



Krembil Neuroscience Program: Spinal Program

Overview

Established in 1994 and currently led by Dr. Michael Fehlings, the Krembil Neuroscience Spinal Program is recognized as a Center of Excellence in Spine and Spinal Cord Injury Care by the Christopher Reeve Paralysis Foundation. The Spinal Program emphasizes the bench-to-bedside approach that fosters translation of new scientific discovery into improved patient outcomes.

Spinal cord injuries cause interruptions in message systems from the brain to the rest of the body. These injuries can be the result of accidents or conditions that damage the spinal cord. Injury to the spinal cord can produce sensory and motor disabilities, affecting a person's ability to move and control muscles and affecting the function of organs.

Milestones/Innovations

- First in Canada to employ image guidance for complex surgery (1995)
- Discovered cells that can divide or multiply and migrate, promising the possibility of repair of injury/degeneration of spinal cord (1999)
- First in Canada to use minimally invasive kyphoplasty to repair vertebral column fractures (2006)
- First in Canada to have successfully used adult neural stem cells to regenerate myelin and restore significant mobility in rats (2006)

Scope of work

- Surgical intervention
- Acute care pain management
- Patient education
- Spinal Cord Registry
- Imaging
- Pre-clinical pharmaceutical trials
- Pathophysiology of spinal cord injury
- Spinal cord regeneration
- Tissue banking
- Clinical trials
- Neuroprotective pharmacological compounds

Integration of Care

Physicians, clinicians and other staff members that make up the Spinal Program believe the best patient care involves an integration of modalities. Patients may receive care or consultation from:

- Spinal Neurosurgeons
- Orthopedic Spinal Surgeons
- Neurologists
- Neuro-oncologists
- Neuro-urologists
- Neuropsychiatrists
- Diagnostic and/or MRI (magnetic resonance imaging) experts
- Pain Management
- Anesthesiology consultants
- Registered Nurses

<p>Basic science research includes investigations into:</p> <ul style="list-style-type: none">• Ion channel disturbances• Mitochondrial dysfunction• Death receptor mediated apoptosis• Gene profiling• Endogenous spinal cord stem cells• Stem cell transplantation• Small molecule therapies• Growth factor induced repair and regeneration	<p>Clinical science research includes investigations into:</p> <ul style="list-style-type: none">• Timing of surgical intervention• Radiographic imaging techniques• Plasticity of neural circuitry after spinal cord injury• Surgical stabilization• Genetic engineering technologies
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