The Spinal Cord Research Centre (SCRC) of Winnipeg was established in 1987 to provide an environment for world-class spinal cord research and training in the field of locomotor control.

**Contact information:**

Spinal Cord Research Centre  
Department of Physiology & Pathophysiology  
Max Rady College of Medicine  
Rady Faculty of Health Sciences  
University of Manitoba  
745 Bannatyne Avenue  
Winnipeg, Manitoba, Canada, R3E 0J9

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Fax: (204) 789-3930  
E-mail: office@scrc.umanitoba.ca  
Website: https://scrc.umanitoba.ca/wp/

**New Director: July 1, 2020 – present**  
Dr. Kristine Cowley, Assistant Professor, Physiology & Pathophysiology  
Room 405, Basic Medical Sciences Building  
Email: Kristine.Cowley@umanitoba.ca

**Former Director: July 2016 – July 2020**  
Dr. Phillip Gardiner, Professor Emeritus, Kinesiology & Recreation Management  
Professor in Physiology & Pathophysiology (cross-appointed)  
Room 404, Basic Medical Sciences Building  
Email: Phillip.Gardiner@umanitoba.ca
On July 1, 2020 I passed the torch over to our new Director, Dr. Kristine Cowley. It has been an honour to be a member of the SCRC since 2002, and to work with the SCRC members during these past 5 years of my directorship, during which times we have seen significant transformative changes. I look forward to continuing our research work in my lab, and to working with Dr. Cowley as the SCRC heads into an exciting future.

New Director - July 1, 2020
Kristine Cowley, PhD
Assistant Professor, Dept. Physiology & Pathophysiology
Tier 2 Canada Research Chair in Health and Function after Spinal Cord Injury

As new Director of the SCRC I look forward to continuing to build on the strong research leadership of the SCRC that has revealed spinal neural strategies contributing to movement, mechanisms guiding spinal plasticity and regeneration, and made important contributions to our understanding of how the spinal cord functions normally. I had anticipated open houses for our new Human Spinal Cord Injury Research Laboratory for Health, Function and Motor Control. COVID-19 has delayed our original plans. Nonetheless our group advanced knowledge this past year, as noted by our awards, research and knowledge translation contributions, and professional and research advances. Spinal cord injury-related research is at an interesting tipping point, with the increasing recognition of the potential to take advantage of neural circuitry within the spinal cord to improve function, even in persons with severe spinal injury, and I look forward to the new insights that will be gleaned in the years ahead.
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Appendix A: SCRC Strategic Plan Report 2017-2022
The Spinal Cord Research Centre (SCRC) of Winnipeg was established in 1987 to develop a world-class spinal cord training program within the Department of Physiology at the University of Manitoba and as a partnership between the University of Manitoba, the Health Sciences Centre Research Foundation (now Health Sciences Centre Foundation) and the Canadian Paraplegic Association Manitoba (now Spinal Cord Injury Manitoba Inc.). The SCRC was reviewed and approved by the Faculty of Medicine Research Committee, and its formation was announced on the occasion of Rick Hansen's stop in Winnipeg on January 21, 1987 during his Man in Motion World Tour to raise funds for spinal cord research. The SCRC was given formal status as a research centre in the Faculty of Medicine in 2003 by the University of Manitoba Board of Governors.

OBJECTIVES

We are recognized as leaders in the field of locomotor control from membrane properties to systems physiology and neuronal networks and regeneration. We believe strongly that the restoration of function following injury requires a deep understanding of the function and organization of the uninjured spinal cord motor system. Therefore, it is of critical importance to continue with the SCRC’s original mechanistic research as it is the renowned strength of the SCRC.

The SCRC will continue with an integrated research and training strategy and focus on its three overlapping ‘thrusts’, specifically: (1) Mechanistic Research, (2) Translational Research and (3) Neuroprotection, Repair, Regeneration & Cell Based Therapies (as in Venn diagram) as well as develop as a Centre following its Strategic Plan (Appendix A).

This integrated research and training strategy is supported through partnership and extensive interaction between the SCRC core members and the affiliates from Human Anatomy & Cell Science, Internal Medicine (Neurology), Kinesiology, Medical Rehabilitation, and Radiology in areas of tissue repair, rehabilitation, prevention and treatment.

Research ‘thrusts’ objectives:

1. Mechanistic Research

We believe strongly that the restoration of function following injury requires a deep understanding of the function and organization of the uninjured spinal cord motor system. Therefore, it is of critical importance to identify the spinal neurons crucial for limb motor control (movement and balance).
and to understand the role that changes in the cellular properties of spinal neurons play in states of altered motor activity, such as after injury.

Researchers within the SCRC employ a unique combination of in vivo whole animal, isolated in vitro spinal cord, isolated in vitro brainstem spinal cord and spinal cord slice preparations, in vivo and whole animal rodent models, as well as transgenic mouse models to study spinal and descending motor systems.

Mechanistic research objectives:

1. Investigate mechanisms of locomotor network activation as a feasible target for repair or functional recovery after injury, and as a target for therapeutic (pharmacological and electrical stimulation) intervention. (Drs. Cowley, Schmidt and Stecina)

2. Investigate the anatomical and functional organization of brainstem neural networks for walking and posture and how these networks can be re-engaged after spinal cord injury or stroke to restore movement. (Dr. Chopek)

3. Develop a comprehensive understanding of the morphological classes of electrical synapses that exist in mammalian brain and spinal cord, the neural systems and circuitry in which these occur, and the essential functions those synapses confer to neuronal network properties. This will be complemented by the elucidation of the accessory protein composition and macromolecular organization of electrical synapses, and delineation of mechanisms underlying regulation of electrical synaptic transmission. (Dr. Nagy)

4. Investigate mature spinal networks in rodents by combination of chemogenetic and optogenetic activation/silencing of select neural populations. (Dr. Stecina)

5. Investigating musculoskeletal deterioration in a pre-clinical research model of severe SCI (Drs. Cowley, Gardiner and MacNeil)

2. Translational Research (for increasing functional recovery and reduction in inactivity-related secondary health consequences after SCI)

Translational research objectives include:

1. Establishing the Human Spinal Cord Injury Research Centre for Health, Balance and Motor Control. (Drs. Cowley and Stecina)

2. Investigating energy expense at rest and during exercise in tetraplegia. (Drs. Cowley, Shay and Leiter)
3. Investigating the secondary health outcomes, health service use and costs in the cohort of Manitobans living with spinal cord injury. (Drs. Cowley, Ethans and Fransoo)

4. Providing essential technology to the hospital and home environment throughout the continuum of care. (Drs. Cowley and Ripat)

**3. Neuroprotection, Repair, Regeneration and Cell Based Research and Therapies**

Treatment of spinal cord injury and other neurodegenerative disorders of the spinal cord like multiple sclerosis needs a multifaceted approach.

Neuroprotection, Repair, Regeneration and Cell Based Research and Therapies objectives include:

1. Development of neuroprotective therapies in the central nervous system. (Dr. Eftekharpour)

2. Examination basic mechanisms of cell death using cell and transgenic animal models and proteomics to uncover the molecular players in neuronal cell death after injury or in neurodegenerative diseases. (Dr. Eftekharpour)

3. Optimizing neural stem cell-based therapies for white matter repair in spinal cord injury through development of combinatorial strategies. (Dr. Karimi)

4. Development of immunomodulatory and neuroprotective therapies in spinal cord injury and multiple sclerosis. (Drs. Karimi and Eftekharpour)

5. Implement the use of transgenic models, lower vertebrate systems and high throughput proteomics to uncover disease mechanisms and identify new regenerative targets and biomarkers for spinal cord injury and multiple sclerosis. (Dr. Karimi)

6. Implement the use of human samples to verify the clinical implication of identified therapeutic targets in animal models of spinal cord injury and multiple sclerosis. (Dr. Karimi and collaborators)


8. Development of clinically relevant approaches in improving neural connectivity and neurological recovery in spinal cord injury. (Drs. Karimi and Stecina)
‘Core’ Faculty Members (10) - Contribute 100% effort to SCRC research and provide support to the SCRC program from their operating grants, with research laboratories and shared facilities located in the Department of Physiology & Pathophysiology, 4th floor, Basic Medical Sciences Building. Drs. Eftekharpour and Karimi are located on the 6th floor in Regenerative Medicine.

**Brainstem-Spinal Neural Networks Laboratory**

Jeremy Chopek, PhD  
Assistant Professor, Dept. Physiology & Pathophysiology  
*Mechanistic research:* Brainstem-spinal cord in-vitro electrophysiology, neuronal microcircuit formation, optogenetic and photomanipulation, transgenic mouse models, viral tracers, confocal microscopy, chx10 brainstem neurons, spinal V3 interneurons, in-vivo electrophysiology, spinal cord injury and exercise, stretch reflexes, gene expression

**Will to Win Neurophysiology and Spinal Cord Pathophysiology Laboratory**

Kristine Cowley, PhD  
Assistant Professor, Dept. Physiology & Pathophysiology  
Tier 2 Canada Research Chair in Health and Function after Spinal Cord Injury  
*Mechanistic & Translational research: In vitro electrophysiology and neuropharmacology, studies of spinal cord motor pattern generation and coordination, and adult rat spinal cord injury and motor training and recovery. Human neuromechanics, exercise physiology, and prevention and treatment of secondary complications of spinal cord injury*

**Spinal Cord Injury and Neuroprotection Laboratory**

Eftekhar Eftekharpour, PhD  
Assistant Professor, Dept. Physiology & Pathophysiology  
*Mechanistic & Neuroprotection, Repair. Regeneration and Repair strategies for treatment of Spinal cord injury and Stroke. Pharmacological and Stem Cell Replacement Approaches to enhance neural cell protection, Manipulation of Redox Regulating systems in nervous system*
MEMBERSHIP - continued

Neurophysiology Laboratory

Brent Fedirchuk, PhD
Associate Professor, Dept. Physiology & Pathophysiology
Mechanistic research: Electrical properties of motoneurons, modulation during locomotion, spinal motor circuitry.

Spinal and Neuromuscular Plasticity Laboratory

Phillip Gardiner, PhD
Professor Emeritus, Faculty of Kinesiology and Recreation Management and Canada Research Chair; Former Director of HLHP Research Institute
Professor, Physiology & Pathophysiology (cross-appointed)
Mechanistic, Translational & Neuroprotection research: Adaptations in spinal cord, neuromuscular junction and muscle to alterations in chronic activity levels; adaptability of biophysical, neurochemical and morphological properties of motoneurons

Central Nervous System & Neurophysiology Laboratory

Larry M. Jordan, PhD
Professor, Dept. Physiology & Pathophysiology
Mechanistic, Translational & Neuroprotection research: Basic studies on brain and spinal cord systems controlling locomotion: genetic identification of core neuron groups, anatomical connectivity, relevant neurotransmitters and receptors, activity patterns of core neuron groups, and targeted deletion and activation. Restoration of locomotor function using spinal transplants of brainstem locomotor neurons

Stem Cell Therapy and Spinal Cord Injury Laboratory

Soheila Karimi, PhD
Professor, Dept. Physiology & Pathophysiology
Basic and Translational Research in Neural Regeneration: Neural repair and regeneration in spinal cord injury and multiple sclerosis, regenerative medicine, neural stem cell biology and therapeutics, myelin biology and repair, preclinical modeling, CNS neuroinflammation and immune modulation, glial scar and matrix remodeling, pharmacological and bioengineered drug delivery systems for spinal cord regeneration, genetic models for studying neural differentiation and mechanisms, neural plasticity and neurological recovery in spinal cord injury and MS, cellular and molecular approaches in neuroscience, neuroanatomical and imaging techniques, primary in vitro models
Gap Junction Laboratory

James Nagy, PhD
Professor, Dept. Physiology & Pathophysiology
Mechanistic research: Neurochemistry, neuroanatomy, biochemistry, cell biology, immunohistochemistry, models of spinal cord and brain injury, gap junction structure and function.

Electrophysiology and Neuropharmacology Laboratory

Brian Schmidt, M.D., FRCPC
Professor, Internal Medicine (Neurology); Adjunct Professor, Dept. Physiology & Pathophysiology
Mechanistic & Translational research: In vitro electrophysiology and neuropharmacology, studies of spinal cord motor pattern generation

Spinal Cord Physiology Laboratory

Katinka Stecina, PhD
Associate Professor, Dept. Physiology & Pathophysiology
Mechanistic & Translational research: Electrophysiology, brain, spinal cord, function network analysis, interneurons, sensory-motor coordination, reflex, surface EMGs, nerve stimulation, transcranial magnetic stimulation.

Professor Emeritus

David A. McCrea, PhD
Professor Emeritus, Dept. Physiology & Pathophysiology
2019
AFFILIATE FACULTY MEMBERS (5) - contribute approximately 25% effort to SCRC research but provide no financial support of overall program, all research labs are located outside of the Department of Physiology & Pathophysiology

Karen Ethans, MD, FRCPC, Associate Professor, Internal Medicine; Director, Spinal Cord Injury Unit, Physical Medicine & Rehabilitation
Sari Hannila, PhD, Associate Professor, Human Anatomy and Cell Science
Jennifer Kornelsen, PhD, Assistant Professor, Radiology, St Boniface MRI Centre
Benjamin Lindsey, PhD, Assistant Professor, Human Anatomy and Cell Science
Barbara Shay, PhD, Associate Professor and Head, Physical Therapy, College of Rehab. Sciences

CURRENT RESEARCH ASSOCIATES; POSTDOCTORAL FELLOWS; PhD & MSc STUDENTS AND STAFF (Core members only)
The following spend 100% time on the Centre’s research and are located in the Department of Physiology & Pathophysiology and Regenerative Medicine (*).

Research Associates: Dr. Harshita Chaudhary* (new); Dr. Kalan Gardiner; Dr. Hardeep Kataria*; Dr. Bruce Lynn

Postdoctoral Fellows: Dr. Antonia Recabal Beyer; Dr. Md Imamul Islam*; Dr. Shiva Nemati*

MSc. Students: Camila Chacon, Mojtaba Hosseini*; Fatemeh Mashayekhi*; Narjes Shahsavani*; Shakila Sultana*; Parisa Tabeshmehr*

PhD. Students: Katrina Armstrong; Mona Nazzal

Technical Support Staff: Erica Couto; Shannon Deschamps; Sharon McCartney; Prabhisha Silwal, Maria Setterbom; Sarah Slagerman

Graduate students who convocated in 2020

Christopher Hart, PhD Student (Advisor: Dr. Soheila Karimi)
Thesis title: Elucidating the role of bone morphogenetic protein-4 in regulating secondary injury mechanisms following traumatic spinal cord injury.

Nagakannan Pandian, PhD Student (Advisor: Dr. Eftekhar Eftekharpour)

Hossein Tavakoli, MSc Student (Advisor: Dr. Stecina; co-advisor Dr. Nagy)
Dr. Jeremy Chopek - This past year I received institutional, provincial and federal funding from the University of Manitoba, Research Manitoba and NSERC, respectively. These funds have been pivotal in advancing my research program investigating brainstem-spinal neural connectivity. As well, my lab has recently recruited my first graduate student that will be joining in September 2020. Lastly, I am pleased to have established collaborations within the department with Dr. Cowley, investigating the spinal neurons that integrate locomotor and autonomic function and Dr. Karimi, examining the synaptic activity of human derived neural stem cells.

Dr. Kristine Cowley – Highlights from the past year include receiving a Tier 2 Canada Research Chair in Health and Function after Spinal Cord Injury, being invited to speak on ‘Health and function after spinal cord injury’ at the International Spinal Research Trust Annual Meeting in London, UK, and collaborating with international colleagues to develop a clinical practice guideline. The guideline is the Paralyzed Veterans of America’s first bone health clinical practice guideline Bone Health and Osteoporosis Management in Adults with Spinal Cord Injury and address bone health issues after SCI for a range of bone-related SCI-specific concerns, from drug and/or activity-based means to prevent or treat bone mineral density loss to how to manage the care of persons who sustain fractures after SCI. Finally, I was a member of the committee that developed The Accessibility Advisory Council Recommendations for the Initial Accessibility Standard for the Design of Public Spaces. This draft standard will be the first regulation for the Province of Manitoba for the built outdoor environment and was developed to comply with the Accessibility for Manitobans Act.

Dr. Eftekhar Eftekharpour - Research on Neurodegeneration has become the main focus of my lab and my contributions in the field has been acknowledged by the Canadian Consortium of Neurodegenerative Diseases, by accepting me as a new member. I have been invited to write two review articles; one in the field of oxidative stress and neuronal cell death in the journal of Free Radical Medicine Biology special issue on oxidative stress (Published), and second one to be published by the journal of BBA-General Basis of Diseases. I have established new collaborative research with scientists in Germany (revised paper in review) and South Korea (manuscript to be submitted). My senior PhD student graduated this year with a stellar record of 11 publications as first or co-author. Two new MSc students have started in my lab and another arriving in January. Despite significant delays in research due to pandemic conditions my lab has been able to keep its productivity.

Dr. Brent Fedirchuk - Throughout 2020 I have continued to coordinate and lead educational contributions, not only of members of the SCRC, but also of the Neurosciences and Spinal Cord Injury Division, and the Department of Physiology and Pathophysiology as a whole. SCRC members are major contributors to several programs within the Rady Faculty of Health Sciences, including Undergraduate Medical Education (UGME), the Master’s of Physician’s Assistant Program (MPAS), the Pharmacy Doctoral Program (PharmD), the Bachelor of Health Sciences Program, our departmental Graduate Program, as well as several other Graduate programs (via delivery of Interdisciplinary Medicine ‘IMED’ graduate courses). The willingness of SCRC members to share...
their expertise by making substantial teaching and mentoring contributions enriches the training environment and research appreciation of trainees in many educational programs. Through these contributions SCRC members not only produce well-trained and highly qualified researchers of the future, but also provide exceptional educational experiences that provide a foundation for an ‘evidence-based’ approach to health and wellness for several undergraduate and/or professional programs. 2020 has been a very challenging year on many fronts, including for the delivery and administration of academic programs. In addition to my normal roles as Associate Head (Education) in the department, Course Director within UGME, and serving on various curriculum oversight committees, I have spent a significant portion of 2020 dealing with COVID related responses. The goal has been to keep essential research operating safely, as well as ‘Pandemic Planning’ to mitigate the impact of COVID on RFHS educational programming.

Dr. Larry Jordan – A busy year in spite of the lock-down in early 2020. My collaborator, Dr. Urszula Slawinska of the Nencki Institute for Experimental Biology in Warsaw, Poland just arrived a week before the March shut-down and the on-site work with our time-point matched animals had to be re-arranged due to COVID-19 issues. These series of experiment we have completed to some extent form the final chapter of my current Ph.D. student, Mona Nazzal’s thesis. This project addressing the plasticity of afferent pathways that facilitate locomotion is nearing completion. Achieving an understanding of the afferent fibers responsible for this facilitation of locomotion will be valuable information for designing rehabilitation strategies for injured patients. We also made progress with analyzing results from the latest series of experiments involving the use of DREADD (Designer Receptors Exclusively Activated by a Designer Drug) technology in an attempt to excite grafted cells transfected with an excitatory DREADD using a viral vector. In each case, the presence of the DREADD enhanced locomotor activity in the presence of the designer drugs used to activate the cells. Determining the identity of the effective cells (those that are labelled with the reporter associated with the DREADD) is under way. The results of the work since the start of 2020 will be presented in the Global Connectome meeting planned by SFN on a virtual platform.

Dr. Soheila Karimi – This year marked the 10 year anniversary of my research program at the University of Manitoba. Although 2020 happened to be a difficult time globally due to the COVID-19 pandemic, my research team and I still had a productive year at all fronts in 2020. We remained our active presence in the field and published several high impact articles in top-tier journals such as Brain, Progress in Neurobiology, GLIA and Experimental neurology. Among these articles, our very first publication of our multiple sclerosis (MS) research appeared in the prestigious and longstanding journal, Brain, which was highlighted by the MS Society of Canada and U of M media, and also was selected by the editor for scientific commentary. I was also able to renew our MS Society grant and secure three years of funding to continue our MS research. My PhD student, Mojtaba Hosseini, also received the 2020 Hillary Kaufman Lerner Memorial Funds in multiple sclerosis.

Personally, 2020 was a landmark year, as I was promoted to a full professor. I was also recognized as Canada's Most Powerful Women: Top 100. It was an honor to be nominated by U of M and win in the category of Science and Technology that recognizes women in STEM roles who are challenging the status quo for knowledge and female empowerment. In 2020, I continued
my national and international leadership activities, by serving in the Scientific Advisory Board of
the International Neurotrauma Society (INTS), the Executive Committee of the international
Women in Multiple Sclerosis (iWiMS) (and Chair of Governance Subcommittee), and the Board of
Directors of the Canadian Association for Neuroscience (CAN). I also continued my outreach and
advocacy activities. As an example, I represented the CAN on CAN’s Hill advocacy for basic science
funding in Canada by meeting with Manitoba Member of Parliament, and member of Health
Standing Committee. I continued my participation in the CIHR System and Clinical Neuroscience
NSA review panels. I also provided mentorship to three trainees (PhD students and postdoctoral
fellows) outside the U of M through the endMS National Training Program (SPRINT). I continued
my role as an Associate Editor for the Frontiers in Neurology and BMC Neuroscience journals. I
was also appointed as the inaugural Chair of the Award and Recognition Committee at the
Department of Physiology and Pathophysiology.

Dr. Jim Nagy - Members of Dr. Nagy’s group continue to delve into the nature of electrical
synapses formed by gap junctions composed of connexin36 in the central nervous system (CNS).
He and collaborators Roger Traub in New York and others in Germany have written a review in
which they discuss possible ways in which electrical synapses may participate in the formation of
neuronal cell assemblies in various areas of the CNS. With respect to delineation of the
macromolecular structural organization and regulation of gap junctions that create electrical
synapses, he and members of his lab have identified major cellular signaling mechanisms that
target electrical synapses and orchestrate their assembly, structural integrity and subcellular
deployment at neuronal elements. Their preliminary results on this topic will form the basis for a
CIHR grant application to be submitted in the Fall 2020 competition. Research activities in his lab
focused on electrical synapses in the spinal cord also continue. This includes work on electrical
synapses between preganglionic sympathetic neurons on which a manuscript for publication in
preparation. In addition, they have recently found of electrical synapses between spinal cord
interneurons that govern the excitability of motoneurons along the entire length of the cord. This
discovery is relevant to the synchronization of motoneuron activity with consequent impact on
speed and force of muscle contraction. This work will the basis for another CIHR grant application
prepared in collaboration with other SCRC members and to be submitted in the Spring 2021
competition. In other collaborations, Dr. Nagy has worked with researchers in Portland, Oregon,
with a focus on elucidating the role of gap junctions in regulating the production of aqueous
humor by trabecular meshwork cells in the anterior chamber of the eye.

Dr. Katinka Stecina - Lots of exciting new results have built-up over the last 5 years that came to
a point in 2020 that we have solid, exciting original research papers from the work done in the
rodent labs. Getting ethics approval for starting experiments in the human electrophysiology
laboratory for health, balance and motor control was the most exciting new development for us!
The use of non-invasive spinal cord and brain stimulation represents such a powerful tool for
understanding human neural circuits as well as discovering new ways to promote recovery of
sensory and motor function after spinal cord injury or stroke. Although, everything in terms of the
planned experimental work had to be re-arranged and re-planned this year with the pandemic
influencing all our lives. I am very thankful to all my trainees to make the best use of these times
and to be productive to their best ability even during the shut-down period.
Jeremy Chopek, PhD

Refereed Papers (C.1):


Published Abstracts (E.2):


Kristine Cowley, PhD

Refereed Papers (C.1):

Contributions to published government reports (E.1):
1. The Accessibility Advisory Council Recommendations for the Initial Accessibility Standard for the Design of Public Spaces. This draft standard will be the first regulation for the Province of Manitoba for the built outdoor environment and was developed to comply with the Accessibility for Manitobans Act. Committee chair: Glen Manning. Committee members (in alphabetical order): Kristine Cowley, Norman Garcia, Rebecca Lauhn-Jensen, Colin Marnoch, Shauna Prociuk, Bob Somers and Jackie Wilkie, 69 pages, 2020.

2. Paralyzed Veterans of America’s first bone health clinical practice guideline Bone Health and Osteoporosis Management in Adults with Spinal Cord Injury. Chair: Craven BC Authors: Burns A (U of Toronto), Carbone L (Augusta U), Cervinka T, Cirnigliaro C (James J. Peters VA Medical Center), Cowley KC (U of Manitoba), Craven BC (U of Toronto), Eng J (U British Columbia), Forrest G (Kessler Foundation), Johnston T (Thomas Jefferson University), Kiratli J (Veterans Affairs), Morgan SL (U of Alabama), Morse L (U Minnesota), Troy K (Worcester Polytechnic Institute) & Weaver F (Veterans Affairs), 120 pages, 2020.

Published Abstracts (E.2):


Contributions to periodicals of local reputation (F):

Published articles in ParaTracks, official periodical of the non-governmental, non-profit community-based spinal cord injury information, rehabilitation and advocacy organization of Spinal Cord Injury Manitoba (SCI MB) and online articles at https://scimanitoba.ca/paratracks/):

Eftekhar Eftekharpour, PhD

Refereed Papers (C.1):


**Published Abstracts (E.2):**


Brent Fedirchuk, PhD

Refereed Papers (C.1):
Phillip Gardiner, PhD

Books/Chapters/Reviews (A):

Refereed Papers (C.1):
10. Chopek JW, MacDonell CW, Sheppard PC, Gardiner KR, Gardiner P. Altered transcription of glutamatergic and glycinergic receptors in spinal cord dorsal horn following spinal cord...


Refereed Papers (C.1):


Published Abstracts (E.2):


10. Nazzal M., Armstrong K, Cabaj A, Majczynski H, Slawinska U., Jordan L, Achieving the proper balance between DREADD ligand effects on the hM3D(Gq) receptor and direct effects on serotonin receptors – a key for locomotor recovery in paraplegic rats. Canadian Health Science Research Forum, Winnipeg-Canada, 2018


Refereed Papers (C.1):


**Published Abstracts (E.2):**


3. Alizadeh A, Dyck SM, Nguyen DH, Kallivalappil ST, Proulx EH and Karimi-Abdolrezaee S. Neuregulin-1, a new therapeutic approach to moderate glial scarring and...


James I. Nagy, PhD

Refereed Papers (C.1):


Brian J. Schmidt, M.D., FRCPC

Refereed Papers (C.1):

Published Abstracts (E.2):
Ansari J, Stecina K and Schmidt BJ. Do propriospinal neurons transmit the locomotor command signal in adult mammals? Manitoba Neuroscience Network Annual Meeting June 2016.
Katinka Stecina, PhD

Refereed Papers (C.1):

Published Abstracts (E.2):


RESEARCH ASSOCIATES PUBLICATIONS - 2015-2020
(Referred Papers listed only)

Kalan Gardiner, PhD

Refereed Papers (C.1):

Hardeep Kataria, PhD

Refereed Papers (C.1):


**Bruce Lynn, PhD**

**Refereed Papers (C.1):**


Due to the Covid-19 pandemic internal and external presentations were limited and all virtual.

1. Manitoba Neuroscience Network 6th Annual Winnipeg Brain Bee Competition 2020, University of Manitoba, Bannatyne campus. Workshop and demonstration on electrophysiological methods used to stimulate the human nervous system non-invasively. March 7, 2020. (Dr. Katinka Stecina)

2. International Conference of the Canadian League Against Epilepsy, Winnipeg, MB. “Electrical synapses in the CNS.” June 2020 (Dr. Jim Nagy)

3. EndMS Summer School, Invited Speaker Virtual presentation. August 2020 (Dr. Soheila Karimi)

4. Hot Topics in Kinesiology Research, Invited lecture for KIN 372 Neuroscience for adapted physical activity, Faculty of Kinesiology, University of Alberta, September 2020. (Dr. Kristine Cowley)

5. Cold Harbor Spring Laboratory meeting (Virtual poster presentation), Lysosome-mediated structural and functional changes in neuronal nucleus in pathophysiology of Alzheimer’s disease: A potential treatable target. December 2-4, 2020. (Dr. Eftekhar Eftekharpour)
SCRC members remain successful in obtaining research funding and presently hold grants from Canadian Institutes of Health Research (CIHR), Natural Sciences and Engineering Research Council of Canada (NSERC) as well as local and other national competitions.

See below for a summary and complete listing of the funding sources held by the core SCRC member for the current year.

**Funding Summary**

**Internal Funding Agencies: 2**
- University of Manitoba Start Up
  - Chopek, Cowley
- University Research Grants Program UM (URGP)
  - Chopek **(new funding)**

**Provincial Funding Agencies: 2**
- Canadian Paraplegic Association (MB)/(CPA/MSCIRC)
  - Cowley, Gardiner, Jordan
- Research Manitoba – New Investigator Operating
  - Chopek **(new funding)**

**External/Federal Funding Agencies: 9**
- Canada Research Chair Program
  - Cowley **(new funding)**
- CFI John Evans Leadership fund/Research MB
  - Cowley (co-app. Stecina)
- Canadian Institutes of Health Research (CIHR)
  - Gardiner, Jordan, Karimi, Nagy, Stecina
  - Karimi **(new funding)**
- Multiple Sclerosis Society of Canada
  - Cowley, Eftekharpoor, Gardiner, Nagy, Stecina
- NSERC
  - Chopek **(new funding)**
- NSERC Discovery Grant
  - Chopek **(new funding)**
- NSERC Early Career Launch Supplement
  - Chopek **(new funding)**
- Rick Hansen Institute
  - Cowley (PI Jacquie Ripat)
- Wings for Life Foundation
  - Eftekharpoor

**SCRC Core Researchers External and Internal Funding**

<table>
<thead>
<tr>
<th>Jeremy</th>
<th>NSERC Discovery Grant</th>
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<tbody>
<tr>
<td>Chopek</td>
<td>2020-2025: $28,000 per annum (pa)</td>
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**Research Manitoba - New Investigator Operating Grants**

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<th>Year</th>
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<td>2020-2022</td>
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**NSERC Early Career Launch Supplement**

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**University Research Grant Program**

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**University of Manitoba Start up:**
<table>
<thead>
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<th>Name</th>
<th>Funding Details</th>
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<tr>
<td>Kristine Cowley</td>
<td><strong>Canada Research Chairs Program (CRC) in Health and Function after Spinal Cord Injury</strong></td>
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<tr>
<td></td>
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<td></td>
<td>2017-2022: $172,233 pa (co-applicant K. Stecina)</td>
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<td><strong>University of Manitoba, Department of Physiology &amp; Pathophysiology Start up:</strong></td>
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<td></td>
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<td><strong>Natural Sciences and Engineering Research Council of Canada (NSERC)</strong></td>
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<td>Operating grant 2015-2020: $24,000 pa</td>
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<td>Eftekhar Eftekharpour</td>
<td><strong>NSERC 2019-2024, $32,000 pa</strong></td>
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<tr>
<td></td>
<td><strong>Wings for Life Foundation</strong> 2018-2020 $150,000pa (100,000Euro) (CoPI: Soheila Karimi))</td>
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<td>Phillip Gardiner</td>
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<td>Soheila Karimi</td>
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<td><strong>NSERC operating - 2015-2020: $28,000 pa</strong></td>
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The SCRC promotes its research through the ongoing Visiting Scientist lecture program, journal club lunch hour lectures and Manitoba Neuroscience Network Seminar Series. The SCRC sponsors and participates in the Winnipeg Chapter of the Society for Neuroscience (WCSN) annual Manitoba Neuroscience Network Meeting (MNN). These events not only promote education and research in the Neurosciences to the public but also facilitate collaboration between basic and clinical researchers and students of various neuroscience backgrounds.

January – December 2020
Spinal Cord Research Journal Club and Visiting Scientist Lectures

Jan 10  *SCRC Guest Speaker*
*Dr. Rodrigo Villar*, Assistant Professor, Kinesiology & Rec Management, U of M
Research presentation

Jan 17  *SCRC Journal Club*
*Nagakannan Pandian*, PhD student
Research Presentation

Jan 24  *SCRC Journal Club*
*Hardeep Kataria*, Research Associate
Research presentation: “Developing new therapies for treatment of multiple sclerosis”

Feb 14  *SCRC Journal Club*
*Md Imamul Islam*, Postdoctoral Fellow
Research presentation: “Looking through a crack into the Neuronal Nucleus in Alzheimer’s Disease”

Feb 21  *SCRC Journal Club*
*Hossein Tavakoli*, MSc student
Research presentation: “Electrical coupling in sympathetic preganglionic neurons and autonomic dysreflexia”

Mar 6  *SCRC Journal Club*
*Narjes Shahsavani*, MSc student
Research presentation: “Defining the role and mechanisms of Neuregulin-1 in neural injury and regeneration in traumatic spinal cord injury”

*Journal Club cancelled March-May 2020 due to COVID-19 pandemic*
Spinal Cord Research Journal Club and Visiting Scientist Lectures - continued

Nov 13  **SCRC Journal Club (Virtual)**
Tribute to Dr. Richard (Dick) Stein (1940-2020)

Nov 20  **SCRC Journal Club (Virtual)**
Nagakannan Pandian, PhD student
Research data presentation

Nov 27  **Manitoba Neuroscience Network (MNN) Seminar Series (Virtual)**
Dr. Katinka Stecina, Associate Professor, Department of Physiology & Pathophysiology
Presentation: *Key neural networks for the control of walking.*

Nov 27  **SCRC Journal Club Guest Speaker (Virtual)**
Dr. Rodrigo Villar, Assistant Professor, Kinesiology & Rec Management, U of M
Research presentation

Dec 11  **SCRC Journal Club Guest Speaker (Virtual)**
Dr. Michael Lane, Associate Professor, Department of Neurobiology & Anatomy
Drexel University College of Medicine
Presentation: *Spinal Cord Injury, Plasticity and Spinal Interneurons*

Dec 18  **SCRC Journal Club Guest Speaker (Virtual)**
Dr. Kimberly Dougherty, Associate Professor, Department of Neurobiology & Anatomy
Drexel University College of Medicine
Presentation: *Locomotor circuit plasticity after SCI: Insights gained from molecularly-defined spinal interneurons.*

University of Manitoba Christmas Break – Journal club resumes in January 2021
The SCRC Donations fund is the only available source of funding to support our Visiting Scientist lecture program and general operating expenses.

**Donations Fund (Private Funding)**
The University of Manitoba "Spinal Cord Research" donations account was set up in March 1999 to accept charitable donations made by private donors in the memorial category and from all-charities campaigns run annually by corporations or employee organizations. The SCRC has responded to over 600 donors with a personal thank you letter. The Advancement Services office sends each donor a tax receipt and acknowledgment letter on behalf of the University. **Available funds as of December 1, 2020: $2,803.98**

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<td>Gifts Business Enterprises *</td>
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<tr>
<td>Total Revenue</td>
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<td>Total Expenses</td>
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<td>Balance as of December 1, 2020</td>
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*Public and Corporate Donations*
Shared Technical & Administrative Support
The SCRC has a philosophy of contributing funds to support shared technical and administrative service (ie. Matt Ellis, Shannon Deschamps and Sharon McCartney). The funding is normally taken from individual researchers external funding as well as some subsidized by the Department of Physiology & Pathophysiology. This has the benefit of creating stability within the SCRC as well as a meaningful method of exchanging knowledge and expertise.

Endowment and/or Trust Income
Will to Win Golf Classic /Community Support
The SCRC was proud to be supported since its inception in 1987 by the local community and specifically the Will to Win Golf Classic. From modest beginnings, this charity event was a major sponsor of spinal cord research at the SCRC and raised over $2,000,000 in the past 34 years.

Even though the Will to Win Golf Classic is no longer running the SCRC still continues to benefit from its donations.

Will to Win donations over the past 5 years
2020-2022 Will-to-Win/Manitoba Paraplegic Foundation Studentship – awarded Narjes Shahsavani ($20,000)
2019-2021 Will-to-Win/Manitoba Paraplegic Foundation Studentship - awarded to Mojtaba Hosseini ($20,000)
2017-2022 Will to Win/Canadian Foundation for Innovation (CFI) funding for the human research facility to be developed at the Spinal Cord Research Centre in the University of Manitoba. This project is being led by Drs. Kristine Cowley and Katinka Stecina.
2018-2019 Will to Win/Manitoba Paraplegia Foundation/SCRC Doctoral Studentships awarded to Katrina Armstrong, PhD student with Dr. Katinka Stecina and Nagakannan Pandian, PhD student with Dr. Soheila Karimi
2015-2019 $100,000 donation over 5 years from the Paul Albrechtsen Foundation Inc. to create a new laboratory for human spinal cord research. The location and details of the laboratory are currently under discussion with the Health Sciences Centre and University of Manitoba. This laboratory will extend SCRC research to patients with spinal cord injury.
2017-2018 Research Manitoba/Will to Win Doctoral Studentship awarded this year, to Mr. Scott Dyck, PhD student with Dr. Soheila Karimi.
2016-2017 Inaugural Research Manitoba/Will to Win Doctoral Studentship awarded this year, to Mr. Nagakannan Pandian, PhD student with Dr. Eftekhar Eftekharpour.
2012-2017 Establishment of a Will to Win Professorship
Assistant Professor recruitment - selected applicant Dr. Kristine Cowley Department of Physiology (University of Manitoba, position #10674).
Five-year salary support and laboratory start up: $600,000
Additional start-up funds provided by University of Manitoba: $75,000
July 2016 Will to Win Golf Classic charity raised over $125,000 – donated to SCRC to help maintain the expert technical support (Gilles Detillieux and Matt Ellis) we need to develop and maintain the equipment and computer programs that are critical to our research.
### UNIVERSITY SUPPORT

Core Members only, alphabetically listed

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>Department</th>
<th>Salary Source</th>
<th>Space (M2)</th>
<th>UM Capital Equip $</th>
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</table>

**Total Core Space (M2)** 987.5

1. Dr. Schmidt - GFT - full time (clinicians only)
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Goal: Enhance collaboration, both internal and external......................................................................... 13
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Executive Summary

On May 25, 2017, the Spinal Cord Research Centre held a strategic planning retreat to begin the process of developing our strategic plan. With thirty-three members in attendance, the group spent some time reflecting upon successes and discussing preferred futures, as well as the centre’s mission and vision statements.

Using appreciative inquiry as a planning tool, the group identified four strategic goals for the centre:

1. **Developing the team to ensure it is flexible and positioned for success and attracts quality trainees.**
   a. Supporting graduate students was seen as necessary to build a common and shared knowledge base, as well as to build skills/competence in a variety of techniques.
   b. Mentorship was seen as an important component of this, particularly in the area of grant writing.
   c. Team flexibility was seen as important to be able to attract a wide variety of grants.

2. **Enhance collaboration, both internal and external.**
   a. Internal collaboration was seen as necessary for cross-pollination, Centre cohesiveness, and for obtaining team grants. It was also seen as necessary for enhancing the skills of graduate students and post docs.
   b. External collaboration was seen as necessary for obtaining grants, as well as doing translational and clinical work. External collaboration was also seen as a mechanism of increasing the reputational power of the Centre, as well as a source of funding.

3. **Enhance communication, both internal and external.**
   a. Members identified communication as important so that the good work of the Centre is known, and that it is seen as a leading multifaceted institution attracting good trainees.
   b. External communication was seen as critical to increasing awareness of the Centre, promoting it as a centre of excellence, and securing non-traditional sources of funding.
   c. Internal communication was seen as important to the effective functioning of the Centre, and to enhancing collaboration and developing the team.

4. **Expand Clinical Research and link current research to patient related outcomes.**
   a. SCRC noted the area of human clinical research as having strong future potential for research.
   b. Linking research to care, whether basic science, translational, or clinical, was seen as important, though members recognized that all types of research were important to the SCRC mission. The Centre and its members noted that it was important to be able to discuss and promote the Centre’s research in terms of its impact on clinical outcomes, clinical processes, or patient quality of life.

Within each of these areas the group identified what these goals meant for the Centre, methods to achieve them as well as the resources that would need to be mobilized to be successful in these areas. These issues are discussed in the body of this report. Next steps will be to develop an operational plan for the achievement of these goals.
Background

As part of the strategic planning process for the Spinal Cord Research Centre (SCRC), Centre members (faculty members, graduate students, postdoctoral affiliates, research technicians and staff) needed to engage in priority setting, and building consensus around Centre goals for the next three to five years. To this end, a research strategic planning session was planned as a key activity to both develop a research strategic plan, as well as build consensus in the Centre around strategic directions for the Centre as a whole. A planning committee was established, and met four times to plan the retreat. The committee included Phillip Gardiner (Director, SCRC), Sharon McCartney (Assistant, SCRC), and Joanne Hamilton (Office of Educational and Faculty Development).

“Appreciative inquiry” was chosen for the strategic planning methodology as it fosters a positive and community-building approach to the process of planning and priority setting (appreciative inquiry backgrounder – appendix 1). A general invitation was sent to all members of the Spinal Cord Research Centre, with 36 members attending the retreat (attendance list – appendix 2). The retreat was a half-day event, starting at 8am with an introduction to the day, background information on appreciative inquiry, and a brief discussion of the mission and vision (agenda – appendix 3; slide deck – appendix 4). An ‘off-site’ location with adequate parking was chosen (Fort Whyte Centre). A facilitator from outside the department was selected and included in the planning process (Joanne Hamilton from the RFHS Office of Educational and Faculty Development).

Results

Appreciative inquiry uses a four stage strategic planning process: Discovery, Dream, Design and Destiny. Results are organized around each of these stages in this report. In addition, faculty members were asked to reflect on the mission and vision statements of the SCRC and identify the significant issues facing the SCRC in the future, which are outlined on page 10 of this report. Four goals were identified by participants, as well as a number of actions that the Centre could undertake to meet these goals. The next steps in the process will be to gather consensus from Centre members on these goals, and then develop timelines for each of the goals and actions, and measure of success for each.
Discovery

In small groups designed to maximize diversity of opinion, participants were given the questions in the sidebar “discovery small group questions”. They were asked to reflect upon the questions, then discuss each question as a group, recording their discussion on the worksheet provided. In a thematic analysis of responses a number of themes emerged. (Individual responses included as appendix 5)

**Question 1.** In terms of research and scholarly activity, what do members in the SCRC do well?

A. **We do good research.** Participants noted that in the area of spinal cord research, the members of SCRC do impactful research, focused on solving problems. This includes long standing work in areas of locomotion, and newer work in the areas of spinal cord injury, regeneration, and developing models. This research has led to an international reputation as a centre that works from single cell to system. This has also resulted in a history of success in attracting grants from both competitive and private sources.

B. **We are flexible in adapting to the scientific field.** This was noted both in the area of technique and through adapting to new developments in knowledge (neurobiology, remyelination). Participants also noted that this flexible approach has allowed the Centre to take advantage of opportunities with regard to the translation of research.

**Question 2:** In terms of research and scholarly activity what are we most proud of within the SCRC? Why?

A. Participants identified a strong research presence in the area of spinal cord function: with discoveries in the area of gap junction function, neuroprotection, neuropharmacology, regeneration, locomotion, sensory control, and electrophysiology.

B. The SCRC is known internationally, with graduates of the training programs finding positions across the globe.

C. Participants also noted a collegial supporting environment exists in the research Centre, with sharing of staff and equipment, and open doors, which is very unique.

D. Many of the research discoveries have stood the test of time.

**Discovery Small Group Questions**

1. In terms of research and scholarly activity, what do members in the SCRC do well?

2. In terms of research and scholarly activity what are we most proud of within the SCRC? Why?

3. What are the possibilities or opportunities for advancing our research mission?
E. The multifaceted approach to spinal cord physiology, using a clinically relevant approach with relevant models (transplantation, regeneration, exercise effects), has also been a source of pride.

**Question 3: What are the possibilities or opportunities for advancing our research mission?**

Four themes arose in the suggestions from participants.

A. **Communication strategies.** Participants suggested that the Centre could do a “better job of ‘bragging’ or broadcasting our accomplishments and how they have been applied”. This could include enhancing the website, developing a ‘where are they now’ page for our trainees and graduates, and being more ‘vigorous’ in the visiting speaker program to enhance visibility with partners and stakeholders.

B. **Clinical research.** The area of linking with clinical research was also a theme in the participants’ responses. This included collaborative research with clinicians from various specialties, encouraging the inclusion of clinical applications to research projects, or making sure research had some clinical connection articulated.

C. **Supporting collaboration and cross pollination.** This was a strong theme in the comments. Collaboration was described as within the Centre, between labs, as well as with those external to the Centre (e.g. with technology field, or with clinicians). Collaboration was also seen as linked to grants. Many saw collaboration as a key factor to future success “No opportunities without productivity, and no productivity without collaboration”. There were a number of suggestions for increasing collaboration, including the creation of an advisory committee, and regular PI meetings. A couple of participants noted that collaboration should be an expectation, and enforced with “each person is required to initiate a new project with another member within SCRC”. Although this may be viewed negatively by some, the intent of the suggestion reflects a sentiment that in some way, collaboration should be an explicit expectation of members of the Centre.

D. **Supporting graduate students.** This was also a major area of focus when participants discussed how the research mission could be advanced. Participants identified both the need to support grad students, but also had suggestions regarding how this might be achieved. Previous graduates of the program were seen as a source of ‘reputational power’ in that their positive experience in the program and perception of the program as excellent was both a source of pride for participants and a source of cultural capital that could be drawn upon. Suggestions included technical journal clubs, shadowing in different labs, and standard lab rotations for students.
Dreams

Dreams, in the appreciative inquiry process, is the approach used to identify positive possibilities for future action. In the activity associated with this process, participants were again asked questions, as a small group activity. (Questions outlined in the sidebar on Page 7). These questions were discussed for whole group discussion after the small group discussion.

Q1) As researchers and scholars, what are we deeply passionate about? What difference do we hope to make with our activities in these areas?

Most participants focused on making a difference with their research, through advancing knowledge, new discoveries, and finding mechanisms of disease. For example, one participant captured this as “Passionate about discoveries. Make a difference in SCI patients’ life. Make discoveries relevant to SCI, seeing preclinical discoveries being tested in clinical trials”. Minor themes arose in the participants’ responses, in areas of education, communication, and collaboration, reflecting the responses to question #3 in the discovery phase. This congruence between these two sections strengthens the findings.

Q2) What other key strengths/areas of research and scholarship would we like to nurture and/or develop? As a group? For individual faculty members? Who do we want to become or what do we want to be best known for?

The retreat participants had a number of suggestions for areas to develop. They reflected the four areas identified for advancing the research mission: Communication strategies; clinical research; collaboration and cross pollination; and supporting graduate students. The responses from participants that identify what the SCRC might want to become might best be summarized by this quote:

“To continue to develop clinically relevant research and get clinicians involved with the intent to improve the quality of life in patients with spinal cord injury and neurodegenerative diseases.”

In terms of the four strategic areas, members identified key goals for the Centre as follows:

1. Communications strategies. This area focused on ensuring the good work of the Centre is known, and that it is seen as a leading multifaceted institution attracting good trainees. The website was noted as a place where this could be achieved.
2. Clinical related research. Building on feedback in previous sessions, SCRC noted the area of human clinical research as having strong future potential for
research, with a number of specific areas mentioned (e.g. neuroprotection and regeneration into functional recovery and cell replacements, cell replacement therapy). This was expressed by one respondent as “To continue to develop clinical relevant research and get clinicians involved with the Centre to improve the quality of life in patients with spinal cord injury and neurodegenerative diseases”; “multifaceted Centre from basic science to preclinical and translational” and “become a multi-faceted center for basic/preclinical/ clinical human research in SCI. Increasing our success for attracting high quality trainees. Implement mechanisms to become a center of excellence. Go for big team grants to be able to implement our dreams.” This was a major theme for this question – the desire to have a multi-faceted Centre that linked bench to bedside.

3. **Collaboration and Crosspollination:** Similar to the section in the discovery phase of the day, participants noted the importance of collaborating between the labs in the Centre and with others external to the Centre. They noted the importance of human based clinical collaboration throughout the discussion. However, they also saw a need to collaborate and cross pollinate between labs to enhance the experience of students.

4. **Supporting Graduate Students.** This was also a theme in this area. SCRC members suggested a number of areas could be developed to support students. These included short and long courses, cross pollination between labs (especially as it relates to different laboratory techniques), journal club with a focus on approaches/techniques, electives/rotations through labs, students participating in rehab (hospital) rounds, and mentorship in grant writing.

**Design**

For the theme area selected, each small group was asked to reflect upon and answer three questions (see sidebar page 8 for the questions).

**Q1) What measurable results do we want to see? What measurable result or goals do we want to be known for? What would ‘success’ look like 5 years from now?**

SCRC members identified measurable results in all four areas that had been identified as priorities in the dreams phase of this process.

Not surprisingly, a number of the measureable results that SCRC members noted were in the area of grants and publications – including number of grants, team grants, and number of publications. Further, a number of these included a trajectory towards an increase in the number of clinical projects, but noted that these needed to be bridged with current projects.

However, a number of other important deliverables were noted by members. First, one area of deliverables commented on was in the area of student training, with a number of metrics proposed (# of trainees & quality, co-supervising students, increased/enhanced teaching and mentoring of trainees, where trainees find employment after graduation, including medical residents in research, the

**Design Small Group Questions**

For the theme areas identified:

1. What measurable results do we want to see? What measurable results do we want to be known for? What would ‘success’ look like 5 years from now?
2. What would it take to create the change we want to see? What resources are needed to implement our preferred future?
3. What important steps/considerations need to be in place to achieve this goal?
implementation of institute courses, quality of applicants, success of students – grants, publications, success in next position).

The area of collaboration and crosspollination had fewer measurable results noted. Collaboration related measurable results included regular meetings of PI’s taking place, attendance at journal clubs increased, and the obtaining of team grants, and new collaborative research between Centre members.

No measurable results were noted in the area of communication, however as the goal of the communication strategy was to increase the awareness of the Centre and its achievements, outcome measures related to this would be closely related to grant success, student admissions, and perhaps publications. Short term outcomes for this area could be measured by a simple survey of stakeholders regarding awareness.

Q2) What would it take to create the changes we want to see? What resources are needed to implement our preferred future?

Although SCRC members had a number of suggestions, this area was better addressed by a dotmocracy exercise that allowed members to identify the priority areas that the Centre must address to achieve its goals. The list of priority areas was brainstormed by the planning committee, and members were invited to add to the list at the retreat. Each member was given 11 dots with which they could vote. Voting consisted of placing their dots on the area(s) they deemed to be priority (e.g. all dots on one priority area, one on each, or any combination of dots/areas). Resources identified by SCRC members in their discussions (appendix 5, design phase, question 2) aligned with the dotmocracy results (table 1).

Table 1 Dotmocracy results.

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<td>Private/corporate/foundation funding</td>
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<td>External (outside of UofM) collaborations</td>
<td>36</td>
<td>10%</td>
</tr>
<tr>
<td>Frequency/Type of SCRC group events</td>
<td>29</td>
<td>8%</td>
</tr>
<tr>
<td>Quality of office/lab facilities.</td>
<td>24</td>
<td>6%</td>
</tr>
<tr>
<td>Access to potential graduate students</td>
<td>22</td>
<td>6%</td>
</tr>
<tr>
<td>Age/demographics of members</td>
<td>18</td>
<td>5%</td>
</tr>
<tr>
<td>Sustained administrative support</td>
<td>14</td>
<td>4%</td>
</tr>
<tr>
<td>Access to potential PDFs</td>
<td>10</td>
<td>3%</td>
</tr>
<tr>
<td>SCRC group size</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>External advisory panel</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Workshops to promote collaborations</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Collaborative mechanisms to do so</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Internal advisory panel</td>
<td>2</td>
<td>1%</td>
</tr>
</tbody>
</table>
Q3) **What important steps/consideration need to be in place to achieve this goal?**

SCRC members also had a number of suggestions for important steps to achieve the goals they identified. The main theme arising from these comments was the need for some sort of ‘advisory group’ or committee that would help ensure mechanisms were in place to foster collaboration, oversee communication (website, social media), proactively prepare responses for equipment and other opportunistic funding opportunities, plan a supplementary curriculum for graduate students, and set short term and long term goals for the Centre.

**Mission and Visioning Exercise**

After completing the Discovery, Dream, and Design phases, members were asked to consider the Mission and Vision statements in the context of the goals for the Centre that emerged in these discussions.

The current mission of the SCRC and a ‘straw dog’ of a vision statement were provided to participants to stimulate discussion. The **current** mission of the SCRC:

---

**The Mission of the Spinal Cord Research Centre of Winnipeg is to provide an environment for world-class spinal cord research and training, through our leadership and expertise in the areas of locomotor control and spinal cord physiology from membrane properties to systems physiology, neuronal networks and regeneration.**

---

Comments regarding the mission included suggestions for revision and general comments.

**General comments:**

- Too limited
- add clinical emphasis x 3
- for research clinical relevance
- missing clinical, preclinical and rehabilitation
- The mission should be focusing on improving the ability of patients to walk again. All aspects of research should be considered.
- Collaboration, communication
- Outdated – things have changed. Labs direction have changed.
- What to be known for

**Suggestions for revision**

- Add circuitry
• Should include bench to bedside, rehabilitation, and cellular aspects
• Add ‘preclinical models to clinical applications’ after ‘systems physiology’
• Use the word cellular instead of membrane
• Include physiology and pathophysiology of spinal cord injury, and function
• add ‘human’
• For spinal cord injury research, including pain, motor, and sensory neurons
• Add injury x 2
• Add neural circuitry
• Replace the phrase “provide an environment for” with conduct
• Glial cell biology? Understanding the biology of the spinal cord tissue
• Not only locomotor, (but) pain, sensory, autonomic injury – sensory
• Understanding of spinal cord biology, physiology, and pathophysiology (expand the ‘spinal cord physiology’ phrase to include these)
• Change locomotor control to spinal cord function
• Add basics of preclinical and clinic
• Add disease mechanisms and pathophysiology of spinal cord injury to the mission
• Removed phrase ‘locomotor control’ and change ‘spinal cord physiology from membrane properties...’ to ‘physiology and pathophysiology o spinal cord function from cellular properties to systems physiology, neuronal networks and regeneration’.
• Add statement ‘clinically benefit people with spinal cord injury’
• An emphasis on regeneration should be included in the statements (enticing to prospective students
• Words missing: cellular properties, pathophysiology, to reflect human – preclinical models to clinical application, knowledge translation to enhance the lives of those living with spinal cord injury; regeneration, rehabilitation –restore function and therapeutic benefit

A suggested mission statement that emerged from the discussions was:

The mission of the Spinal Cord Research Centre is to provide an environment for world-class preclinical and clinical spinal cord research and training, through our leadership and expertise in the areas of spinal cord function from cellular properties to spinal cord pathophysiology, to enhance the lives of those living with spinal cord injury

Vision Statement:

The proposed or ‘straw dog’ version presented at the SCRC retreat was:

Within 5 years, the SCRC will be known internationally for its unique unified effort through research to not only understand the basis of spinal cord control and its response to injury from the subcellular to the systems levels, but to also apply this
Feedback on the vision:

- Change the phrase ‘understand the basis of spinal motor control and its response to injury’ to ‘understand spinal cord neural systems and their responses’.
- Use the term ‘neuro-systems’ instead of motor control
- Write out the word five
- Add ‘be the premier centre’ or ‘centre of excellence’
- Spinal cord pathophysiology and function should be used instead of motor or locomotion
- Suggestion for vision “be the world-class centre of excellence for basic, preclinical, and translational research in spinal cord injury and diseases”
- SCRC is an acronym, write it out (consistent with mission)
- Vision should be longer term...and more grand
- Add clinical component
- More collaboration are required for better vision for future
- Web communicate research
- The statement ‘will be known internationally’ – I think this is already realized
- Delete the phrase ‘not only’ and change the phrase ‘but to’ to ‘and’
- Vision will not be met with a disparate group --- too little collaborations, lacking collaboration. Disconnection between members of the SCRC. Need opportunities
- Add complications associated with spinal cord injury
- Suggestion for mission “To become a centre of excellence for basic, preclinical, and [missing] human spinal cord research and spinal cord injury’
- Add rehabilitation

A suggested Vision came out of the discussion:

*Within five years, the Spinal Cord Research Centre will be a world-class centre for basic, preclinical and translational research in human spinal cord research and spinal cord injury designed to improve the quality of life for individuals with spinal cord injuries and disorders.*
Conclusions

Based on the consultations at the retreat, four goals were identified, with a number of suggested actions for each of the goals.

Goal: Developing the team to ensure it is flexible and positioned for success and attracts quality trainees.

**TRAINNEES:**

**Action:** Develop regular workshops for graduate students and post docs on topics such as laboratory techniques, career planning, (cv development/job search, Non-university professional opportunities, and how would trainees of the SCRC be well positioned for these opportunities), management/business skills.

**Action:** Develop courses for graduate students over the entire scope of spinal cord research – grant funding, human research area development, techniques, etc.

**Action:** Develop a ‘where are they now’ portion of the Centre website to highlight the success of our students.

**Action:** Host technical journal clubs to focus on emerging and innovative skills and techniques.

**Action:** Have students shadow in different labs on a regular basis as part of their orientation to the Centre. Position these as standard lab rotations for students.

**Action:** Have students work with medical residents and attend teaching rounds to learn about the clinical side of the discipline.

**Action:** Develop a mentorship program for grad students particularly in the area of grant writing.

**Action:** Create more opportunities for trainees in teaching.

**Action:** Create opportunities for student exchanges, and international opportunities.

**Action:** Outreach to Fort Garry, to get local students attracted to the SCRC.

**FACULTY AND STAFF:**

**Action:** Hold regular meetings in the Centre.

**Action:** Monthly journal clubs for professional development.

**Action:** Co-supervise trainees.

**Action:** Have overlapping funding for contingency planning to promote stability for staff and faculty.

**Action:** Initiate grand rounds (or workshop series) to keep members update on changes in the field across the scope of spinal cord research

**Action:** Host technical journal clubs to focus on emerging and innovative skills and techniques.

**Action:** Develop 1 – 2 Canada Research Chair proposals, ready for submission.

Goal: Enhance collaboration, both internal and external.

**INTERNAL:**

**Action:** Supervise resident research projects, as a way to build collaboration between clinical and basic sciences.

**Action:** Work towards more team grants.

**Action:** Long term co-supervision students.

**Action:** Implement a monthly journal club that brings everyone together
**Action:** Schedule regular meetings of PI’s.
**Action:** Consider space planning to promote collaboration

**EXTERNAL:**
**Action:** Get involved in outreach to the community (e.g. Café Scientifique).
**Action:** Recruit clinicians to research projects.
**Action:** Invite others to meetings, events, workshops, such as med rehab, biomedical engineering, etc.
**Action:** Create an advisory panel with internal and external members including international members. Possibly create international advisory council.
**Action:** Require each member to initiate a project with another member of the Centre.

**Goal:** Enhance communication, both internal and external.

**EXTERNAL:**
**Action:** Enhance website, include videos about research to promote the Centre and attract high quality students.
**Action:** Initiate grand rounds
**Action:** Use social media to promote the Centre and its research.
**Action:** Develop a ‘where are they now’ portion of the Centre website to highlight the success of our students.

**INTERNAL:**
**Action:** Have regular meetings of the Centre, and regular meetings of PIs.
**Action:** In the Centre meetings, set short and long term goals individually and as a group. Have annual review of progress against goals.

**Goal:** Expand clinical research and link current research to patient related outcomes.

**Action:** Have strategic research projects and equipment proposals ready to go, based on Centre priorities, ready for short notice grant opportunities. Compile requests for infrastructure proposals so they can be submitted on short notice.
**Action:** Strike an opportunities committee that can develop proposals and scan for traditional and non-traditional research and funding opportunities.
**Action:** Develop partnership with clinics.
**Action:** Supervise resident research projects.
**Action:** Participate in the recruitment in clinical areas (neurology, neurosurgery).

By achieving these four goals, members envisioned the Spinal Cord Research Centre would be recognized as a centre of excellence for bench to bedside spinal cord research, attracting high quality graduate students and post-doctoral fellows. Existing grants would be maintained, and new grants would be secured, including a Canada Research Chair(s). Findings from research would be published in high quality journals. And the results of the research done by the Centre would have a positive impact on the lives of people affected by spinal cord injuries or diseases.
Next Steps

The draft plan will be reviewed by Centre members, with solicitation of suggestions and revisions, particularly as it relates to actions to achieve the goals, and timelines for the actions. A finalized plan will be developed and submitted to the Director, SCRC, for approval, and to the Head of the Department of Physiology and Pathophysiology, and to the Dean of the Rady Faculty of Health Sciences for information. Subsequent to the approval of the plan, next steps will include the striking of an action committee(s) to develop an action plan with timelines and priorities.
Appendices 1-5

Appendix 1
Appreciative Inquiry as a method for strategic planning
Adapted from Stavros, Cooperrider, & Kelley, 2003

Appreciative Inquiry is based on this premise:
• Change requires action.
• Action requires a plan.
• A plan requires a strategy.
• A strategy requires goals and enabling objectives.
• Goals and objectives require a mission.
• A mission is defined by a vision.
• A vision is set by one’s values.

The Appreciative Inquiry (AI) approach to strategic planning starts by focusing on the strengths of an organization and its stakeholders’ values and shared vision.

Use strengths, opportunities, aspirations and results (SOAR) rather than SWOT.

- Build on their strengths (the positive core).
- Discover ‘profitable’ opportunities (profit in terms of value and meaning’.
- Visualize goals and strategic alternatives.
- Identify enabling objectives.
- Design strategies and tactics that are integrated with most successful programs
- Implement a strategic plan that is a dynamic, continuous, and living document

Uses a cycle of change –the 4-D Cycle: based on four stages: discovery – focusses on excellence, core values and best practices; dream - envisioning positive possibilities; design - the structure, processes and relationships that support the dream; destiny - an effective inspirational plan for implementation

Strategic Inquiry – Appreciative Intent: Inspiration to SOAR

<table>
<thead>
<tr>
<th>Strategic Inquiry</th>
<th>Strengths</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What are our (greatest) assets; what can we build on; What are we doing well; what do our strengths tell us about our skills</td>
<td>What are the best possible opportunities; what are our stakeholders asking for; how do we collectively understand outside threats; how can we reframe to see the opportunity; how can we best partner with others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appreciative Insight</th>
<th>Aspirations</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What is our preferred future; what do we care deeply about; considering our strengths and opportunities – who should we become How can we make a difference for our organization and its stakeholders</td>
<td>What are the measurable results; how do we know we are succeeding; how do we tangibly translate our strengths, opportunities and aspirations</td>
</tr>
</tbody>
</table>

(adapted from Stavros, Cooperrider, & Kelley, 2003)
Potential questions for SOAR
(Adapted from Stavros, Jacqueline, & Hinrichs, 2011 and UofGuelph Assoicate VP, Academic, nd).

Strengths: What can we build on?
1. What are we most proud of as an organization? How does that reflect our greatest strength
2. What makes us unique? What can we be best at in our world?
3. What is our proudest achievement in the last year or two?
4. How do we use our strengths to get results
5. How do our strengths fit with the realities of the profession/our field
6. What do we provide that is ‘world class’ in our field.

Another way:
1. What are we doing well?
   • What key achievements are we most proud of?
   • What positive aspects of the research program have or others commented on?
2. What are we known for?
   • What makes us unique?
   • Why do students choose our program?
3. What key resources and areas of expertise give us an advantage?

Developing Strengths:
In small groups....
• Each person will describe examples of stories that shows the organization at its best and
• When s/he felt proud to be part of it.
Each group will report back to the large group the major themes that came up in their discussions.

Opportunities: what are our stakeholders asking for?
1. How do we make sense of opportunities provided by external forces or trends
2. What are the top three opportunities on which we should focus our efforts
3. How can we best meet the needs of our stakeholders...including students, patients/clients, employers, and the general public
4. How can we reframe challenges to be seen as existing opportunities
5. What new skills do we need to move forward

Another way:
1. What changes in demand do we expect to see over the next years?
   • What external forces or trends may positively impact the program?
2. What future external opportunities exist for the program?
   • What are key areas of untapped potential?
   • What are students, employers and/or other community members asking for?
3. How can we highlight our program strengths and distinguish ourselves from competing programs?
4. How can we reframe perceived challenges to be seen as opportunities?
**Aspirations:** What do we care deeply about?

1. When we explore our values and aspirations, “what are we deeply passionate about/”
2. Reflecting on our strengths and opportunities, who are we, who should we become and where do we go in the future?
3. What is our most compelling aspirations?
4. What strategic initiatives (e.g. projects, programs, processes) would support our aspirations

**Another way:**

1. What are we deeply passionate about?
2. As a program, what difference do we hope to make (e.g. to learners, the institution, employers, the community)?
3. What does our preferred future look like?
4. What projects, programs or processes would support our aspirations?

**Developing aspirations:**

In small groups discuss...

- What are we deeply passionate about?
- What are our most compelling aspirations?

Each group will report back to the large group the major themes that came up in their discussion.

**Results:** how do we know we are succeeding?

1. Considering our strengths, opportunities, and aspirations, what meaningful measures would indicate that we are on track to achieve our goals?
2. What are 3-5 indicators that would create a scorecard that addresses a triple bottom line of ‘our own metrics, people and planet?’
3. What resources are needed to implement vital projects?
4. What are the best rewards to support those who achieve our goals?

**Another way:**

1. Considering our strengths, opportunities, and aspirations, what meaningful measures will indicate that we are on track in achieving our goals?
2. What measurable results do we want to see? What measurable results will we be known for?
3. What resources are needed to implement our most vital projects and initiatives?
4. What are the 3-5 key goals would you like to accomplish in order to achieve these results?

**Developing Results**

In small groups discuss

- How do you define success as a professional?
- How do you know you are succeeding?

Each group will report back to the larger group the major themes that came up in their discussions.
Appendix 2

Spinal Cord Research Centre
Strategic Plan Meeting
Thursday, May 25, 2017
FortWhyte Alive, Siobhan Richardson Field Station

Agenda
8:15am - 8:45am Registration and continental breakfast
8:45am - 8:55am Welcome and introduction to the day, organization and process
Break out sessions
10:30am - 10:40am Coffee break
Break out sessions
Noon -1:30pm Working lunch

Organizers: Dr. Phillip Gardiner, Sharon McCartney
Facilitator: Joanne Hamilton, Director, UM Office of Educational and Faculty Development

Break Out Groups

Group 1
Faculty: Dr. Brian Schmidt, Dr. Chris MacDonell
Students: Arsalan Alizadeh, Prabhpal Kaur Bhullar, Hardeep Kataria (Postdoc)
Staff: Erika Couto

Group 2
Faculty: Dr. Dave McCrea, Dr. Kristine Cowley
Students: Scott Dyck, Chris Hart
Staff: Jahanzeb Ansari, Dr. Santhosh Kallivalappil

Group 3
Faculty: Dr. Jim Nagy, Dr. Eftekhar Eftekharpour
Students: Katrina Armstrong, Sarah Chen (Postdoc), Ghazaleh Shahriary
Staff: Gilles Detillieux

Group 4
Faculty: Dr. Larry Jordan, Dr. Katinka Stecina
Students: Alisha Beaudoin, Ramiro Morfin, Imamul Islam (Postdoc)
Staff: Shannon Deschamps, Jessie Shea

Group 5
Faculty: Dr. Brent Fedirchuk, Dr. Soheila Karimi
Students: Mona Nazzal, Nagakannan Pandian
Staff: Kalan Gardiner, Maria Setterbom
## Appendix 3

### Spinal Cord Research Centre Strategic Plan

#### Meeting Agenda

**Fort Whyte Alive**  
**May 25, 2017**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:15–8:45</td>
<td>Breakfast/Registration</td>
<td>Sharon</td>
</tr>
<tr>
<td>8:45–8:55</td>
<td>Welcome; introduction to day organization/process</td>
<td>Joanne – brief powerpoint of the appreciative inquiry process; discussion of ‘list of issues that need changing process; small group process – recorder/reporter;</td>
</tr>
<tr>
<td>8:55–9:30</td>
<td>Mission/vision discussion</td>
<td>Phillip – present mission/vision and process for review over course of day</td>
</tr>
<tr>
<td>9:30–10:00</td>
<td>Discover</td>
<td>Small groups with key questions</td>
</tr>
<tr>
<td>10:00–10:30</td>
<td>Discover – large group</td>
<td>De brief one question from small group work</td>
</tr>
<tr>
<td>10:30-10:40</td>
<td>Coffee break</td>
<td>Small groups with key questions</td>
</tr>
<tr>
<td>10:40–11:10</td>
<td>Dream</td>
<td>Small groups with key questions</td>
</tr>
<tr>
<td>11:10–10:40</td>
<td>Dream – large group</td>
<td>De brief one question from small group work</td>
</tr>
<tr>
<td>11:40–12:30</td>
<td>Design</td>
<td>Small groups with key questions</td>
</tr>
<tr>
<td>12:00–12:30</td>
<td>Design – large group</td>
<td>Debrief small group discussions – introduce dotmocracy for ‘list of issues that need changing process’.</td>
</tr>
<tr>
<td>12:30–1:30</td>
<td>Working Lunch</td>
<td>Discuss/summarize day – Philip: summarize suggestions for ‘research areas’ (Joanne and Sharon to provide list from earlier discussion); revisit suggestions around the mission statement (from poster and from table sheets); Collect all working sheets from tables – will collate into a report for the group – Next step – develop ‘operational plan’ for the strategic plan developed through today’s meeting (using data produced at the meeting) Wrap up and thanks</td>
</tr>
</tbody>
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Appendix 4

Slide Deck

**SCRC**

**Mission:** To provide an environment for world-class spinal cord research and training, through our leadership and expertise in the areas of locomotor control and spinal cord physiology from membrane properties to systems physiology, neuronal networks and regeneration.

**Vision:** Within 5 years, the SCRC will be known internationally for its unique unified effort through research to not only understand the basis of spinal motor control and its response to injury from the subcellular to the systems levels, but to also apply this generated knowledge through programs designed to improve the quality of life for individuals with spinal cord injuries.

**Appreciative Inquiry**

- A strategic planning tool
  - strengths, values and shared vision
- Uses a 4-D cycle of change
  - Discovery – focuses on excellence, core values and best practices
  - Dream – envision positive possibilities
  - Design – the structure, processes and relationships that support the Dream
  - Destiny – an effective inspirational plan for implementation
Our Process Today

Discovery

• Strengths
• Opportunities

Dream

Aspirations

Design Destiny

Post-Retreat Action
• Results
• Strategic Plan

Agenda

• Welcome
• Discover
  ▶ Small group discussions – identify strengths, linkages, what works, preferred future
• Discuss
  ▶ Large group discussions – share thoughts, establish process for decisions
• Dream
  ▶ Small group discussions – envision what “can be”
• Discuss
  ▶ Large group discussions – what did we hear, what did it mean
• Design
  ▶ Small group discussion – what should we do to make our vision a reality
• Wrap up and Next steps
Appendix 5

Discovery phase - Group and Individual Responses:

**Q1) In terms of research and scholarly activity, what do members in the SCRC do well?**

- Well on the basics.
- Broad base of cellular understanding.
- Broad spectrum of expertise.
- Great models.
- Successful basic science labs.
- Current grants – CFI, CIHR.
- Individually, the researchers in University of Manitoba are doing very well, but small collaboration. Good models, good funds and environments for students. But it would be great if we can also work on patients for research. We can work on CNS related diseases. Glial cells are also important to investigate not just neurons.
- General OK, needs advanced techniques.
- Basic + clinical – connecting – only KNSC.
- Neuro-protection E.E.; regeneration S.K; transplantation (L.J/S.K) loco and post control.
- Neural control of posture, locomotion, trunk etc.
- Afferents involved in control of stance, foot- diabetes.
- Basic research, techniques (model systems), neuroprotection, neuro-regeneration, transplantation, posture control, bone loss, recovery, effect of exercise, pharmacological activation of propriospinal cells.
- Electrophysiology: 35 years focus on one behavior (locomotion).
- Regeneration.
- Publishing/ funding/training.
- 1) Electrophysiology: motor locomotion; 2) Regeneration; 3) Publication.
- Basic research understanding the physiology of spinal cord and pathology of SCI have put SCRC at a place where near complete understanding is attempted and had been achieved.
- Molecular biology, electrophysiology.
- Spinal cord sensory and motor systems, neurobiology of spinal cord injury, strategies to promote regeneration and decrease effects of SCI, electrophysiology, acute and chronic models of SCI, locomotion, immuno-histochemical approaches, mentor trainees.
- Electrophysiology of motor and sensory, regeneration & re-myelination, discoveries of SCI mechanisms/ addressing these directions to find new therapies.
- Broad approach, working extensively with basics.
- SCRC has a longstanding trade record in using a multimodal attack on a specific biological question with results that stand the test of time. From single cell to whole animals. Attracting funding both competitive- private. Consistent publications in high quality journals. Development of independent researchers.
- Maintain our strength in electrophysiology while adding/ expanding/ adapting to new strong areas in scientific community. Molecular biology invitro.
- General ability to adapt to changing research technologies including diversity to the general started the locomotion research. Locomotion research. Regenerative spinal cord research. Have good history of tracking students that go on in the area.

- Dave: 2 courses: 1) basic clinical aspects of SCI, 2) cross poll courses, 3) journal club.

- Cellular, molecular aspect of SCI regeneration. Locomotion- electrophysiology= spinal, sensory, electrophysiology, molecular biology.

- Used to be more in locomotion with electrophysiology, not much in sensory has become more in molecular biology. Regeneration has been added. Pathophysiology of SCI- should be added to mission. Flexible in adapting to the scientific field- neurobiology, re-myelination. Many models of SCI – acute, chronic, histochemical approach.

- Discovery. Understanding mechanisms. Being able to make a meaningful contribution to disease. Emphasized that basic discovery is the foundation to meaningful clinical trials. Development of realistic approaches to disease research. We hope to make new discoveries and make meaningful. Best known for integrity and reliable results.

- Focused research goal- i.e. one problem intensely, long history of problem based research according to a particular research goal – i.e. locomotion from single cell to system. Regeneration- attracting funding, publication, being attentive to changing trends in the field. Goal oriented in terms of publication quality and aiming for high quality journals. Establishing a center and adapting to new opportunities with regard to translation of the research, taking advantage of available expertise. Mentorship. Long history of developing independent researchers. This includes support for students and facilitating growth and development. Generation of quality impact on the field. Stand the test of time.

Q2) In terms of research scholarly activity, what are we most proud of within the SCRC? Why?

- Thorough understanding of the basics science underlying fxn (function) and injury.

- Ask where the trainees that have gone through the SCRC today – active/strong faculty throughout the world.

- People understand the training environment at the SCRC.

- Basic science discoveries: Gap junction function: Pre-synthetic inhibitor, mixed synapses, c-terminal, neuroprotection, neuropharmacology, regeneration.

- Motor neurons: experts, gene expression, receptors, transplants.

- Locomotor: motoneuron properties, identified interneuron model, descending command.

- Sensory control: pair afferents, gene expression, exercise, diabetes

- Cell replacement: oligodendrocytes, raphe neurons.

- 1) past accomplishments; 2) individual desperate accomplishment

- Group known internationally.

- Fundamental discoveries.

- Regeneration.

- Electr 4th floor

- Electrophysiology, regenerative therapy, training program is good, student support is great, diversity of research group.

- Contributions of group to locomotion field, produce well-trained and well-rounded grads, many have continued in research/academia, collegial environment where PI’s and trainees and technical support personnel all feel they are on the same team and facilitate others’ work.
- Proud of pioneering discoveries have been made by the SCRC. Excellent trainees that SCRC has generated. The competitive grants that various investigators have attracted.
- Establish regeneration research which has been highly successful to new opportunities to apply their research skills to new questions. Evolution in recent years to translate basic discovery to the clinical setting. International reputation.
- Strong contribution to electrophysiology field.
- Proud of training program. Turning out competent researchers who are successful in the field and continue.
- Starting locomotion research and moving toward molecular technologies and adapting to changing research.
- Have very collegial attitude within the labs. Cross cooperation between labs. Share equipment personnel.
- Soheila- cellular and molecular mechanisms, more cohesion. More interaction and cross pollination, collaboration, communication, cohesion, cross pollination.
- More collaboration – “clinical” and “basic” people. Having made meaningful contributions to our understanding of how CNS function and to increasing our understanding of disease mechanisms. Having improved the quality of life of patients.
- Proud of research quality – test of time. Respect from other respective fields. Multifaceted approach to spinal cord physiology. Being able to work towards a clinically relevant approach with relevant models as in transplantation and translation. Models that work. Beginning to apply basic-applied.

**Q3) What are the possibilities of opportunities for advancing our research mission?**

- More emphasis on clinical application
- Better job of ‘bragging’ or broadcasting our accomplishments and how they have been applied.
- Website. Alumni page. Where are they now?
- What drew/draws existing trainees to the SCRC? What should attract high quality trainees to the SCRC?
- Breadth of research approaches. Journal club.
- Neuroscience specific courses for grad students especially who don’t have background in neuroscience.
- Partnerships private funds
- Collaborative research: with clinicians; physiology, medicine, neurology, neurosurgery, physiotherapy. Input from SCI population. Joint projects in basic science. Afferent control of locomotor and standing. Cell replacement therapy. Neuroprotection. Positive control (Basic and clinical) (Foundation grants).
- Mitacs.
- Networking for fundraising.
- Scaling up current projects.
- Collaboration for better research mission.
- Robotics/ technology partnerships/medtronics.
- Clinical connection.
- Group grants- collaborative discussion (more!).
- Work with clinical side, FES (functional electrical stimulation) - (research and training).
- Partner with technology field.
- Advertise with industry.
- Collaboration amongst groups within SCRC group grants.
- High quality personnel.
- Including workshops, practical demonstrations.
- Have a more vigorous visiting speaker program to enhance SCRC visibility amongst other Universities/ groups/ centers (particularly important for emerging Human Lab.)
- Increasing internal and external interactions, increasing visibility of SCRC in the community, build on existing strength and add new insight and direction through collaborations.
- More collaboration. Develop opportunities for undergraduate graduates, post graduate students to have exposure to other SCRC labs. Foundation grant? Advisory committee cross pollination.
- Enforced collaboration. Directive - someone to oversee to create collaboration. All individuals collaborating together is a great opportunity.
- No opportunities without productivity, and no productivity without collaboration.
- (Inviting researchers in order to create awareness of SCRC. Attend conference and meetings to create awareness). Broadcast our accomplishments.
- To increase visibility by increasing visiting researchers who have had no previous awareness. Have technical based journal club. Broadcast past trainees. Better collaboration between locomotor and regeneration labs.
- Nagy 1) collaboration; Cowley 2) bragging about our accomplishments; Katinka 3) facilitation of clinical partnerships; Kalan 4) increase visibility to those who do not know the SCRC; 5) Technical based journal club partnerships.
- Bringing in visitors to increase visibility participating in conferences. Need for more integration between the electrophysiology and molecular biology group. Take it to the next level in the form of more collaboration. Using the Journal club for presenting techniques. Having more diversity in the student committee. Clinical research. At one time 90% of locomotor, now we are doing different things. Proud of long past in locomotion. Collaboration between each other. No opportunities without productivity. Take more interest with each other, collaborate and be more efficient in productivity. Web site design. To make it more known broadcast better.
- Possibilities are higher quality personnel. More collaboration within group (i.e. SCRC). Getting to know other labs. Annual event or shadow for a day. Structured lab rotation - for a part of graduate program. PDF access to teaching with other groups. Develop opportunities for undergrads to work in lab. Exposure.

Dream phase - Group and Individual Responses:

Q1) As researchers and scholars, what are we deeply passionate about? What difference do we hope to make with our activities in these areas?
- To encompass translation.
- Sustained development and turn-over of SERC- promote.
- Development of education.
- Enrich communication strategies e.g. Website.
- We hope to make new discoveries and make meaningful contribution to the field.
- Focus on finding mechanisms of diseases and way to address them.
- Discovery. Generating questions and exploring the possible answers.
- Advance knowledge.
- Knowing and discovery of the mechanisms of neuroscience.
- Discovery, application, translation.
- Maintaining big picture perspective with respect to spinal cord physiology and pathophysiology including how we got to where we are.
- Passionate about discoveries. Make a difference in SCI patients’ life. Make discoveries relevant to SCI, seeing preclinical discoveries being tested in clinical trials.
- Passion- knowing. Discovery. Translating and selling these ideas (for funding).
- Telling a story visually and communicate effectivity using visual aspects.
- Being a multifaceted training program. “Producing” top quality researchers. Successful in future.
- Strengthen collaboration between labs.
- Basic knowledge of spinal cord. Passionate about. Good training program. Remain visible.
- Making new discoveries and meaningful contributions. Finding mechanisms and applications to quality of life.

Q2) What other key strengths/ areas of research and scholarship would we like to nurture and/or develop? As a group? For individual faculty members? Who do we want to become or what do we want to be best known for?

- Strengthen collaborations between labs.
- Develop some courses 1) understanding the pathophysiology of SCI – and the effects on the systems affected by SCI; 2) Cross pollination of different labs – what are the electrophysiological techniques needed to demonstrate function of regenerating neurons.
- What can confocal microscope be used for?
- Electives/rotation though labs. Graduate students following anat/rehab rounds.
- Website animations.
- JC Seminar Series. Focus on approaches/techniques to direction of the field opens door to collaboration and greater understanding.
- Strengthen collaboration within the groups.
- Team grant.
- Basic discoveries can be built upon.
- Animal models- keep building (Chopek).
- Incorporate new recruit with expertise on movements & identified spinal cord neurons
- Cell replacement therapy consortium could be developed.
- Genetically identified interneurons and their role in the 2 layer CPG model.
- Incorporate neuroprotection and regeneration facilitation into functional recovery and cell replacements.
- Nurture clinical research and increase collaboration.
- New people coming to be recruited J. Chopek- micro-circuits.
- Outside of university research group with increased potential for experimentation.
- Course development in relation to SCI: 1) Strengthen group collaborations; 2) build on previous accomplishments and strengths; 3) BME; physiotherapy; software development; 4) Alumni of SCRC to webpage; 5) animations of “SCI-Work” for teaching/promotions.
- Clinical collaborations
- Strengthen internal collaboration with basic science labs.
- To continue to develop clinical relevant research and get clinicians involved with the SCRC to improve the quality of life in patients with spinal cord injury and neurodegenerative diseases.
- Human based clinical collaboration.
- Solid meaningful contribution.
- Success in human research would be essential for the SCRC success.
- Be known as a multifaceted center from basic science to preclinical and translational.
- Become a leading destination for trainees.
- Strengthen collaboration. Courses that improve skills of trainees.
- Mentorship in grant writing for getting money.
- Multifaceted center addressing all the stages of research of one basic to translational approaches.
- Human neurophysiology lab. Its success over next couple of years will be very important to SCRC success.
- Be recognized as a multi-faceted research enterprise including basic science, pre-clinical and translational components. Maybe with many project incorporating aspects of all.
- A leading destination for trainees seeking multifaceted training program.
- Become a multi-faceted center for basic/preclinical/clinical human research in SCI. Increasing our success for attracting high quality trainees. Implement mechanisms to become a center of excellence. Go for big team grants to be able to implement our dreams.
- Discovery based research and eventual translational. Clever forefront discoveries. Adopting new technologies (nurture / develop). Nurture each other’s grant applications (develop/nurture). Grant writing ability to produce one. Mentorship (money / grants). Getting money and spinal cord research. Having an impressive publishing record. What do we want to be known for? Areas of research to develop: cell physiology, BBB.
- SCRC in transition with Kris, Katinka new grant. Human neurophysiology - nuture. Develop pragmatic details. Space, equipment, staff support.
- Human basic research along with traditional Neurophysiology Basic Research.
- Maintain past success in graduating competent researchers.
- Being a leading multifaceted institution attracting good students.
- Mentorship in grant application writing.
- Have technical talks. Have visitors to talk that don’t know the SCRC. Database of lab technologies and expertise.
- Protocols as a group. Foundation grants- conference presentations, workshops, technical immuno, computer imaging, stats and graphics, surgical. Comprehensive website of SCRC. Human facility-translational addition. Keep all the basic research areas in addition to moving into human research. Attract high quality trainees. Better marketing.
- Katina- strengthen collaboration with clinical. Destination for trainees by emphasizing basic to clinical. Katrina- mentorship in grant writing change journal club. Kris- develop courses healing with
techniques, research questions in different labs. Brent: nurturing development of translational research. Phil: outreach.
- Success in SCRC in succeeding with human transplantation especially will need nurturing in regards to space and other. CFI grant in regards to a group. Team grants to show our diversity and nurture the basic research. Broadening our vision that includes human research that has basic and pre-clinical models that can be considered translational. Be known for broad research model, basic science and preclinical, human. Bring in more money for research. Attract trainees and maintain the have better visibility. Leading destination for trainees. Nurture our outreach. Mentorship in grant writing for getting money.

**Design phase: Group and Individual Responses:**

**Q1) What measurable results do we want to see? What measurable result or goals do we want to be known for? What would ‘success’ look like 5 years from now?**

- Because of broader training opportunities the collaboration had more joint funded research projects.
- Human research labs up and running.
- 1 or 2 residents projects completed been through the lab.
- Where are the trainees that received training at SCRC?
- Teaching and mentoring opportunities for students. More than informal summer trainees-change structure of funding to incorporate prep (?).
- Team grants.
- Identify our major past-contribution and how to build upon them.
- Advisory committee (annual).
- External evaluation (one-off, international).
- Translational results from collaborations.
- Pts / residents? – (grants; # pubs)- to close for 5 years to advise (?).
- Increase teaching for PhD. and MSc students possibilities.
- Co-supervise of students.
- More students, more funding, more publications.
- Grants mentorship, publication, trainees.
- Success of trainees in their destinations.
- Trainee attraction.
- Grant success.
- Recruitment.
- Publications.
- # of trainees and quality.
- Co-supervising of students.
- Facilities updated infrastructure.
- Recruitment of clinicians.
- Teaching and mentoring of trainees.
- Better journal club attendance.
- Getting grants, publications.
- New collaborative research initiatives between SCRC members. New grants secured. Increased # trainees of very good quality. Secure finding for ongoing technical support.
- Increase in operating funds. Increase in annual publications. Increasing the number of trainees. Dedicating more times to meet regularly. Trainees. Infrastructure (applying for NSERC RTI, Groups CFI).
- Resident research projects. Clinical/ human lab increase interactions resulting from broader exposures of students PDF’s and RA to other labs.
- Better interaction between the groups/ better discussion and attendance (e.g. journal clubs). Money and publications. Graduated students.
- Increased number of trainees.
- Mentorship in grant writing (e.g. Scope, breadth etc. of study would increase grant $) Application success.
- Increased/ improved infrastructure.
- Institute courses- overview of entire scope of SC research. Grant funding. Human research area development. Quality of trainee applicants.
- Review of SCRC.
- Brian- funding # students. PDF. Success rate, support, publications, advances in technology. Gaps that need to be filled. Link with clinicians. Create more opportunities for trainees in teaching.
- Grants and funding for SCRC. Number of students and post-docs. Awards, studentships and recognition for students. Ability to collaborate with the centers that are well-known in the field. Publications quality and then quantity. Some fields are harder to publish. Success rate of the graduates in their next position. Where do they end up? Enhancing visibility. What success looks like in 5 years? Having balanced progress in all fields above. Getting feedback is one way of measuring success.
- Measurable results- increase number of students and post docs. Success rate. Collaborate with center that are well known. Increase publications. Update resources and infrastructure. Success progress in all of the fields. Hard to have clinical in 5 years. Bridge with current clinical projects, Create teaching and mentoring component in SCRC trainees. (Better opportunities).
- Better interaction especially journal clubs. Altruism-individual success dependent upon other successes of members- groups.
- Short term achievements for the present. In-line of mentorship. More cohesiveness. Initial next baby steps (e.g. everyone attends journal club.)
- Change short-term goals to help achieve the long-term goals.
- Workshops build in our strengths. International awareness on what is going on here and the various areas. Advising groups like CPA, ICORE, maximize impact strength.
- Strategic planning meeting. CRC proposal ready to go. Name different flavors. Growth of group and plan in place to submit to department for CRC Chair. Infrastructure grants – positive strategically ready for INF Grants. Catalogue of priorities that can be used on short notice.
- Regular meetings of PI’s (4 to 5 per year).
- Attract future grad students and PDF’s. Website. Video about research - Facebook/ Twitter / social media.
- In training programs tailored to be broader. Student clinical rounds. Business give a talk about… “What academic/ non-academic careers look like?”
- Review of SCRC- International experience for graduate students. One time group SCRC heads or leaders evaluate or assess the SCRC research.

**Q2) What would it take to create the change we want to see? What resources are needed to implement our preferred future?**

- 1) Create the ability for our trainees to teach/mentor within the SCRC; 2) effort from SCRC to find and promote physical location for human research lab; 3) create time for broader training within program (ranging from ward rounds and professional development) skills – CV develop/ job search; 4) Changing website /social media development – clinical trials? /shadow doctors/ e.g. K. Ethans 5) Different CRC chair and infrastructure requests ready to go.

- Promote interactions. Incorporate people from Med rehab, Physiotherapy, Biomedical engineering, etc.

- Participate in recruitment in the clinical areas (Neurology, Neurosurgery).

- Push forward on previous fundamental research.

- Outreach – CPA/ UofM admin (advisory group): clinical/ business/mod & companies/ outsiders/ neuro groups/ MPI

- Student exchange/ international experience.

- One time, international evaluator group- for recommendations to SCRC.

- Advisory group.

- International advisory group for administration (Dean’s office).

- Support from department, administration.

- What is the preferred future?


- Visibility. Advertisement and outreach.

- Updating facilities and infrastructure.

- Collaboration both inside and outside the group.

- Grants. # of trainees. Increasing collaboration within and outside the university. Updating infrastructure.

- Ongoing support from department (e.g. w.r.t. space, mechanism for funding of core technical support. Grant money- Nancy Klos.

- Operating funds. Collaborations (internal and external). Outreach to community.

- Recruitment of students. Outreach to Ft. Garry Campus. Workshops to get local students attracted to SCRC. Social media accounts and contributing to events. Community outreach.

- Altruism

- Increase communication within the group to increase efficiency.

- Continued support from department.

- Funds. Dedicated. Move spaces to accommodate new study areas i.e. Human. Having planning sessions. Increase publication. Increase trainees. Regular PI meetings. Mentorship for grant writing for young PI’s and trainees.

- Advisory board, workshop (e.g. doing research). Be visible re: opportunities.

- Commitment to the plans/ decisions made in this meeting. Resources (i.e. space for new research).
Q3) **What important steps/consideration need to be in place to achieve this goal?**

- Useful to have a better understanding of the non-academic endeavors. Professional opportunities for trainees of the SCRC (+ physiology). How are CIHR employees selected? Pharmaceutical companies?
- Non-university professional opportunities, and how would trainees of the SCRC be well positioned for these opportunities?
- Mission: Cellular properties and pathophysiology of SCI (Spinal cord injury).
- Workshop to develop collaboration within the SCRC.
- Advisory Group with expertise in: Industry (Pharmaceuticals, engineering), clinical trials. CPA, neurology/neurosurgery, physiotherapy, UM administration, other neuroscience group leaders at UM, MPI.
- International members?
- Ad hoc committee to advise on continued development of SCRC.
- Webpage (i.e. start there).
- Communication.
- Advisory groups.
- Mentorship for grant writing. Improvements to the website. Social media should be utilized. Core stable mechanism to maintain. Shared technical expertise.
- Be in a position to take on recruitments and foster collaboration.
- CRC chairs gives potential for recruitments.
- Strategic opportunity planning done ahead of time.
- Be positioned to take advantage of potential recruitment opportunities that may spring up expectedly, (i.e CRC Tier I chair). We need to have 1 or 2 CRC proposals in hand and ready for submission with little advanced notice.
- Also compile requests for infrastructure proposals so they can be submitted on short notice.
- Meet regularly, set short and long term goals individually and as a group.
- Cooperation, collaboration, re-evaluation.
- Mandated collaboration. Managed Overview. Annual review. Each person is required to initiate a new project with another member within SCRC.
- Your survival is dependent on each other like bees.
- Preparedness for equipment grant opportunities and recruitment opportunities (e.g. Can Res. Chair, as well as donations).
- Regular PI meetings (e.g. 4-5 per year).
- Have overlap funding for contingency plan for unexpected opportunity of position (CRC) for equipment as well.
- Cooperation and collaboration. Re-evaluate goals at certain times. LinkedIn and ResearchGate pages – resources for SCRC specifically.

**Miscellaneous Comments:**

- Facilitate more clinical research. More partnership with clinics.
- Who is doing what? This is what we do.
- Develop idea about what can happen.
- Sense of stagnation. Tech evolving faster and we are not keeping up with it.
- Collaborate with private sector to help with funding for technology.
- No translation of knowledge to specific field.
- Look for partnerships with technology companies.
- Advertise more. Industry to know what we are doing.