manitoba neuroscience network

# Neural stem cells-based therapies for spinal cord injury

NEUROSCIENCE GRAND ROUNDS

DATE

Friday, March 15th, 2024

9:00 AM - 10:00 AM

LOCATION

Psychiatry Bldg. 2nd Floor Rm PX236/238

## SPEAKER


Soheila Karimi , PhD

Professor, Department of Physiology and Pathophysiology, Rady Faculty of Health Sciences, University of Manitoba


## BIO

Soheila Karimi is a full professor in the Department of Physiology and Pathophysiology at the University of Manitoba, and the Founding Director of the Manitoba Multiple Sclerosis Research Centre. Soheila has had a long-term interest in neural regeneration and repair with a focus on therapeutic development for spinal cord injury and multiple sclerosis. She received her PhD from the University of Saskatchewan in 2001, followed by a CIHR postdoctoral fellowship at the University of Toronto. In 2007, Soheila joined the University of Toronto as an adjunct Assistant Professor until 2010 when she moved to the University of Manitoba. Her research program contributes to both basic and applied regenerative medicine discoveries in neurosciences. Karimi's program has been continuously funded by the CIHR, Multiple Sclerosis Canada and other national and international agencies, and has contributed to high impact scholarly publications. Soheila has been actively involved in leadership, outreach, and mentorship activities in Canada and internationally. She currently serves in the Board of Directors of the Canadian Association for Neuroscience, the Advisory Board of the International Neurotrauma Society, and the Executive Committee of the International Women in Multiple Sclerosis, among many other peer-review, editorial and advisory panels.

## ABSTRACT


Spinal cord injury (SCI) results in significant neurodegeneration and consequently disintegration of neural network that underlie neurological dysfunction. Successful restoration of damaged spinal circuit requires replenishment of neuron-glia network. Adult neural precursor cells (NPCs) have the unique multilineage capacity to generate both neurons and glia. Despite this capacity, transplantation studies by our group and others have shown restricted ability of NPCs for neuronal differentiation (neurogenesis) in the milieu of SCI, where NPCs predominantly give rise to glia. These challenges have also limited the functional benefits of NPC transplantation in clinical trials for people with SCI, although the safety and feasibility of this strategy have been verified. To address this critical gap, we have studied SCI microenvironment to understand how the regenerative response of transplanted NPCs is extrinsically regulated in the injured spinal cord. We have identified several pathways that their dysregulation negatively influences NPC-mediated repair after SCI. This talk will focus on our discovery on the inhibitory role of matrix chondroitin sulfate proteoglycans (CSPGs) in NPC transplantation after SCI. We have unraveled that SCI-induced upregulation of CSPGs restricts graft survival and limits NPC neurogenesis and synaptic integration of new neurons in SCI through co-activation of two receptor protein tyrosine phosphatases, LAR and PTP-sigma. Our extensive therapeutic work suggests that pharmacological inhibition of CSPGs/LAR/PTP-sigma axis holds promise as a clinically feasible adjunct treatment to optimize the efficacy and neurologic benefits of NPC-based therapies for SCI.


## OBJECTIVES

1. Introduction to neural precursor cells and their promise for spinal cord repair

2. Discovery of CSPGs/LAR/PTP-sigma axis as a negative regulator of NPC-mediated repair after spinal cord injury

3. Implications towards development of new regenerative therapies for spinal cord injury.

Zoom Link: https://us06web.zoom.us/j/83267302150

Meeting ID: 832 6730 2150

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