de Clinica e Cirurgia Veterinária, Escola de Veterinária da Universidade Federal de Minas Gerais, Universidade Federal de Minas Gerais, Av. Antonio Carlos, 6627, Belo Horizonte, MG, Brazil; [5]Computer Science, Lawrence Berkeley National Laboratory, Berkeley, CA 94143, USA and [6]Department of Microbiology

OBJECTIVES/GOALS: Antibiotic treatment sets the stage for intestinal domination by Candida albicanswhich is necessary for development of invasive disease, but the resources driving this bloom remain poorly defined. We sought to determine these factors in order to design novel prophylaxis strategies for reducing gastrointestinal (GI) colonization. METHODS/STUDY POPULATION: We initially developed a generalizable framework, termed metabolic footprinting to determine the metabolites C. albicanspreferentially uses in the mouse GI tract. After identifying the metabolites C. albicansutilizes, we usedin vitro growth assays in the presence and absence of oxygen to validate out metabolomics findings. We next determined if a probiotic E. coli that utilizes oxygen would reduce C. albicanscolonization compared to a mutant E. coli that could not respire oxygen. Finding that oxygen was a necessary resource, we utilized germ-free mice to determine if Clostridiaspp. known to reduce GI oxygen would prevent C. albicanscolonization. Lastly, we sought to see if 5-aminosalicylic acid (5-ASA) could prevent C. albicanscolonization. RESULTS/ANTICIPATED RESULTS: We found that C. albicans preferentially utilizes simple carbohydrates including fructo-oligosaccharides (e.g., 1-kestose), disaccharides (e.g., β-gentiobiose), and alcoholic sugars (e.g., sorbitol) and is able to grow in vitro on minimal media supplemented with either of these nutrients. However, in the hypoxic environment that is found in the "healthy" colon, C. albicans cannot utilize these nutrients. We next found that pre-colonization in a mouse model with a probiotic E. coli significantly reduced C. albicanscolonization, but the mutant E. coli had no effect on colonization. We next showed that Clostridia supplementation restored GI hypoxia and reduced C. albicanscolonization. Remarkably, we found that 5-ASA significantly reduced GI colonization of C. albicans. DISCUSSION/SIGNIFICANCE: We have shown that C. albicans requires oxygen to colonize the GI tract. Importantly, we found that 5-ASA can prevent an antibiotic mediated bloom of C. albicans by restoring GI hypoxia, which warrants additional studies to determine if 5-ASA can be used as an adjunctive prophylactic treatment in high risk patients.

404

Mechanisms of a Dynamic Stability Protocol for Persons with Thumb Osteoarthritis†

Corey McGee[1], Halil Ibrahim Ergen[2], Paula Ludewig[1], Ann Brearley[1], Ann Van Heest[1] and Erin Krebs[3]
[1]University of Minnesota; [2]Gaziantep University and [3]Minneapolis VA Health Care System

OBJECTIVES/GOALS: Our aims are to 1) describe changes in thumb Carpometacarpal (CMC1) joint stability following an 8-week clinic-based dynamic stability exercise program using computerized tomography (CAT) and 2) to evaluate the agreement between ultrasound and CAT (reference standard) when quantifying thumb CMC stability. METHODS/STUDY POPULATION: Aim 1: We have enrolled 13/49 participants in a prospective pre-post interventional study of an 8-week clinic-based occupational therapy dynamic stability program. The primary outcome will be change in stability (thumb metacarpal subluxation in mm) when forcefully loading the thumb as per CAT from pre-treatment to post-treatment at 9 weeks. Aim 2: Same 49 participants are undergoing a one-time ultrasound during baseline assessment. Agreement of ultrasound and CAT measurements (thumb metacarpal subluxation in mm) will be assessed by the Bland-Altman method. RESULTS/ANTICIPATED RESULTS: Exercise is a first-line treatment of CMC1 OA yet there is insufficient evidence to support this. Progression of CMC1 OA is characterized by altered joint mechanics. Joint replacement surgery may reduce pain but often worsens thumb mechanics and overall hand function. This study is the first to test the sustained biomechanical effects of non-invasive thumb exercises. Should these benefits exist, this will further support exercise as a first-tier intervention. Should ultrasound be a suitable proxy for CAT, therapists/physicians could monitor thumb CMC mechanics in response to treatment without risk of radiation exposure. We anticipate 1) a statistically significant reduction in thumb CMC subluxation at 9 weeks follow up and 2) high agreement between sonographic and CAT measures of thumb stability. DISCUSSION/SIGNIFICANCE: This study will lay the foundation for future work and may offer critical support for the use of a non-pharmacological and non-surgical approach as first-line treatment of a highly disabling disease. Future study should include controlled trials where hand function, activity limitation, disease progression, and costs are the outcomes in interest.

†The online version of this abstract has been updated since original publication. A notice detailing the change has been published at https://doi.org/10.1017/cts.2024.528.

406

A CTS Team Approach to Identifying Risk of Neonatal Hypoglycemia and its Relationship with Endothelial Dysfunction*

Aditya Devidas Mahadevan[1], Jennifer Pruitt[1], Leslie A. Parker[2] and Helen Jones[3]
[1]University of Florida Clinical and Translational Science Institute; [2]University of Florida College of Nursing and [3]University of Florida College of Medicine; Center for Research in Perinatal Outcomes

OBJECTIVES/GOALS: Neonatal hypoglycemia is seen in 65% of maternally diabetic pregnancies, and can lead to severe neurological damage. Neonatal glycemia may also be an indicator of placental function in these pregnancies. The purpose of this study is to identify patterns of neonatal glycemia, and associated endothelial dysfunction, by maternal diabetes subtype. METHODS/STUDY POPULATION: Pregnancies with maternal Type 1 (T1DM), Type 2 (T2DM), and gestational diabetes mellitus (GDM) are being enrolled. Maternal hemoglobin A1c (HbA1c) and umbilical cord insulin/glucose are being collected from 20 pregnancies in each group, 10 of which also undergo placental/umbilical cord tissue collection. Following delivery, neonatal blood glucose levels are also collected every 3-4 hours (4+ measurements) to determine rate of glycemic change. Linear regression modeling will be used to determine associations with placental and umbilical endothelial RNA expression, umbilical cord insulin levels, and maternal HbA1c within each diabetic subtype and between normoglycemic and hypoglycemic neonates. Endothelial gene expression will be compared using paired t-tests with Benjamini-Hochberg correction. RESULTS/ANTICIPATED RESULTS: Thus far, 5 T1DM, 10 T2DM, and 13 GDM samples have been collected. Gestational age at delivery and birth weight were similar between groups (38.1 ± 1.05 weeks; 3.6 ± 0.59 kilograms) and delivery method is evenly distributed (Cesarean section or vaginal delivery). Currently, with limited cohort size, no association is evident between maternal HbA1c and