

(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)**

Matthew Frain and John Figg  
University of Florida

**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**

Alex Ablavsky<sup>1</sup>, Alyssa Wohlfahrt<sup>1</sup>, Kevin John<sup>2</sup> and Haval Chweich<sup>2</sup>  
<sup>1</sup>Tufts University School of Medicine and <sup>2</sup>Tufts Medical Center

**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.**

Libak Abou and Anna Kratz  
University of Michigan

**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