scholastic outcomes and research experience, was to support and improve the wellbeing of college student participants. METHODS/STUDY POPULATION: Following the cancellation of in-person summer research programs, students were invited to attend a digital Summer Foundations in Research program. The 4-week program included 4 small group dialogue sessions led by trained facilitators and 4 large group mindfulness seminars followed with 3 Q/A style small group sessions. Surveys were delivered on days 1, 27, and 3 months following the program. Wellbeing measures included Brief Resilience, Perceived Stress, and Satisfaction with Life Scales. Students were prompted to indicate how worthwhile they found course components and comment on why they rated each component the way they did. Wellbeing results were assessed using paired t-tests with Bonferroni correction for multiple comparisons. Thematic analysis was used to interpret qualitative results. RESULTS/ANTICIPATED RESULTS: Students improved across all wellbeing measures at the program conclusion, including resilience (mean difference(SE) pre- to post-program $+0.22(0.06)$ p=0.0007), perceived stress ($-1.71(0.66)$ p=0.0116), and life satisfaction ($+1.57(0.52)$ p=0.0037). Gains in resilience were maintained 3 months out (pre-program to 3 month survey $+0.28(0.06)$ p<0.0001). To our surprise, mindfulness was the highest rated component of the research program with 85% (121/142) of students rating the mindfulness component 'extremely' or 'quite worthwhile.' At 3 months, 81% (74/91) reported continued use of one or more skills learned in the mindfulness sessions. Student comments endorsed the perceived importance of interactive mindfulness and dialogue sessions to the program and to careers in biomedical science and research. DISCUSSION/SIGNIFICANCE OF FINDINGS: Our results support the use of interactive mindfulness and dialogue programming as a participant supported, evidence-based approach to strengthen the resilience of undergraduate students pursuing careers in biomedicine. In the future, booster programming may be considered to maintain improvements in perceived stress and life satisfaction.

**98729**

### Professional Development Core of the Hispanic Alliance for Clinical and Translational Research: a scientific productivity catalyst for underrepresented minorities (URM) in Clinical and Translational Research (CTR)

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ABSTRACT IMPACT: The Hispanic Alliance for Clinical and Translational Research Professional Development Core (PDC) will contribute to the improvement of the health of an increasing US Hispanic population, by supporting and training a new cadre of Hispanic/Latino CTR researchers and community leaders that understand this population's prevalent health needs. OBJECTIVES/GOALS: To use the Professional Development Core (PDC) of the Hispanic Alliance for Clinical and Translational Research (Alliance) as a hub that coordinates training, mentoring programs, and grant support to address the need for more underrepresented minorities (URM) in clinical and translational research and mentoring. METHODS/STUDY POPULATION: PDC will: (1). Coordinate and offer an effective educational program based for new and mid-career researchers to address the gaps in research competencies on Hispanic/Latino health and healthcare through web-based asynchronous distance training, enhanced with face-to-face interactions. (2). Establish a robust mentoring program to address the mentoring gap for URM faculty by developing mentorship skills of faculty and researchers through a variety of resources, and offering protected time to mentor-mentee teams. (3). Design and implement a tailor-made curriculum to train scientists and community partners jointly, enabling them to carry out multidisciplinary research responsive to the Hispanic/Latino community health's needs. RESULTS/ANTICIPATED RESULTS: From 2010 to 2019 the PDC supported over 1,000 researchers and faculty and provided 52 activities over the 9 years. PDC-supported researchers submitted 56 proposals and 21 grants (37.5.%) were awarded, for a total of $2, 225,751.00, and to published 94 peer-review papers. We expect that through Alliance PDC will sponsor at least 20 new trainees/mentees in Clinical and Translational Research (CTR), 20 new certified mentors, a continuous support program, and an increase of 30% in the scientific productivity (e.g., grants submission and peer-reviewed publications) of the Hispanic CTRs in Puerto Rico and the establishment of long-term links with the Hispanic community in Puerto Rico and across the United States to address its health needs. DISCUSSION/SIGNIFICANCE OF FINDINGS: The PDC programs are significant in addressing the need for qualified researchers and mentors that understand, have the know-how, and are interested in addressing the health needs of a growing USA Hispanic medically underserved population.

## Evaluation
### *Basic Science*

**22370**

### Mechanical Analysis of Posterior Spinal Fusion Assemblies Intended to Cross the Cervicothoracic Junction

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ABSTRACT IMPACT: A comparative evaluation of the mechanical properties of commonly used posterior spinal fusion assemblies will allow surgeons to choose an assembly based on desired properties. The results will better inform surgical decision making and may lead to improved patient outcomes. OBJECTIVES/GOALS: The objective of this study is to evaluate and compare the mechanical properties of three posterior spinal fusion assemblies commonly used to cross the cervicothoracic junction. Fusion success depends on immobilization of vertebrae. The results will better inform surgical decision making and may improve patient outcomes. METHODS/STUDY POPULATION: Three titanium alloy posterior spinal fusion assemblies intended to cross the cervicothoracic junction underwent static compressive bending, tensile bending, and torsion as described in ASTM F1717 to a torque of 2.5 Nm: 3.5mm rods (Assembly A), 3.5mm to 5.5mm dilating rods (Assembly B), and two 3.5mm rods connected to two 5.5mm rods (Assembly C). Five samples of each assembly were attached to ultrahigh molecular weight polyethylene blocks via multiaxial screws for testing. The distance from the axis of rotation to the point of attachment of the rod and cervical screw was used as the lever arm to calculate the force required to create the desired torque for each test: lever arm of 37mm, requiring 67.6N of force to generate 2.5Nm of torque. Force and displacement were recorded, and stiffness of each construct calculated. RESULTS/ANTICIPATED RESULTS: An ANOVA was performed

and resulted in p-values all p<0.005, indicating the test groups were significantly different. Therefore, pairwise t-tests with Bonferroni corrections (p<0.017) were used to determine pairs that were significantly different. Assembly A (3.5mm rods only) was found to be significantly less stiff than Assembly B (dilating rods) and Assembly C (3.5mm-connector-5.5mm rods) in each mode of bending: compression bending, tension bending, and torsion. Assembly A had a significantly greater range of motion in compression bending and torsion, but not tension bending, when compared to Assembly B and Assembly C. The only significant difference between Assembly B and Assembly C was found in the stiffness value of compression bending. DISCUSSION/SIGNIFICANCE OF FINDINGS: The results of this study indicate that incorporating a 5.5mm rod in a fusion assembly adds significant stiffness to the posterior spinal fusion construct. When stability of a fusion is of heightened concern, as demonstrated by the ASTM F1717 vertebectomy (worst case scenario) model, including 5.5mm rods increases the likelihood of fusion success.

## Clinical Trial

**70925**

### A TL1 team approach to investigate attention and learning at the intracranial network level and assess the effect different cognitive rehabilitation strategies have on measures of attention and learning*

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ABSTRACT IMPACT: Access to intracranial recording in our epileptic sample provides a unique opportunity to characterize neurological activation patterns associated with attention and implicit learning; this foundational physiological understanding will serve to better guide cognitive rehabilitation techniques in TBI patients that aim to improve functioning across these cognitive domains. OBJECTIVES/GOALS: 1) Investigate the network level interactions of attention and learning during an attention network task (ANT) and an implicit learning contextual cueing (CC) task. 2) Assess the effect that attention rehabilitation strategies have on behavioral and neural responses pre/post-attentional intervention. METHODS/STUDY POPULATION: This study involves refractory epilepsy patients (rEP) with implanted intracranial electrodes and moderate-to-severe traumatic brain injury (m/sTBI) survivors. In rEP, we are identifying network level modulations of cortical regions via the ANT, which probes components of attention (alerting, orienting, and executive control) and a CC task that probes implicit learning. We hypothesize that modulation of attention and learning can be seen at the neuronal level. In TBI we will assess improvement following two behavioral attention rehabilitation paradigms; and use our results from epileptic patients to guide measurement of treatment-related neuroplastic change via scalp electroencephalography. RESULTS/ANTICIPATED RESULTS: Preliminary behavioral results from the rEP cohort are in line with previous studies and the intracranial data is suggestive of region- and task-specific modulations in memory and attention related systems. Following completion of recruitment, we expect to more concretely identify regions and networks that exhibit modulatory effects associated with attention and implicit learning. Additionally, we anticipate that deficits in attention will be mitigated following training and hypothesize that implicit learning rate will improve in TBI patients as a result of both attentional rehabilitation paradigms. DISCUSSION/SIGNIFICANCE OF FINDINGS: Characterizing intracranial activity in epilepsy patients will give electrophysiology data unattainable in TBI patients. This intracranial perspective will enable us to propose mechanisms of action that may result from our interventions and enable critique of current rehabilitation treatments.

## Dissemination and Implementation

**24402**

### Grounded Theory Model for Adherence to Home Exercise among People with a Mobility Disability

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ABSTRACT IMPACT: Future exercise interventions for people with mobility disability should be tailored to the level of the individual and responsive to intervention adherence. A promising area of research is the use of adaptive interventions as a mechanism for tailoring and 'titrating' the intervention based on data obtained during early intervention stages. OBJECTIVES/GOALS: The purpose of the study was to understand adherence to a home-based exercise trial delivered to people with a mobility disability. The objective was to develop a multi-dimensional model for engaging and retaining participants not adhering to an exercise trial by using a grounded theory approach involving both qualitative and quantitative data. METHODS/STUDY POPULATION: An exercise trial utilized telehealth technology to deliver a home-based exercise intervention for adults with a mobility disability. In order to understand factors of adherence to the exercise trial, a mixed methods study design was used involving baseline data and semi-structured interviews. Maximum variation sampling was used to select participants based on level of adherence, gender, race, and functional level. Categorization based on adherence to exercise videos during the first 12 weeks of the intervention included 3 groups: 1) high adherence (≥80% weekly median exercise video minutes viewed), 2) sub-optimal adherence (< 80% but ≥20%), and 3) low adherence (< 20%). Interviews were conducted with 10 participants in each group (n = 30) and data were analyzed using a grounded theory approach. RESULTS/ANTICIPATED RESULTS: A sample of 30 participants from a large pragmatic, home-based exercise trail have completed interviews. All interviews were transcribed and uploaded to NVivo software for coding. Emerging codes include lack of time to exercise, inappropriate exercise intensity, and lack of support for exercise. Using grounded theory approach, results include: 1) identifying risk factors for low adherence to a home-based exercise program delivered to people with mobility disability, 2) discovering themes for not responding to program activities in a home-based exercise program for adults with physical disabilities, and 3) determining the relationships between variables that emerge from thematic and statistical analyses. A model for adherence to home exercises among people with mobility disability will be presented. DISCUSSION/SIGNIFICANCE OF FINDINGS: People with a mobility disability are more susceptible to adopting sedentary lifestyles, which result in poor psychosocial and physical health outcomes. There is a clear and pressing need for designing future home-based exercise interventions with a greater level of customization for participants who have low to non-adherence.