



Repurposing Acute Therapies for Enhanced Recovery after Spinal Cord Injury, (RATER SCI)

Project Coordinator: Prof. John Kramer, The University of British Columbia, International Collaboration on Repair Discoveries (ICORD), CIHR, Vancouver, Canada

Project Partners: Prof. Armin Curt, University Hospital Balgrist, Spinal Cord Injury Center, In-kind, Zurich, Switzerland

Frank Bradke, German Center for Neurodegenerative Diseases (DZNE e.V.), Axon Growth and Regeneration, BMBF, Bonn, Germany

Prof. Catherine Mercier, Center for Interdisciplinary Research in Rehabilitation and Social Integration, University of Laval, FRQS, Hamel, Canada

Soler Dolors, Institut Guttmann, ISCIII, Badalona, Spain

Profound sensorimotor deficits are the hallmark of damage in the central nervous system (CNS). Among the more difficult to manage are muscle paralysis and neuropathic pain. The combination of these deficits is particularly cruel: burning or dyesthesia in areas of the body that are otherwise numb and incapable of volitional movement. The economic burden to the individual, caregivers, and European and Canadian societies are enormous.

The proposed research project will evaluate the effectiveness of pharmacological and rehabilitation interventions to increase motor function and/or relieve neuropathic pain. Our aims are to determine: 1) if existing treatment options already used to manage neuropathic pain can be repurposed to improve motor function and 2) whether an existing rehabilitation intervention to improve locomotion can be repurposed to relieve neuropathic pain.

Research will be carried out in Canada, Switzerland, Germany, and Spain, and involve research in humans and animal models of spinal cord injury. An investigation into pain medications will be primarily focused on the use of anticonvulsants. These are a particular class of drug that is commonly administered for neuropathic pain after spinal cord injury. Two rehabilitation therapies will be investigated for their potential to resolve neuropathic pain and increase muscle strength. In Spain, a research project will incorporate the use of electrical stimulation applied to the brain as a strategy to improve hand function. Parallel studies in Canada will investigate if gait training reduces pain whilst improving how people walk. At the end of the proposed research project, our goal is to understand the relationship between pain and the recovery of muscle strength, and develop new strategies to enhance neurological recovery in humans with SCI.