Congressionally Directed Medical Research Programs

CDMRP

Department of Defense

https://cdmrp.army.mil

Spinal Cord Injury Research Program

VISION

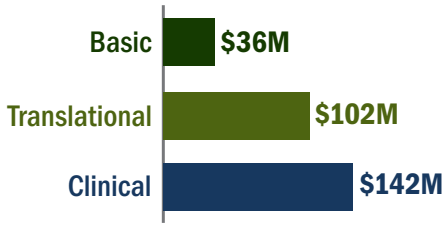
Advance the treatment and management of spinal cord injury and ameliorate its consequences relevant to injured Service Members

MISSION

To fund research and encourage multidisciplinary collaborations for the development and translation of more effective strategies to improve the health and well-being of Service Members, Veterans, and other individuals with spinal cord injury

PROGRAM PORTFOLIO

The SCIRP funded 278 awards through FY20 across the research and development continuum but favors projects in a more advanced stage of development, with over $140M invested into projects that are touching patients now.



PROGRAM HISTORY

Spinal cord injuries (SCIs) are complex neurotraumatic wounds with long-term consequences requiring lifelong care. It is estimated that about 300,000 individuals are living with an SCI,[1] and this number continues to grow, as over 17,000 new cases occur in the U.S. each year. *This means, on average, someone in the U.S. suffers an SCI every 30 minutes.*

The Peer Reviewed Spinal Cord Injury Research Program (SCIRP) was established by Congress in fiscal year 2009 (FY09) to support research and treatments into repairing/regenerating damaged spinal cords and improving rehabilitation therapies. With $397.85 million (M) in congressional appropriations between FY09 and FY22 for peer-reviewed spinal cord research, the SCIRP supports the translation of therapeutic strategies across the continuum of care from management of the acute injury through functional and psychological rehabilitation for chronically injured individuals.

CURRENT PROGRAM PRIORITIES

The program evaluates its priorities annually, in partnership with members of the SCI community, researchers, clinicians, and other funders. The FY22 program priorities are listed below:

- Preserving and protecting spinal cord tissue at time of injury for improved neurologic outcomes
- Identifying and validating biomarkers for diagnosis, prognosis, and for evaluation of treatment efficacies
- Developing, testing, and validating promising interventions to address bowel, genitourinary, neuropathic pain, cardiopulmonary, or autonomic dysfunction in people with SCI
- Investigating psychosocial issues relevant to people with SCI, their families, and/or their care-partners
- Rehabilitation and regeneration – maximizing the function of the residual neural circuitry, including harnessing neuroplasticity and recovery to improve function after SCI

EXCITING NEW RESEARCH

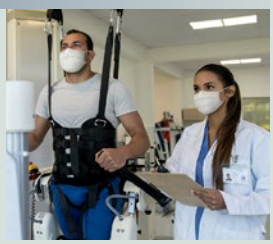
- **Dr. Laura Carbone,** ***Augusta University Research Institute*** – Clinical testing of a novel non-opioid strategy for treating neuropathic pain
- **Dr. Jae Lee,** ***University of Miami*** – Discovering novel anti-inflammatory drugs for neuroprotection post-SCI
- **Dr. Rachel Cowan,** ***University of Alabama*** – Determining meaningful changes in fitness and their relation to changes in self-care, mobility, and independence for individuals with SCI
- **Dr. Chad Swank,** ***Baylor Scott & White Research Institute*** – Investigating the benefits of exoskeleton assisted walking in the first months of recovery

[1] https://www.nscisc.uab.edu/

RESEARCH OUTCOMES

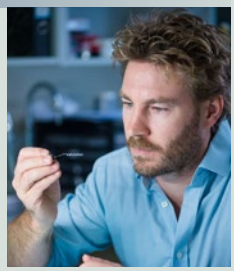
The SCIRP is a program addressing congressional intent for an SCI research and treatment program working to develop healthcare solutions for and in partnership with the SCI community. Below are examples of some impactful research accomplishments from this program.

PSYCHOSOCIAL ISSUES



Dr. Allen Heinemann at the Shirley Ryan AbilityLab leads an FY16 SCIRP Qualitative Research Award utilizing patient focus groups to examine how robotic exoskeleton technology is received in the SCI community, with the ultimate goal of leveraging consumer experiences to establish recommendations and regulations for exoskeleton use. Exoskeleton users emphasized the psychological benefits of being eye-level with their non-disabled friends and family, and some reported physiologic improvements in areas such as bowel/bladder function and pain management. Despite these benefits, participants reported several drawbacks such as safety concerns, fatigue, muscle spasms, device size, and inaccessibility for the average user. Dr. Heinemann's research highlights that exoskeletons are promising mobility aids but have a long way to go before widespread adoption by the SCI community. Most importantly, this user-focused research demonstrates the critical need to center the lived experiences of those with SCI for the successful adoption of rehabilitative technologies.

REHABILITATION AND REGENERATION



Brain-computer interfaces (BCI) aim at establishing a direct link to the brain and may provide a bridge to restoring independent function and limb control. Dr. Nicholas Opie of the University of Melbourne leveraged an FY16 SCIRP Translational Research Award to provide crucial development, optimization, and biosafety testing of the Stentrode.™ This novel BCI technology is unique in that it uses a minimally invasive endovascular (in vein) delivery method, thereby overcoming many of the limitations of traditional approaches. The SCIRP-funded project was integral to an industry-funded first-in-human clinical trial in individuals with motor deficits and severe paralysis. In this clinical trial, after an initial training period with the technology, participants regained their ability to perform independent activities of daily living, such as communication, using a computer and smart phone to text, send emails, shop online, and do their banking. This provides not just proof of concept for the endovascular BCI, but real hope for individuals living with neurological disorders or injuries to regain meaningful independence and autonomy. The company developing the Stentrode, Synchron, recently received Food and Drug Administration approval to commence human trials in the United States.

BIOMARKERS

Imaging is a critical diagnostic and prognostic tool for clinicians, particularly for central nervous system injuries. After a traumatic SCI, metal hardware is often implanted to stabilize the injury. However, this limits the ability to perform MRI near the implanted hardware. With an FY18 SCIRP Investigator-Initiated Research Award to the Medical College of Wisconsin, Dr. Kevin Koch is focusing on using multispectral imaging to reduce the signal disruption around metal hardware in SCI patients to enable more accurate imaging of the spinal cord. Importantly, metal hardware implantation is not restricted to SCIs, and optimized imaging techniques around metal fixators would have widespread benefits for Service Members and civilians recovering from orthopaedic injuries as well.

Point of Contact: CDMRP Public Affairs, 301-619-9783
usarmy.detrick.medcom-cdmrp.mbx.cdmrp-public-affairs@mail.mil

03/2022