

(35–45 Hz) frequencies in the occipital lobe. Increases in interbrain synchrony were also positively correlated with increases in empathy. Additionally, intercardiac synchrony between the participant and instructor showed a significant correlation at post-intervention only. Future investigations will focus on the relationship between interbrain, intercardiac, and movement synchrony. **DISCUSSION/SIGNIFICANCE:** Our findings support the idea that dance increases interpersonal synchrony at the level of the brain, heart, and behavior. Understanding the neural and somatic mechanisms of social behaviors will help promote understanding and development of interventions for the critical problem of social isolation and loneliness.

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### **A CTS team approach to Gold Nanorod (GNR) Theranostics in Adoptive Cell Therapy (ACT)**

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**OBJECTIVES/GOALS:** The objective of this study is to use GNR technology to track immune cells infiltrating malignant brain tumors that are delivered as part of a novel immunotherapeutic strategy. We seek to implement this new platform to elucidate the underlying mechanisms of therapeutic benefit from ACT via correlation between biodistribution and efficacy. **METHODS/STUDY POPULATION:** Utilizing the inherent two-photon luminescent signal of GNRs, we will identify uptake and phenotype of lineage negative hematopoietic stem cells (HSCs) in vitro. HSCs will be isolated from the bone marrow of 6-week-old C57bl/6 female mice. Following isolation, HSCs will be co-cultured with varying concentrations of GNRs in DMEM w/o sodium pyruvate for 24 hours, tested for viability, and images to quantify uptake and identify phenotyping. CT contrast of our novel Iodine-capped PEGylated gold nanorods will be confirmed through microCT and biodistribution of HSCs at time points after injection will be identified via CT visualization in vivo. **RESULTS/ANTICIPATED RESULTS:** We expect that increased GNR signaling 24 hours post-transplant in the tumors of glioma-bearing mice will be positively correlated with long term survival following ACT. Published data from our labs have revealed that CCR2+ lineage-negative HSCs significantly accumulate in tumor of glioma-bearing mice<sup>12</sup>. Importantly, CCR2+ lineage-negative HSCs promote differentiation to dendritic cells in the tumor, increase antitumor T cell responses mediated by cross-priming and cross-presentation, and improve efficacy of immune checkpoint inhibition<sup>12</sup>. Given that HSCs are important in mediating immunotherapy efficacy, we seek to correlate the accumulation of GNR signaling within the tumor as a marker of treatment response. **DISCUSSION/SIGNIFICANCE:** Adoptively transferred cells have been imaged using numerous published methods. While promising to the field of immunotherapy, these methods lack significant clinical validation. GNRs have not been used to study hematopoietic stem cells in the context of ACT and brain malignancies. Our research is poised to address this gap.

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### **Clinical and Radiographic Features of Mesenteric Ischemia after Intra-Aortic Balloon Pump Placement**

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**OBJECTIVES/GOALS:** Intra-aortic balloon pumps are commonly used as circulatory support in patients with critically reduced cardiac

function. The goal of this study is to estimate the incidence of mesenteric ischemia as an understudied vascular complication and to describe the clinical and radiographic characteristics of patients experiencing this complication. **METHODS/STUDY POPULATION:** We will be conducting a retrospective analysis of the electronic medical records of all patients who underwent intra-aortic balloon pump (IABP) placement between October 2020 and April 2023 at our academic medical center to identify the incidence of mesenteric ischemia. We will describe the clinical course of these patients and characterize them based on demographic features and risk factors for vascular complications including medical comorbidities. Finally, we will assess available chest x-ray and thoracoabdominal CT imaging for adequacy of balloon tip positioning, concordance between balloon size and aortic dimensions, and compromise of any visceral arteries in patients who experienced mesenteric ischemia vs. those who did not. **RESULTS/ANTICIPATED RESULTS:** We anticipate approximately 150 patients to have received IABPs over this period with at least 4 known cases of mesenteric ischemia. We will describe the clinical presentation of these cases and their often fatal outcomes. We expect several known risk factors will be present in these patients, including history of peripheral vascular disease, diabetes, or smoking history. On chest x-ray, we predict balloon tip positioning to be suboptimal (defined as >5cm below the aortic arch) in many patients, both those with mesenteric ischemia and those without, but a greater discordance on CT imaging between balloon size and aortic dimensions with greater evidence of visceral compromise in patients with mesenteric ischemia compared to those without. **DISCUSSION/SIGNIFICANCE:** Mesenteric ischemia is a serious and poorly studied complication of intra-aortic balloon pumps. Understanding the hospital course, clinical characteristics, and radiographic features present in these patients may guide clinicians in the early recognition and management of this potentially fatal complication.

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### **Pain and falls among persons with multiple sclerosis.**

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**OBJECTIVES/GOALS:** Falls are very common among persons with multiple sclerosis (PwMS) due to the disabling symptoms associated with the disease. The relationship between pain and falls is underexplored. This study investigated the relationship between the facets of pain (intensity and interference) and falls in the context of co-occurring symptoms of MS. **METHODS/STUDY POPULATION:** This is a survey-based study that included 915 adults with MS. Participants provided data on demographics, clinical data, concerns about falling, symptom severity, and occurrence of falls in the past 6 months. Participants also completed the Patient Reported Outcome Measurement Information System (PROMIS) pain interference and pain intensity short forms. Pain interference and pain intensity were separately entered into univariate and multivariable logistic regression models developed to examine the associations between falls incidence and pain. Multivariable models were adjusted for age, sex, years since diagnosis, MS type, Patient Determined Disease Steps, MS status, concerns about falling, fatigue severity, PROMIS depression short form, and PROMIS physical function short form. **RESULTS/ANTICIPATED RESULTS:** Univariate regression analyses indicated that pain interference (OR = 1.05; 95% CI 1.03 to 1.06; p < 0.01) and pain intensity (OR = 1.03; 95% CI 1.02 to 1.04; p < 0.01) were both associated with

falls. Only pain interference remained significantly associated with falls in multivariable regression analysis (OR = 1.02; 95% CI 1.00 to 1.05;  $p = 0.03$ ). The model explained 25% of the variance in falls. Pain intensity was not associated with falls (OR = 0.98; 95% CI 0.95 to 1.01;  $p > 0.05$ ) in multivariable regression analysis. **DISCUSSION/SIGNIFICANCE:** The findings suggest that pain is associated with falls among PwMS. Interventions designed to reduce falls incidence among PwMS may consider the inclusion of pain management as an integral component of those programs.

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### Knowledge of Familial Hypercholesterolemia Among Cardiology Healthcare Providers

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**OBJECTIVES/GOALS:** Familial Hypercholesterolemia (FH) is a common disorder that is vastly underdiagnosed and causes an increased risk for sudden cardiac death. Cardiology providers (CHCPs) are in an ideal position to care for patients with FH. This research aimed to assess the knowledge of CHCPs in the screening, diagnosis, and management of FH. **METHODS/STUDY POPULATION:** Adaptation of an existing knowledge tool guided survey development. FH knowledge domains included description of FH, prognosis, prevalence, inheritance, diagnostic criteria, and management options. CHCPs were asked to select their provider type (MD, PA, NP, RN) and years in clinical practice (less than 1-5 years, 6-10 years, 11-20 years, and greater than 20 years). Convenience and snowball sampling recruited CHCPs in the Division of Cardiology at Columbia University Irving Medical Center (CUIMC). Descriptive statistical analysis was performed on quantitative survey data using R. Frequency counts of provider type and years in clinical practice were calculated. Comparisons of scores between provider types and years in clinical practice were made using ANOVA. **RESULTS/ANTICIPATED RESULTS:** 70 surveys were analyzed (30.2% response rate). 50% of CHCPs identified as MDs, 24.2% as RNs, 12.9% as NPs, and 12.9% as PAs. With regards to clinical experience, 21.4% of CHCPs had 1-5 years, 25.7% had 6-10 years, 24.3% had 11-20 years, and 28.6% had greater than 20 years. The average overall score across all CHCPs was 55.4%, with the highest on the description knowledge domain (81.4% correct), followed by management (61.8%), diagnostic criteria (60.6%), inheritance (58.6%), prevalence (44.3%), and prognosis (25.2%). Physicians had the highest average score of 66.0%, followed by NPs (50.3%), PAs (49.7%), and RNs (39.3%). There was no significant difference in scores across experience levels, provider types, and knowledge domains based on experience levels. **DISCUSSION/SIGNIFICANCE:** CHCPs across all provider types and years of experience had limited FH knowledge. There exists an opportunity to improve CHCPs' knowledge of FH through education (didactic knowledge) or practice (experiential knowledge). Future interventions should aim to increase didactic and experiential knowledge of CHCPs through a variety of methods.

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### Expert group decision making for pharmacogenomic testing in Ontario

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**OBJECTIVES/GOALS:** There is a need to better understand how governments develop strategies to adopt, evaluate, and implement novel health technologies in a public healthcare system. The goal of this project is to understand this strategy development process for the translation of pharmacogenomic (PGx) testing in Ontario, Canada. **METHODS/STUDY POPULATION:** This observational case study of the Ontario Health PGx Working Group focused on developing recommendations for a PGx testing implementation strategy in the province. The group included 9 individuals affiliated with Ontario Health and 13 healthcare experts from multiple clinical fields. Ontario Health is the government agency that oversees provincial healthcare planning and service delivery. Guided by the Translational Thinking Framework and qualitative research methods, we observed the working group's activities for eight months. We collected meeting recordings, slideshow decks, emails, and group characteristics. We used descriptive statistics and a nine-step inductive approach to analyze the data to create process maps, a case report, and key decision summaries. **RESULTS/ANTICIPATED RESULTS:** There were 19 meetings conducted remotely with video-conferencing technology. Throughout the working group's activities, we identified 15 key decisions related to either administrative processes or PGx scientific content. We further stratified these two categories into four main themes relating to decisions about 1) membership involvement, 2) logistical management, 3) discussion and recommendation scope, and 4) information dissemination. These four decision themes represent tools by which Ontario Health guided the expert group activities and achieved their goal of generating a strategic roadmap for PGx testing implementation in Ontario. **DISCUSSION/SIGNIFICANCE:** The Ontario government makes decisions about how expert groups function by monitoring and controlling the group's activities to ensure efficiency, standardization, and practicality. Describing expert group decision-making increases transparency and highlights the critical role they play in the translational pathway of health technologies.

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### Urinary Exosomal MicroRNA as Early Markers of Diabetic Kidney Disease in African American Adults

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