimod. We showed that TLR7/8 stimulation in monocytes caused slightly increased numbers of elongated and branched endothelial structures. Future work will incorporate monocytes from SLE patients to investigate how TLR7/8 activation replicates SLE pathogenesis.



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Quantitative CLASH (QtCLASH) Analysis of miRNA Targeting in Colorectal Cancer

Colorectal cancer (CRC) is the third most common cancer worldwide, and an essential need remains for identification of CRC biomarkers and therapeutic targets to improve diagnosis and treatment. Dysregulation of specific cellular microRNA (miRNA) levels is associated with CRC diagnosis and can often be prognostic of tumor severity. However, we lack a detailed understanding of the specific molecular mechanisms that mediate miRNA levels and miRNA targeting and efficacy. In the recently discovered target directed miRNA degradation (TDMD) process, extensive base-pairing between a miRNA and a specific mRNA triggers miRNA degradation, rather than canonical degradation of the “target” mRNA. We hypothesize that aberrant TDMD in CRC promotes dysregulated miRNA levels, which in turn alters expression of their downstream target mRNAs and drives tumorigenesis. To quantitatively analyze miRNA/target and TDMD trigger pairs in CRC, we are developing a novel experimental method based on the Crosslinking, Ligation, and Sequencing of Hybrids (CLASH) ribonomics method for miRNA target identification. Our Quantitative CLASH (QtCLASH) protocol includes both modifications to the CLASH experimental method and development of a novel, open-source pipeline for data analysis. Addition of Unique Molecular Identifiers to sequencing experiments allows tracking of individual miRNA/target CLASH hybrids. These miRNA / target pairs are then enumerated to create a tissue-specific targeting score for each chimeric molecule. In addition to further elucidating the role of aberrant miRNA expression in CRC pathogenesis, this method will potentially allow further TDMD miRNA/target pairs to be identified with a specific role in CRC tumorigenesis.



CARETIA WASHINGTON

MD-PhD Student
College of Public Health and Health Professions and
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Mentor: Dejana Braithwaite, PhD

Racial and Socioeconomic Disparities in Survival Among Women with Advanced-stage Ovarian Cancer Who Received Systemic Therapy: A National Cancer Database Analysis

Purpose of the study: To evaluate the association between race and ethnicity and all-cause mortality among women with advanced-stage ovarian cancer who received systemic therapy. Methods: We obtained data from the National Cancer Database on women diagnosed with advanced-stage ovarian cancer from 2004 to 2015. Multivariable Cox proportional hazards models were used to calculate hazard ratios (HR) and 95% confidence intervals (95% CI) by race and ethnicity groups (non-Hispanic (NH)-White, NH-Black, Hispanic, NH-Asian/Pacific Islander, and Other) and to examine the association of race/ethnicity with survival, stratified by age and comorbidity while adjusting for clinical and demographic variables. Results: There were 53,367 women (52.4% ages ≥ 65 years, 8.7% NH-Black, 5.7% Hispanic, and 2.7% NH-Asian/Pacific Islander) included in the analysis. NH-Black women had a higher risk of death compared to NH-White women (HR: 1.13; 95% CI: 1.07,1.18), while Hispanic women had a lower risk of death compared to NH-White women (HR: 0.89; 95% CI: 0.82,0.97). The Black-White disparity persisted for women ages ≤ 65 years and ≥ 65 years, and among women with no comorbidities (HR:1.14; 95% CI: 1.08,1.21). Conclusions: Among women with advanced-stage ovarian cancer who received systemic therapy, NH-Black women experienced decreased survival compared with NH-White women, regardless of age and comorbidity status. Additional research is essential to identify drivers of ovarian cancer disparities, including racial differences in treatment response.



ZEHAO YU

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Mentor: Yonghui Wu, PhD

SODA: A Natural Language Processing Package to Extract Social Determinants of Health for Cancer Studies

We aim to develop an open-source natural language processing (NLP) package, SODA (i.e., SOcial DeterminAnts), with pre-trained transformer models to extract social determinants of health (SDoH) for cancer patients, examine the generalizability of SODA to a new disease domain (i.e., opioid use), and evaluate the extraction rate of SDoH using cancer populations.

TLI Trainees



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TYLER NESBIT, MS, MA, CFLE

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Mentors: Larry Forthun, Ph.D. and Sarah McKune, MPH, Ph.D.

A CTS Team Approach to Adapting an Evidence-Based Mindfulness Tool to Increase Trust of Reproductive Healthcare Providers

Background: Preliminary research with focus groups of Black women indicate that provider mindfulness and patient-centered communication are essential elements of establishing trusting relationships with reproductive healthcare providers. The goals of this study are to understand the perspectives and needs of providers to design or adapt a program to support their development of trust-building patient care. **Methods:** Providers will be recruited to participate in interviews to understand their perceptions of the emotional, trust, and communication needs of Black women, training, experience, and attitudes related to mindfulness and patient-centered communication, and the recommendations, barriers, and facilitators to implementing whole-person care. Interviews will be guided by a set of primary and probing questions to ensure consistency of content between interviews. Interviews will be audio recorded and transcribed for thematic coding. Initial coding will be conducted by a team of two doctoral and two undergraduate students while interviews are ongoing to generate intercoder reliability of codes and emergent themes (Saldana, 2016). Interviews will continue until no new codes have been established for a minimum of three consecutive interviews. Then, focused and axial coding will be conducted to consolidate and link related concepts into a theory of change model. **Significance:** It is expected that these results will guide the next steps of the intervention mapping process by providing the basis for program development or adaptation. Adopting more holistic approaches to medicine and whole-person care through the incorporation of mindfulness initiatives for care providers represents an opportunity to benefit Black women and providers alike.


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ANDREW RAINEY, MPH

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Mentor: Mariola Edelmann, PhD



A CTS Team Approach to Developing an Effective Vaccine for Non-Typhoidal Salmonella

Non-Typhoidal Salmonella (NTS) causes over 95 million infections globally each year, and no effective vaccine exists to combat these infections in humans. The goal of this study is to determine the immune protection provided by a novel extracellular vesicle (EV)-based vaccine generated using lab-strain Salmonella against wastewater-derived Salmonella. We recovered NTS isolates from 17 raw influent wastewater samples collected from two wastewater reclamation facilities (WRF) in Gainesville, FL. Whole genome sequencing was performed on each isolate and compared to sequences of clinical and environmental isolates during our study period to identify clinically relevant isolates for assessing EV based vaccine protection. Mouse serum and stool samples were collected from a cohort of EV-vaccinated mice. Surrogates of protection against Salmonella used anti-Salmonella IgA in the feces of these mice, and anti-Salmonella IgG in serum of the mice, by using ELISAs coated with whole cell lysate collected from the two wastewater-derived isolates. We have previously shown that an EV vaccine provides protection against Salmonella enterica Serovar Typhimurium, the serovar used in the generation of the EV vaccine. We anticipate that the EV vaccine generates additional protection against the community-acquired strains, which will be characterized by increases in fecal IgA and serum IgG against two community Salmonella isolates that is similar to responses against the serovar used to generate the EV vaccine (Typhimurium). This study will improve the translation of our vaccine studies by demonstrating the efficacy of our novel EV vaccine against circulating Salmonella isolates.


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MICHELLE KUNTZ, BS

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Mentors: Catherine Striley, PhD,MSW,MPE and Christopher McCurdy, PhD,FAAPS

A CTS team approach to identifying thematic constructs related to kratom use during pregnancy: A qualitative analysis of social media posts

Background & Aims: Research on the safety of prenatal kratom use - an herb that acts on opioid receptors - is scarce. Our transdisciplinary clinical and translational science (CTS) team conducted an inductive qualitative analysis of subreddit posts discussing kratom use during pregnancy. **Methods:** On Nov. 7, 2022, pregnancy- and/or kratom-related keywords were used to extract 1,470 posts from three subreddits: r/kratom, r/pregnant, and r/quittingkratom. After the removal of 269 duplicate posts, the remaining posts' titles and text were screened to exclude posts that were written in a non-English language (n=0), published by a Redditor who stated in the post's title and/or text that they were a minor (n=0), and those not discussing human prenatal kratom use (n=1,017). Inductive qualitative analyses were conducted via two independent reviewers. **Results:** Among the 184 eligible posts, 13 clinically salient themes were identified. A majority of posts were published to elicit information and/or support from the Reddit community. Nearly two-thirds of posts shared motivators for changing kratom dosage, and approximately 3 out of 5 posts of posts discussed reducing or quitting prenatal kratom use. Verbatim quotes will be shown to illustrate themes depicted in the sample. A word cloud will be created with the most used nouns from the eligible posts. **Discussion/Significance of Impact:** These findings could assist clinicians in identifying questions that obstetric patients may have regarding the prenatal use of this novel psychoactive substance. Further research is needed to validate these findings using other social media data, such as Twitter. **Disclosure/Conflicts of interest:** Research reported in this publication was supported by the National Center for Advancing Translational Sciences of the National Institutes of Health under University of Florida and Florida State University Clinical and Translational Science Awards TL1TR001428 and UL1TR001427. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.



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AMBER OCONNOR

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A CTS team approach to reliable delivery of aerosols to lung cells at the air-liquid interface (ALI), through Dosimetric Aerosol in Vitro Inhalation Device (DAVID)

Particle deposition in the respiratory tract occurs in different patterns depending on particle characteristics and an individual's respiratory mechanics. In this study, aerosolized CuO nanoparticles (CuONPs) were deposited in four patterns onto A549 cells cultured at the air-liquid interface (ALI) via the Dosimetric Aerosol in Vitro Inhalation Device (DAVID). ImageJ analysis showed the deposition areas corresponding to spots, ring, rectangle, and circle patterns were ~10, 27, 7 and 68% of the cell culture insert's area. The global doses delivered to the cells were estimated from the mass of Cu quantified by Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) following acid digestion, and the surface area of the cell culture insert. Global doses of ~18±6 to 64±8, 19±3 to 73±10, 11±1 to 43±8 and 10±3 to 38±6 µg/cm² were recorded for spots, ring, rectangle, and circle, respectively, for exposure time of 10-, 20- and 30-min. Preliminary testing using alamarBlue assay revealed that the percent proliferation of the cells declined with increasing global doses of CuONPs. Correlating the dose with the percent proliferation revealed the deposition pattern had an impact on the cellular response, with the rectangular and circular patterns being the most and least toxic, respectively, at the highest dose delivered. Additionally, the variabilities in proliferation rate observed suggest potential cellular signaling, i.e., communication between cells in response to their environment. The study highlights the importance of deposition pattern in in vitro inhalation toxicology.



ADITYA MAHADEVAN, B, MD-PHD STUDENT

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Mentors: Helen Jones, PhD



A CTS team approach to identifying thematic constructs related to kratom use during pregnancy: A qualitative analysis of social media posts

Background & Aims: Research on the safety of prenatal kratom use - an herb that acts on opioid receptors - is scarce. Our transdisciplinary clinical and translational science (CTS) team conducted an inductive qualitative analysis of subreddit posts discussing kratom use during pregnancy. **Methods:** On Nov. 7, 2022, pregnancy- and/or kratom-related keywords were used to extract 1,470 posts from three subreddits: r/kratom, r/pregnant, and r/quittingkratom. After the removal of 269 duplicate posts, the remaining posts' titles and text were screened to exclude posts that were written in a non-English language (n=0), published by a Redditor who stated in the post's title and/or text that they were a minor (n=0), and those not discussing human prenatal kratom use (n=1,017). Inductive qualitative analyses were conducted via two independent reviewers. **Results:** Among the 184 eligible posts, 13 clinically salient themes were identified. A majority of posts were published to elicit information and/or support from the Reddit community. Nearly two-thirds of posts shared motivators for changing kratom dosage, and approximately 3 out of 5 posts of posts discussed reducing or quitting prenatal kratom use. Verbatim quotes will be shown to illustrate themes depicted in the sample. A word cloud will be created with the most used nouns from the eligible posts. **Discussion/Significance of Impact:** These findings could assist clinicians in identifying questions that obstetric patients may have regarding the prenatal use of this novel psychoactive substance. Further research is needed to validate these findings using other social media data, such as Twitter. **Disclosure/Conflicts of interest:** Research reported in this publication was supported by the National Center for Advancing Translational Sciences of the National Institutes of Health under University of Florida and Florida State University Clinical and Translational Science Awards TL1TR001428 and UL1TR001427. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.



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TRACTS Scholar

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Plavix is Associated with Reduced Likelihood of Aneurysmal Sub Arachnoid Hemorrhage: A Multicenter Matched Cohort Study

Maladaptive inflammation underlies the formation and rupture of human intracranial aneurysms. There is a growing body of evidence that anti-inflammatory pharmaceuticals may beneficially modulate this process. Clopidogrel (Plavix) is a commonly used irreversible P2Y₁₂ receptor with anti-inflammatory activity. In this paper, we investigate whether clopidogrel is associated with the likelihood of aneurysm rupture in a multi-institutional propensity-matched cohort analysis. Methods Patients presenting for endovascular treatment of their unruptured intracranial aneurysms and those presenting with aneurysm rupture between 2015 and 2019 were prospectively identified at two quaternary referral centers. Patient demographics, comorbidities, and medication usage at the time of presentation were collected. Patients taking clopidogrel or not taking clopidogrel were matched in a 1:1 fashion concerning location, age, smoking status, aneurysm size, aspirin usage, and hypertension. Results 1048 patients with electively treated aneurysms or subarachnoid hemorrhages were prospectively identified. 921 patients were confirmed to harbor aneurysms during catheter-based diagnostic angiography. 172/921 (19%) patients were actively taking clopidogrel at the time of presentation. 332 patients were matched in a 1:1 fashion. Patients taking clopidogrel at presentation were less likely to present with ruptured aneurysms than those who were not taking clopidogrel (6.6% vs 23.5%, $p < .0001$). Estimated treatment effect analysis demonstrated that clopidogrel usage decreased aneurysm rupture risk by 15%. Conclusions We present, to the best of our knowledge, the first large-scale multi-institutional analysis suggesting clopidogrel use is protective against intracranial aneurysm rupture. We hope that these data will guide future investigations revealing the pathophysiologic underpinning of this association.

Faculty



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Identification of Research Priorities During the 4th Trimester in Mother-Infant Dyads

The 4th trimester (birth to 3 months) is a critical period in which complex interactions among biological, psychological, and social factors impact the health outcomes of mother-infant dyads. An understanding of the challenges faced by mothers during this period is needed to guide research initiatives. The purpose of this study is to identify challenges faced by mother-infant dyads during the 4th trimester. Mothers in the Tallahassee or Gainesville areas who have given birth to a singleton, the healthy infant in the last 6 months are sought to participate. Data collection includes questions regarding pregnancy, birth, and postpartum experiences along with surveys regarding social support, depression, body image, partner relationship, and mother-infant bonding. After survey completion, mothers may opt to participate in a qualitative interview. Quantitative and qualitative analyses will occur then convergent mixed methods will be used to integrate findings. To date, participants (N=61) are primarily white (62.1%), non-Hispanic (76.7%), married (82.3%), and have a college degree (64.5%). The average time from birth to survey completion is 89 days (range 7-282 days). Three quarters (75.8%) of mothers reported current breastfeeding and 43.9% screened as at risk for depression. In mothers who have returned to work (n=32), those who returned less than 12 weeks reported a higher depression score (M=10.3) than those who returned after 12 weeks (M=7.4) ($p=0.09$). Fifteen mothers have completed qualitative interviews. Data collection will continue through April 2023. Data will be merged such that qualitative interviews may explain quantitative findings. Research priorities during the 4th trimester will be identified to guide the next steps.