DIVISION OF NEURODEGENERATIVE DISORDERS

2020 ACTIVITY REPORT

LOCATION:
St. Boniface Hospital Albrechtsen Research Centre
351 Tache Avenue
Winnipeg, Manitoba R2H 2A6
Canada
Table of Contents

1. Message from the Director ........................................................................................................ 3
2. Our Staff ..................................................................................................................................... 4
3. Academic Research Projects ...................................................................................................... 5
4. Academic Funding ................................................................................................................... 15
5. Trainee Funding/Awards ............................................................................................................ 22
6. Teaching Activities .................................................................................................................... 23
7. Publications ............................................................................................................................... 27
8. Conference Contributions .......................................................................................................... 34
9. Invited Presentations, Scholarly & Outreach Activities ........................................................... 38
10. Visiting Speaker Program ........................................................................................................... 42
11. News releases, Etc. .................................................................................................................... 45
12. Commercialization .................................................................................................................... 50
1. Message from the Director

The Division of Neurodegenerative Disorders (DND) is housed within the Dr. John Foerster Centre for Health Research on Aging, located in the St. Boniface Hospital Albrechtsen Research Centre. DND was established in 1999 through a major funding initiative “Age of Discovery” by the St. Boniface Hospital Foundation. I am pleased to provide you with a copy of the Division of Neurodegenerative Disorders’ 2020 Activity Report. I invite you to read about the exciting activities over the past year.

I am pleased to report that during 2020, the Division’s total active grant funding held by our researchers was almost $8 million. Congratulations to: Dr. Miyoung Suh who received new funding from the Canadian Agricultural Partnership and Dr. Michel Aliani who received a 5-yr NSERC Discovery grant. Dr. Fernyhough continues to serve at Head of the Department of Pharmacology & Therapeutics, University of Manitoba. Dr. Benedict Albensi was named as Editor-in-Chief, Journal of Molecular Biology.

There were an outstanding number of publications during 2020. Our investigators published a total of 39 full length publications.

There were 8 planned speakers through the Manitoba Neuroscience Network Visiting Speaker Program (4 cancelled due to the Coronavirus pandemic). Our Speaker Program is funded jointly by: Manitoba Neuroscience Network, the Division of Neurodegenerative Disorders at St. Boniface Research Centre, the Department of Pharmacology & Therapeutics, University of Manitoba and the Neuroscience Research Program at the Kleysen Institute for Advanced Medicine. We continue to coordinate and funnel all neuroscience related talks from these partners through the Manitoba Neuroscience Network and this has worked very well in preventing overlap of visits, talks, etc. The Division also participates in the Department of Pharmacology & Therapeutics Weekly Seminar Program led by Dr. Vern Dolinsky. The Manitoba Neuroscience Network’s administrative office continues to operate out of the Division’s administration office.

DND investigators continue to provide a broad array of teaching to University of Manitoba undergraduate and graduate students. We are happy to report that our graduate students and trainees attracted a total of 18 awards throughout 2020. Our student, Bradley Feltham (Supervisor: Dr. Miyoung Suh), graduated as a Registered Dietician with the University of Manitoba.

In spite of difficult funding times with cut backs at CIHR the DND group continues to prosper and with hopes of further expansion in the future.

Respectfully Submitted,

Paul Fernyhough, Ph.D.
Director, Division of Neurodegenerative Disorders at St. Boniface Hospital Albrechtsen Research Centre
Professor & Head, Department of Pharmacology & Therapeutics, University of Manitoba
## 2. Our Staff (61)

### Principal Investigators (7)
- Fernyhough, Paul
- Albensi, Benedict
- Aliani, Michel
- Glazner, Gordon
- Modirrousta, Mandana
- Smith, Darrell
- Suh, Miyoung

### Graduate Students (14)
- Abo Aoun, Mohamed
- Amiri, Shayan
- Chauhan, Sanjana
- Fahmi, Ronak
- Feltham, Bradley
- Tavakoli, Ali
- Kloss, Olena
- Mishra, Pranav
- Otutola, Jegede
- Ramezani, Fatemah
- Shulgina, Veronica
- Walchuk, Chelsey
- Wang, Yidi
- Yoon, Rex

### B.Sc. Med Students (1)
- Kothari, Asha

### Undergraduate Students (12)
- Albensi, Speranza
- Boticki, Luka
- Demare, Sarah
- Fernyhough, David
- Gauvin, Evan
- Geddert, Natasha
- Monti, Emma
- Paradoski, Brandon
- Pearson, Melissa
- Slike, Alana
- Tran, Tyler
- Vallis, Jack

### Postdoctoral Fellows & Research Associates (7)
- Adlimoghaddam, Aida
- Aghanoori, Mohamad-Reza
- Davies, Don
- Dordevic, Jelena
- Naznin, Farhana
- Snow, Wanda
- Waise, TM Zaved

### Technicians (12)
- Goldberg, Erin
- Huang, Ya Wen
- Mangat, Sandeep
- McElrea, April
- Mostafizar, Marina
- Odero, Gary
- Olson, Nancy
- Oyekan, Ruth
- Perez, Claudia
- Shariati-Ievari, Shiva
- Tessler, Lori
- Wang, Le

### Other (4)
- Prasad, Ben (rTMS psychiatrist)
- Wikstrom, Sara (rTMS nurse)
- Dubiel, Paola (rTMS nurse)
- Meek, Benjamin (rTMS Coordinator)

### Administration (4)
- Fernyhough, Paul (Director)
- Fowler, Debbie (Technician)
- Jorundson, Kelly (Admin. Manager)
- Mitalay, Caterina (M-5 McEwan)
3. Academic Research Projects

A. Dr. Benedict Albensi

My laboratory attempts to identify molecular signaling pathways and mechanisms that could be targeted with promising therapeutics for enhancing memory and for preventing and/or reversing memory impairments, in diseases or conditions such as Alzheimer’s disease, but also stroke, head trauma, infections, and epilepsy etc. Much of our work is centered on a biochemical pathway involving the transcription factor, nuclear factor kappa B (NF-kB), which is central to not only inflammatory processes and immune system function but also plays a central role in basic mechanisms of memory formation and recall.

To this end, the Albensi lab focuses on investigating approaches for preventing and treating Alzheimer’s disease (AD) and related dementias. For example, investigations into the prevention of AD have included choline, creatine, and flaxseed (omega-3). For later stage AD, compounds such as nilotinib and approaches such as mitochondrial transfusion are being investigated.

Project 1:
Women are at higher risk of acquiring Alzheimer’s disease (AD) and other dementias, and approximately 2/3 of seniors with AD in Canada are women (http://www.alzheimer.ca). In fact, for most regions of the world, the incidence of AD is higher in women than in men. Differences in lifestyle factors, brain development, hormonal programming, cellular and molecular mechanisms, genetic, and/or metabolic differences may be at the root cause, but no one knows for sure. While the primary risk factor for developing AD is age, the higher AD incidence rates in women cannot be attributed simply to the increased longevity of women versus men. Currently, there is no cure for AD, and treatments targeting amyloid beta (Aβ) and/or neurofibrillary tangles (NFTs) have been largely ineffective in both genders. However, it is becoming apparent that changes in brain metabolism driven by mitochondrial dysfunction are processes central to many age-related neurodegenerative disorders. This project focuses on sex-specific mechanisms of mitochondrial dysfunction in early stage AD. We expect our findings to have specific relevance to women with AD and should help to prevent AD in women. Our findings may also be generalized to men, and other age-related neurodegenerative disorders and mitochondrial based disorders.

Project 2:
Developed nations around the world are facing a crisis as the annual number of new cases of Alzheimer’s disease (AD) is set to skyrocket over the next 15 years. Therefore, successful interventions to prevent and/or treat AD will be of great interest to the public, healthcare professionals, and government officials. Flaxseed containing beverage products may present a solution in preventing AD, with Manitoba playing a leading role in this pursuit. Manitoba currently produces 12% of the world’s
flax; therefore, increased demand for flaxseed will result in more Manitoba flax produced and sold. The dietary benefits of flax can help drive this demand, especially its effect on memory and cognition (i.e. thinking, knowing, perception). The goals of this project are to determine: 1) the effect of flax beverage on memory and cognition (primary outcome) and 2) determine the economic impact of results from goal 1 on the MB agriculture industry and the health care sector. Goal 1 will be accomplished by conducting a clinical trial with flax milk. In goal 2, we will estimate the economic impact of flaxseed's beneficial effects on the demand for flax milk and flax. The work for this project will be completed by a multi-disciplinary team made up of medical professionals, basic scientists, a statistical consultant, and a health economist.

Project 3:
The objective is to evaluate the effects of the anti-cancer drug, nilotinib for treating Alzheimer’s disease (AD). In particular, we will focus our efforts on evaluating brain metabolism and the pathologic consequences of using nilotinib in relevant mouse models of AD and aging. Nilotinib, a tyrosine kinase activity inhibitor, is traditionally used for treating chronic myelogenous leukemia (CML). The rationale for using nilotinib in AD is based on our recent preliminary data and results from our colleagues at Georgetown University. Previously our collaborator, R. Scott Turner and his associates used this compound in Parkinson’s disease (PD) and Lewy Body dementia (LBD) patients (advanced stage), and surprisingly showed in the data collected thus far (n=11 patients completed), that low-dose nilotinib (150-300 mg) for 6 months promoted the clearance of accumulated amyloid beta (Ab) plaques and hyperphosphorylated Tau - tangles. Their studies focused on safety, CSF biomarkers of PD, dopamine levels, blood-brain barrier (BBB) effects, cognitive, and motor changes in patients with PD and LBD - and more recently in patients with AD (recruitment underway). Given the interesting PD/LBD results we hypothesize that nilotinib may clear AD pathological markers by modulating mitochondrial function – in particular by initiating mitophagy, a cellular clean-up mechanism associated with mitochondrial quality control. The project detailed here will be the first to examine the mechanistic effects of nilotinib on brain metabolism and mitochondrial function in relevant transgenic mouse models of AD and aging.
Project 4:

A large number of studies have shown that nuclear factor kappa B (NFkB) is a network hub responsible for complex biological signaling, including transcriptional regulation in the cytoplasm and nucleus. Given that NFkB is an ancient protein transcription factor, it has been hypothesized to be a master regulator of evolutionarily conserved biochemical signaling cascades. Our prior studies, including NSERC funded work, and preliminary data show roles for NFkB in synaptic plasticity, memory, and mitochondrial function. In 2001, it was first published that NFkB subunits were found in the mitochondria, including not only IkBalpha and NFkB p65 subunits, but also NFkB signaling pathway proteins such as IKKalpha, IKKbeta, and IKKgamma. My laboratory has also recently found evidence for NFkB localization and activity in the mitochondrion. Mitochondria are the primary source for biological energy generation in the cell, which manifests itself in the form of the coenzyme adenosine triphosphate (ATP). Mitochondria are also ancient in their appearance in the biological record and have been hypothesized to have originated from bacterium having their own DNA. To date, little work has been done to understand the significance of NFkB subunits and related NFkB signaling pathway proteins in the mitochondria and how this may affect normal mitochondrial functions. Also, little is known on how NFkB regulates mitochondrial function in a context of energy demand at plasticity active synapses. A small number of studies provide preliminary evidence for NFkB in controlling mitochondrial function however a precise understanding of how NFkB contributes to various mitochondrial functions is lacking. Our long-term goal is to find novel roles for NFkB in synaptic plasticity, memory, and mitochondrial function. The purpose of this research is to understand how NFkB activity contributes to cellular respiration, mitochondrial Complex (IV) expression and function, and mitochondrial dynamics & motility. Given our current pilot data and the existing literature, we expect to find important roles for NFkB in the regulation of mitochondrial function, which have not been characterized nor fully understood. The impact of this work is significant for training HQP on cutting edge projects and hugely important for understanding the regulation of normal mitochondrial function, and the contribution of mitochondrial function to processes such as synaptic plasticity and memory.
B. Dr. Michel Aliani

A functional food is any food claimed to have a health-promoting or disease-preventing property beyond the basic function of supplying nutrients. Nutritional interventions using functional foods have had a considerable role as legitimate therapeutic strategies to combat common metabolic disorders in Canada and around the world.

Acceptability of functional foods is a constantly evolving challenge to nutritional interventions where compliance is a key factor for success. Incorporation of novel ingredients in functional foods may shift the molecular balance of flavour precursors which can compromise consumer acceptability. Therefore, understanding the molecular interactions among natural flavor precursors and added bioactive compounds is crucial to our understanding of flavour formation in functional foods. Once ingested, the bioactive compounds are susceptible to major changes in the body with formation of novel compounds engaged in different biochemical pathways. The metabolomics studies of the metabolites derived from functional foods in the body are extremely informative on the effects exerted by these compounds.

The focus of Dr. Aliani’s research is therefore twofold.

- To provide the scientific and molecular basis for the development and successful marketing of functional foods targeted to patients as well as healthy populations in the world and
- To investigate the effect of active compounds on metabolic pathways in animal and human model.
Dr. Aliani’s current research projects include:

- Creation of a database for selected pulses and to investigate the effect of different processing on bioactive compounds using mass-spectrometry and NMR techniques (Funded by Saskatchewan Pulse Growers/CIGI/Warburton Ltd; Ronak Fahmi PhD project). This project is still ongoing and Ronak Fahmi is now writing her PhD Thesis.
- Genetic markers for flavour selection in pork (Funded by ARDI in collaboration with Maple Leaf Ltd.; Erin Goldberg Post-doctoral Funded by MITACS). This project has been completed and a report has been provided Maple Leaf Ltd.
- Identification of cancer specific metabolic signatures in body fluids of the patients with early stage lung cancer using proton magnetic resonance spectroscopy (MRS) and mass spectrometry (MS) (Collaboration with Dr. Naseer Ahmed Funded by Manitoba Cancer Care). This project has been completed and two abstracts have been submitted. Manuscripts are currently being prepared.

C. Dr. Paul Fernyhough

The WHO informs us that by 2025 there will be 300 million sufferers from diabetes worldwide – a figure approximately equal to the population of the USA. Neurobiologist Dr. Fernyhough is studying the etiology of the peripheral nerve damage observed in patients with diabetes. In addition, he is researching the link between Alzheimer’s disease and Type 2 diabetes. “In patients with Alzheimer’s disease there is an increased risk of developing diabetes and these patients exhibit more severe and accelerated memory loss” says Dr. Fernyhough. Our studies are focused on identifying key signaling pathways that are impaired in animal models of Alzheimer’s disease. A major direction of the lab is to determine whether improper insulin signal transduction in neurons is central to axon and neuronal loss.

My laboratory will be taking 2 paths over the next 3-5 years:

PROGRAM 1 – The main focus of our research will take a hypothesis-driven approach and perform mechanistic studies in order to understand the etiology of diabetic sensory neuropathy. This work is currently supported by CIHR and NIH. The program is multidisciplinary involving in vitro and in vivo paradigms and includes collaborative arrangements (see section later describing collaborations). The main body of work will use cutting edge real time imaging with standard and confocal microscopes to
assess the role of impaired Ca\textsuperscript{2+} homeostasis, mitochondrial dysfunction, AMP-activated protein kinase pathway analysis and enhanced ROS levels in the etiology of diabetic neuropathy. Studies will be performed on adult neuronal tissues as single neuron cultures or slices of neuronal tissue.

**PROGRAM 2** – In parallel the laboratory will take a translational approach and attempt to identify novel drugs for treatment of diabetic neuropathy. The JDRF has supported my laboratory in order to extend our drug screen studies. This work has now been supported by CIHR and NIH. We have identified at least 4 FDA-approved compounds that can improve axon regeneration in cultures of adult sensory neurons. This work has been taken in vivo to test the drugs in whole animal models of type 1 diabetes. In addition medicinal chemistry is being used to identify related compounds that may also be efficacious and will permit generation of new IP. A CIHR-SPOR network grant is now supporting human clinical trials in diabetic neuropathy with a topical formulation developed in collaboration with Dr. Nigel Calcutt at UCSD. This work is being performed by Drs. Vera Bril and Bruce Perkins at the University Health Network in Toronto. This work is being mediated by a small biotech company, WinSanTor Inc, where Drs. Fernyhough, Nigel Calcutt and Lakshmi Kotra are the co-founders and Stanley Kim is the CEO. The company has been funded by several NIH SBIR and STTR grants to support drug development for treatment in diabetic neuropathy, chemotherapy-induced peripheral neuropathy and HIV-induced neuropathy. Both programs of work are comprised of a number of local, national and international collaborations.
D. Dr. Gordon Glazner

Cellular biologist Dr. Gordon Glazner is investigating protective mechanisms within the cell. When a neuron is under stress, it fights for survival by increasing the production of certain proteins. The balance that is struck between the death-inducing stress and the production of protective proteins will determine whether the cell lives or dies. The production of these proteins is controlled by transcription factors, and one of the most important of these is NF-kappaB. “NF-kappaB is a stressed-induced anti-stress response,” Dr. Glazner explains. “In neurons, NF-kappaB is always fairly high, which isn’t true of other cells. We believe it is important not just for survival but for function of the neuron itself, so discovering the ways in which outside messengers impact on that can be important for our understanding of how the nerve itself works and, in turn, for our understanding of clinical pathologies which involve neuronal death.”

Research Associate Dr. Jelena Dordevic (Supervisor: Dr. Gordon Glazner)
E. Dr. Mandana Modirrousta

Research in the Neuromodulation and Neuropsychiatry Unit focuses on improving and expanding the application of neuromodulation as an investigational as well as a treatment tool. Successful, goal directed behaviours require optimal and effective communication between several brain regions. Disruption of brain network, either as a result of a structural abnormality (e.g. brain injury) or dysfunction can result in different neuropsychiatric disorders. Our research in “Neuromodulation and Neuropsychiatry Unit” attempts to understand how to optimally use brain stimulation techniques to treat neuropsychiatric disorders.

Dr. Modirrousta is also the Director of the Neuromodulation & Neuropsychiatry Unit at the St. Boniface Hospital since 2013. She holds academic positions with the University of Manitoba as an Associate Professor in Department of Psychiatry and an Adjunct Professor in the Department of Physiology & Pathophysiology.

Current Projects

- We have a number of manuscripts at various stages of preparation and peer review with regards to the use of repetitive transcranial magnetic stimulation (rTMS) to improve symptoms associated with Traumatic Brain Injury, Obsessive Compulsive Disorder, and Mild Cognitive Impairment.
- Publishing the results of a collaboration with Dr. Amir Ravandi in which we compared oxylipidomic profiles of responders and non-responders to rTMS treatment for depression.
- Testing the efficacy of rTMS for symptoms associated with Primary Progressive Aphasia.
- Ongoing multi-site clinical trial comparing the efficacy of rTMS and pharmaceuticals for patients with treatment-resistant depression.
- Retrospective chart review regarding the
prevalence of Functional Cognitive Disorder (FCD) within the Neuromodulation and Neuropsychiatry Unit.
- Retrospective chart review of factors associated with positive outcomes for patients with depression treated with rTMS at St. Boniface Hospital.
- Systematic literature review of FCD.
- Online survey of patients and health care providers to assess the impact on health delivery in Manitoba of the shift to virtual health care delivery during the COVID-19 pandemic.
- Assessing the use and impact of social media and communication technology in the elderly during the COVID-19 pandemic.
- Assessing whether the use of Virtual Reality as a model for feel-real socialization can improve both the mental and the physical health of elderly people during the pandemic.
- Analyzing the impact of social distancing measures on health outcomes and mortality in elderly individuals using machine learning techniques.

F. Dr. Miyoung Suh

Nutrition and Degenerative Eye Diseases: Nutrients can prevent and/or improve retinal diseases such as diabetic retinopathy, macular dystrophy, and computer vision syndrome. More recently, Dr. Suh’s research has looked into translational studies using humans, which are based off her previous research in various animal models (e.g. Fat-1 mice, type-1 diabetic retinopathy rat model, elongation of very long chain fatty acid 4 (elovl4) deficient mice, and neonatal piglets). Through the usage of nutrient intervention with DHA, β-carotene enriched formulation, lutein and DHA enriched eggs, and choline (deficient/sufficient formulation), she studies various dietary aids to help prevent/mitigate eye degeneration.

Nutrition and Male Reproductive Dysfunction: Lipids may play a critical role in male reproductive systems (spermatogenesis) in obese, diabetic, and alcohol-challenged animal models. Dr. Suh’s lab has found that docosapentaenoic acid (C22:5n-6) deficiency in testis phospholipids is closely related with abnormal testis growth and sperm production in rodent models. Male reproductive health has been decreasing in recent decades. By using various nutrition interventions (n-6 and n-3 fatty acids, zinc, and conjugated linoleic acid) and alcohol, her lab tries to find ways to maintain optimal male reproductive function.

Nutrition and Fetal Alcohol Spectrum Disorder: In very recent years, Dr. Suh’s research has explored the impact of nutrition on the fetal brain, retina, and reproductive organ development, by assessing their effects after the developing fetus is exposed to alcohol during pregnancy. This study involves both human and animal work, which will ultimately lead to the development of nutritional strategies for preventing or mitigating the severity of fetal alcohol spectrum disorder.
G. Dr. Darrell Smith

The goal of the lab is to advance the development and screening of agents that could be used to treat neurodegenerative problems, particularly peripheral neuropathies.

There is currently an incomplete understanding of the pathogenesis of most neurodegenerative disorders and there are no treatments able to delay the onset and slow the progression of many of these disorders. The common treatments used for peripheral neuropathies include pain relievers, anti-seizure medications, and antidepressants. These drugs are used to control the discomfort associated with peripheral neuropathies and have no effect on the progression of the neuropathies themselves.

Fluorescent images of immunostained adult sensory neurons
4. Academic Funding

Total Academic Active Funding in DND: $7,892,746

Our faculty hold major funding awards from national/international agencies such as the Canadian Institutes of Health, Natural Sciences and Engineering Research Council of Canada, Research Manitoba, Canadian Agricultural Partnership, Mitacs, and the Alzheimer Society. Our research is also supported by the St. Boniface Foundation and various provincial agencies such as Manitoba Egg Farmers, Manitoba Liquor & Lotteries, the University of Manitoba and Cancer Care Manitoba.
The following is a breakdown of active funding held by each of our principal investigators in 2020.

**A. Dr. Benedict Albensi**

<table>
<thead>
<tr>
<th>DATE</th>
<th>AGENCY</th>
<th>TITLE</th>
<th>TOTAL AWARD</th>
<th>AMOUNT /YEAR</th>
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<tbody>
<tr>
<td>04/2019 - 3/2022</td>
<td>Canadian Agriculture Partnership</td>
<td>Role: PI Title: Effects of dietary flaxseed on memory and cognition.</td>
<td>430,746</td>
<td>143,582</td>
</tr>
<tr>
<td>04/2019 - 03/2024</td>
<td>CIHR</td>
<td>Role: PI Title: Sex-based differences associated with mitochondrial dysfunction in Alzheimer’s disease.</td>
<td>725,985</td>
<td>145,197</td>
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<tr>
<td>04/2017 - 03/2020</td>
<td>St. Boniface Foundation</td>
<td>Role: PI Title: Douglas &amp; Patricia Everett Endowment Alzheimer’s Res</td>
<td>207,297</td>
<td>69,099</td>
</tr>
<tr>
<td>04/2015 - 3/2020</td>
<td>Alzheimer/Research MB Chair Albensi</td>
<td>Role: PI Title: Basic and Patient-Oriented Dementia Research: Linking Novel Methods for Early Stage Detection with Understanding Pathological Mechanisms in Dementia</td>
<td>250,000</td>
<td>50,000</td>
</tr>
<tr>
<td>04/2015 - 03/2020</td>
<td>Research MB/ASM Chair Albensi</td>
<td>Role: PI Title: Basic and Patient-Oriented Dementia Research</td>
<td>250,000</td>
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**Total Funding - Albensi**

<table>
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<tr>
<th>TOTAL AWARD</th>
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<tr>
<td>1,864,028</td>
<td>457,878</td>
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*Undergraduate Student Alana Slike (Supervisor: Dr. Benedict Albensi)*
B. Dr. Michel Aliani

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<th>DATE</th>
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<th>TITLE</th>
<th>TOTAL AWARD</th>
<th>AMOUNT/YEAR</th>
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</thead>
</table>
| 2019-2020| CMBTC   | Contract | Role: PI Aliani  
Title: Effect of barley varieties & brewing locations on beer flavor. | 25,000      | 25,000      |
| 2019/04-2024/03 | NSERC | Discovery Individual | Role: PI  
Title: Understanding complex interactions between flavor precursors in meat-pulse products using a flavouromics platform | 200,000    | 25,000      |
| 2019-2026 | CIHR   | Project | Role: co-investigator  
Title: Investigation of the cytochrome P450 isozymes responsible for biotransformation of secoisolariciresinol diglucoside (SDG) derived enterolignans and their interaction with metoprolol in hepatocytes and healthy adults. | 835,000    | 167,000     |
| 2019/04 – 2020/03 | NSERC | RTI | Role: PI  
Title: GC-MS for flavouromics platform | 150,000    | 150,000     |
| **Total Funding - Aliani**          |         |                                                       | **1,210,000** | **367,000** |

Research Associate Dr. Aida Adlimoghaddam (Supervisor: Dr. Ben Albensi)
### C. Dr. Paul Fernyhough

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<tr>
<th>DATE</th>
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<th>TITLE</th>
<th>TOTAL AWARD</th>
<th>AMOUNT /YEAR</th>
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</thead>
<tbody>
<tr>
<td>2019-2022</td>
<td>MITACs</td>
<td>Accelerate program</td>
<td>Role: PI; co-sponsor WinSanTor Inc. Training grant: Development of specific peptide antagonists of muscarinic receptors to repair the nervous system.</td>
<td>180,000</td>
</tr>
<tr>
<td>2019-2024</td>
<td>CIHR</td>
<td>Project</td>
<td>Role: PI: Fernyhough, P.; Co-PIs: DeKoninck, Y., UofLaval &amp; Calcutt, N.A., UCSD (with $100k matching from WinSanTor) Title: Muscarinic receptor antagonism as a novel mechanism for sensory nerve repair.</td>
<td>1,090,125</td>
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<tr>
<td>2019-2020</td>
<td>NSERC</td>
<td>Discovery Individual</td>
<td>Role: PI Discovery grant: Muscarinic receptor signaling pathways regulating axonal regeneration and sprouting in adult neurons.</td>
<td>32,000</td>
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<td>2019-2020</td>
<td>St Boniface Foundation</td>
<td>Synergy NEO2</td>
<td>50,000</td>
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<td>2019-2020</td>
<td>St Boniface Foundation</td>
<td>Nick Shepel</td>
<td>1,339</td>
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<td>2018-2020</td>
<td>St Boniface Foundation</td>
<td>Ben Gurion Univ. Partnership</td>
<td>Role: PI Title: Correcting aberrant axonal bioenergetics to drive nerve repair in neurological disease.</td>
<td>300,000</td>
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<tr>
<td>2018-2023</td>
<td>St Boniface Foundation</td>
<td>Bank of Montreal Award</td>
<td>Role: PI Title: Energy failure in nerve fibers: its detection and therapeutic reversal in neurological disease.</td>
<td>250,000</td>
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<tr>
<td>2016-2020</td>
<td>CIHR</td>
<td>SPOR</td>
<td>Role: co-PI; PI: Lewis, G.F. (UofToronto); co-PI (part of team of 15) $25 million. Title: SPOR chronic disease network. SPOR network in diabetes and its related complications.</td>
<td>885,000</td>
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**Total Funding - Fernyhough**

|               | 2,788,464 | 1,023,864 |
D. Dr. Gordon Glazner

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<tr>
<th>DATE</th>
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<th>TITLE</th>
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<tr>
<td>2020</td>
<td>St. Boniface Foundation</td>
<td>Alzheimer’s research. Role: PI</td>
<td>100,000</td>
<td>100,000</td>
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<td></td>
<td><strong>Total Funding - Glazner</strong></td>
<td><strong>100,000</strong></td>
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E. Dr. Mandana Modirrousta

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<tr>
<th>DATE</th>
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<tbody>
<tr>
<td>2019 - 2020</td>
<td>Mitac/Project Whitecard Inc.</td>
<td>Mitacs Accelerate: Assessing the impact of an immersive VR gaming experience on navigation ability and spatial cognition in an elderly population</td>
<td>45,000</td>
<td>45,000</td>
</tr>
<tr>
<td>2017 - 2021</td>
<td>Massachusetts General Hospital</td>
<td>Contract: Role: PI Title: Switching versus augmentation in treatment resistant depression (Research Contract)</td>
<td>761,280 USD</td>
<td>175,250 USD</td>
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<tr>
<td>2020-2021</td>
<td>University of Manitoba</td>
<td>Small Research Equipment Grant Role: PI Title: Electro-encephalography to measure brain activity before and after transcranial magnetic stimulation.</td>
<td>24,300</td>
<td>24,300</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total Funding - Modirrousta</strong></td>
<td><strong>830,580</strong></td>
<td><strong>244,550</strong></td>
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F. Dr. Miyoung Suh

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<tr>
<th>DATE</th>
<th>AGENCY</th>
<th>TITLE</th>
<th>TOTAL AWARD</th>
<th>AMOUNT /YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019-21</td>
<td>Egg Farmers of Canada</td>
<td>Role: PI Title: Egg as a strategy to maintain retina health in diabetes</td>
<td>128,146</td>
<td>64,073</td>
</tr>
<tr>
<td>2020-21</td>
<td>University of Manitoba</td>
<td>UofM Research Grant: UMS3232</td>
<td>Role: PI Title: The effects of maternal DHA consumption on fetal hippocampal development in rats exposed to chronic ethanol during gestation</td>
<td>10,000</td>
</tr>
<tr>
<td>2020-23</td>
<td>Canadian Agricultural Partnership (CAP)</td>
<td>Ag Action Manitoba Program Research and Innovation Activity. Ag Action</td>
<td>454,445</td>
<td>151,482</td>
</tr>
<tr>
<td>2020-23</td>
<td>Ag Action Manitoba Program</td>
<td>Strategic Initiatives: Opaskwayak Cree Nations</td>
<td>Role: PI Title: Smart Vertical Farm for Health in Northern Communities</td>
<td>297,083</td>
</tr>
<tr>
<td>2017 - 2020</td>
<td>Mitacs</td>
<td>Converge Program</td>
<td>Role: PI Title: Improving community health in Indigenous Canadian communities through data-driven, sustainable food production systems</td>
<td>210,000</td>
</tr>
</tbody>
</table>

Total Funding - Suh                                           1,099,674     394,583

DND Total Active Academic Funding Held in 2020               $7,892,746     $2,587,875

PhD student Bradley Feltham  
(Supervisor: Dr. Miyoung Suh)
Active Team Grants (no funding received by our principal investigators, but listed as co-PI on award)

Dr. Benedict Albensi

<table>
<thead>
<tr>
<th>DATE</th>
<th>AGENCY</th>
<th>TITLE</th>
<th>TOTAL AWARD</th>
<th>AMOUNT /YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/2019 - 03/2024</td>
<td>Canadian Dementia Strategy-Team Grant</td>
<td>Role: co-PI Phase II. $46 million dollars to be distributed competitively among Canadian Consortium on Neurodegeneration in Aging (CCNA) members. (no funding received by Albensi so far)</td>
<td>6,063,172</td>
<td>1,212,634</td>
</tr>
</tbody>
</table>

Dr. Paul Fernyhough

<table>
<thead>
<tr>
<th>DATE</th>
<th>AGENCY</th>
<th>TITLE</th>
<th>TOTAL AWARD</th>
<th>AMOUNT /YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 - 2020</td>
<td>Research Manitoba</td>
<td>Cluster-Team Grant. DEVOTION: Developmental Origins of Chronic Diseases in Children Network. Role: co-PI (part of team of 12) PIs: McGavock, J. &amp; Halayko, A.</td>
<td>2,500,000</td>
<td>500,000</td>
</tr>
<tr>
<td>2015 - 2020</td>
<td>Lawson Foundation</td>
<td>Cluster-Team Grant. DEVOTION: Developmental Origins of Chronic Diseases in Children Network Role: co-PI; PIs: McGavock, J. &amp; Halayko, A. (part of team of 12; *matching for Research Manitoba)</td>
<td>1,200,000</td>
<td>240,000</td>
</tr>
</tbody>
</table>

Commercialization Funding

In addition to funding above, Dr. Fernyhough reported new commercialization funding for WinSanTor Inc.

1) In Fall 2018 WinSantor obtained US$2 million via STTR phase 2 (follow up from previously held grant)
   Title: Development of pirenzepine for CIPN
   NIH Grant Number: 2R42 CA213555-02  PI: Andrew Mizisin, WinSanTor Inc

2) NIH award - SBIR program - NIDDK - 2R44DK104512-05
   Regeneration of Epidermal Nerves in Human Diabetic Neuropathy.
   PI: Kim, S. CEO of WinSanTor Inc.  Budget Period: 05/01/2019 – 04/30/2020;
   Project Period: 09/30/2014 – 04/30/2022
   SUMMARY TOTALS FOR YEARS 5-7: Yr 5 US$1,000,000; Yr 6 US$995,582; Yr 7 US$985,495
5. Trainee Funding/Awards

Congratulations to our trainees on receiving the following awards that supported their salary and/or travel to international conference to present their scholarly work they are conducting at St. Boniface Research Centre.

<table>
<thead>
<tr>
<th>Name</th>
<th>Supervisor:</th>
<th>Award</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amiri, Shayan</td>
<td>Supervisor: Dr. Paul Fernyhough</td>
<td>Graduate Enhancement of Tri-agency (GETS)</td>
</tr>
<tr>
<td>Chauhan, Sanjana</td>
<td>Supervisor: Dr. Paul Fernyhough</td>
<td>University of Manitoba Faculty of Graduate Studies Fellowship (UMGF)</td>
</tr>
<tr>
<td>Demare, Sarah</td>
<td>Supervisor: Dr. Paul Fernyhough</td>
<td>NSERC Undergraduate Research Summer Award</td>
</tr>
<tr>
<td>Fahmi, Ronak</td>
<td>Supervisor: Dr. Michel Aliani</td>
<td>University of Manitoba Faculty of Graduate Studies Fellowship (UMGF)</td>
</tr>
</tbody>
</table>
| Feltham, Bradley| Supervisor: Dr. Miyoung Suh                      | -University of Manitoba Doctoral Award For Indigenous Students  
                      -Prairie Indigenous Knowledge Exchange Network (PIKE-Net) PhD Graduate Fellowship  
                      -Dr. Elizabeth B. Smith Convocation Prize                                                 |
| Hoang, Amila    | Supervisor: Dr. Paul Fernyhough                  | BioTalent Canada Studentship                                                                   |
| Jejede, Olutola | Supervisor: Dr. Miyoung Suh                      | NSERC Undergraduate Research Summer Award                                                       |
| Mishra, Pranav  | Supervisor: Drs. Ben Albensi / Paul Fernyhough  | University of Manitoba Faculty of Graduate Studies Fellowship (UMGF)                          |
| Naznin, Farhana | Supervisor: Dr. Paul Fernyhough                  | Mitacs Accelerate Postdoctoral Fellowship                                                       |
| Pearson, Melissa| Supervisor: Dr. Michel Aliani                    | NSERC Undergraduate Research Summer Award                                                       |
| Tavakoli, Ali   | Supervisor: Dr. Mandana Modirrousta              | Mitacs Accelerate Studentship                                                                  |
| Walchuk, Chelsey| Supervisor: Dr. Miyoung Suh                      | University of Manitoba Faculty of Graduate Studies Fellowship (UMGF) / Garson N. Vogel Memorial Award |
| Wang, Yidi      | Supervisor: Dr. Miyoung Suh                      | University of Manitoba Faculty of Graduate Studies Fellowship (UMGF) / MGS  
                      Jane Fabro McComb Scholarship                                                                  |
6. Teaching Activities

A. Benedict Albensi

University of Manitoba, Department of Pharmacology & Therapeutics

- Fall 2020, Lecturer, Dept. of Pharmacology & Therapeutics, Univ. of Manitoba, DDSS 3162, Pharmacokinetics/Drug disposition. Two lectures.
- Winter 2020, Lecturer, Dept. of Pharmacology & Therapeutics, Univ. of Manitoba, DDSS 3162 (formerly ORLB 3320), Epilepsy Drugs. One lecture on epilepsy drugs.
- Winter 2020, Lecturer, Dept. of Pharmacology & Therapeutics, Univ. of Manitoba, Pharmacy/Nursing/PA, PHAC 2100 – 6 cr. hrs. Two lectures on epilepsy/antiepileptic drugs.
- Fall 2020, Lecturer, Dept. of Pharmacology & Therapeutics, Univ. of Manitoba, Pharmacy/PA, PHAC 2100 – 6 cr. hrs. Five-six lectures and tutorials on pharmacodynamics/pharmacokinetics/drug disposition.
- Fall 2020, Lecturer, Dept. of Pharmacology & Therapeutics, Univ. of Manitoba, Drugs in Human Disease, PHAC 4030 – 3 cr. hrs. Lectures on pharmacokinetics/drug metabolism and CNS drugs for epilepsy and other conditions, neurochemistry, neurodegeneration.
- Winter 2020, Lecturer, Dept. of Pharmacology & Therapeutics, Univ. of Manitoba, Drugs in Human Disease, PHAC 4040 – 3 cr. hrs. Two lectures on drug development and clinical trials.

Healthcare Student Tutorials/Case based learning

- Fall 2020, University of Manitoba Faculty of Health Sci., Physician Assistant students.
- PHAC 7230, Pharmacokinetics.

Invited Lectures (by other schools)

- Fall 2020, Guest Lecturer, NEUR 321, University of Calgary. Online lecture on synaptic plasticity and memory.

Research Technician Sandeep Mangat (Supervisor Dr. Benedict Albensi)
B. Michel Aliani

University of Manitoba, Department of Food & Human Nutritional Sciences

- Course Number and Title: HNSC 7170_Advanced problems in Nutrition
- Course Number and Title: HNSC 2150_Composition, functional and nutritional properties of foods
- Course Number and Title: HNSC 4570_Sensory evaluation of foods
- Course Number and Title: HNSC 4510_Food product development

C. Paul Fernyhough

University of Manitoba, Department of Pharmacology & Therapeutics

- Drugs and human disease (PHAC 4040) (2 x 3 credit hr 3/4th year undergraduate and 1st yr graduate level). I present 2 lectures on antiviral pharmacology.
- Molecular Pharmacology (PHAC 7222) (3 credit hr - 2nd year or above graduate level) – 12 lecture unit – I present 2 lectures on growth factor receptors, tyrosine kinases and associated receptors and one tutorial on critique of manuscript.
- Neuroscience (IMED 7101 and 7102) (6 credit hr - 1st/2nd yr graduate level) – coordinator of neurobiology of disease segment. Deliver 3 lectures on neurotrophins, transcription factors and peripheral neuropathy and mark dissertations.
- Pharmacology (PHAC 2100) (6 credit hr – Pharmacy course) – I deliver 10 lectures each year covering antivirals (2 hr), antifungals (1 hr), diabetes (2 hr), pain drugs (4 hr) and GI tract (1 hr).
- Pharmacology (PHAC7230/7240) (6 credit physician assistant course) – I deliver 4 lectures each year on antivirals, antifungals, GI tract and diabetes.
- Neuropharmacology (PHAC 7162) (1.5 credit hr – 2nd yr and above graduate level) – deliver 2 lectures on neuronal growth factors and PNS disease.
- Pharmacology (ORLB3320) – 3rd year undergraduate dentistry course – I deliver 3 lectures.
- Pharmacology (RESP1440) – 1st year respiratory medicine course – I deliver 1 lecture.

PhD Student Ms. Sanjana Chauhan (Supervisor: Dr. Paul Fernyhough)

D. Dr. Gordon Glazner

University of Manitoba, Department of Pharmacology & Therapeutics

- Drugs and human disease (PHAC 4030) (2 x 3 credit hr 3/4th year undergraduate and 1st yr graduate level).
- Dentistry – General Pharmacology course (ORLB 3320) (6 credit hours course for 2nd year dentistry students)
  Total of 60 hours of contact
E. Dr. Miyoung Suh

University of Manitoba, Department of Food & Human Nutritional Sciences

- HNSC 7560 Current Topics in Lipid Nutrition
- HNSC 7200 Seminar in Foods and Nutrition Research (MSc) & Advanced Seminar in Human Nutritional Sciences (PhD)
- HNSC 7460/ANSC7460 Lipid Nutrition and Metabolism
- HNSC 4600 Practice-Based Research in Human Nutritional Sciences (Co-teaching (85%) with Research Dietitian, Manitoba Partnership Dietetic Education
- HNSC 4320 Nutritional Management of Disease States (100%) (with laboratory, 2 sessions x 2 hours per week)
7. Publications (including Book Chapters)

A. Benedict Albensi


B. Dr. Michel Aliani


*Undergraduate Student Jeffrey Wilson  
(Supervisor: Dr. Paul Fernyhough)


C. Dr. Paul Fernyhough


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D. Dr. Gordon Glazner


E. Dr. Mandana Modirrousta


**CHAPTERS IN BOOKS**


   ![Image of Dr. Mandana Modirrousta demonstrating rTMS equipment with her research associate Ben Meek.](image-credit)

**F. Dr. Darrell Smith**


G. Dr. Miyoung Suh


Clinical Trials Coordinator, Ms. Nancy Olson (Supervisor: Dr. Benedict Albensi)
8. Conference Contributions

A. Dr. Benedict Albensi


Suh Lab: Back row L-R    Olena Kloss, Yidi Wang, Rex Yoon; Front row L-R    Chelsey Walchuk, Dr. Miyoung Suh, Bradley Feltham
B. Dr. Michel Aliani

1. IFT conference, 2020 Title: Consumer Acceptability and Chemical Characteristics of Pan Bread Supplemented with Revtech Treated Split Yellow Pea Flours. Ronak Fahmi and Michel Aliani

2. The American Association of Immunologists conference Title: PI3K-dependent Reprogramming of Hexokinase Isoforms Regulates B Lymphocyte Metabolism Edgard Mejia, Affan Ali Sher, Sen Hou, Grant, Hatch, Michel Aliani and Aaron Marshall

3. 9th Canadian Barley Symposium & 24th BMBRI Triennial Meeting, Winnipeg Feb, 2020 Title: Barley flavour and varieties

C. Dr. Paul Fernyhough


D. Dr. Mandana Modirrousta


E. Dr. Miyoung Suh


7. Kapourchali FR, Louis XL, Feltham BA Eskin NAM & Suh M (2020) Fatty acid compositions of immature and mature testis are differently responsive to dietary docosahexaenoic acid during development in rats exposed to prenatal ethanol, 14th International Society for the Study of Fatty acids and Lipids (ISSFAL, 2020), Qingdao, China, June 14-17, 2020 (Postponed)


Dr. Benedict Albensi touring students from Louis Riel School Division through his research lab.
9. Invited Presentations, Scholarly & Outreach Activities

A. Dr. Benedict Albensi

Non Peer-Reviewed - Online Articles

1. 2020 B.C. ALBENSI. What Does Inflammation Have To Do With Alzheimer’s Disease? [https://caretalk.com/alzheimers/home]

Invited Oral Presentations

a) Academic

1. 2020 11th Targeting Mitochondrial Congress, virtual (in-person mtg. cancelled)
2. 2020 University of Missouri Kansas City, School of Pharmacy, Kansas City, MO, USA
3. 2020 Central Michigan University, College of Medicine, Mt. Pleasant, MI, USA

b) Public

1. 2020 Brain Injury and Dementia. Sponsored by the Alzheimer's Society of Manitoba. Winnipeg, MB, Canada
2. 2020 Brain Injury and Dementia. Sponsored by the Manitoba Brain Injury Association. [https://www.youtube.com/watch?v=3ppRSi2JzhZl Winnipeg, MB, Canada]
3. 2020 Opportunities for Improving Health and Nutrition: Partnerships Between the Lab and Ag Sector, Winnipeg, MB
4. 2020 The Forgotten Ones: Challenges with Alzheimer’s Research and Care. Live Well @Work Seminar Series, University of Manitoba, Winnipeg

Consulting & Contracting

a) Scientific or Medical Advisor

1. 2019-20 CareTalk - Clinical Research.IO, Boston, MA
2. 2019- Mitrix Bio (formerly called Mitochondrial Transfusion), San Francisco, CA

b) General

1. 2020- Efficient Co. - Fort Lauderdale, FL

Radio, Television, Newspaper, & Youtube Interviews

1. 2020 Alzheimer’s Speaks Radio Talk Show – Interview by Lori La Bey
2. 2020 Scientific Sense Talk Show – Interview by Gil Eapen
4. 2020 MitoCanada Charity Challenge Marathon – Interview (at hr. 4:29:45) with Daniel Bowie [https://www.youtube.com/watch?v=oeUYjHsxHgA].
6. 2020 Mitochondrial Function and Dementia - Live Interview with Dr. Philip McMillan
   https://www.youtube.com/watch?v=0vffQSNPI_M&t=39s

7. 2020 St Boniface Mega Million Choices Hospital Lottery – Commercial with Kahla Evans - Global TV

Board & editorial appointments

1. 9/2020- Director on Board of Directors, Brain Injury Association of Manitoba (non-profit), Winnipeg, MB
2. 9/2015- Director on Board of Directors, MitoCanada (non-profit), Brantford, ON
3. 10/2020- Vice Chair - Chair-elect (elected by international online ballot), ISTAART-Alzheimer’s Association, Nutrition, Metabolism, & Dementia PIA Executive Committee, Chicago, IL, USA
4. 9/2018- Co-Chair Systems Integrity Team (SASI Leadership Team) - ACRES (Alliance for Clinical Research Excellence and Safety) Global, HQ-Boston, MA, USA
5. 4/2018- Chair of Weston Study Multi-site Multi-national Clinical Data (rTMS-AD study) and Safety Monitoring Board (DSMB) - Canada & Australia
6. 2020- Editor-in-Chief, Molecular Neurobiology, Springer-Nature Pub., NY, USA
7. 2020- Senior Editor Journal of Alzheimer’s Disease. IOS Press Pub., Netherlands
8. 2014- Associate Editor (Basic Sciences). Brain Injury, Official journal of the International Brain Injury Assoc. (IBIA), Taylor & Francis Pub, USA

Manuscript Ad Hoc Referee (various dates)

1. 2019- ongoing Expert Review of Proteomics
3. 2017- ongoing Scientific Reports (Nature Pub Group)
4. 2016- ongoing Molecular Brain
5. 2016- ongoing Oncotarget
6. 2016- ongoing NeuroMolecular Medicine

Committees & Grant review panels

1. 12/2020 External Review. Brain Canada, Future Leaders in Canadian Brain Research
2. 2017- Member, CIHR – College of Reviewers, Canada
4. 7/2018-20 Senator, Faculty Senate (elected) - Faculty of Health Sciences, Univ. of Manitoba
6. 2009- Coordinator, Canadian Medical Hall of Fame – Discovery Days in Health Sciences, representing Dept. of Pharmacology & Therapeutics and Div’n. of Neurodegen. Disorders Wpg. MB

Other outreach activities

1. 2020 Poster judge, American Neurological Association Meeting, Online
2. 2020 Judge, Youth Science Canada/Bison Regional Science Fair, Online
B. Dr. Michel Aliani

Committee member - University of Manitoba - Outreach Committee
Review panel - Journal of Food Science, Metabolomics, Journal of foods and Agricultural Chemistry

Advisor to Health Canada: At their request, I have been in several online discussion with Health Canada representatives in Ottawa which were mainly related to sensory evaluation and flavour chemistry studies of several health products (Confidential discussion). On a positive note, there will be a possibility for a potential collaboration with Health Canada to conduct some of these evaluations at the U of M once the COVID 19 restrictions will permit proper sensory studies.

Memberships:
 Instituto of Food Technology (IFT) Start year - end year / present: 2014 to present
Metabolomics Society Start year - end year / present: 2014 to present
Analytical Chemistry Start year - end year / present: 2014 to present
Canadian Centre for Agri-Food Research in Health and Medicine (CCARM) Start year - end year / present: 2014 to present

C. Dr. Paul Fernyhough

Invited Talks:


Other current activities:
2007 – present College of Medicine Promotions Committee, Basic Sciences Representative
2012 – present Canadian Institutes of Health Research (CIHR) – Cell Biology and Mechanisms of disease panel
2015 – present Head of Department of Pharmacology & Therapeutics, University of Manitoba
2015 – present Member, Faculty of Health Sciences (FHS) Executive Council
2015 – present Member, College of Medicine Research Advisory Committee
2015 - present Member, College of Medicine Research Support Fund (RSF) Adjudication Committee
2015 – present Member, College of Medicine Department Head’s Council
2015 – present Member of FHS core platform review committee
2015 - present International Diabetic Neuropathy Consortium, Universities at Aarhus and Copenhagen in Denmark and Oxford, UK and Ann Arbor, USA. Funded by Novo Foundation, Denmark. Member of advisory board.
2018 – present Member of University of Manitoba Tricouncil bridge funding review panel
D. Dr. Mandana Modirrousta

Invited Talks


Other current activities:

1. Reviewer, Canadian Journal of Psychiatry (x2)
2. Grant review panel member, Canadian Institutes of Health Research Project Grant: Spring 2020 competition

E. Dr. Miyoung Suh

Invited Talks

1. ‘Seeking ways to improve Indigenous health in Northern Manitoba with smart vertical farms’
   The Association of Korean-Canadian Scientists and Engineers-Manitoba Chapter (AKCSE-MB), Annual General Meeting, Dec 10, 2020

Other current activities:

Submitted Final report on nutrition in the prevention of FASD-Nutrition Project, Submitted to Manitoba Liquor & Lotteries, Oct 2020

Committees/grant review/other:

Ongoing Thesis Advisory Committees
Ongoing Phd External Thesis Examine
2014-present Committee member, Young Generation, Association of Korean-Canadian Scientists and Engineers, Canada/ Award selection committee
2012-present Judge for Canadian Student Health Research Forum (Manitoba Poster Competition)
2012-present Judge for The Annual Functional Foods and Natural Health Products Grad. Symposium
2012-present Gant review: Mitacs Accelerate and Elevate program
2017-present CIHR College of reviewers
2020 EDI organizing committee, The Association of Korean-Canadian Scientists and Engineers, Nov 6, 2020 (Virtual meeting)
2020-present President, The Association of Korean-Canadian Scientists and Engineers-Manitoba Chapter
10. Visiting Speaker Program

The Division of Neurodegenerative Disorders, the Neuroscience Research Program located within the Kleyson Institute for Advanced Medicine at the Health Sciences Centre, and the Department of Pharmacology & Therapeutics, University of Manitoba, conjointly participate in funding the Manitoba Neuroscience Networks’s Seminar Series/Visiting Speaker Program. The Manitoba Neuroscience Network’s administrative office is located within the Division of Neurodegenerative Disorders.

Seminar & Visiting Speaker Series (2020)

January 31, 2020

**Dr. Ana Hanlon-Dearman**
Associate Professor, Pediatrics & Child Health, University of Manitoba

*Understanding and managing sleep in fetal alcohol spectrum disorder (FASD)*

February 28, 2020

**Dr. Ben Lindsey**
Assistant Professor, Department of Human Anatomy & Cell Science, University of Manitoba

*Uncovering the biological significance of adult neural stem cells using the zebrafish model*

October 23, 2020

**Dr. Zahra Moussavi**
Director, Biomedical Engineering Program, Professor, Dept. Elec. & Comp. Engineering & Dept. of Psychiatry

*Repeated trials of Cognitive Exercises simultaneously with Transcranial Alternative Current Stimulation (TACS) as a Treatment for dementia: Fiction or Fact?*

November 27, 2020

**Dr. Katinka Stecina**
Assistant Professor, Department of Physiology & Pathophysiology, University of Manitoba

*Key neural networks for the control of walking*
Planned Speakers

Seminars by speakers below were cancelled due to the Coronavirus pandemic

March 27, 2020

Dr. Eftekhar Eftekarpour
Assistant Professor, Department of Physiology &
Pathophysiology, University of Manitoba

May 29, 2020

Dr. Ji-Hyun Ko
Assistant Professor, Department of Human Anatomy
& Cell Science, University of Manitoba | Principal Investigator,
Kleysen Institute for Advanced Medicine

**Brain Awareness Week**  
*All events cancelled due to the Coronavirus pandemic*

Calendar:

**WINNIPEG BRAIN BEE**

*Saturday, March 7*

Bannatyne campus, University of Manitoba

**NEUROSCIENCE FOR KIDS!**

*Saturday, March 11, 2020  11:00am -6:00pm*

Outlet Collection Winnipeg:  Free neuroscience activities presented in association with students from the University of Manitoba chapter of Let’s Talk Science

**EDGE OF SCIENCE SEMINAR**

*Monday, March 16, 2020  12:00-1:00pm  Theatre C Bannatyne Campus*

**Invited Speaker:** Dr. Brian MacVicar, University of British Columbia

Title: *Microglia sensing and modulation of synaptic plasticity in neuronal circuits*

**SPECIAL LECTURE**

March 17, 2020  12:00-1:00pm  Theatre C Bannatyne Campus

**Invited Speaker:** Dr. Tuan Trang, University of Calgary

Title: Microglia and pannexin1: a cellular Rubik’s cube
CAFÉ SCIENTIFIQUE  
*Wednesday, March 15 7:00-8:30pm*  
McNally Robinson Bookstore  1120 Grant Avenue  
Co-sponsored by MNN:  Research in motion: using new technologies to diagnose and treat Parkinson’s disease

NEUROSCIENCE FOR KIDS!  
*Saturday, March 21, 2020  11:00am -6:00pm*  
Garden City Shopping Centre  
Free neuroscience activities presented in association with students from the University of Manitoba chapter of Let’s Talk Science

Manitoba Neuroscience Network (MNN) Annual Meeting: The 2020 MNN Scientific Meeting was cancelled due to the Coronavirus pandemic.

**Manitoba Dementia Journal Club**: Dr. Albensi heads up the Dementia journal club that started several years with the effort of Dr. Gough (Dept. Chemistry at the Univ. of Manitoba). With a common goal of uniting researchers across Winnipeg, across faculties, and across departments, the club began with a focus on Alzheimer’s dementia, but has since expanded to include all forms of dementia. Currently the group meets monthly at various Winnipeg locations, but with many meetings occurring at the University of Manitoba, Ft. Garry, HSC, and St. Boniface. Learn more about Dementia Research Manitoba at: [https://dementiamanitoba.wixsite.com/mysite](https://dementiamanitoba.wixsite.com/mysite)

Where Basic, Translational, and Clinical Research Meet  
We are a group of scientists, physicians, administrators, and other healthcare professionals devoted to high quality dementia research in Manitoba. To attend our club or for more information contact:  

Dr. Benedict C. Albensi, Chair  
204-235-3942  
DementiaManitoba@outlook.com
11. News releases and other misc. announcements

Albensi talk ranked #1 at World Targeting Mitochondrial Congress


Dr. Benedict Albensi, Principal Investigator, Synaptic Plasticity and Cellular Memory Dysfunction Lab, Division of Neurodegenerative Disorders, presented a 25-minute seminar, entitled, “Roles for Mitochondrial Dysfunction in Alzheimer’s Disease” at the 11th annual World Targeting Mitochondrial Congress via a virtual session.

The talk was ranked #1 out of 58 talks with 171 online viewers. For more information about Dr. Albensi’s talk, please visit [https://targeting-mitochondria.com/alert-on-mitochondria/786-roles-for-mitochondrial-dysfunction-in-alzheimer-s-disease](https://targeting-mitochondria.com/alert-on-mitochondria/786-roles-for-mitochondrial-dysfunction-in-alzheimer-s-disease).

Ideally Suited to Become a Leading Indigenous Scholar


Those were words used to describe the work of PhD student Bradley Feltham who recently won the Doctoral Award For Indigenous Students, U of M, and also won the Prairie Indigenous Knowledge Exchange Network (PIKE-Net) PhD Graduate Fellowship, U of M.

It was noted by the voting committee that Feltham’s work was exceptionally strong and demonstrated his status as an exemplary student. Another committee member noted that Feltham is ideally positioned to become a leading Indigenous scholar and would be an excellent mentor for others in the PIKE-Net program and beyond.

According to his supervisor, Dr. Miyoung Suh, Principal Investigator with the Division of Neurodegenerative Disorders and the Canadian Centre for Agri-Food in Research & Medicine, “I would say, he is simply an outstanding student who balances duality between academic responsibility and leadership roles, especially for the indigenous students on campus and communities.”
Albenski receives Research Merit Award

Congratulations to Benedict Albensi, Department of Pharmacology and Therapeutics, Max Rady College of Medicine, Rady Faculty of Health Sciences and Principal Investigator at St. Boniface Hospital Research, for winning the Research, Scholarly Work and Creative Activities Merit award from the University of Manitoba. “Thanks to all who financially support my research, those who work hard in my lab to generate data, and those that collaborate or partner in our efforts to advance memory and Alzheimer’s research. It is much appreciated," Albensi said.

Merit Awards at the University of Manitoba recognize faculty members for their outstanding teaching, research, scholarly work and creative activities, and service in three categories: Social Sciences, Humanities and Fine Arts; Life Sciences, Natural Sciences and Engineering; and Promoting Indigenous Achievement. Annual applications and nominations are invited for the previous calendar year and awarded by two Joint Committees on Merit Awards.

Albenski named Editor-in-Chief of Molecular Neurobiology

Congratulations to Dr. Benedict Albensi, Principal Investigator, St. Boniface Hospital Research, Division of Neurodegenerative Disorders (DND); Professor & Manitoba Dementia Research Chair, Max Rady College of Medicine, Dept. of Pharmacology & Therapeutics, for his recent appointment as Editor-in-Chief of Molecular Neurobiology.

This bimonthly peer-reviewed scientific journal covers all aspects of molecular neuroscience and contemporary molecular brain research with an Impact Factor of 5.076 (2017). Established in 1987, Molecular Neurobiology is published by Springer Science+Business Media out of New York City.

Dr. Benedict Albensi is also a Core Member in Biomedical Engineering with the Faculties of Health Sciences, Engineering & Science, Research Affiliate Centre on Aging, and serves as Chair of the Everett Endowment Fund for Alzheimer’s Research.
**Mitochondrial dysfunction in dementia**

Professor Benedict Albensi, University of Manitoba, Winnipeg, Canada

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**Alzheimer Society Manitoba**

Dementia Care & Brain Health

**Facebook Live: Q&A with Dr. Mandana Modirrousta**

Join Dr. Mandana Modirrousta for a Facebook Live Q&A on the Alzheimer Society's Facebook Page every Wednesday from 3:30 to 4 pm.

We encourage you to ask questions as we want to make this as interactive as possible. Hope you will join us!

**Click here to join the Facebook Live** event on Wednesday, May 27 at 3:30 pm.

Past Events:

- May 13 – Q&A with Dr. Modirrousta – Ask a doctor!
- May 6 – Q&A with Dr. Modirrousta – Ask a doctor!

April 29 – Am I at Risk of Having Dementia? How Can I Keep my Brain Healthy?

April 22 – Signs and Symptoms of Dementia – Getting a Diagnosis

April 15 – Is There a Difference Between Dementia and Alzheimer’s Disease
035 Dr. Ben Albensi: How do brains remember?

Critically Speaking

Science

Listen on Apple Podcasts

What happens when we remember something? Therese Markow talks with neuroscientist Dr. Ben Albensi about how memory works, involving both chemical and structural changes. They talk about the signals in the brain, the connections among different brain regions underpinning memory, and the role of sleep in consolidating the memory process. Dr. Albensi also describes what happens when a person suffers amnesia.

Key Takeaways:
Memory begins in the brain region called the hippocampus, from which chemical signals and neural connections then extend to other regions. These connections are important for memory. Enriched environments result in more connections. Sleep is critical to the memory process.

“We’ve learned from scientific evidence and experiments that sleep is critical to quality of memory and memory consolidation.” — Dr. Ben Albensi

Facebook Live: Q & A with Dr. Mandana Modirrousta

June 3rd 3:30 pm - 4:00 pm
Alzheimer Society Facebook Page

This is your chance to engage with a dementia expert! Join us on Facebook live with your questions and engage with Dr. Mandana Modirrousta. She wants to hear from you and answer any questions and concerns you may have.

Dr. Modirrousta has hosted sessions on various topics related to dementia. This time, she will devote the full session for your questions. Take this opportunity to ask a doctor!

Presented by Dr. Mandana Modirrousta, Associate Professor, Departments of Psychiatry and Neurology, University of Manitoba; Director, Neuromodulation and Neuropsychiatry Unit, St. Boniface Hospital

Diagnosis and management of dementia with Lewy bodies
Fourth consensus report of the DLB Consortium

Mandana Modirrousta MD PhD FRCPC

Depts of Psychiatry, Neurology, Pathology and Pathophysiology
Faculty member, Division of Neurodegenerative Disorders
St-Boniface Hospital Albrechtsen Research Centre

Dementia Journal Club Dr Mandana Modirrousta Dec 21 2020
June 4, 2020

https://www.ted.com/talks/miyoung_suh_farming_to_the_sky_a_game_changer_for_health_in_the_north
12. Commercialization

A. WinSanTor

Founded in 2011, WinSanTor Inc. is a clinical-stage biotechnology company focused on the discovery and development of treatments for peripheral neuropathies, including diabetic peripheral neuropathy, chemo- and HIV-induced peripheral neuropathy, and others. Visit their website: https://winsantor.com

Study finds drugs that can reverse nerve damage.

People who suffer from chronic numbness or pain and tingling in their extremities, caused by diabetes or other conditions, might soon get relief. A study by an international team of researchers has found that a class of drugs prescribed for other medical issues such as nearsightedness, incontinence or peptic ulcers may also prevent numbness and pain in fingers, arms and legs.

Led by Dr. Paul Fernyhough of the University of Manitoba and St. Boniface Hospital Albrechtsen Research Centre, and Dr. Nigel Calcutt of the University of California at San Diego, the researchers found that antimuscarinic drugs such as pirenzepine can reverse the numbness and pain, called neuropathy, often experienced by people with diabetes, HIV, or as a side effect of cancer chemotherapy.

Read more on the founders: https://winsantor.com/the-winsantor-team/
Fernyhough notes: “The costs of treating these diseases and associated morbidities exceed the costs for treating breast cancer. For the first time we have identified a new class of drugs that can reverse nerve damage in animal models of these diseases.”

In peripheral neuropathy the nerve endings of the peripheral nerves die leading to severe impacts on quality of life. For example, patients suffer from intractable pain, foot ulcers, infections and ultimately amputations. There are presently no treatments other than palliative care. The study found that widely-used drugs targeted a key receptor in the neural pathway regulating the growth of nerve fibres and stimulated their regeneration. The drugs drive nerve fibre regeneration and repair in disease states such as diabetes and chemotherapy where there is otherwise irreversible nerve damage.

Calcutt, Fernyhough and Lakshmi Kotra of the University of Toronto together have founded the biotech company **WinSanTor** Inc to specifically develop the therapeutic potential of this novel approach to treating neuropathy.

“This data opens the possibility that the process of peripheral nerve degeneration may be therapeutically reversible, and now with the potential to use existing drugs, we can rapidly translate these findings to clinical trials,” says Stanley Kim, co-founder and CEO of WinSanTor Inc. “Peripheral neuropathy is a major and often neglected health problem affecting hundreds of millions of people around the world, including a majority of diabetes patients, and we can’t afford to wait any longer in advancing treatments for this disease.”

Fernyhough adds: “An exciting aspect of the work is that these are new uses for old drugs. They have been used in humans for over 20 years with no serious side effects and have an excellent safety profile. We expect Phase 1 trials to progress smoothly with Phase 2 trials arranged and already funded for 2017.”

“We are proud of Dr Fernyhough’s exciting finding and the clinical implications of this discovery,” says Dr. Grant Pierce, Executive Director of Research at St Boniface Hospital. “It is another example of the successful history at St Boniface Hospital of translating our lab bench findings into valuable medical applications to benefit the health of Canadians.”

“I congratulate Drs. Fernyhough and Calcutt on their findings,” says Dr. Digvir Jayas, Vice-President (Research and International) and Distinguished Professor at the University of Manitoba. “This research will benefit millions of people who are affected by chronic diseases.”

The results of the study were published in 2017 in the Journal of Clinical Investigation. The research was funded by grants from the JDRF, the Canadian Institutes of Health Research, and the National Institutes of Health, with support from St. Boniface Hospital Foundation.