Imagining oneself as a physically active person

Dr. Shaelyn Strachan
MISSION
To promote and fund scientific, educational and other activities to improve the health and well-being of Manitobans, focusing on support of new researchers.

VISION
To continue to be an important source of support for health research and education, in collaboration with other Manitoba organizations.

VALUES
The values of the MMSF are rooted in its history of the Manitoba Medical Service (MMS) which was created in 1943 to provide medical coverage for all Manitobans at reasonable fee rates and was a precursor to Medicare. When Medicare was established in Manitoba, the MMS was no longer needed. Dedicated Manitoba Medical Service Members generously donated their investment in the MMS to create a legacy through the Manitoba Medical Service Foundation in 1971, with a mandate to fund and promote health research and education in Manitoba.

Today, because of the ongoing and generous funding and support from Manitoba Blue Cross, the MMSF continues to provide funding for the advancement of scientific, educational and other activities, to improve the health and well-being of Manitobans.

The MMSF endeavors to follow its roots by:

• Being committed to community through inviting both members of the lay public and health professionals to be volunteer members of the Board, and to engage their wisdom in selecting award recipients

• Providing mentorship and feedback through direct engagement of applicants, by participating in the Foundation’s unique grant review process

• Selecting the highest caliber of new researchers for promotion and grant support

• Developing collaborative partnerships with other organizations

• Providing funding to advance health-related research projects for the benefit of Manitobans and the world

• Ensuring our processes are effective and accountable, to sustain our mission for future generations

Since 1971, the Manitoba Medical Service Foundation has provided over $18 MILLION towards furthering health-related research and education in Manitoba.
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2011 MMSF Board Celebrates 40th Anniversary

Back Row: Mr. Aidan O’Brien, Dr. Gerald Minuk, Dr. R. Daniel Gietz, Mr. Neil Fast, Dr. Greg Hammond (Executive Director & Treasurer), Dr. Peter Cattini (Secretary), Dr. Grant Pierce, Mr. Andrew Yorke (MMSF Director and MBC President & CEO), Hon. W. Scott Wright, Mr. Mark Gray, Dr. Brian Postl, Dr. William Christie, Ms. Tannis Novotny (Executive Administration).
Middle Row: Mr. Kerry Bittner (Member-at-Large), Mr. Shaun Lamoureux (MBC, VP & CFO), Dr. Susan McClement, Dr. Christine Peschken, Dr. Lindsay DuVal (Vice-Chair of the Board), Dr. John Wade (Assistant Executive Director), Dr. Estelle Simons, Mr. Gordon Webster.
Front Row: Ms. Linda Newton, Mr. Allen Rouse (Chair of the Board), Ms. Patricia McCallum (Member-at-Large), Mrs. Isabel Auld.
Missing: Dr. Nicholas Anthonisen, Dr. Patrick Choy, Dr. Kent HayGlass, Mr. Gordon Holland, Dr. Allan Ronald, Mr. Jerry Kruk (Citizen-at-Large)
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Chairperson of the Board

Dr. Lindsay DuVal
Vice-Chairperson

Dr. Greg Hammond
Executive Director

Dr. John Wade
Assistant Executive Director

Dr. Peter Cattini
Honorable Secretary

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Mr. Kerry Bittner
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Message from the MMSF
Board of Directors

Although our finances for research and personnel funds remained stretched for the 2011 competition we funded 18 out of 26 applications received. Our 2011 funding budget was enhanced by a generous donation from the Board of Manitoba Blue Cross (MBC). It is through the assistance of Manitoba Blue Cross that the Foundation endures today. Manitoba Blue Cross sustains the Foundation by financing our overhead and administrative costs. This allows us to contribute 100% of our revenue to accomplishing our mission. We are extremely grateful to MBC for this timely assistance.

The MMSF is unique in that it holds in-person interviews for each qualifying operating grant application received in our annual competition. Our unique granting process and marking system has continued to be useful with a major mark awarded for new young investigators and a separate mark for the quality of the grant project applied for. The criteria for marking may be viewed on our website - www.mmsf.ca. Details for grants funded over the past five years as well as other Foundation contributions to health-related research and education are also located on our website.

We are grateful for the many collaborations we have with other agencies that helps to stretch research funding dollars, allowing a higher number of quality grants to receive funding. Over our history we have collaboratively worked together with The Winnipeg Foundation, Manitoba Medical College Foundation, Health Sciences Centre Foundation, Manitoba Institute of Child Health, Manitoba Health Research Council, the University of Manitoba, and of course our strongest supporter, Manitoba Blue Cross. We thank each organization for it’s commitment to improving the health and well-being of all Manitobans. Each year our collaborations with partners are developed according to the high quality research proposals submitted. We continually strive to develop collaborations to further research in Manitoba and provide new young investigators with a start to their research careers, and often their first independent research operating grant.

Dr. Greg Hammond continues to preside as executive director along with Dr. John Wade as assistant executive director and Dr. Lindsay DuVal as vice-chairperson of the Board. We extend a huge thank you to all members of the board of directors for their great service and commitment to volunteerism for the betterment of Manitobans. It is through their unrelenting dedication that the Foundation is able to fulfill its vision.

Allen Rouse, Board Chairperson
The Manitoba Medical Service (MMS) came into being as a result of requests for voluntary health insurance coverage in Manitoba. A committee was formed to set the parameters, fee schedule and create by-laws for the MMS. This committee was comprised of Dr. Malcolm Rutherford MacCharles (chairman), Dr. Brian Best, Dr. Hugh F. Cameron, Dr. J. S. McInnis, Dr. Claude McRae, Dr. A. Clifford Abbott, and Dr. Ross Mitchell. In 1943, the MMS was established as a not-for-profit corporation to provide equitable access to health services for patients of all income levels. In this model of service, all registered practitioners, who had agreed to provide services for an established fee, provided reliable medical care for Manitobans. This made basic and other medical care available to everyone.

The original MMS Board was comprised of medical members and lay members. The founding board members were Dr. Malcolm Rutherford MacCharles (surgeon), Mr. John B. Richardson (grain dealer), Dr. Hubert D. Kitchen (physician), Mr. Robert McKay (financial broker), Dr. Ross Mitchell (doctor of medicine), Mr. Fredrick W. Ross (banker), Dr. J. Stewart McInnes (doctor of medicine), Mr. Milton D. Grant (life insurance manager), Dr. Claude McRae (doctor of medicine), Mr. Gerald F. Pearson (banker), Dr. Hugh Cameron (surgeon), Mr. Donald H. Murdock (manager), Dr. Brian Best (doctor of medicine), Mr. Donovan Swailes (secretary) and Dr. Clifford Abbott (surgeon). This blend of individuals helped to keep the best interest of all Manitobans in the forefront. The coverage MMS provided was a co-operative endeavour to benefit both the insured and the medical practitioners.

In 1958, the government introduced a federal hospitalization plan and the Manitoba Hospital Service Association was dissolved. The government plan did not cover semi-private hospital rooms, so the Manitoba Medical Service was asked to provide this benefit. To administer the new plan, the MMS established the United Health Insurance Corporation Limited (UHICL), which in time, became the Manitoba Blue Cross we know today. This wholly-owned subsidiary company was established to fill in the gaps in coverage Manitobans faced. In 1974 UHICL changed its name to United Health Services Corporation (UHSC) to reflect its widening scope of responsibilities and to take advantage of a ‘non-profit’ status. At this time the MMS redeemed all shares in UHSC and MMS no longer held any financial interest in UHSC. In 1974, UHSC obtained a license to operate under the trade name Manitoba Blue Cross and continued to provide Manitobans with coverage not provided by federal and provincial plans.

When public health care was first conceived in the 1970’s and the services of MMS were no longer required, the MMS worked together with government to help establish Medicare in Manitoba. In 1971 the MMS began preparations for its dissolution and the Manitoba Medical Service Foundation was created to continue the work of providing health care coverage to Manitobans.
Service Foundation (MMSF) was incorporated. In wrapping up business for the MMS, members showed how much they cared about Manitobans by donating the remaining MMS funds to create the Foundation, with a vision to serve Manitobans through health education and research. In 1971 the MMS’ original capital contribution was $200,000, with additional contributions made until 1975 when the books of the MMS were closed. In total the MMS’ capital contributions, borne out of the members’ generosity, totalled $455,697. The value of these funds has continued to grow through careful investing and management. This generosity by Manitobans lives on today in the MMSF and continues to serve Manitobans.

The values of the Foundation are rooted in the MMS history. The Foundation provides funds for the establishment or furtherance of projects promoting scientific, research, educational and other activities in the maintenance and improvement of the health and well-being of the residents of Manitoba. Its board members continue to be comprised of individuals from the medical and lay community. The 1971 founding members were Dr. O. A. Schmidt (chairman), Mr. Allen Rouse, Dr. P. H. T. Thorlakson, Dr. J. C. Wilt, Professor Anne DuMoulin, Mr. Justice J. E. Wilson, Dr. W. D. Bowman, Miss Dorothy Smith, Dr. Norman J. Corne, Mr. J. A. Coulter, Mr. Bruce C. Sutherland, Mr. M. E. Lapka, and Mr. Hans Schneider.

The MMSF has received Manitoba Blue Cross (MBC) support from the start. This ongoing support keeps the dreams of the original MMS members alive and continues to improve the health and well-being of all Manitobans. Manitoba Blue Cross supports the MMSF by covering all administration expenses, allowing every dollar of the Foundation’s investment income to go directly towards furthering research and education in Manitoba. In addition, MBC made capital contributions as well as provided funding for a significant portion of the annual grants. The boards of the MMSF and Manitoba Blue Cross continue to work together in many areas, including investment strategies. MBC maintains the values of the original MMS by providing supplementary health coverage, beyond Medicare, to Manitobans.

Together the Manitoba Medical Service Foundation and Manitoba Blue Cross continue to fulfil the dreams and values established by Manitobans in 1943: Manitobans paying it forward for the benefit of all Manitobans.

₁Manitoba Hospital Service Association (MHSA) was created in March 1938 to provide a hospital coverage benefit package and began marketing under the name of Manitoba Blue Cross in 1939. In 1958 the MHSA was dissolved as a result of the federal hospitalization program, and the name Manitoba Blue Cross temporarily disappeared.
MMSF
Approved Funding
2011

Dr. Mojgan Rastegar
MeCp2 and Neuronal differentiation of embryonic stem cells
Sleep apnea is a common disorder in which a person has one or more pauses in breathing or shallow breaths while they sleep that can last from a few seconds to minutes. There are three types of Sleep Apnea. Obstructive sleep apnea (OSA) is the most common form and occurs when throat muscles relax and the tongue obstructs the airflow.

Pregnancy increases the risk of OSA due to weight gain and swelling. The mother’s oxygen level drops and subsequently so does the oxygen level in the baby’s blood. Chronic low levels of oxygen for the babies might result in babies being delivered with long-term mental disabilities and comorbidity.

The incidence of obstructive sleep apnea in pregnancy is unknown. There is some evidence that pregnancy precipitates the OSA. The evidence also finds a relationship between OSA and small babies and hypertension disorder in pregnancy.

The objectives of this study are to identify the women at risk of dropping their oxygen level after giving birth, identify the risk factors for the drop in oxygen and identify the incidence of OSA in obstetric patients.

The results of this research project will identify the patients at risk of OSA to monitor them appropriately and prevent complications.
Congenital anomalies of the kidney and urinary tract (CAKUT) are the leading cause of chronic kidney disease (CKD) in children, and the cause in most cases is unknown. Diabetes in pregnancy has been linked to various birth anomalies; however, its role in the development of CAKUT has not yet been adequately assessed. The increasing rates of type 2 diabetes in young women of childbearing age in Manitoba and, to a lesser degree, increasing rates of type 1 diabetes make determining the true risk associated with diabetes in pregnancy very important.

This study will be the first to evaluate the differing effects of both type 1 and type 2 diabetes, which developed prior to, and during pregnancy, compared with other known risk factors, on the development of CAKUT in infants using administrative data housed at the Manitoba Centre for Health Policy (MCHP).

This new knowledge, especially about the effect in the timing of diabetes diagnosis in pregnancy will be critical, and may impact counselling, screening and treatment targets in order to decrease the risk of these severe anomalies.
This project studies how complications during pregnancy increase the risk for early-onset obesity, diabetes and cardiovascular disease in the offspring. One of the most common complications during pregnancy is diabetes, which results in high blood sugar and insulin levels in pregnant mothers. These and additional factors have major effects on the growth and development of the fetus.

The research explores the biological processes that cause children from pregnancies complicated by diabetes to be at higher risk for obesity, diabetes, and cardiovascular disease later in their life.
Cystic fibrosis is the most common life-threatening genetic disease in Caucasian populations. In cystic fibrosis patients, pulmonary infection by *Pseudomonas aeruginosa* and concomitant inflammation is the primary cause of pulmonary failure and patient mortality. The initial infection by *P. aeruginosa* in the cystic fibrosis lungs is of acute nature and a transition to chronic infection occurs when the disease progresses. After a chronic infection is established the patients are permanently colonized by *P. aeruginosa*. Such patients periodically suffer pulmonary exacerbations where active infection and inflammation manifest and irreversible lung damage takes place, which ultimately lead to pulmonary failure. Despite the increasing understanding of bacterial diseases and cystic fibrosis pathological process, the cause of cystic fibrosis exacerbations and the mechanism of the infection transition between acute and chronic states remain yet to be fully elucidated; prevention of chronic infections or exacerbations remains challenging.

The proposed research project is designed to characterize the regulatory networks that control *P. aeruginosa* infection phase transition process and to examine the role of such transitions process in pulmonary exacerbations. Two specific objectives will be pursued: (1) identification of regulators involved in reciprocal infection phase transitions; (2) in detail characterization of key regulators in infection phase transition with a focus on a novel regulatory gene PA1611 identified in our lab.

The results will enhance our understanding of bacterial infections, its persistence mechanism and progression in general, and should shed light on the mechanism of the exacerbations in *P. aeruginosa* lung infections. Such information will provide a basis for the development of novel intervention strategies against life-threatening bacterial infections, the cystic fibrosis pulmonary infection in particular.
Sensory feedback provides humans with information about the performance of their movements. Sensory feedback may be visual, auditory, or haptic (the feeling from the moving limb itself). Many people suffer from decreased or disrupted haptic sensory feedback in the form of paresthesia, which is the feeling of tingling and numbness along their limb. Beneficial feedback when learning movements may be different for individuals if their sensory feedback changes. In most cases individuals faced with re-learning reaching movements, due to injury or disease, also have some form of disrupted sensory feedback.

The present project will assess the impact of altered sensation on movement performance to determine if the benefit of combined visual-auditory sensory information is further enhanced when haptic sensory feedback is disrupted. We predict that individuals will be more reliant on visual sensory feedback when haptic sensory feedback is disrupted. Movement details will be collected using three-dimensional motion analysis that will allow a detailed understanding of movement performance. The aim of this project is to establish parameters for helping individuals with injury or disease learn to perform accurate and efficient movements. Ease of movement has a direct beneficial impact on an individual’s ability to participate in home and community life.
This project seeks to improve upon a previously devised 3D synthetic temporal bone model created with rapid prototyping technology. Surgical trainees can use this model, as well as expert surgeons for pre-operative surgical rehearsal. We will directly employ individualized CT data of patients with a destructive cyst, in the creation of a physical model to be dissected in advance of actual surgery. The hypothesis of this study is to evaluate if 3D printed models can improve patient safety. These realistic models will hopefully provide valuable information about the spatial relationship between important structures that need to be protected and the actual disease process.
Obesity is a major health issue and contributes to morbidity and mortality. The recent rapid increase in the prevalence of obesity in human populations represents a major health issue, since obesity is closely linked to other major disorders. The development of improved methods for the prevention and treatment of obesity is critical to reducing complications from obesity-related disorders. At the cellular level, the increased fat mass in obesity is the result of both increased cell size (hypertrophy) and increased fat cell number (hyperplasia). Adipose tissue hyperplasia is the result of increased adipogenic differentiation of mesenchymal stem cells (MSC). Studies have demonstrated that obese individuals have increased numbers of fat cells. Since the generation of new fat cells plays a crucial role in the development of obesity, development of new therapeutic agents capable of inhibiting adipogenesis could have a significant impact on the prevention and management of obesity and obesity-related disorders.

Osteoporosis, another major health issue in the aging population, is associated with a progressive decrease in bone formation and an increase in adipogenesis in MSC. MSCs are common progenitors of osteoblasts and adipocytes, and a reciprocal relationship between osteogenic and adipogenic differentiation of MSC has been demonstrated. Thus, it is thought that intervention with this increased adipogenesis that occurs at the expense of osteogenesis may be beneficial to intervention in osteoporosis and may improve bone health. Therapeutic agents capable of reversing the shift in lineage specific differentiation of MSC in aging in favour of osteogenic and away from adipogenic differentiation would be of great potential in treating obesity, osteoporosis and other diseases that involve dysregulation of adipogenesis.

The objectives of the proposed research are to identify bioactive molecules that inhibit adipogenic differentiation of MSC and to elucidate molecular mechanisms by which bioactive molecules inhibit key adipogenic gene expression and adipogenesis in MSC.

This research will significantly enhance current knowledge of the regulation of adipogenesis and ultimately lead to the development of new therapeutic agents to control obesity and thereby reduce the impact of its major related disorders.
Identical twins are caused by the splitting of one fertilized egg. Depending on the time of splitting, identical twins could share one common outer membrane (monochorionic, MC) or have separate outer membranes (dichorionic, DC) in the mother’s womb. Since identical twins are genetically the same, many studies have been conducted to investigate if MC identical twins are more similar than DC twins due to the shared intrauterine environment. To date, the results are inconclusive. Recently, Kaminsky et al. (2009) compared the DNA methylation profiles, a mechanism which controls the translation from DNA to protein, for 12K sites using MC and DC identical twins as well as fraternal twins and found that the DC identical twins were more similar than the fraternal twins while the MC identical twins were not different from the fraternal twins.

We hypothesize that during the re-establishment of a new DNA methylation profile in early embryonic development, the DNA methylation similarity between the identical twins is determined by the timing of the splitting of embryonic cells; that is, the identical twins will have more similar DNA methylation profiles if the separation happens earlier during development. There are two specific aims: 1) To identify the MC and DC identical twins. 2) To investigate the DNA methylation differences between the MC and DC identical twins.

All twins in the Data Repository at the Manitoba Centre for Health Policy between 1979 and 2011 will be identified. Forty-eight MC and 48 DC identical twins will be selected for DNA methylation for 450K sites. Statistical methods will be used to compare the DNA methylation profiles between the MC and DC identical twins.

This study will provide 1) descriptions of the baseline DNA methylation profiles for identical twins; 2) insights on the effects of early human embryonic development on DNA methylation features. Information gained from this study will provide guidance for future studies using discordant identical twins (one twin is affected with a disease while the other twin is not affected) to investigate the relationship between DNA methylation and diseases, and will contribute to better treatment and prevention of these diseases.
Fetal alcohol syndrome (FAS) affects one in 100 newborns and is the leading cause of developmental disability in Canadian children. FAS results from alcohol consumption during pregnancy and the strongest manifestations can result in short stature, small head, neurological damage and abnormal facial features. FAS patients exhibit physical, mental, behavioural and learning disabilities. Manitoba has many outstanding special education and social support programs that can significantly improve the lives of FAS patients and their families. These programs are most effective with early intervention; however, there is currently no medical treatment, diagnostic tools or biomarkers available to diagnose FAS early.

Retinaldehyde dehydrogenase 2 (RALDH2) is one of the primary enzymes used by the body to break down alcohol. Unfortunately, it is the same enzyme the body uses to convert vitamin A to retinoic acid – one of the most important signaling molecules in neurodevelopment. Because the same RALDH2 enzyme is used in both biochemical reactions, exposure to high alcohol often results in an insufficiency of retinoic acid. Indeed, experiments in early frog (Xenopus) development show exposure to ethanol induced comparable growth and neurological damage as those in humans with FAS. In humans, RALDH2 has a number of naturally occurring genetic variants. From the frog model experiments, we know that some versions can actually be protective for FAS-like damage, while other versions can sensitize the embryos resulting in more significant FAS-like damage.

The present proposal will focus on the analysis of the different variants of the human RALDH2 in patients diagnosed with FASD. We will use the latest next-generation sequencing technology. We expect to find a correlation between the severity of FASD symptoms in patients and nature of the RALDH2 gene variants. If true, these studies may lead to the first FASD biomarkers and will become an important tool to help assess the risk of new patients developing more severe forms FASD.
Resveratrol, a potent anti-oxidant and anti-inflammatory agent is found in a wide variety of dietary sources including grapes, and is found in red wine. Population studies have reported that moderate, but regular consumption of red wine is linked to lower incidence of cardiovascular disease and may be related to the presence of resveratrol.

This clinical trial is being conducted to study the effects of resveratrol on heart function and quality of life in patients with a type of heart disease that is characterized by the heart’s inability to pump blood. This is because the heart’s main pumping chamber, the left ventricle, is enlarged, dilated and weak. The purpose of this study is to determine if resveratrol can improve heart function and quality of life in patients with this type of heart disease as well as to determine if some of the effects of resveratrol are due to its anti-oxidant, or anti-inflammatory activities or reversal of the changes in the shape and size of the heart. Clinical studies that investigate the potential heart benefits of resveratrol in patients with this type of heart disease have not been previously reported. Accordingly, this research is being done because it will fill this deficiency in the information available and may establish that resveratrol treatment can improve heart function and the quality of life in these patients.
Dr. James Marriott
Internal Medicine, University of Manitoba

A randomized, controlled crossover trial evaluating oral testosterone in the treatment of fatigue in male multiple sclerosis patients

Fatigue is one of the most frequent symptoms reported by multiple sclerosis (MS) patients and is often a significant source of disability. Unlike normal fatigue, multiple sclerosis related fatigue (MSRF) occurs independently of activity level, suggesting that it is due to dysfunction in the neural pathways that regulate the perception of energy although the precise cause is still not understood. While MSRF can be managed through lifestyle modifications and with drug treatment, these measures are commonly either ineffective or only partially effective.

Administration of the male sex hormone testosterone has been shown to improve energy levels in males with testosterone-deficiency states. Testosterone also reduces fatigue in patients with other medical conditions not associated with low testosterone levels, suggesting that this treatment may also be useful in symptomatic control of MSRF.

This proposed seven-month long clinical trial is designed to test the hypothesis that administration of oral testosterone tablets to male MS patients will result in an improvement of fatigue relative to the administration of placebo tablets. As fatigue is frequently reported by MS patients to be one of their most frustrating and disabling symptoms, any proven additional treatment option for MSRF would be beneficial in improving quality of life.
Early cerebellar circuits are critical targets of vermian defect in cerebellotrigeminal-dermal syndrome

The cerebellum is a part of the brain that is critical for motor coordination and non-motor functions. The well-known architecture and function of the cerebellum provide a remarkable model system for studying normal and abnormal development of the nervous system.

Cerebellotrigeminal-dermal syndrome is a form of abnormal cerebellar development characterized by three apparent signs: 1) lack of the middle part of the cerebellum (called vermis); 2) lack of sensation in the face, and 3) lack of hair growth in parts of the body.

In this study, using a mouse model, we will investigate the vermis anomaly and the impact of a specific group of neurons (called α-syn+ neurons) on cerebellar vermis development. First, we will explore two important components of the early stage of the developing cerebellum. We will study α-Syn+ neurons, which born outside of the cerebellum in the embryonic nervous system and later migrate to the cerebellum. We believe that α-Syn+ neurons act as a “central organizer” of the developing cerebellum. Second, we will study the first nerve fibers that enter the cerebellum. These fibers are believed to bring balance information to the cerebellum and are important for proper development. In a previous study I have shown that the first nerve fibers that enter the cerebellum bring face sensory information, and end at the α-Syn+ neurons. These are the first two components produced and they establish part of the developing cerebellum. We believe that if the front part of the vermis is not developed, the rear part will not develop either. Therefore, the entire vermis is absent. This outcome occurs when cerebellum development is affected by cerebellotrigeminal-dermal syndrome.

In this project, we will study these processes in a mouse model that shows very similar deficits to cerebellotrigeminal-dermal syndrome. We will use molecular biology techniques to understand how α-syn+ neurons and their early nerve fibers generate cerebellar anomalies. These studies will provide important information that could lead to a better understanding of molecular mechanisms in early cerebellar development, which could in turn, lead to clinical intervention for cerebellar anomalies.
Lumbar spinal stenosis (LSS), a narrowing of the openings in the spinal column, is the most common reason for spinal surgery after age 65. Presently there are no tools available to assess the movement of people with degenerative LSS. This is unfortunate since movement problems, particularly brought on by walking, are the primary complaint of patients with LSS, in addition to back pain.

Our research has two specific objectives. (1) To determine if questionnaires that measure outcome parallel leg movement ability of people with LSS after strain (walking) and no strain (resting) compared to healthy participants. (2) To identify which movements are challenging for people with LSS compared to healthy participants after strain compared to no strain.

Participants will complete a series of clinical questionnaires prior to performing a series of activities. Participants will then be asked to move their foot quickly and accurately to targets of varying levels of difficulty and distance as they appear on a touch screen monitor. Next participants will complete a walking test on a treadmill that will safely induce strain. Immediately following the treadmill exercise participants will be asked to repeat the foot pointing activity.

We predict that having LSS will increase the difficulty of the foot pointing task, and that following the treadmill walking activity the task will be even more difficult. This research will allow clinicians to measure the movement ability of LSS patients. If these techniques become used in a future pre-surgical screening clinic, patients who are appropriate surgical candidates could be identified more rapidly from patients that may benefit from conservative care. This would decrease the waitlist time for surgical consultation, and improve access for LSS patients who need intervention. The end result would be improved utilization of Manitoba health care resources, and more importantly, improved quality of life for Manitobans with LSS.
Autism spectrum disorders are different forms of autism characterized by complex neurological disorders that result in the communication and socialization behaviours of autistic patients. These disorders affect one in 150 individuals by age 3. Rett Syndrome is the best-studied form of autism spectrum disorders and a leading cause of mental retardation in females. Rett Syndrome patients develop normally up to 6-18 months of age, but start to show particular symptoms, including loss of speech and purposeful hand movements, mental retardation, learning disabilities, seizures, respiratory abnormalities, anxiety and autism. Rett Syndrome results from mutations in the X-linked MECP2 gene and has no effective treatment. However, in a mouse model of the disease, re-activation of the gene after the onset of symptoms can partially rescue the physiological deficits caused by MeCP2 deficiency. This raises hope towards therapy prospects either by delivering the MECP2 gene into the affected neurons, or through drug treatments targeted towards protein candidates, both of which may compensate for MeCP2 loss in neurons.

We reported the first generation of pre-clinical human MECP2 gene therapy viruses and showed their stable and efficient expression in adult neural stem cells of a mouse model of the disease. Importantly, we showed the rescue potential of these gene therapy viruses in neuronal maturation of MeCP2 deficient neurons. We will now use these gene therapy viruses in an embryonic stem cell model of the disease to address questions about the disease. Our research will significantly increase our understanding about impaired brain function in autism, and will be beneficial for Rett Syndrome therapeutic strategies. In addition to Rett Syndrome and autism, MECP2 mutations are associated with a wide range of neurological disorders including X-linked mental retardation and Angleman Syndrome. Therefore, while our results are primarily beneficial for Rett Syndrome, they will have translational potential in a broader range of neurological disorders beyond autism.
There have been major advances in the management of cancer over the last decade with the result that the number of cancer survivors is increasing for most cancers. There are limited data on the long-term economic impact of cancer diagnosis on the individuals diagnosed with these cancers in Canada. This project will investigate the economic impact among three common cancers (breast, prostate, colorectal) survivors, in terms of employment and barriers to re-enter the labour force.

We will conduct a survey of colorectal cancer survivors who will be identified from the Manitoba Cancer Registry. By linking the survey with the Manitoba Cancer Registry, we can determine the effect of age, gender, socio-economic status, type of cancer, stages of cancer, and cancer treatment (surgery alone, surgery with chemotherapy, radiation therapy etc.), number of years after cancer diagnosis on employment status and barriers for re-entering the labour force. Our findings will be compared to the general population in Manitoba, using Manitoban respondents to the Labour Force Survey, which is a monthly survey of households about employment and labour force characteristics conducted by the Statistics Canada.

Economic outcomes are all too often either not addressed in clinical trials or relegated to the status of secondary importance while health care stakeholders are continually challenged to better understand the medical and psychological impact of illness on a person’s life. Policy makers are keen to quantify the economic and financial burdens of cancer to implement cost-effective health policies to support survivors. This project will contribute to the knowledge base about return-to-work issues, and the hidden out-of-pocket costs for cancer survivors. This project will provide information on the economic challenges during cancer survivorship. If significant impact on employment is found, this study should prompt efforts to identify and appraise effective strategies for restoring productive capabilities, thereby minimizing the economic burden of cancer to the society as a whole.
While physical activity is modifiable health behaviour implicated in the prevention of many chronic conditions threatening Manitobans (e.g., cardiovascular disease, diabetes), most Manitobans are insufficiently active for proper health. The development of successful physical activity interventions has been limited. Research suggests that seeing oneself as a physically active person or identifying with physical activity is associated with engaging in regular physical activity. However, much less is known about how to strengthen or build physical activity identity. It is argued that reflecting on what one could be in the future (possible self) may offer a means of changing current identity or self-views.

The present research seeks to determine if a physical activity intervention that focuses on physical activity possible selves will bring about changes in physical activity identity and physical activity behaviour. Further, in recognition that identities are slow to change, the study seeks to determine whether repeated exposure to a physical activity possible selves intervention is necessary to strengthen physical activity identity and physical activity behaviour. Using an online intervention format, 200 insufficiently active adults will be randomly assigned to a control, a standard possible selves intervention or an enhanced possible selves intervention. In the standard condition, participants will engage in an imagery generation task where they imagine and reflect on themselves in the future as a physically active person. In addition to this image generation task, participants in the enhanced condition will complete subsequent image generation tasks each week for five additional weeks. Participants’ physical activity identity and behaviour will be measured for ten weeks and intervention conditions will be compared at the study’s end. The study will help determine if a possible selves intervention can lead to increases in physical activity identity and physical activity behaviour and will represent a first attempt at intervening to foster physical activity identities.
The overall goal of our research is to develop improved approaches for gene therapy of a group of lethal neurodegenerative disorders called the GM2 gangliosidoses. These disorders, which include Tay-Sachs and Sandhoff diseases, result because of the accumulation in the brain of the lipid called GM2 ganglioside. Normally, this lipid is removed by the product of the HEXB gene, but in these diseases, HEXB is missing. As a result, the GM2 ganglioside accumulates and kills the cells.

Using a mouse model of Sandhoff disease where the disease progresses similarly to that in humans, we will treat the disease by providing a replacement for the missing HEXB gene. We will deliver the missing gene by incorporating it into viral vector called adeno-associated-virus-9 (AAV9), and injecting it intravenously into newborn or/and adult mice. The AAV9 vector was chosen because of recent work demonstrating that it can infect both newborn and adult brains. We will also test whether ultrasound can be safely used to increase the amount of virus that reaches the brain. The efficacy of the treatments will be measured by monitoring the health of the animals, their survival and whether there is evidence that the HEXB gene reached the brain and removed the accumulating lipid. Overall, we expect the life of Sandhoff mice to be extended by the gene therapy and that ultrasound will increase the efficiency of the gene therapy. The development of improved approaches to gene therapy for Sandhoff disease would provide a step forward in the therapy of all GM2 gangliosidoses since each exhibits similar symptoms. In addition to the direct impact of this work on the GM2 gangliosidoses, a more effective way to target the brain would have applicability to other similar disorders that result from the accumulation of large molecules like GM2 ganglioside in the brain.
Ammonia is a highly toxic agent that causes, if systemic blood concentrations are elevated, multiple disturbing or even fatal consequences, affecting predominantly the central nervous system.

In humans the main source of blood ammonia derives from ammonia produced by gut bacteria. Concentrations of bacterial derived ammonia in the intestine exceed blood ammonia levels by about 1000 times. Along this steep gradient ammonia leaks into the portal vein, before it is detoxified to urea by the liver. In a state of a liver failure, e.g. due to an infection of hepatitis C, toxic effects of ammonia are inevitable. Since ammonia enters the body fluids from the intestine, it is important to understand how the intestinal epithelia, the cell layer that separates the intestinal lumen from the body fluids, is functioning in order to reduce these potentially dangerous ammonia influxes.

The goal of this study is to employ a recently established human cell-culture system that consists of cells that mimic intestinal cells (Caco-2BBE cells) and of cells that produce mucus (HT-29MTX E12 cells).

Seeded on a special filter membrane this co-culture forms an in vivo-like intestinal epithelium. This artificial intestinal epithelium can then be mounted into a transport chamber (Ussing chamber) to investigate epithelial ammonia transport characteristics and its regulation.

Our objectives are: 1) determination whether the human carcinoma Caco-2BBE cell line expresses the same suit of ammonia transporting proteins as the human intestine; 2) evaluation of the efficacy of the Caco-2BBE/HT-29MTX co-culture system in Ussing chamber ammonia transport studies; and 3) investigation of the ammonia transport mechanism in the human intestine by employing the Caco-2BBE/HT-29MTX co-culture system and a variety of ammonia transporter specific inhibitors. This pilot study will allow us to discover more details regarding the mechanisms involved in the transport of toxic ammonia in the human intestine. Moreover, once this co-culture model has been established, also regulatory mechanisms can be explored. Altogether these insights are crucial to develop therapeutic drugs to modify dangerous ammonia influxes via the intestine that causes elevated systemic ammonia levels and eventually lethal brain damage in a state of disease.

Dr. Dirk Weihrauch
Biological Sciences, University of Manitoba
A novel in vitro model for investigating hyperammonemia in the human intestine

Ammonia is a highly toxic agent that causes, if systemic blood concentrations are elevated, multiple disturbing or even fatal consequences, affecting predominantly the central nervous system.

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$23,000
Dr. Rakesh Arora
Intensive Care Cardiac Surgery Unit, St. Boniface Hospital
and Surgery, University of Manitoba
MMSF/MHRC Dr. F. W. DuVal Clinical Research Professorship

Determining the incidence of postoperative delirium in the current era of cardiac surgery

Our team is leading in a national effort to better predict and prevent delirium in cardiac surgery patients and to identify and reduce post-op delirium.

Health professionals have long been aware of the phenomenon, but have only more recently seen it as a significant factor affecting patient outcomes following heart surgery. While many patients experience some confusion upon waking up from their anesthetic, delirium is a more serious form of brain dysfunction that typically occurs one to five days following surgery. One of the challenges in developing treatment strategies for this problem is that delirium itself isn’t always obvious. While some patients have “excited delirium” and become quite agitated or disruptive, many others experience a “quiet” delirium. These patients appear very sleepy or unresponsive and this form of delirium often goes undetected but carries at least an equal risk of bad outcome as those who experience the agitated delirium.

As a result there is lack of understanding of how common delirium actually is in patients undergoing heart surgery. A further challenge in delirium is that a problem in the brain cannot yet be determined by a blood test, the way liver or kidney problems can be.

The first step is to implement a standardized way of screening patients at the bedside for delirium following a heart operation. By doing this we cannot only know how common the problem is, but also determine which patients are at highest risk for developing delirium. Research will begin by using information gathered in the cardiac surgery intensive care unit and post-surgery in-patient ward since 2010, when nurses began using the Confusion Assessment Method (CAM) – a technique for identifying delirium. Since implementing a formal delirium screening program, it has been determined that approximately one in five patients suffer from delirium following their heart operation.

This research plans to investigate the differences between patients who were deemed to be delirious by the CAM assessment and those who were not. It is hoped that, with this information we can create an easy to use “score card” so that physicians can clearly identify which patients are most at risk for delirium, before their operation, and then “tailor” their hospital and surgical care to hopefully prevent this potentially life-threatening complication from occurring.

The second step will be investigating whether the condition can be triggered by environmental factors, such as noise in a patient’s room.
For many years the McLaughlin Foundation has funded senior medical residents or completing residents with research fellowships to facilitate their advancement of research skills. Being appointed a McLaughlin Fellow has become a very prestigious recognition. In 2000, the McLaughlin Foundation decided to discontinue its continuing program, and, in shutting down, granted Canada’s medical schools a lump sum payment intended to continue a program of clinical research development for senior/graduating residents. The University of Manitoba was granted $500,000 for a once only payment.

This would provide, as an endowment, an award of $25,000 annually, which is half of a senior resident’s salary. The Manitoba Medical Service Foundation (MMSF) agreed, at their Board meeting in May 2002, to match the $25,000 (this award is to be approved annually by the MMSF board) to allow an award of $50,000 per year to a deserving resident showing promise of an academic career with research activity.

In 2011, Dr. Kristjan Paulson, Department of Internal Medicine at the University of Manitoba, was awarded the fellowship for the study of “Outcomes after hematopoietic stem cell transplantation: Developing a clinical prediction tool.”

In 2012, the guidelines for the fellowship shall specify that “The award cannot be held concurrently with another major salary award.” This rule was not in effect at the time of Dr. Paulson’s award. He was successful in also receiving the Manitoba Health Research Council (MHRC) Clinical Research Fellowship. In accepting both of the fellowship awards, the McLaughlin award funding amount was revised to meet MHRC guidelines. The McLaughlin award was revised to $35,000 (U of M $17,500 MMSF $17,500), for Dr. Paulson.
The B.Sc. Medicine Summer Student Program in the Faculty of Medicine gives medical students an opportunity to engage in original research, either basic or clinical, under the supervision of a member of the faculty. The specific aim is to develop within the student skills at experimental design, hypothesis testing, and critical evaluation of data and effective communication of result.

The program runs during the summer recess between years 1 and 2, 2 and 3. All students receive stipendiary support, presently $5,000.

The MMSF currently provides stipendiary support to this program of $45,000 yearly, which is approved annually by the Board of Directors. Since 1974 the MMSF has contributed over $1.2 million.

2011 STUDENTS SUPPORTED BY THE MMSF

1st Year Students
- Kristie Peden
- Anene Peters
- Carolyn Bulman

2nd Year Students
- George Deng
- Kirstyn Humniski
- Jeffrey Tompkins
- Victor Penner
- Kyle Miller
- Roman Nepomuceno
The Bachelor of Science in Dentistry Summer Student Program in the Faculty of Dentistry introduces interested dental students to undertake research during their undergraduate careers. The majority of funding for this program is provided by MMSF.

The specific aim is to develop the student skills of experimental design, hypothesis testing, critical evaluation of data and effective communication of result and acquiring knowledge and skills in research design and methodology. Through active participation in a research program, the students are given the opportunity to develop both skills in applying scientific knowledge to dental practice and an interest in dental research. The student carries out research in either the basic sciences or in a clinical area under the direction of a faculty supervisor.

The program lasts for two summer terms, and runs during the summer recess between years 1 and 2, 2 and 3. All students receive stipendiary support, presently $4,500.

The MMSF currently provides stipendiary support to this program of $22,500 yearly, which is approved annually by the Board of Directors. Since 1994 the MMSF has contributed almost $300,000.

After the second summer term and completion of his/her research, the student is required to make an oral presentation and to submit a final report. In addition, the program provides an additional qualification to facilitate entry by the graduate into various advanced degree and specialty programs.

2011 STUDENTS SUPPORTED BY THE MMSF

Vanessa Hunsinger
Jordan Gigliotti
Kevin Vint
Matt Kotyk
Sara Keating
Undergraduate and Graduate Student Research Awards
Medicine, University of Manitoba

The Foundation currently provides eight undergraduate awards to B.Sc. Medicine Students & up to Four Basic Health Science Awards in Excellence

- Morris Neaman Memorial Awards (2 awards of $1,000)
- Dr. Norman & Margaret Corne Memorial Award ($1,000)
- MMSF / Justice James E. Wilson Memorial Award ($1,000)
- MMSF / Dr. Lyonel Israels Memorial Award ($1,000)
- MMSF / Dr. F. W. DuVal Memorial Award ($1,000)
- MMSF / Jack C. Wilt Memorial Award ($1,000)
- MMSF/Dr. William D. Bowman Memorial Award ($1,000)
- MMSF Basic Health Sciences PhD Awards (2 awards of $1,000)

Victor Penner
Benjamin Fultz
Jeff Tompkins
Sophie Davie
Robert Gourlay

Morris Neaman Award
$1,000

Morris Neaman Award
$1,000

MMSF/Justice J. Wilson Award
$1,000

Dr. Norman & Margaret Corne Award $1,000

MMSF/Dr. F. W. DuVal Award
$1,000

William Turk
Alexandra Kuzyk
Carolyn Bulman
Ami Patel
Paula Espino

MMSF/Dr. Jack C. Wilt Award
$1,000

MMSF/Dr. Lyonel Israels Award
$1,000

MMSF/Dr. William D. Bowman Memorial Award $1,000

Basic Health Sciences PhD Major Award $1,000
The MMSF/Dr. William D. Bowman Memorial Annual undergraduate award for excellence and outstanding promise in a student involved in pediatric research was created by the Foundation in June 2011, in memory of Dr. Bowman. The Manitoba Medical Service Foundation intends to supports this award indefinitely.

Dr. Bowman was a member of the Board of Directors of the Manitoba Medical Service Foundation from 1973 to 2007. Dr. Bowman retired due to illness after 34 years of dedicated service to the Foundation. Dr. Bowman passed away after a lengthy illness on March 2, 2011.

Bill dedicated his life to children and became a renowned paediatric specialist. In 1955 Bill established the Department of Paediatrics at the Manitoba Clinic where he practiced in paediatrics until his retirement in 1998. After his retirement he left a thriving department of 13 paediatricians. Bill is also known as a mentor and teacher. He was a member of the active medical staff of the Children’s Hospital of Winnipeg and of the Grace General Hospital of Winnipeg. He served for several years as president of the medical staff in both hospitals. Bill was active in paediatric teaching at the University of Manitoba until 1990, when he retired with the rank of professor. He was a member of the Board of Directors of Manitoba Blue Cross from 1972 to 1997 and was also Chair of the Manitoba Blue Cross Board for many years. The Manitoba Medical Service Foundation supports this award.

“It was a pleasure and a great honour to present this award for the first time,” said Dr. Greg Hammond. The first award was presented on September 8, 2011 at the Joe Doupe Lecture and went to Carolyn Bulman for her project titled ‘Defining Neurodevelopmental Domains in Children with Prenatal Solvent Exposure.’ Carolyn’s supervisor was Dr. Ana Hanlon-Dearman.

Dr. Dearman received an MMSF operating grant award in 2009 as well a being a joint recipient of the MMSF/SBGH Richard Hoeschen Memorial Award. With a mentor like Ana, Carolyn has a great start in developing her interest and possible career in research in Manitoba.

Through the inception of this award the values of Dr. Bowman and his love of pediatrics are carried forward, linking generations of pediatric researchers for the betterment of Manitoba’s young. Leaders plus mentors equal the future of research.
Canadian Student Health Research Forum MMSF 2011 Poster Presentations Award Winners

Suchitra Natarajan
Naresh Redhu
Zhizhi Sun
Yingfeng Zheng

Richard Hoeschen Memorial Awards Sponsored by the MMSF and SBHRC
(St. Boniface Hospital Research Centre)
This award was split between the following candidates:

Dr. Idris Elbakri
Radiology, University of Manitoba
Was awarded $2,000 to support Gina Nirula: Tomosynthesis Imaging in Pediatric Patients, and Victoria Chau: Comparison of Estimated to Actual Organ Radiation Dose Measurements in Neonates.

Dr. Robert Chase
Community Health Science, University of Manitoba
Was awarded $2,000 to support Delphine Ruremesha’s B.Sc. Med Project entitled: Life Story Board: An Innovative Interviewing Tool.
Xiuli Ma, Mario Fonseca, Dr. Vern Dolinsky,
Kyle Cheung, Troy Pereira
Mechanisms of increased susceptibility for metabolic syndrome in offspring exposed to type-2 diabetes during gestation.

Dr. Songyan Liu
Identification of RALDH2 allelic variation by exome-wide DNA capture and next generation sequencing in patients with fetal alcohol syndrome.

Front Row: Dr. Mo jgan Rastegar
Middle Row: Robby Zachariah (PhD student), Vichithra Liyanage (MSc student),
Chinelo Ezeonwuka (MSc student), Brendan Olynk (MSc student)
Back Row: Benjamin Barber (MSc student), Carl Olson (Research technician)
MeCP2 and Neuronal differentiation of embryonic stem cells

Drs. Jane Griffith, Harminder Singh, and Bosu Seo
Return to work and barriers to returning to work among cancer survivors:
A population-based study of survivors of common cancers
Manitoba Blue Cross is a provider of health and wellness benefits, as well as travel insurance coverage for Manitobans. We take care of our people and help to protect their futures. Defining ourselves as Manitobans helping Manitobans, we feel strongly about supporting our local medical researchers through the Manitoba Medical Service Foundation (MMSF), particularly the young scientists on the threshold of their careers.

For over 40 years Manitoba Blue Cross has supported medical research projects through the MMSF. While other research funding bodies may be dedicated to a specific area of health, the MMSF opens the door to a much wider range of applicants, which means a made-in-Manitoba solution — anything from better patient care to new treatment options — can get its start. Every contribution these projects make to the global body of medical research is a reason to celebrate.

Manitoba Blue Cross has a mandate to enrich and protect people’s lives, and the MMSF has a history of providing us with a means to do this. This year there are again projects that have the potential to bring exciting new discoveries to life in Manitoba. Through the MMSF, Manitoba Blue Cross is able to ensure The Colour of Caring is seen and felt in every corner of the Keystone Province, and that it radiates beyond our borders.

“The Manitoba Medical Service Foundation is unique in that it helps fund first-time researchers. Like Manitoba Blue Cross, these people dedicate themselves to improving the health and wellness of Manitobans. Their enthusiasm and commitment epitomize the meaning of The Colour of Caring, making us a proud supporter of their initiatives.

On behalf of Manitoba Blue Cross, I wish to congratulate the recipients of this year’s grants and awards. The rising cost and demand for health care in Manitoba reminds us of the importance of all efforts directed towards the finding of new treatments and improving medical outcomes.”

Andrew Yorke, President & CEO
PARTNERSHIPS
The Manitoba Medical Service Foundation is proud to recognize cooperative funding partners. See websites for details

www.mmsf.ca

Manitoba Blue Cross
THE COLOUR OF CARING

www.mb.bluecross.ca

Manitoba Health Research Council
Fostering New Knowledge for Improved Health

www.mhrc.mb.ca

The Manitoba Institute of Child Health
a division of The Children’s Hospital Foundation

www.mich.ca

The Winnipeg Foundation

www.wpgfdn.org
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