Health Research Nonformula Grants - State Fiscal Year 2021-22

Health research nonformula grants totaling $2,000,000 were awarded to eight organizations in response to the Request for Application (RFA) # 67-127 for spinal cord injury research. All research projects addressed the following research priority, which was established by the Department in conjunction with the Spinal Cord Research Advisory Committee:

All applications submitted in response to this RFA must be aligned with the following research priorities established by the Department in conjunction with the Spinal Cord Research Advisory Committee.

a) Pharmacologic, biologic, medical device, brain stimulus, and rehabilitative approaches and techniques.

b) Preference will be given to those projects and techniques that seek to change the nature and course of the injury.

c) To ensure funded research addresses the gap in translation of discovery to human study and proposal, further preference will be given to research that is strategically translational or translatable relative to aims and outcomes. .

d) Finally, further preference will be given to research strategies that represent either potential or existing collaboration with industry, whether in the development and trial of biologics, pharmacologics, device, or novel therapeutic rehabilitative treatments in combination with these developments.

This RFA provides three funding options aligned to the research priorities described above. Each of the three Tiers of funding will have specific maximum allowable budget requests, project requirements and a maximum allowable Grant period:

Tier 1: Pilot Research Grant:

- Maximum Budget Request: $100,000.
- Project Requirements: This Tier will fund applications that propose early research investment aligned with the research priority as the institution applicant prepares to seek a larger research Grant from a Federal program or non-profit organization. Preliminary data is not required for this Tier.
- Grant Period: June 1, 2022 to May 31, 2024 (a one year no-cost extension may be requested and approved with sufficient justification, extending the period to May 31, 2025.)

Tier 2: Standard Research Grant:

- Maximum Budget Request: $200,000.
- Project Requirements: This Tier will primarily fund applications for research aligned with the research priority which include supporting and preliminary data for the research proposed. This Tier may also fund pilot research (with no preliminary or supporting detail) if the application justifies the budget for pilot research. Institution applicants are encouraged to attach research papers; in-press, pre-published drafts, and accepted research papers may be cited or submitted separately as an attachment to the application.
- Grant Period: June 1, 2022 to May 31, 2024 (a one year no-cost extension may be requested and approved with sufficient justification, extending the period to May 31, 2025.)

Tier 3: Clinical/Translational Research Grant:

- Maximum Budget Request: $400,000
- Project Requirements: This Tier will fund applications which have a concurrent application to, or funding from, Federal or industry sources for projects aligned with the research priority. Preliminary data must be published or in press in a scientific journal and cited or submitted separately as an attachment to the application.
- Grant Period: June 1, 2022 to May 31, 2025 (a one year no-cost extension may be requested and approved with sufficient justification, extending the period to May 31, 2026.)

The following list of grant awards provides the lead and collaborating institutions, title of the research project, amount of the grant award, and project purpose.

Thomas Jefferson University: Tier 2

Amount Awarded: $199,998

Research Project Title: "Transplantation of Synaptogenic Astrocytes for Reconnecting Respiratory Circuitry"

Purpose: A majority of spinal cord injury (SCI) cases occur in the cervical region, resulting in persistent respiratory dysfunction that is associated with mortality, morbidities such as respiratory infections, and greatly reduced patient quality of life. Cervical SCI disrupts the neural circuitry that controls the diaphragm (the major muscle of inspiratory breathing); However, axon regeneration, synaptic reconnection and consequent restoration of this critical circuitry do not occur following SCI. In animal models of chronic cervical SCI, we will test a highly innovative astrocyte subpopulation-specific transplantation strategy aimed at promoting reconnection of this neural circuitry for restoring diaphragmatic respiratory function. Importantly, we will perform all studies in the chronic paradigm, which is critical given the vast majority of individuals affected by SCI are chronically injured.

Collaborating Organizations: Temple University

Albert Einstein Healthcare Network: Tier 2

Amount Awarded: $199,423

Research Project Title: Noninvasive brain stimulation therapy in subacute human spinal cord injury: a translational study
Purpose: The objective of this proposal is to begin translating findings from our pre-clinical studies to human tetraplegia following cervical SCI (cervSCI). Our HF-rTMS treatment protocol has not been previously assessed in humans, and is qualitatively different from rTMS protocols reported to transiently enhance existing pathways previously demonstrated by our group and others. The protocol involves a daily dose of ~10 mins bilateral HF-rTMS for 2 weeks. SCI participants will be studied in their inpatient setting, in which we have a track-record of clinical TMS studies and trials that support the feasibility of this proposal.

Collaborating Organizations: None.

Drexel University: Tier 2

Amount Awarded: $200,000

Research Project Title: Optimizing transcutaneous spinal cord stimulation to promote recovery after SCI
Purpose: Spasticity is a debilitating condition that emerges in up to 75% of spinal cord injured individuals, and it greatly affects their quality of life. Current pharmacological approaches to decrease spasticity lead to significant undesirable sides effects including a reduction in muscle activity that significantly interferes with motor recovery. While transcutaneous spinal cord stimulation (tSCS) is a promising strategy to reduce spasticity after SCI, stimulation protocols are vaguely and empirically developed, with many parameters used anecdotally. The objective of this proposal is to identify the optimal stimulation protocol to decrease spasticity in terms of intensity, frequency, and location. Our overall objective is to render this non-invasive treatment available to patients with SCI without further delay
- and optimizing tSCS protocols is the key to moving this therapy forward.

Collaborating Organizations: None.

Drexel University: Tier 2

Amount Awarded $200,000.00

Research Project Title: Mechanistic targeting of spinal neurons to enhance locomotor function after SCI
Purpose: The goal of this study is to determine the mechanistic basis of benefits afforded by currently used clinical and experimental therapies aiming to restore locomotion after spinal cord injury, including stimulation, pharmacology, and growth factors, at the level of specific spinal interneurons and sensorimotor circuits. The identification of beneficial plasticity that occurs due to these treatments will allow for the development of optimized therapeutics which specifically target spinal neuronal and circuit elements in order to enhance locomotor recovery following SCI.

Collaborating Organizations: None.

Temple University: Tier 2

Amount Awarded $199,999.00

Research Project Title: Enhancing Rehabilitation Effectiveness with Coactivation of Corticospinal Neurons
Purpose: Chemogenetic modulators afford the ability not only to stimulate neuronal activity but also reduce it, depending on the types chosen. They can be genetically introduced into general neuronal populations or specific neuronal tracts using intersectional genetics. Most importantly, chemogenetic modulators are fluorescently tagged to allow precise mapping of the entire neuron, dendrites and axonal terminals extending throughout the CNS. This study will provide key insight into how circuits adapt to the injury during rehabilitation and how cortical activity can influence the extent of this recovery. This research will identify key intersections between plasticity and how rehabilitation shapes these connections to allow the damage circuit to be rerouted around the lesion and enhance functional recovery.

Collaborating Organizations: None.

University of Pittsburgh: Tier 2

Amount Awarded $199,996.00

Research Project Title: An Enhanced Brain-Computer Interface for Paralysis

Purpose: We have shown that people with quadriplegia can quickly learn to use brain-computer interface (BCI) technology to control robotic arms and hands. In this project, we plan to impart precision to BCI movement. To do this, we will conduct basic research to identify subtle changes in brain state that occur when a person intends to make an accurate grasping movement. We will apply our data to enhance the neural decoders in our BCIs. We will then validate the decoders in monkeys as they use brain control to "reach" for targets of increasing difficulty in 3D, using a virtual-reality monitor. As in the past, we will transfer this technology, so that people with upper-limb paralysis can use these improved BCIs for precise reaching.

Collaborating Organizations: None.

Drexel University: Tier 3

Amount Awarded $400,000.00

Research Project Title: Tele-exercise for Individuals with SCI: Physical, Psychosocial Determinants
Purpose: The objective of this study is to examine the efficacy of our participant-centered tele-health physical activity program (Tele Exercise to promote Empowered Movement with Spinal Cord Injury, TEEMS) for individuals with SCI on physical and personal determinants through a parallel mixed-methods design approach.

Collaborating Organizations: Temple University

University of Pittsburgh: Tier 3

Amount Awarded $398,044.00

Research Project Title: Active Permeable Pressure Relieving Seating System
Purpose: Iteratively develop, optimize, and evaluate the Active Permeable Pressure Relieving Dynamic Seating System (APPRDSS) for improving pressure injuries (PI) in-home treatment by the integration of novel modular seat and back support coordinated with powered seat functions (PSF). Multiple prototypes will be built for evaluation. We will utilize a participatory action design and engineering (PADE) approach to incorporate end-user and clinician knowledge and perspective throughout the design process. We will conduct in-lab clinical testing of APPRDSS using people with spinal cord injuries and expert clinicians by comparing it to a ROHO cushion and backrest to drive further improvements in the APPRDSS.

Collaborating Organizations: None.