



2017 SUMMER STUDENTSHIP PROGRAM BOOKLET



THE POWER OF PARTNERSHIPS

These amazing summer studentship research projects wouldn't be possible without the continued partnership of the University of Alberta, Alberta Health Services, the Stollery Children's Hospital Foundation and the supporters of the Lois Hole Hospital for Women.

We are tremendously grateful for their support and commitment to investing in the next generation of women's and children's health researchers.



DIRECTOR'S MESSAGE

I'm pleased to introduce the 2017 WCHRI Summer Studentship awardees. These exceptional scholars provide a "glimpse" into the next generation of health researchers.

Since 2009, the WCHRI Summer Studentship Program has offered students the opportunity to participate in women's and/or children's health research during the summer months. You'll see that these students have achieved much to be proud of in a short timeframe. We are thrilled to give these students the opportunity to get a "taste" for research and hope that in their future studies and longer-term careers, they may develop a deeper understanding and appreciation for the value of research in improving health outcomes for all Albertans.



This program is possible because of the generosity of the Stollery Children's Hospital Foundation and supporters of the Lois Hole Hospital for Women. Their funding allows us to continue this important research opportunity for so many gifted students.

Congratulations to all summer students for completing the program and thank you to their supervisors, who provided their precious time and expertise. The future looks very bright!

Sincerely,

Sandra Davidge, PhD
Executive Director
Women and Children's Health Research Institute

2017 SUCCESSFUL AWARDEES SUMMER STUDENTSHIP PROGRAM

STUDENT	SUPERVISOR	PROJECT TITLE	FACULTY-DEPARTMENT
Capel, Heather	Adams, Kim	Development and optimization of an exploratory haptic assistive robotic interface for use by children with motor impairments	Rehabilitation Medicine-Physical Therapy
Do, Victor	Hornberger, Lisa	Cardiovascular health of children of diabetic mothers	Medicine & Dentistry-Pediatrics
Fu, Timothy	Uludag, Hasan	Gene therapy for breast cancer	Engineering-Chemical and Materials Engineering
Garros, Christiana	Joffe, Ari	Determining how to predict the measured energy requirement in children in pediatric intensive care: toward optimizing nutritional support	Medicine & Dentistry-Pediatrics
Hansen, Megan	Funk, Gregory	New approaches to understand the life-threatening depression of breathing that accompanies reductions in brain oxygen in prematurity	Medicine & Dentistry-Physiology
Kang, Min Ku	Caluseriu, Oana	Deciphering the genetic basis of a new immune disorder in the Cree First Nation	Medicine & Dentistry-Medical Genetics
Krahn, Jessica	Caine, Vera	Developing an evaluation for pregnancy pathways: A housing intervention for pregnant/parenting mothers experiencing homelessness and their children	Nursing
Li, Paul	Davidge, Sandra	How the placenta may cause high blood pressure in pregnancy	Medicine & Dentistry-Obstetrics & Gynecology
Lin, Andrea	Parent, Eric	Translation to English and testing of the Italian Spine Youth Quality of Life (ISYQOL) questionnaire	Rehabilitation Medicine-Physical Therapy

STUDENT	SUPERVISOR	PROJECT TITLE	FACULTY DEPARTMENT
Luan, Jiali	Noga, Michelle	Regional assessment of right ventricular wall motion in children with repaired tetralogy of Fallot	Medicine & Dentistry -Radiology & Diagnostic Imaging
Ma, Jenny	Lehmann, Ordan	Investigating if there is a common mechanism underlying pediatric glaucoma	Medicine & Dentistry- Ophthalmology and Visual Sciences
Ma, Keon	Ali, Samina	The iPad study: A study of iPads as a form of distraction to decrease the pain and stress of medical procedures in children	Medicine & Dentistry-Pediatrics
Malley, Alexandra	Ross, Sue	Designing a walking exercise therapy to improve sleep and QOL in menopausal women in Edmonton	Medicine & Dentistry-Obstetrics & Gynecology
Matta, Mirna	Richer, Lawrence	Exploring remote delivery of an exercise program in patients with POTS	Medicine & Dentistry-Pediatrics
Mulvany-Robbins, Bridget	Eisenstat, David	How altering genetic expression may be beneficial in the treatment of children with glioma	Medicine & Dentistry-Pediatrics
Onushko, Meghan	Olson, David	Fetal membrane interaction with leukocytes during term and preterm labour	Medicine & Dentistry-Obstetrics & Gynecology
Reid, Kyle	Zwaigenbaum, Lonnie	Predicting autism from early social-emotional behaviours	Medicine & Dentistry-Pediatrics
Shah, Prachi	Wine, Eytan	Gut bacteria as a cause for Crohn disease and ulcerative colitis in children	Medicine & Dentistry-Pediatrics
Sobierajski, Frances	Davenport, Margie	Physical activity, sedentary behaviour and vascular health in late pregnancy	Physical Education and Recreation
Sosniuk, Morgan	West, Lori	Immune cells in children undergoing cardiac surgery: Studying their type and function	Medicine & Dentistry-Pediatrics
Stryapunina, Iryna	Hobman, Tom	Investigating the interaction between Zika virus NS5 and host proteins Trim21 and USP15	Medicine & Dentistry-Cell Biology
Ure, Megan	Alexander, Todd	Identification and characterization of a new gene regulating body calcium	Medicine & Dentistry-Pediatrics

HEATHER CAPEL

RESEARCH PROJECT

Children rely heavily on object exploration to learn about the world and develop cognitive and social skills. However, children with motor impairments have difficulty with object manipulation and miss out on important exploratory and developmental opportunities. Through assistive robotics, children with motor impairments can better manipulate objects, compensating for physical limitations that normally impair exploration. Unfortunately, the use of assistive robotics for exploratory tasks is under-researched, and previous robotic systems only allow visual feedback for the user. In addition, many properties of objects (eg. roughness and hardness) can only be explored through touch. By adding haptic (touch) feedback to the robotic interface, we will offer an active touch experience to enhance children's development. We must determine if a haptic interface can accurately inform users about objects around them. We will optimize the interface and run trial sessions, presenting subjects with contrasting object pairs and asking them to assess the objects based on a particular feature — such as roughness. Galvanic skin response may also yield data about the difficulty/stressfulness of each task. Analyzing behavioral data will determine the accuracy of choices in each object comparison. We expect that the interface will be quite accurate for object exploration, with room for future improvement.

CAREER ASPIRATIONS

Since my early teens I have been interested in a career in rehabilitation medicine, specifically occupational therapy. I am excited to be pursuing a master's in occupational therapy at the University of Alberta starting in September. I am interested in continuing to develop my knowledge of assistive technology throughout my master's degree and future career. Although I have always been interested in working with children, I have recently become interested in the opportunities available to work with seniors and adults with complex care needs. Assistive technology has such a broad range of applications across all populations, and as it is a rapidly expanding field, I am sure that assistive technology will continue to be a part of my career. I hope to use my interests in technology and physiological monitoring to benefit my future patients and fellow health care team. I also hope that research continues to be part of my career, through my own research or through assisting the work of other labs as a clinician.

FUNDING PARTNER



SUPERVISOR

Dr. Kim Adams

PROJECT TITLE

Development and optimization of an exploratory haptic assistive robotic interface for use by children with motor impairments

MOTIVATION

Last summer, I had the opportunity to pursue research on visual degeneration, and continued my work during the school year during an intensive, for-credit research course. Through my previous experiences in research, I developed an appreciation and passion for the effort and novel thinking that goes into the research process. At the same time, I had reached out to Dr. Adams to discuss her work with assistive technology, as it was an area that I was interested in learning more about within the realm of occupational therapy. I began volunteering with her lab, and quickly found myself captivated by the opportunities that assistive technology could provide for people with disabilities. I knew that summer research in this field would provide a more comprehensive view of Dr. Adams' work and its place within the larger fields of assistive technology and occupational therapy. The project I am currently working on with Dr. Adams offers the perfect blend of all my interests: physiology, assistive technology and occupational therapy.

VICTOR DO

RESEARCH PROJECT

Cardiovascular disease (CVD), is the leading cause of death globally. Lifestyle choices and family history are major risk factors; however, exposure to an abnormal environment before birth has also been identified as a contributor to increased likelihood of long-term adult CVD. For instance, adults whose mothers had diabetes during their pregnancy (a common complication of pregnancy), have been shown to have an increased risk of CVD. Maternal diabetes is known to impact fetal heart structure and function before birth with development of heart defects, heart muscle thickening and reduced filling function. Although it is believed that the increased heart muscle thickness and reduced function in infants of diabetic mothers (IDMs) resolve within months of delivery, very little data exists confirming this. Furthermore, whether these abnormalities observed before birth are associated with long-term adult CVD is unknown. Recently, we (including the applicant) have demonstrated that the thickened heart muscle in IDMs actually persists in late infancy. We have also shown the aorta, the large vessel that carries blood from the heart to the body, is stiffer in IDMs — particularly in those with worse control of their blood sugar levels in pregnancy. Increased artery stiffness is observed in adults who develop CVD. To understand whether these changes in the heart and the aorta persist into childhood and could possibly be risks factors of adult CVD, we will bring back the same group of children who are now four to six years of age for further heart function and blood pressure assessments. This will include 25 – 30 IDMs and 25 – 30 whose mothers were healthy. We will assess through noninvasive techniques heart muscle structure and function and blood vessel function and compare findings between IDMs and healthy controls. We will then correlate our findings with abnormalities in the mothers (sugar control and other health factors during pregnancy) and the babies (heart structure and function) before birth as well as family indicators of lifestyle, and IDM nutrition and activity levels. This will elucidate how exposure before birth to diabetes may contribute to long-term CVD. Studies that link maternal health during the pregnancy with longer-term cardiovascular health of exposed infants are key to understanding potential mechanisms and the evolution of CVD in babies with a suboptimal environment before birth. With such knowledge, strategies to reduce pre and postnatal exposures and reverse early cardiovascular changes can be developed, which could ultimately reduce the likelihood of evolving CVD in adulthood in this growing population of children.

CAREER ASPIRATIONS

I am currently a medical student entering my second year and I am very motivated to pursue a career as a clinician-scientist and work in an academic program to continue to pursue research interests along with clinical practice. I am interested in the fields of pediatrics and cardiology. I would like to be involved in research throughout my training as I move further through medical school and into residency.



SUPERVISOR

Dr. Lisa Hornberger

PROJECT TITLE

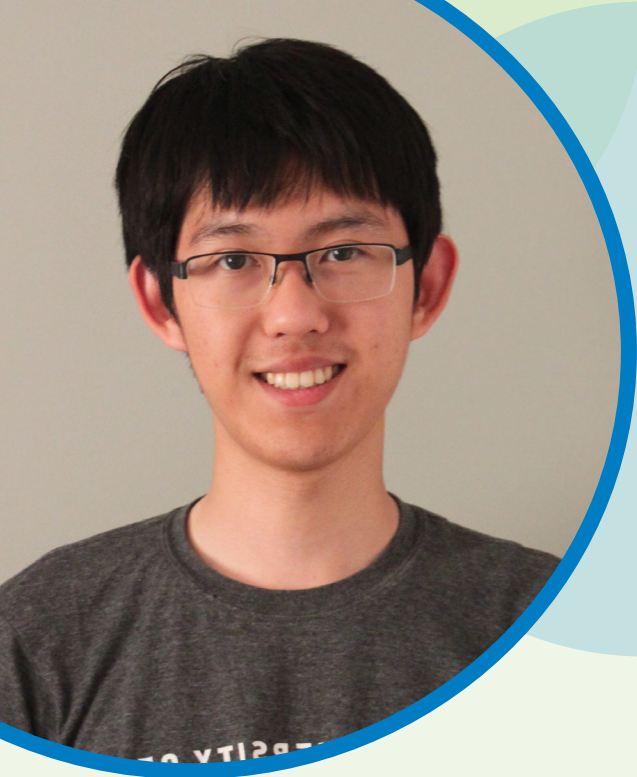
Cardiovascular health of children of diabetic mothers

MOTIVATION

I started my research with Dr. Hornberger last summer as I wanted to get exposure in clinical research after two summers in basic science. I worked on analyzing the fetal and infant echocardiograms of this same study and I really enjoyed my experience. We got interesting results which motivated me to want to return and continue to pursue this study. I also want to further my skills in clinical research to include starting from ethics approvals, clinical appointments, all the way to analysis — which is what this study phase allows me to be able to do. The more work I do in this field, the more interested I have become and I am further motivated to continue to further my skills in research — including designing studies, grant writing, further skills in statistical analysis and relevant clinical skills to the research I am involved in.

FUNDING PARTNER





TIMOTHY FU

RESEARCH PROJECT

Breast cancer is a deadly disease. While a number of treatment options have been developed for advanced breast cancers, not all patients ultimately get cured. One promising way to treat this deadly disease is to stimulate the immune system so that the body's own defences detect and attack the cancer cells effectively. This project is intended to explore this therapeutic approach by developing effective ways to modify immune cells. We want to explore if DNA molecules can be effectively delivered to immune cells and whether such cells could be made to secrete important molecules that stimulate the fight against the cancer.

CAREER ASPIRATIONS

After finishing my undergraduate degree, I plan on furthering my education to work towards a career in health care and research.

FUNDING PARTNER



SUPERVISOR

Dr. Hasan Uludag

PROJECT TITLE

Gene therapy for breast cancer

MOTIVATION

I volunteered in Dr. Uludag's lab during high school, and the experience was invaluable for learning practical skills in research. I gained a lot from working alongside the people from his lab, so I wanted to continue during university as well. Breast cancer continues to be a disease affecting a very significant portion of people, and investigating alternative therapies is both rewarding and worthwhile.

CHRISTIANA GARROS

RESEARCH PROJECT

Many studies have found that we cannot predict how much energy a child in the pediatric intensive care unit (PICU) needs (energy expenditure or EE.) The only way to know EE in critically ill children is by using a technique called “indirect calorimetry;” however, this is often not available because it needs experts, takes a long time and is expensive. Without indirect calorimetry, however, over- and under-feeding is common. Over-feeding can cause fat production, fatty liver, and faster breathing (by increasing carbon-dioxide). Under-feeding can cause malnutrition, with worse healing of wounds, immune function, and muscle strength. Developing a way to predict EE in children in the PICU would mean we could give the best amount of nutrition, and avoid under- and over-feeding, without needing indirect calorimetry that is often not available. Our objectives are to determine which patient factors can predict EE in children in the PICU; and, if over- or under-feeding results in longer time on the breathing machine or in PICU. In this study, all children in the PICU at Stollery Children’s Hospital who had indirect calorimetry done (over 50 children/year; about 100 – 120 patients over two years) will be included. I record information from the patient’s electronic chart and enter it into a study database, including general (sex, age, admission diagnosis); body size (weight, height, body mass index); and severity of illness (vital signs, organ functions and medications used) information. Advanced statistical methods will be used to meet the study objectives. Developing a way to predict EE may make indirect calorimetry measurements unnecessary in many patients. Showing worse outcomes from over- and under-feeding will show that nutrition research in PICU is a priority. Overall, we aim to improve outcomes for children in the PICU by optimizing the nutrition support we provide during their severe illness.

CAREER ASPIRATIONS

Although I am not yet certain what my future career will be, I have a passion for many fields within biology, physiology and medicine which I am pursuing through my undergraduate studies. Medicine is one of the fields I am taking into consideration, and if I decide to train to become a physician, I’d like to specialize in pediatrics. Regardless of what career or specialization I end up choosing, I aim to always incorporate research into future work. Through early experiences with research like this one, I will be able to further explore my passions, and learn valuable skills. I look forward to future projects both as a student and in my future career.

FUNDING PARTNER



SUPERVISOR

Dr. Ari Joffe

PROJECT TITLE

Determining how to predict the measured energy requirement in children in pediatric intensive care: toward optimizing nutritional support

MOTIVATION

As I was entering my first year of university science I had my first experience with conducting research as a volunteer. I still had a lot to learn but the experience was so rewarding and enjoyable that I knew I wanted to continue doing research work in subsequent years. I was motivated to pursue this project by a love of science and research, with an interest in pediatrics, and a strong belief in the importance of research. Furthermore, this project is an excellent opportunity for me to continue to learn the “ins and outs” of research, consequently improve my own skills and perhaps improve knowledge to enhance the care of critically ill children.



MEGAN HANSEN

RESEARCH PROJECT

Failure to provide the brain with oxygen for even a few minutes can result in permanent brain damage or death. Infants who suffer from apnea of prematurity (AOP) are at risk because their immature brain produces unstable breathing with frequent pauses, or apneas, which cause oxygen levels to fall. Low oxygen leads to an increase in adenosine levels in the spaces between cells which causes a potentially fatal depression of breathing. Infants with AOP are given caffeine (adenosine receptor blocker) to stimulate breathing. However, ~20% of infants do not respond so alternate treatments are needed. The enzyme adenosine kinase is key in keeping adenosine levels low in nonrespiratory parts of the brain. The objective of this proposal is to apply electrophysiological and pharmacological methods to brain slices and intact neonatal mice to determine whether adenosine kinase can be targeted to counteract the life-threatening depression of breathing that occurs in hypoxia.

SUPERVISOR

Dr. Gregory Funk

PROJECT TITLE

New approaches to understand the life-threatening depression of breathing that accompanies reductions in brain oxygen in prematurity

MOTIVATION

My motivation to participate in this project was driven by my interest to gain a better understanding of the research process. Additionally I wanted to learn more regarding how advances in basic science lead to the development of new medical treatments. The practical relevance of this project to pediatric medicine is what ultimately sparked my desire to make a contribution.

CAREER ASPIRATIONS

I hope to pursue a career in the healthcare field. I love problem solving as well as working with children; this forms the basis of my desire to be a clinician-scientist. I have always been interested in the clinical side of pediatric medicine; however, my experience in this lab has made me interested in continuing on with the research aspect as well. I am very grateful the WCHRI Summer Studentship Program allowed me to develop this research interest.

FUNDING PARTNER



MIN KU KANG

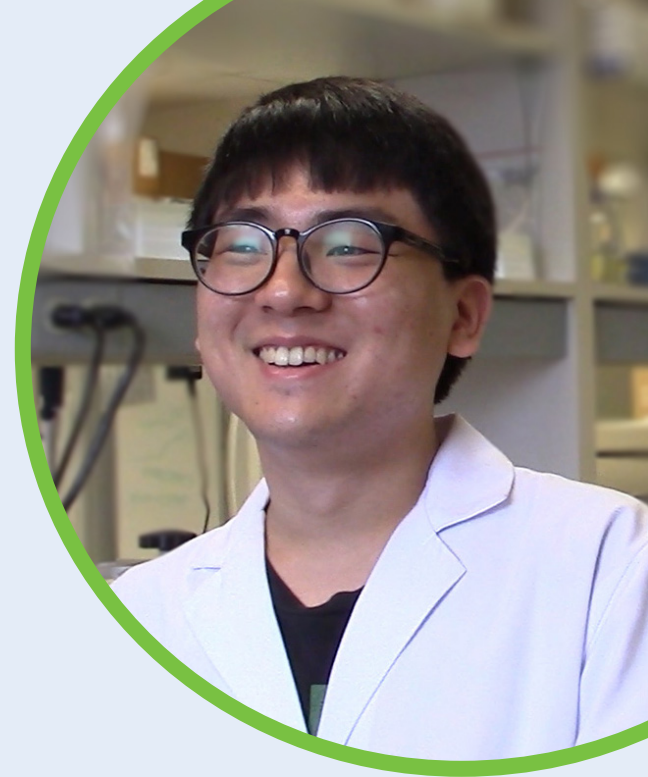
RESEARCH PROJECT

About one in 12 Canadians, two-thirds of them children, are affected by rare diseases often with an unknown cause which makes proper diagnosis and treatments extremely difficult. In 2015, a child born to consanguineous parents from the Cree First Nation in Northern Alberta, was suffering from a life-threatening rare disorder that influenced her immune system, bones and skin. She was hospitalized, various tests have failed to identify the cause of her disorder and a previous sibling has already passed away due to the same disease. We hypothesized that a genetic disorder underlines the clinical presentation of our patients and, in agreement with the parents, we embarked on a quest to find the cause of this novel and rare disorder. Employing the latest genetic technology, called “next generation sequencing,” we were able to identify a strong candidate gene for this disorder, in a gene that has not been previously associated with human disease. Currently, we are working in demonstrating that the changes seen in the patient relate to changes seen at the level of the patient’s cells we are studying. I am part of the research team utilizing advanced technologies to introduce the mutation in skin cells and then correcting this change, followed by specific tests already developed in the lab to get an ultimate proof of our findings. The importance of this study is at least three-fold: the results are aimed to benefit the family for potential family planning, as well as offer an early detection test for this new disorder not only for family members, but also for community members (this is a very inter-related by blood community) that will facilitate early access to treatment options, and last but not least — it provides me with an invaluable hands-on experience in a truly translational study.

CAREER ASPIRATIONS

My dream is to become a medical geneticist, who diagnoses patients with complex, rare genetic disorders and investigates the underlying molecular basis: from candidate gene identification to functional studies for elucidation of the gene function. There are many patients out there with an “undiagnosed” condition that is so rare that they often have to travel from hospital to hospital in the hopes of getting a diagnosis and to receive proper treatments. Imagine living a life with a condition that you did not choose to have, with no apparent reason why this is happening to you. I would be confused: “why is this happening to me?”; sad: “why do I have to suffer?”; and finally, angry: “why is the cause still unknown?”. Through research, I want to help them find the cause and using this information, I want to develop diagnostic tools and treatments. Finally, I aspire to become an advocate for the “rare” patients so that they too can get the medical attention they need, just like everyone else.

FUNDING PARTNER



SUPERVISOR

Dr. Oana Caluseriu

PROJECT TITLE

Deciphering the genetic basis of a new immune disorder in the Cree First Nation

MOTIVATION

It was very heartbreaking to think about our patient who had to suffer from a rare immune disorder at such a young age. Because of this disorder, her life was at risk; multiple hospital visits and clinical testing have failed to pinpoint the cause and effectively treat her. The physical suffering from the disease itself is one thing; the problem with our patients was that we simply didn't know the culprit behind it. Having a condition that affects one's life with unknown causes imposes immense stress on the patient and family. This research project has the potential to alleviate the physical and mental pain of the patient and family. Once we find out the cause, we can develop diagnostic tests and treatments for future patients. Most importantly, the patients and family can finally have an answer. The primary motive for me was to help the patient and the family to fight against this new immune disorder through research. However, there is a second motive: Once we establish a successful story of finding a genetic cause for rare disorder and how this can positively affect the patient's life, this can raise awareness about rare genetic disorders. Because I wanted to become part of this meaningful journey, I decided to participate in this project.



JESSICA KRAHN

RESEARCH PROJECT

In this project, we focused on a developmental evaluation framework for Pregnancy Pathways, a housing program for pregnant/parenting women and their children who are experiencing homelessness in Edmonton. Homelessness is associated with poor mental and physical health outcomes for women and their children due to increased rates of trauma, exploitation, stigma and substance use. To develop a program that meets both immediate needs for security and housing and builds up individual capacities for future wellness will have an important role in Edmonton. There is a significant gap in the research of housing programs for this population and our research is necessary to determining what interventions best address the needs of this population (both mothers and children). For this project we will be using a developmental evaluation approach, which is different from traditional evaluations as it allows for program adaptation throughout the evaluation process in response to findings. This form of evaluation is especially useful for programs that aim to address complex and changing issues for which the best program implementation strategies are not well known, as in the case of Pregnancy Pathways. We will work with the lead agency of Pregnancy Pathways, the Boyle McCauley Health Centre, to develop evaluation indicators that accurately measure outcomes and qualities of the program that have been identified by participants, community stakeholders and funders. A key focus is to create a successful program that empowers women and their children and builds on their current strengths and community connections. As part of the summer studentship, I specifically looked at the published and grey literature in relation to outcome and process measures for children who are born to women or live in their early years with women who are part of transitional housing programs.

SUPERVISOR

Dr. Vera Caine

PROJECT TITLE

Developing an evaluation for pregnancy pathways: A housing intervention for pregnant/parenting mothers experiencing homelessness and their children

MOTIVATION

For much of my life, I've been passionate about women's health and reducing the harms of social inequity seen around the world. As I got to know the work that my supervisor engages in, especially women experiencing homelessness and motherhood, I was inspired by the role that nursing and nursing research can play in closing some of the gaps in care provision that exist for this population. I became involved with Pregnancy Pathways last summer and was further inspired by the countless organizations and service providers who have come together to address the complex issue of pregnancy and homelessness in Edmonton in a very tangible way. From my background in nursing, I also understood the importance of developing evidence-informed best practices, and thus saw the immense importance of developing a way to evaluate the outcomes of Pregnancy Pathways. Developing a way to systematically evaluate what works, doesn't work, and how, will allow the program to be modified as needed to best meet the needs of the women and children it serves, and to generate and disseminate knowledge about best practice in this area where a significant gap in research exists.

CAREER ASPIRATIONS

Seeing the crucial role that health care providers working in interprofessional teams play in mitigating the social determinants of health has inspired me to continue to work in the area of health inequity, especially alongside vulnerable populations. In the future, I would love to be a part of a program like Pregnancy Pathways in the role of a registered nurse or as a nurse practitioner after pursuing graduate studies. I also hope to continue to contribute to the body of knowledge in this area by conducting and participating in research.

FUNDING PARTNER



PAUL LI

RESEARCH PROJECT

Preeclampsia (PE) is a common (5-7%) pregnancy disorder that is a leading cause of maternal disease and death, and one of the most common reasons for induced preterm delivery. It is diagnosed by the development of high blood pressure and kidney damage after the 20th week of gestation. Both the cause and course of the disease remain poorly understood and delivery of the placenta and fetus is currently the only known cure for PE. Nonetheless, there is substantial evidence that reduced blood vessel function contributes to the development of high blood pressure in the disease. It is thought that this might be due to small particles that are released from the placenta into the mother's bloodstream. However, the specific cause(s) and process(es) are not completely understood. Our lab recently made the exciting discovery of a new pathway involving a receptor (called the LOX-1 receptor) that affects the blood vessels of women with PE. Interestingly, we also showed that the placental particles are able to disturb the function of blood vessels from rats via this new pathway. In the current studies, we will further identify how reduced blood vessel function develops in PE via this specific pathway. We are very excited about our discovery of specific pathways that may affect the blood vessels of women with PE and the proposed studies will further determine the role of these pathways in the development of PE. Thus, our goals are to increase our understanding of the development of PE in order to develop new therapeutic strategies to treat this disease in the future.

CAREER ASPIRATIONS

I will begin medical school come the fall semester, and I am interested in pursuing specialties such as cardiology or emergency medicine. My summer experience has also helped me develop an appreciation for OBGYN medicine. I hope to continue applying my research experience to enhance my practice and contribute to my field of specialization.

FUNDING PARTNER



SUPERVISOR

Dr. Sandra Davidge

PROJECT TITLE

How the placenta may cause high blood pressure in pregnancy

MOTIVATION

I was interested in cardiovascular physiology but I also sought to broaden my experiences and challenge myself with research that I was unfamiliar with. Therefore, when seeking a summer student position, the Davidge lab was particularly attractive as it fulfilled both criteria. This lab explored cardiovascular pathology such as hypertension, but did so in the context of pregnancy. This introduction into the field of obstetrics and gynecology was exciting because of the clinical aspect of our research, and it was motivating to know that our research could impact the lives of mothers and their children. In addition, the blend of basic and clinical aspects of my summer project granted me an opportunity to work with a variety of experimental techniques, such as wire myography used to measure blood vessel function and response. I was also drawn to this research project because of the collaborative research environment, which I saw as an opportunity to work with researchers and students from a variety of backgrounds. Indeed, meeting my colleagues and developing an appreciation for the multidisciplinary aspect of research was among the most rewarding experiences this summer.



ANDREA LIN

RESEARCH PROJECT

Scoliosis is a three-dimensional spinal deformity characterised by a lateral curvature and vertebral rotation affecting 2 – 3% of the adolescents. Eight females to one male progress to severities requiring surgical treatment. Scoliosis is associated with deterioration in health-related quality of life (QOL). Several questionnaires evaluate QOL in those with spinal deformities. However, the questionnaires available in English to date show poor measurement properties including high ceiling effects and limited correlations with scoliosis severity. Recently, the Italian Spine Youth Quality of Life (ISYQOL) questionnaire has been developed from patients' and clinicians' concerns and using Rasch analysis to address scaling limitations. Our English cross-cultural adaptation of the ISYQOL will be tested in this project. We will determine if our English translation of the ISYQOL will present low ceiling effects, reproducible results and have strong relation to the patients' scores on other widely used questionnaires. One hundred participants will be recruited from the Edmonton scoliosis clinic and complete the questionnaires twice; one week apart. We believe the cultural adaptation of the ISYQOL to English will solve problems identified with previous questionnaires. This questionnaire has the potential to be adopted widely as problems with existing questionnaires are well recognized as a limitation to document the effect of conservative interventions in patients with smaller scoliosis curves. This project is innovative as the questionnaire has not yet been used in North America, embedded in our scoliosis clinic and results will likely influence the management of scoliosis widely, which affects mostly females and developing adolescents. This tool may make it possible to document the effectiveness of conservative therapies, which up to now could not be assessed properly with existing tools.

SUPERVISOR

Dr. Eric Parent

PROJECT TITLE

Translation to English and testing of the Italian Spine Youth Quality of Life (ISYQOL) questionnaire

MOTIVATION

People who have adolescent idiopathic scoliosis have a disorder in which the spine curves sideways. The cause of the spinal curvature is unknown. This condition can have an impact on the patient's way of life and how they view their physical appearances. As someone who has experienced an injury impacting my mobility and quality of life, I understand the importance of informing medical professionals about how a patient is feeling about their condition to allow them to understand how it affects the patient's life. I was interested to see how clinicians quantitatively measure quality of life in scoliosis patients, which is something that is difficult to operationally define. I believe that developing a method that can accurately represent what a patient is feeling in their day to day lives is crucial in ensuring that we understand their concerns and what is important to them. This will allow medical professionals to adjust treatment plans to best suit each patient.

CAREER ASPIRATIONS

I am excited to enter my first year of medicine in the fall, and hope that the skills I have learned will provide the tools I require to become a better and more informed physician upon graduation.

FUNDING PARTNER



JIALI LUAN

RESEARCH PROJECT

Tetralogy of Fallot (TOF) is a common congenital heart disease which affects the blood supply to the lungs. Currently, surgery is done to correct the defects seen in this condition. These pediatric patients are subsequently followed by MRI and ultrasound after surgery. Eventually, pulmonary valve replacement is performed as these children outgrow their valves. Deciding when to replace these valves depends on various factors. MRI is traditionally used to evaluate heart function and size. Currently, newer methods of evaluating different areas and measures of right heart function are being researched. We wish to explore new ways of analyzing the right ventricle in patients with repaired TOF. During this study, we will analyze MRI images taken from TOF patients from within the last five years. We will use our own custom software to analyze regions of the right ventricle to assess strain and area change. After comparing these values to standard measures of right ventricular size and function, and exercise testing, we will determine if our regional measures are more effective in predicting need for intervention. Outcomes and interventions will include surgery, interventional procedure, and presence of symptoms with no intervention or surgery. By knowing the optimal time to replace the pulmonary valve, we can minimize the number of operations the children have to undergo. We hope our work will ultimately contribute to the imaging guidelines for determining the indication for pulmonary valve replacement in pediatric patients.

CAREER ASPIRATIONS

The research experience has given me excellent insight into medical imaging and cardiology. Although I am still in the process of deciding upon a medical specialty, this experience will be valuable to guide my future decisions. I wish to incorporate a research component to my future career.

FUNDING PARTNER



SUPERVISOR

Dr. Michelle Noga

PROJECT TITLE

Regional assessment of right ventricular wall motion in children with repaired tetralogy of Fallot

MOTIVATION

The topic of imaging in congenital heart disease is fascinating. In addition, imaging has come a long way in determining the management of complex conditions such as tetralogy of Fallot. In addition to the medical side of the project, the technological and computational aspects are also very interesting to me. Overall, the project and research presented a great learning experience to enhance my skills as a future physician. Learning about the process of research from planning to manuscript writing will also be an asset for me in the future.



JENNY MA

RESEARCH PROJECT

Glaucoma is a common disorder caused by elevated intraocular pressure. Childhood cases are frequently associated with visual impairment and, on occasion, blindness. In childhood, the disorder is primarily caused by impaired flow of aqueous fluid from the eye, which normally drains into a specialized channel, called Schlemm's canal. Recently, this narrow channel was shown to be ciliated, which means it is lined by small structures that beat and move fluid over cells.

Our laboratory has discovered that one gene that causes pediatric glaucoma profoundly affects the function of cilia. On the basis of these results, we propose that ciliary dysfunction may more broadly underlie glaucoma. We have undertaken preliminary analysis of related genes, including one that also causes pediatric glaucoma, and observed similar impairment of ciliary function. Based on these findings, we hypothesize that ciliary dysfunction may represent a common mechanism in multiple glaucoma subtypes.

SUPERVISOR

Dr. Ordan Lehmann

PROJECT TITLE

Investigating if there is a common mechanism underlying pediatric glaucoma

MOTIVATION

I have a keen interest in ophthalmology, which motivated me to learn more about ocular disorders such as glaucoma and its underlying mechanism of action. This research allowed me to gain a better appreciation for the basic science behind clinical applications.

CAREER ASPIRATIONS

My research this summer has allowed me to further develop my interest in ophthalmology. I am now more certain about the area of medicine I would like to specialize in.

FUNDING PARTNER



KEON MA

RESEARCH PROJECT

There is a substantial need to better manage pain associated with IV insertions, especially in children, as it is one of the most common procedures performed within medical facilities. Although anesthetic creams or sprays are often applied, their effectiveness may be limited, especially under time constraints, and can even cause blood vessels to constrict, making it more difficult to locate the vein and perform the procedure. Distraction therapy is an emerging area of interest, given that it can be easily employed and is a great alternative in situations where drug management of pain is not possible, such as allergies. We are examining iPads as a form of distraction to better alleviate the pain and distress in children receiving an IV, as compared to the current standard of care which is usually an anesthetic cream, only. The iPads are pre-loaded with games and other activities, and can be constantly updated at a minimal cost. The study will be conducted as a randomized control trial, where the use of an iPad (with standard anesthetic cream) or standard anesthetic cream alone is randomly assigned to children coming into the emergency department. Eight children will be video recorded during their IV insertion, and the videos will be analyzed for pain scores and eight signs of behavioral discomfort for each 15 second interval using a metric known as the Observational Scale of Behavioral Distress - Revised (OSBD-R). These signs of distress include information seeking, crying, screaming, physical restraint, verbal resistance, seeking emotional support, verbal pain or flailing. We expect that adding iPads as distraction therapy will be an equally efficacious if not a better means to minimize the pain and distress associated with IV placements as compared to anesthetic creams, alone. We hope to implement iPad distraction therapy in local pain management protocols and to disseminate this knowledge to other pediatric emergency departments across Canada through collaborative networks.

CAREER ASPIRATIONS

I hope to specialize in pediatric emergency medicine, and contribute to academic medicine through my own research portfolio.

FUNDING PARTNER



SUPERVISOR

Dr. Samina Ali

PROJECT TITLE

The iPad study: A study of iPads as a form of distraction to decrease the pain and stress of medical procedures in children

MOTIVATION

Having participated in the AIHS HYRS Program in high school, I was given the invaluable opportunity to gain early exposure to research. I then volunteered with the Pediatric Emergency Medicine Research Associate Program (PEMRAP) at the Alberta Children's Hospital, in which I contributed to many clinical studies, including one that sparked my interest in pediatric pain management. My project this summer was a perfect extension of that experience, and I was so excited to work within the realm of pediatrics again.



ALEXANDRA MALLEY

RESEARCH PROJECT

Walking is a low cost, simple exercise with proven health and environmental benefits, and has the potential to be incorporated into almost every able-bodied person's schedule and lifestyle. The Mature Women's Health Research group at the University of Alberta wants to design a study to investigate whether a walking exercise program will improve quality of life in women seeking help at Edmonton's menopause clinics with moderate to severe menopause symptoms. The study consists of several parts, including the assessment of accelerometer use and an evaluation of current literature on walking exercise with the goal of identifying successful regimes that can be adapted and that would engage women. An important part of our study will be an environmental scan to support the design of a suitable walking exercise regime in Edmonton, where winters can be a particular barrier to outdoor exercise. The environmental scan will explore locations and collect information on walking trails outdoors (tracks in the city or River Valley) and indoors (mall walking, indoor facilities) and gather information on existing walking groups and walking events using online resources, community contacts, and word of mouth. Data will be collected and analyzed descriptively for facilities and groups to identify features that might be suitable to menopausal women. The goal is to devise a walking program in the Edmonton area that would provide year-round walking opportunities and would be attractive for women to start and maintain a walking habit and thus ultimately has the potential of generating a meaningful and sustainable impact on health outcomes.

SUPERVISOR

Dr. Sue Ross

PROJECT TITLE

Designing a walking exercise therapy to improve sleep and QOL in menopausal women in Edmonton

MOTIVATION

Coming from a small town in rural Alberta, I previously had limited research experience, but rather spent the majority of my extra-curricular time developing and executing exercise programs for seniors in the area, both at the local hospital and assisted living facilities. Being in Edmonton now for medical school, I was excited about the opportunity to participate in this research project because it would not only give me experience in the research field, but it would also allow me to use the skills I had gained previously and continue to provide tangible health interventions for the local population. Regardless where I end up in my career in medicine, so long as I am caring for women, women will be going through menopause. This project will therefore be applicable to any specialty, and because it is a walking intervention, it can also be incorporated into most able-bodied women's lives, which is also incredibly important. Accessibility is a huge barrier to exercise and healthcare in general, and this project is an excellent way for me to begin learning how to remove some of those barriers.

CAREER ASPIRATIONS

I've just finished my first year of medical school, and I haven't quite decided which area of medicine I'd like to pursue for my future career. However, what I do know, is that I'm interested in continuity of care, and caring for patients over long periods of time. In particular, I'm interested in caring for patients where the ultimate goal isn't necessarily to cure them, but rather to improve their overall quality of life with accessible healthcare interventions. My project on walking exercise programs for women in menopause is an excellent example of this — there's no way to prevent them from going through this transition, which can be a significant burden for some women, but we can try to provide a simple intervention they can incorporate into their daily routine to hopefully improve their overall quality of life. In addition to working as a clinician, this project has also inspired me to undertake future research projects to ensure that women have evidence-based wellness options as they age. It is my goal to help improve the care (and self-care) options that are available to my patients.

FUNDING PARTNER



MIRNA MATTA

RESEARCH PROJECT

Postural Orthostatic Tachycardia Symptom (POTS) is a condition that affects approximately 50,000 people in Canada, often beginning in early adolescence, and affects more females than males. Patients with POTS are often unable to stand for long periods due to excessive heart rate increases, dizziness and overall fatigue. Children severely affected by POTS have a reduced quality of life due to their inability to attend school or enjoy extracurricular activities. Interventions in the form of lifestyle changes (for example, increased water and salt intake) and drug therapies have shown variable effectiveness. Exercise as an intervention, however, has consistently been shown to be effective and often leads to patients becoming symptom-free. Research studies of exercise as an intervention have mostly been conducted in adult populations and up to 60% of participants are unable to complete the exercise program. One of the factors that may limit participation in the exercise program is the requirement for expensive equipment such as a recumbent bike. The other major limiting factor is the inability to customize the program for individuals based on their ability and access to equipment. In this study we will develop a strategy to implement exercise as an intervention for POTS that is based on principles like (1) personalized programs; (2) functional exercise movements that do not require expensive equipment; and (3) the ability to administer the program to those who may not reside in urban settings. In this study, we will develop the program from the perspective of parents and patients with POTS; the expertise of clinicians and rehabilitation specialists who currently care for children with POTS; and build on the experience from collaborators who have developed similar programs in other domains. An initial visit will provide the children with exercise instructions; after a month they will return and provide feedback on how the exercise program went and how it could be improved. As well, to measure the quality of the outcomes, children will submit videos of themselves performing a subset of the exercises. The goal of this study is to develop a functional movement exercise program that will be well tolerated and customizable to kids' varying abilities, making it a viable long term treatment for the future. The study is also a first step in administering an exercise program remotely so participants can perform it at home, allowing for broad participation, particularly for those without readily available clinical resources.

CAREER ASPIRATIONS

After my exposure to clinical research this summer, I learned that research plays a vital role in evolving patient care. Therefore, I hope to continue this work in the future as a clinician-scientist. More particularly, I hope to someday work in pediatrics as I believe that helping children prevent or manage their conditions can truly go a long way in improving both the patient's and their family's quality of life from a very early age.



SUPERVISOR

Dr. Lawrence Richer

PROJECT TITLE

Exploring remote delivery of an exercise program in patients with POTS

MOTIVATION

After previously taking part in basic scientific research, I wanted to explore its application in a clinical setting as I believe that in our healthcare system it is important to both care for patients and constantly advance patient care. This project appealed to me because it sought to personalize health treatments and to build towards remote delivery of interventions. This approach will ensure that patients without easy access to care will receive the same treatments as those in major centres. I believe both of these aspects are quite novel and will lead to exciting future research projects.

FUNDING PARTNER





BRIDGET MULVANY-ROBBINS

RESEARCH PROJECT

Gliomas in children are an especially malignant type of brain tumour that currently cannot be treated with the same regimen as adult gliomas. A potential reason for the lack of successful treatment is that genes involved in children's brain development may be the cause of these gliomas. Chromosomes are structures that contain the basic genetic information in the form of genes for growth and development and are packaged with the help of proteins called histones. Many gliomas in children are due to mutations in genes that control this chromosomal packaging during brain development. Transcription factors are responsible for switching these genes on or off and this property can be taken advantage of when developing new treatments for children with gliomas. This project aims to first identify the involvement of a transcription factor known as Dlx-2 in normal brain development by altering the amount of Dlx-2, then identifying the role of Dlx-2 in mice and human cells with the mutations that cause gliomas in children. The significance of this project is that it may serve as preliminary research to develop new treatments to effectively treat children with gliomas caused by histone mutations.

CAREER ASPIRATIONS

I will be starting my second year of medical school in the fall, with hopes of obtaining a surgical residency in the future.

FUNDING PARTNER



SUPERVISORS

Dr. David Eisenstat

PROJECT TITLE

How altering genetic expression may be beneficial in the treatment of children with glioma

MOTIVATION

This project amalgamates two areas of interest of mine: neuroscience, which is my undergraduate background, and oncology, which I have learned more about through studying pediatric high grade glioma from a developmental perspective in this research project.

MEGHAN ONUSHKO

RESEARCH PROJECT

The uterus experiences a broad range of changes as it transitions or transforms from pregnancy to birth. Certain proteins, known as chemoattractants, are produced by uterine tissues and are able to attract circulating white blood cells. Under the influence of chemoattractants, these cells escape from capillaries and move using their own mechanisms into the pregnant uterine tissues where they release inflammatory mediators that hasten the transformation of the uterus towards birth. This event occurs with every birth whether term or preterm. At preterm, this causes the early onset of labour. With over 15-million occurrences annually, preterm birth is the primary cause of death (one million per year) and long-term morbidity among infants. Of the babies who survive, many are at risk of serious health complications including difficulty breathing, changes in brain development, and other long-term disabilities. Antenatal care or intervention during pregnancy could prevent three-quarters of these births (World Health Organization, 2016). Researchers can use in-vitro tools to characterize the cell signalling pathways in preterm birth (<37 weeks) long before any symptoms appear; blocking these pathways may assist in preventing preterm birth. The human fetal membranes (amnion, chorion) that surround the baby specifically release chemoattractants into the blood and they are the major source. Therefore, we have developed a migration test that uses white blood cells obtained from an arm vein in pregnant women to predict the timing of delivery. Since the responsiveness of these cells to the chemoattractant increases the closer a pregnant woman is to giving birth, we were interested in the causes of this responsiveness. The potential causes could include: an increased number receptors for protein molecules on the white blood cells, interactive mechanisms that enhance communication between the different maternal tissues, or more effective methods of white blood cell migration. Since it has been determined that inflammatory protein receptors on muscle layer surrounding the uterus (myometrium) change when labour begins, it is likely that the same process is occurring on the fetal membranes. From this, we hypothesize that an increased number of receptors for protein molecules causes white blood cells to invade the uterus before (or on) the expected delivery date. In the broader context, this knowledge could be used to develop a simple clinical test, which could serve as an identification tool for the mothers at risk of preterm labour.

CAREER ASPIRATIONS

I plan to continue a career that combines medicine and research, where I can support and educate mothers at risk for birth complications. My hope is that we can develop a diagnostic tool for women that will improve their birth outcomes and subsequently, the health of their baby. I am so grateful for this studentship opportunity; it has given me first hand experience and access to knowledge and resources that will help me succeed in the future.



SUPERVISOR

Dr. David Olson

PROJECT TITLE

Fetal membrane interaction with leukocytes during term and preterm labour

MOTIVATION

My interest in fetal development and birth complications led me to the Olson lab. Here I discovered that preterm birth is the primary cause of death among infants and that we have much more to learn about perinatal health.

FUNDING PARTNER





KYLE REID

RESEARCH PROJECT

Understanding the early development of children who are later diagnosed with autism spectrum disorder (ASD) is important for early diagnosis and referral to intervention programs. Abnormal social-emotional behaviors have been identified as a potential early predictor of ASD. This study will examine if scores on a parent-reported questionnaire, the Brief Infant-Toddler Social Emotional Assessment (BITSEA), can predict diagnosis of ASD in a high-risk sibling population. Two groups of families were recruited to assess the efficacy of the BITSEA in identifying ASD in toddlers: (1) families without a history of ASD (low-risk) and (2) families with at least one child diagnosed with ASD (high-risk). Parents completed the BITSEA when their child was 18 months of age and the children were assessed for ASD at age three years. Scores on the BITSEA for high-risk children who were diagnosed with ASD at age three years will be compared to children from the low-risk and high-risk groups who were not diagnosed at age three to determine if BITSEA scores at 18 months can predict ASD outcomes at three years. It is expected that parents of children who are diagnosed with ASD will identify greater social-emotional abnormalities at 18 months of age compared to parents of children who were not diagnosed with ASD. These findings have the potential to assist diagnostic assessment of ASD in early childhood.

SUPERVISOR

Dr. Lonnie Zwaigenbaum

PROJECT TITLE

Predicting autism from early social-emotional behaviours

MOTIVATION

I have always had an interest in medical sciences and have aspired to be physician and researcher from a very early age. My specific interest in autism is personal; I grew up with an older brother who is on the autism spectrum. This has allowed me firsthand experience on the impact autism and other neurodevelopmental disabilities have on a family, and the immense value of early detection. The ability to participate in research built on a foundation which respects the observations and knowledge that families bring to the table is an honour.

CAREER ASPIRATIONS

My long term goal is to become an MD/PhD specializing in pediatrics and neurodevelopmental disabilities. I am passionate about making sure timely accurate information is in the hands of practitioners. By being both a clinician and researcher, I feel that I would be able to positively influence the decisions that may be made by practitioners as they support children and their families affected by neurodevelopmental disabilities.

FUNDING PARTNER



PRACHI SHAH

RESEARCH PROJECT

Approximately one in 150 Canadians suffers from common and debilitating gastrointestinal disorders such as Crohn disease (CD) and ulcerative colitis (UC). As well, 25% of newly diagnosed cases occur in children, which offers us the unique opportunity to examine the disease closer to the time of disease onset when fewer environmental factors (stress, breast feeding, smoking and exposure to medications) are involved, allowing for research to more easily examine direct causes of disease development. As the causes of CD and UC remain poorly understood, and with previous studies suggesting that disease development involves gut bacteria, this study aims to examine the role of microorganisms as a cause of CD and UC in children. By collecting fluid from within the intestines of children with CD and UC during colonoscopy, we have been able to identify changes occurring in the presence of good vs bad gut microorganisms. My work will focus on examining the function of a specific microorganism, recently identified by the Wine lab, to determine how it is involved in the development of CD and UC. This research will help determine more effective methods of diagnosis and treatments for children with UC.

CAREER ASPIRATIONS

I have always wanted to pursue a medical career as a clinician. This studentship provided an opportunity to be involved in clinical research and learn about being a clinician-scientist. I gained insight into the field of gastroenterology and pediatrics and am inspired to pursue the area of pediatrics in my future endeavors. The invaluable skills and experience I have gained this summer will help me work towards my goal of becoming a medical doctor and to guide the path of my career in medicine. I am grateful to WCHRI and the Wine lab for giving me this opportunity so early in my education.

FUNDING PARTNER



SUPERVISOR

Dr. Eytan Wine

PROJECT TITLE

Gut bacteria as a cause for Crohn disease and ulcerative colitis in children

MOTIVATION

Having family members who have dealt with gastrointestinal disease, I have long been interested in the field. I wanted to learn more about gastrointestinal diseases and being involved with this research has allowed me to do so. I was able to learn more about how these diseases are studied in the lab and treated in the clinic. This studentship in Dr. Wine's lab allowed me the opportunity to explore research in pediatric gastroenterology as well as learn more about being a clinician-scientist.



FRANCES SOBIERAJSKI

RESEARCH PROJECT

Despite the well-established benefits of exercise during pregnancy, recent data suggest that 85% of women in Alberta fail to meet current guidelines for exercise during pregnancy. At the same time, women tend to become increasingly sedentary during pregnancy. Common sedentary activities include sitting while driving a car, working at a computer or watching TV. In non-pregnant populations, too much sedentary time is independently linked to increased risk of cardiovascular disease. An important component of cardiovascular health is vascular (artery) health. Furthermore, vascular dysfunction is believed to precede the development of pregnancy related complications, such as preeclampsia and pregnancy-induced hypertension. During healthy pregnancy, an aerobic exercise intervention was found to improve vascular health. However, the impact of sedentary behaviour on vascular health has yet to be examined during pregnancy. Therefore, the purpose of the proposed project is to examine the relationship between physical activity, sedentary behaviour and vascular health. Specifically, I will be using a non-invasive measure of peripheral artery health, flow mediated dilation (which is predictive of future cardiovascular disease), as well as objectively collected measures of physical activity and sedentary behaviour to explore the impact of maternal activity patterns on cardiovascular health. This study will be the first to assess the impact of these behaviours on vascular health during pregnancy. If sedentary behaviour is found to be independently associated with vascular health, interventions aimed at reducing sedentary time may be an easier more realistic behaviour to target during pregnancy with significant health benefits.

SUPERVISOR

Dr. Margie Davenport

PROJECT TITLE

Physical activity, sedentary behaviour and vascular health in late pregnancy

MOTIVATION

I am passionate about promoting the benefits of physical activity for the maintenance of health and prevention of disease. However, I have become increasingly aware that it is important to look at the entire spectrum of movement behaviours, since structured physical activity encompasses a relatively small portion of most individuals' waking time. Therefore, I became interested in health research that seeks to develop a holistic approach to health promotion, looking at the entire spectrum of movement behaviours. Since 2015, I have volunteered in the Program for Pregnancy and Postpartum Health. Within a few months of starting, I learned many different lab techniques, and was interested in becoming more involved. As such, I applied for a summer studentship in the lab, as it was an opportunity to take on a project of my own and become involved in all aspects of research, including data collection, data analysis and dissemination of my results.

CAREER ASPIRATIONS

An essential component of health research, as I see it, is to ensure the effective dissemination of study results to target user groups. This upcoming fall, I will be starting a Master's of Public Health in Health Promotion at the University of Alberta. I have chosen to pursue a career in Public Health in order to develop effective strategies to bridge the gap between health research and its applications. I see myself using health research in collaboration with input from local communities to influence evidence-based health initiatives, programs and interventions aimed at promoting healthy active living for women and children.

FUNDING PARTNER



MORGAN SOSNIUK

RESEARCH PROJECT

When children are born with heart disease, sometimes surgery is required at a very young age. During heart surgeries, an organ in the chest called the thymus is removed so that the surgeon can access the heart. The thymus is important in the maturation and development of a type of immune cells called T cells. At birth, humans have T cells that have already developed but new T cells are produced in the thymus until they are much older. Previous studies to look at how thymus removal changes the immune system in children showed differences in patients with and without a thymus, but there were conflicting reports regarding whether or not there is an impact on children's health. Some studies show increased risk of poor immune function and development of allergies and autoimmune disease while others do not. Additionally, these studies have generally only looked at small numbers of patients. We now have an unparalleled opportunity to collaborate with an ongoing surgical research project to look at the immune system of a large number of young patients undergoing heart surgeries at the Stollery Children's Hospital. Over the coming two years we will study the question of whether removing the thymus in this special group of young patients changes their immune system. Our goal is to have a better understanding of the immune system in young heart surgery patients and to create a database that will allow the long-term follow up of this large patient group. This study is a rare opportunity to study a unique pediatric population, allowing us to develop strategies for better outcomes for their health and well-being. The work that we will do over this summer will look at the types of T cells and other immune cells that these children have before their thymus is removed, establishing an important baseline to compare to samples after thymus removal. The results from this study will allow us to create a control group dataset to use in many studies moving forward.

CAREER ASPIRATIONS

I aspire to pursue a career as a clinician-scientist and I am particularly passionate about the field of transplant immunology. I am entering my third year of the Immunology and Infection program at the University of Alberta and I love being able to apply my knowledge to new challenges in the context of research. My PI Dr. Lori J. West has been an inspiration in her career as a clinician and a researcher and I am thankful to be part of such a supportive lab that does such strong work and impacts a unique patient population. I hope to continue with research throughout my training.

FUNDING PARTNER



SUPERVISOR

Dr. Lori West

PROJECT TITLE

Immune cells in children undergoing cardiac surgery: Studying their type and function

MOTIVATION

I have worked in the West lab for the past three summers and I was motivated to continue my growth as a student researcher as I honed my technical skills and helped further a project I was passionate about. As an immunology student, this project offered opportunities for me to acquire advanced flow cytometry skills and advance my understanding of methods in immune phenotyping. I was also excited to establish a strong baseline that would be useful in many studies moving forward and be involved in elucidating immunological implications of thymectomy. Above all, I was excited to use my passion for basic science and bench work to impact a pediatric patient population.



IRYNA STRYAPUNINA

RESEARCH PROJECT

Zika virus (ZIKV) is a mosquito-transmitted virus that is endemic to many tropical and subtropical regions in the world. The recent Zika outbreak in the Americas resulted in severe economic and public health burdens on the affected countries. Infection in adults is often asymptomatic or limited to flu-like symptoms. However, if Zika virus is contracted during pregnancy, the virus can travel through the placenta to infect the developing fetus resulting in severe neurological and developmental defects. Disease outcomes during Zika infection are likely influenced by extensive interactions between viral proteins and cellular proteins. Identifying and understanding these protein interactions may aid in developing effective vaccines and therapeutics. In a recent research project, I identified several novel interactions between viral and cellular proteins. As part of my WCHRI-supported current research study, I will investigate the interactions between one of the viral proteins (capsid), with two human proteins, nucleolin and DDX27, and their potential roles in the viral life cycle. I expect that the findings from this project will further our understanding of how Zika virus exploits cellular proteins to benefit its replication and help identify novel cellular targets for antiviral therapy.

SUPERVISOR

Dr. Tom Hobman

PROJECT TITLE

Investigating the interaction between Zika virus capsid and host proteins nucleolin and DDX27

MOTIVATION

Zika virus and its teratogenic effect in newborn babies is a huge concern in today's world. I cannot imagine the terror that expecting parents must experience in endemic areas. Although the virus was first isolated in 1947 it has not been linked to microcephaly until the recent outbreak in South and Central America. Therefore, little research has been done on the virus until the 2016 outbreak. Thus, the biggest motivating factor for me is to be able to further our understanding of the viral life cycle and pathogenesis, allowing future treatment discoveries.

CAREER ASPIRATIONS

My future career goals are to attend graduate school and complete a PhD in virology. After, I hope to become a professor with my own research group targeting a pathogenic disease. I also would like to teach university courses throughout my career.

FUNDING PARTNER



MEGAN URE

RESEARCH PROJECT

The level of blood calcium is tightly regulated, to prevent a myriad of symptoms. Central to this, parathyroid hormone (PTH) is secreted in response to low blood calcium. The signal for this occurs through blood calcium no longer binding to the calcium sensing receptor (CaSR). Consequently, the occurrence of low blood calcium levels when blood PTH levels are also low is a rarity. When this occurs in children, it typically causes seizures and is associated with abnormalities in the production of PTH or CaSR signaling. Dr. Alexander has identified a new protein that is mutated in a child with this clinical presentation. We know almost nothing about this protein. The objective of this project is therefore to determine the role of this protein in regulating the production and release of PTH in response to low blood calcium levels. This work will help to establish how mutations in the protein gene cause low calcium levels and low blood PTH. This knowledge will contribute to both our understanding of this rare childhood clinical disorder, but more importantly to calcium homeostasis in general, perhaps opening up new therapeutic targets for diseases of altered calcium homeostasis, such as kidney stones and osteoporosis.

CAREER ASPIRATIONS

I was recently accepted into medical school, so I am thankful that I have seen where clinical knowledge originates.

FUNDING PARTNER



SUPERVISOR

Dr. Todd Alexander

PROJECT TITLE

Identification and characterization of a new gene regulating body calcium

MOTIVATION

I began research because I was intrigued by the scientific process, and started working with Dr. Alexander's laboratory in 2012. This is now my 4th summer in his lab. After exploring other interests, I came back to the laboratory because I can see the importance of research in creating a greater knowledge base for the development of new treatment options.



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