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IMS Supervisors Recruiting SURP 2018 students

First Name	Family Name	Email
Darius	Bägli	darius.bagli@sickkids.ca

Office Phone #	Lab Phone #	Address
416-813-8192	416-813-7775	Sickkids Hospital/Peter Gilgan Centre for Research & Learning

Project Title

Epigenetic Mechanisms in Urologic Disease and Development.

Project Description

Student will conduct studies in one of the following areas:

1/ Epigenetic regulation of cell growth & phenotype in human genital tissues +/- androgen stimulation;

2/ Epigenetic regulation of bladder stem cell and differentiated cell responses to bacterial infection (UTI);

3/ Micro environmental (extracellular matrix) regulation of stem cell differentiation

4/ Micro environmental regulation of smooth muscle growth and differentiation and it s epigenetic regulation

5/ Epigenetic regulation of whole bladder muscle mechanotransduction responses.

Experience in basic cell & molecular lab techniques, cell and tissue culture, and/or small animal handling is an asset.

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First Name	Family Name	Email
Moumita	Barua	moumita.barua@uhn.ca

Office Phone #	Lab Phone #	Address
416-340-4800 x 8007	416-634-7273	2R416-17; Max Bell Research Centre, 200 Elizabeth Street, Toronto ON, M5G 1L7

Project Title

Elucidating the Genetic Epidemiology of Glomerular Kidney Disease.

Project Description

Glomerular kidney disease is an important clinical problem that often leads to kidney failure in affected individuals. The genetic causes of glomerular kidney disease are now only begun to be uncovered, especially after the widespread adoption of next-generation sequencing (NGS) by research laboratories. Dr. Barua's laboratory has access to DNA samples belonging to a cohort of well phenotyped individuals with glomerular kidney disease. Using whole exome and genome sequencing, the laboratory is elucidating the genetic causes in this cohort. The laboratory is seeking a talented summer student who possesses knowledge in computer programming language such as Python. Previous experience in NGS is not required.

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First Name	Family Name	Email
Anne	Bassett	anne.bassett@utoronto.ca

Office Phone #	Lab Phone #	Address
416-535-8501 x 32734	same	Centre for Addiction and Mental Health, 33 Russell St., Main Bldg, 1/F, Toronto, ON M5S 2S1

Project Title

Genetic and clinical predictors for neurodevelopmental, congenital cardiac and related disorders.

Project Description

There is a large genetic component to risk for developmental conditions, including those involving the heart and the brain. The identification of clinical and genetic markers for these diseases would allow earlier diagnosis and development of more effective treatment and potentially preventive strategies. We study human genetic models that significantly increase the power to identify such markers. Working at the University Health Network and Centre for Addiction and Mental Health, and with colleagues at The Centre for Applied Genomics (SickKids), our patient populations and extensive genetic and clinical data offer the opportunity to discover new pathways to fundamental disease mechanisms. Resources include whole genome sequencing data, comprehensive clinical data, long term outcome data, and patient populations with schizophrenia, early-onset Parkinson disease, intellectual disability, epilepsy and congenital cardiac diseases, including those with specific genetic subtypes. These clinical and statistical/bioinformatics based research results have the potential to be immediately translated into clinical practice and have public health implications.

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First Name	Family Name	Email
Mark	Bayley	mark.bayley@uhn.ca *A post-doctoral fellow who will assist with the supervision of the student is Dr. Sarah Munce; sarah.munce@uhn.ca
Office Phone #	**Lab Phone #**	**Address**
416-597-3422 x 3943		Toronto Rehabilitation Institute-University Health Network, 550 University Avenue, Toronto, Ontario, M5G 2A2

Project Title

The impact of vocational interventions on quality of life and social participation in young adults with physical disabilities: a systematic review.

Project Description

The current project will involve a systematic review on the impact of vocational interventions on quality of life and social participation in young adults with physical disabilities (i.e., cerebral palsy, acquired brain injury, spinal cord injury, etc). All English, peer-reviewed studies published from the year 2000-most recent will be included. Literature search strategies will be developed using medical subject headings and text words related to vocational interventions and physical disabilities and the search itself will be peer-reviewed. Numerous electronic databases including MEDLINE, CINAHL, EMBASE, and PsycINFO will be searched. Two reviewers including the student will independently screen titles and abstracts for inclusion, followed by full text screening of potentially relevant articles, and finally, data abstraction and quality appraisal. Abstracted data will include study characteristics and reporting of outcomes. Preference will be for a candidate with experience in systematic reviews, but is not required. The candidate will have also have access to a post-doctoral fellow for additional mentorship opportunities. Findings from this review will help to develop supported employment initiatives for young adults in the LIFEspan (Living Independently Fully Engaged) service.

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Chaim	Bell	chaim.bell@sinaihealthsystem.ca

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416-586-4800 x 2583		Mount Sinai Hospital, 600 University Avenue, Suite 427 Toronto, Ontario M5G 1X5

Project Title

Antimicrobial consumption, ICU onset C-difficile, central line-associated bloodstream infections, ventilator-associated pneumonia, morbidity and mortality in Ontario Intensive Care Units.

Project Description

The Critical Care Information System (CCIS) is a comprehensive source of province-wide information on access to critical care, quality of care and outcomes for critically ill patients. As part of the MoHLTC's Critical Care Strategy, CCIS has been developed to provide real time data on every patient admitted to Level 2 & 3 intensive care units (ICUs) in Ontario's acute care hospitals. It is intended to provide the MoHLTC, LHINs and hospitals with information on bed availability, critical care service utilization and patient outcomes. It has emerged as a rich repository of clinical information with the potential to drive quality improvement initiatives, and inform stakeholders nationally and internationally. The Sinai Health System - University Health Network Antimicrobial Stewardship Program worked with Critical Care Services Ontario to add three data elements into CCIS specific to antimicrobial use in January 2013:

1. days of antibacterial therapy

2. days of antifungal therapy

3. ICU-related onset C. difficile infection

Studying these data elements will provide key insights into antimicrobial treatment trends and variability across Ontario ICUs, leading to improved understanding of the relationship between antimicrobial therapy, ICU-onset C. difficile infections, central line-associated bloodstream infections (CLABSI) and ventilator-associated pneumonia (VAP).

A student with knowledge of statistics would be helpful for this work.

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First Name	Family Name	Email
Manuel	Carcao	manuel.carcao@sickkids.ca

Office Phone #	Lab Phone #	Address
416-813-5367		Division of Haematology/Oncology; Room 9416; Hospital for Sick Children, 555 University Av, Toronto, Ontario, Canada

Project Title

Phenotype – Genotype correlations in Hereditary Spherocytosis.

Project Description

Hereditary Spherocytosis (HS) is an inherited life-long hemolytic anemia. It is the most common reason to perform a splenectomy in children. HS is an amalgamation of disorders of 5 different red cell membrane proteins (Ankyrin, beta and alpha spectrin, Band 3 and protein 4.2). As such these represent subtypes of HS. There are many different mutations that can lead to these subtypes of HS. All of this leads to a disease with considerable phenotypic heterogeneity.

At the Hospital for Sick Children we follow at any given time over 150 children with HS. We have amassed a considerable amount of data on now over 350 children with HS (over the past 15 years) and relevant parents.

We undertake genetic testing to identify the subtype of HS. All of this information has been compiled into a database. However the database is now 2 years out of date and needs updating. From the database we certainly are looking at publishing a number of papers.

The student will work with me and with a fellow to put this data together and will assist with writing up several papers arising from this work.

A good grasp of Excell and statistics would be helpful.

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IMS Supervisors Recruiting SURP 2018 students

First Name	Family Name	Email
Vinod	Chandran	vinod.chandran@uhnresearch.ca

Office Phone #	Lab Phone #	Address
416-603-5192		1E410B, Toronto Western Hospital, 399 Bathurst St., Toronto, ON M5T 2S8

Project Title

Prognosis and Biomarker Studies in Psoriasis and Psoriatic Arthritis.

Project Description

The student will participate in one of a number of ongoing and proposed investigations of the role of biomarkers in susceptibility to and expression of psoriatic arthritis.

The student will be learning molecular techniques such as genotyping, proteomic analyses and will be exposed to research methodology. The student may also be involved in collection and analysis of clinical data and will be exposed to clinical features, assessment and management of patients with rheumatic diseases.

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Douglas	Chepeha	douglas.chepeha@uhn.ca
Office Phone #	**Lab Phone #**	**Address**
416-946-4629	same	200 Elizabeth Street, 8NU 881 Toronto General Hospital

Project Title

Immumohistochemical Characterization of the Invasive Front in Head and Neck Squamous Carcinoma.

Project Description

Background Variations in the tumor-host interface, regarded as the invasive front (IF) could predict tumor invasiveness and account for variability of individual outcomes within similar cancer stages.

Clinical Role: 300 Oral Cavity Squamous Cell Carcinoma (OSCC) resection specimens have been aggregated from a cohort of patients who underwent surgery from 2007-2014. The student will be tasked with updating the clinical data for this patient population from 2014-2017.

Laboratory Role: The student will assist with immunhistochemical staining. The tissue will be sequentially stained for markers of EMT (e-cadherin, n-cadherin vimentin), cancer stemness (CD44), and transcription factors (snail, slug, twist1). The IF and the cores will be photographed and catalogued in an existing the database. In addition, the IHC grading and IF data will be added to the existing OCSCC database.

Importance: Few studies of OCSCC have addressed the correlation of immunohistochemistry to the invasive front (IF). IF is a known clinical variable that is associated with more aggressive tumor characteristics. Understanding the molecular mechanisms contributing to a more aggressive IF should facilitate the investigation of targeted treatment and customization of care. This is a long standing project and although there will be presentation opportunities, independent publication is less likely.

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IMS Supervisors Recruiting SURP 2018 students

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Chung-Wai	Chow	cw.chow@utoronto.ca
Office Phone #	**Lab Phone #**	**Address**
416-340-3512	same	585 University Avenue, 11 PMB 130

Project Title

Help Effects of Air Pollution.

Project Description

There are 2 potential projects available for undergraduate research students, depending on their previous experience.

The 1st project uses animal models of cystic fibrosis and asthma to evaluate the effect of prior exposure to air pollution on exacerbation of the underlying disease. In this study, the undergraduate student will work with a senior graduate student to conduct in vivo nose only pollution exposures, followed by infection with respiratory pathogen. The outcome metrics will include evaluation of lung physiology, assessment of respiratory infection and application of molecular and protein biochemistry techniques to evaluate inflammation. Previous experience with animal handling and bench research are requirements for this project.

The 2nd project is focused on understanding the chemistry of air pollutants, and their effect on lung health in a cohort of participants in northern Alberta. This project will involve travel to Fort McKay Firt Nations and Fort McMurray for 2 to 3 weeks to conduct in home surveys of housedust, complete home and health questionnaires, and collection of bio samples from participants.

Due to the short duration of the Summer Undergraduate Research Program, only students who currently hold valid certifications for Biosafety, Ethics and handling of Biohazards, will be eligible to participate in the study.

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Alan	Cochrane	alan.cochrane@utoronto.ca
Office Phone #	**Lab Phone #**	**Address**
416-978-2500	same	1 King's College Circle Rm 4382

Project Title

Modulating viral RNA processing using small molecules.

Project Description

Many viruses are dependent upon the host cell RNA processing machinery for their replication. Recent studies by my group have been examining these processes in the context of both HIV-1 and adenovirus infection in an effort to identify the host proteins that are key players in supporting virus protein expression. Using high throughput screening techniques, we have also identified multiple small molecules that modulate host protein function to suppress virus replication. Projects are available to examine the underlying mechanism by which these compounds act using a range of molecular biology techniques including cell culture, western blotting, immunofluorescence, in situ hybridization, and qRTPCR. Students will be assigned a subclass of the molecules under investigation and trained in the various techniques to explore the mechanism by which they act, ultimately with the possibility that such insights could lead to novel therapeutics for the treatment of these infections.

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Lihi	Eder	lihi.eder@wchospital.ca

Office Phone #	Lab Phone #	Address
416-323-6400 x 5108		76 Grenville Street, Toronto, ON M5S 1B2

Project Title

The correlation between findings on joint examination and ultrasound findings in patients with psoriatic disease.

Project Description

The project is aimed to assess the relationship between musculoskeletal symptoms, findings on physical examination of the joints and ultrasound findings in patients with psoriasis who present to an early arthritis clinic with musculoskeletal complaints. The patients has been evaluated by a physiotherapist and a rheumatologists for signs and symptoms of arthritis. They also filled out questionnaires regarding their musculoskeletal symptoms. An ultrasound assessment of the joints was performed to detect signs of inflammation in the joints and tendons.

We will evaluate the level of agreement between the physiotherapist, rheumatologist, patient and the ultrasound. The latter method will serve as the gold standard. The student will assist in evaluation of the patients. The student will administer questionnaires, assist in data entry and participate in analysis and interpretation of the results. The candidate should be a medical student.

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416-978-2287	416-978-2033	1 King's College Circle Rm 4180

Project Title

Reprogramming astrocytes as a novel stroke therapy.

Project Description

In vivo reprogramming has generated significant interest as a potential approach to stroke. The aim is to regenerate tissue by directly reprogramming cells *in vivo*, at the site of damage, to replace those lost to injury. While we have shown that astrocytes can be converted to neurons after stroke, it remains unknown whether reprogramming impacts functional outcome, the most clinically relevant measure of stroke recovery. In my lab, we are characterizing the cellular outcome of reprogramming, in terms of numbers and types of neurons produced and examining if there is an improvement in **functional outcome**. We are using behavioural tasks that are reflective of sensory motor ability (gross motor coordination, dexterous forelimb function and gait) and cognitive ability (memory and problem solving) in preclinical models of sensory motor and cognitive stroke.

SURP students will be responsible for neuronal quantification and assessment of **behavioural tasks**. Students will be required to handle animals, following appropriate training, but no previous experience is necessary.

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Tony	George	tony.george@camh.ca

Office Phone #	Lab Phone #	Address
416-535-8501 x 32662	c/o Alexandria Coles (lab manager), CAMH x 36225	100 Stokes Street, BGB 3288 (CAMH)

Project Title

Effects of Repetitive Transcranial Magnetic Stimulation on Cannabis Use in People with Schizophrenia.

Project Description

The prevalence of cannabis use disorder (CUD) in people with schizophrenia is ~25% compared to <3% in general population, and is associated with poorer functional outcomes, early onset of psychosis and symptoms exacerbation, and higher rates of psychiatric hospitalization. This NIH-funded study specifically tests the effects of active (n=20) versus sham (n=20) high frequency rTMS (20 Hz) delivered by a standard Figure-8 TMS coil on cannabis use and cognitive outcomes in a total of N=48 patients with schizophrenia and co-morbid CUD, in a 4-week, single-blind, randomized, parallel groups controlled trial. which we have shown to be effective in the schizophrenia CUD population. The primary outcome measure would be trial endpoint self-reported cannabis use assessed by timeline follow-back confirmed by cannabis urine toxicology. Secondary outcome measures include neurocognitive outcomes (e.g. verbal memory and learning, working memory), cannabis craving and withdrawal and psychosis symptom ratings (Positive and Negative Symptoms Scale for Schizophrenia, Calgary Depression Scale for Schizophrenia). We predict that active versus sham rTMS would significant reduce cannabis use and increase trial endpoint negative cannabis urine frequency, and improve neurocognitive outcomes such as verbal learning and memory and working memory, as well as reductions in withdrawal and craving, positive and negative symptoms of psychosis in schizophrenia.

The student would be involved with subject recruitment, screening and study assessments of cannabis use, craving, withdrawal and cognitive function.

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416-603-5753		1E410B, Toronto Western Hospital, 399 Bathurst St., Toronto, ON M5T 2S8

Project Title

Prognosis Studies in Psoriasis and Psoriatic Arthritis.

Project Description

Psoriatic arthritis (PsA) is a complex disease both clinically and genetically. In addition to the arthritis and cutaneous manifestations of the disease, there are also significant co-morbidities. Prognosis studies are carried out to identify predictors for progression of joint damage, mortality, and the development of cardiovascular disease and metabolic syndrome. These predictors include demographic and clinical features, as well as genetic and serum biomarkers.

The student will participate in one of a number of ongoing and proposed studies related to the prognosis psoriatic arthritis including assessment of outcomes and comorbidities in these patients and factors related to these outcomes.

The student will collect clinical data, administer instruments of health status, collate information and participate in the analysis of data. The student will be exposed to clinical research methodology as well as learn the clinical features, assessment and management of patients with rheumatic diseases.

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IMS Supervisors Recruiting SURP 2018 students

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Office Phone #	Lab Phone #	Address
416-813-7654 x 205115	416-813-7654 x 201915	The Hospital for Sick Children, 555 University Ave, Room 5447, Toronto, ON

Project Title

Measuring medical students' comfort and self-efficacy performing physical exams on patients with obesity.

Project Description

Background: As the prevalence of obesity in Canada continues to rise, it is imperative that medical students and physicians are trained to adapt and perform physical examinations on patients with obesity. Traditional training of physical examinations can be particularly challenging in patients with obesity as internal structures are underneath a thick layer of adipose tissue. There is currently a paucity of information related to medical trainee comfort and training in this area.

Aim: Assess medical students' comfort and self-efficacy in performing physical exams on patients with obesity.

Methodology: The successful summer student will conduct a literature review, develop and administer a comprehensive survey using REDCap software, and analyze outcome measures, including comfort and self-efficacy and their association with a number of descriptive statistics. The summer student will present their findings at the SickKids Summer Student Symposium and the University of Toronto SURP Research Day.

Impact: Results of this work will be used to inform the need for an education platform to train medical students on performing physical exams on patients with obesity.

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Elise	Heon	erika.tavares@sickkids.ca

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416-813-8606	416-813-7654 x 301510	The Hospital for Sick Children, PGCRL (Peter Gilgan Centre for Research and Learning), Genetics and Genome Biology, 686 Bay St., Rm 14-9400, Toronto, ON

Project Title

Identification of disease causing mutations in inherited eye disorders using next-generation sequencing data and validation assays.

Project Description

This project will involve the study of cases affected with inherited retinal disease using bioinformatics analysis of whole exome/genome sequencing. The candidate will learn to look for pathogenic variants using a number of bioinformatics tools, and the subsequent variant validation and family segregation by PCR, Sanger sequence, restriction enzyme digest. The student will be exposed to R coding, primer design, PCR, electrophoresis; assessment of variants using databases (gnomAD, ExAc, 1000 genomes, PolyPhen, sift, among others). Some projects might require functional validation on cDNA or cell lines. In addition the candidate will be exposed to the vocabulary surrounding diseases and what defines a phenotype. Candidates are expected to know how to review the literature on a topic on their own be an active learner, team player and have high ethics. Candidates with relevant experience will be favored.

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Office Phone #	**Lab Phone #**	**Address**
416-480-6703		2075 Bayview Ave., Rm D704, Toronto, ON M4N 3M5

Project Title

Elucidating the role and regulation of uncoupling proteins post-burn.

Project Description

Burn injuries induce chronic systemic hypermetabolism which, if left unchecked, increases the risk of organ failure, infection, sepsis and death. We have recently shown that the adipose reacts to thermal injury by browning, thus increasing the density and uncoupling of mitochondria (Abdullahi et al. Trends Endocrinol Metab, 2016; Patsouris et al. Cell Rep, 2015). Furthermore, we have preliminary data that other tissues, such as the liver and muscle, also respond to burn injury by increasing the expression of uncoupling proteins (UCPs). As these contribute to the increase in resting energy expenditure and thus the hypermetabolic phenotype, a thorough understanding of their regulation and role in burns is required to guide pharmaceutical interventions.

The ideal student will have a background in basic biochemistry. Experience with pipetting, preparing buffers, electrophoresis, cell culturing and data analysis are assets. Using a murine model of burn trauma, tissues will be harvested and analyzed via Western blotting for uncoupling proteins and Seahorse XF96 analysis for mitochondrial respirometry. In vitro models using fat explants will also be applied to further our understanding of mitochondrial uncoupling post-burn.

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Office Phone #	Lab Phone #	Address
416-480-6703		2075 Bayview Ave., Rm D704, Toronto, ON M4N 3M5

Project Title

Investigation of the effects of polysaccharide based materials and mesenchymal stem cells on wound healing in pigs.

Project Description

PI: Marc Jeschke, MD, PhD (Lab Group: Stem Cell, Lab Supervision: Gertraud Eylert, Andrea Datu).

Project: In an established porcine model we are investigating the different polysaccharide based materials which are produced in our laboratory. These materials applied onto skin in order to provide coverage in wounds contain incorporated mesenchymal stem cells. The progress of wound healing with stem cells will be examined based on histology. Student work among others: Histology Staining, Immunohistochemistry Staining, Microscopy, Cell Counting, Measuring Wounds and Histology Pictures with ImageJ (Computer Program), Literature Review.

Experience required: Knowledge of skin structure, good eye/exact/precise measurement skills, PubMed Library Knowledge.

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Office Phone #	Lab Phone #	Address
416-480-6703		2075 Bayview Ave., Rm D704, Toronto, ON M4N 3M5

Project Title

Investigating the Wnt/Beta-Catenin pathway as a regulator of hepatic hypermetabolism in thermal injury.

Project Description

The preservation of liver function is an important factor in the survival of thermal injury patients, with dysfunction of this organ contributing to the adverse hypermetabolic and hyperinflammatory effects characteristic of severe burn injuries. Beta-Catenin, the main mediator of the Wnt signaling pathway, is a crucial factor in the maintenance of homeostasis. Among its many functions are regulation of glucose metabolism via glycolysis, and cell survival. We hypothesize that Wnt signaling is deregulated in the liver following thermal injury, with consequences for liver glucose metabolism. To investigate this, we are investigating Wnt/beta-catenin levels and activity at different time points post-injury in the livers of mice subjected to a 30% total-body-surface area burn. Methods of analysis include immunoblotting, qPCR, immunohistochemistry, histology, and metabolic assays.

As the Wnt/beta-catenin pathway is a major regulator of liver homeostasis and metabolism, understanding the workings of this signaling regulator in response to burn injury may provide a future therapeutic target for liver hypermetabolism.

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416-978-7938		340 College Street, Suite 400, Toronto, ON M5T 3A9

Project Title

Eyeglass Insurance Coverage and Association with Visual Impairment and Use of Eye Care Providers in Canadians.

Project Description

Vision problems due to refractive error are common (57%) and readily correctable. However, the cost of a pair of prescription eyeglasses in Canada is expensive and is not covered by any of the Canadian provincial health insurance plans. The majority of Canadians thus must pay out-of-pocket, or rely on private or employer-sponsored insurance plans to obtain optical correction. It is unknown if lack of insurance coverage for eyeglasses/contact lenses is associated with decreased visits to an eye care provider and increased burden of visual impairment in Canada, particularly in Canadians aged 20-64 as the cost of routine eye exams by an eye care provider in this age group is currently not covered by any of the Canadian provinces.

Using data collected from the Canadian Community Health Survey, the aims of this study are 1) to understand the frequency and source of eyeglass insurance coverage, 2) to investigate if lack of eyeglass insurance coverage is associated with less utilization of an eye care provider, and 3) to exam if lack of eyeglass insurance coverage is associated with increased prevalence of self-reported visual impairment. The sample size is very large. An ability to use a statistical software (e.g. SAS) is a must.

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Jennifer	Jones	jennifer.jones@uhn.ca

Office Phone #	Lab Phone #	Address
416-581-8603		200 Elizabeth Street, B-PMB-148

Project Title

Cancer Rehabilitation and Survivorship.

Project Description

Despite the increasing incidence of cancer, mortality rates have dropped significantly over the past three decades. For the majority, cancer can now be viewed as a curable or chronic disease and as advances continue in cancer control, the numbers of people surviving cancer will continue to rise. In response, there has been a recent surge of attention paid to the field of cancer survivorship leading to efforts to manage treatment related sequelae, enhance quality of life and improve the overall functioning of people who are receiving long-term follow-up care after cancer treatment. The Health, Wellness and Cancer Survivorship Centre (ELLICSR) at University Health Network (UHN) is a research facility that houses researchers and self-management research facilities and offers the opportunity to examine new approaches to predict, prevent and manage long-term adverse effects of cancer and its treatment.

IMS SURP student will have the opportunity to participate in one of a number of ongoing studies related to the detection, prevention and treatment of cancer treatment related sequelae as well as knowledge translation and health systems research. The goal is to provide the student with a broad research training experience with the direct support of the experienced research team and supervisor.

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Sheena	Josselyn	sheena.josselyn@sickkids.ca

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416-813-7654 x 301824	416-813-6898	686 Bay Street – Peter Gilgan Centre for Research and Learning – The Hospital for Sick Children

Project Title

Making memories in Mice.

Project Description

My lab is interested in understanding how the brain encodes and stores information. This project examines how different memories are stored using mouse models.

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Farzad	Khalvati	farzad.khalvati@utoronto.ca

Office Phone #	Lab Phone #	Address
647-505-4268		The Lunenfeld-Tanenbaum Research Institute, Mount Sinai Hospital

Project Title

Radiomics-based Prognosis Analysis of Cancer.

Project Description

This research will focus on quantitative imaging biomarker discovery and validation for cancer prognosis (e.g., prostate, pancreas) using MRI and CT images via machine (deep) learning, statistical analysis, and medical image analysis. The main objective is to design quantitative imagine biomarkers for cancer prognosis via conventional image analysis, novel deep learning, and combination of survival analysis with deep learning approaches. The main expertise required for this project includes machine (deep) learning and statistical analysis.

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First Name	Family Name	Email
James	Kennedy	jim.kennedy@camh.ca

Office Phone #	Lab Phone #	Address
416-979-4987		250 College Street

Project Title

Pharmacogenetics of Medication Treatment in Neuropsychiatry.

Project Description

Our research aims to revolutionize the way that doctors write prescriptions. The data generated in the IMPACT (http://impact.camhx.ca/en/home.php) study will provide new genetic discoveries that will continuously improve the clinical validity and utility of pharmacogenetic testing to guide treatment with psychiatric and other medications (analgesics, anti-hypertensives…). In addition to current investigations, we will use new genomic methods including DNA variant function from novel remote enhancers, 3D chromatin structure, and DNA methylation studies to develop the new area of pharmaco-epigenetics. We will test these discoveries in large patient populations across the province and clinical trials. We have already tested over 9000 patients via our Ontario IMPACT study and we are completing the largest randomized controlled trial in Canada of a pharmacogenetic test via Genome Canada funds (2014-18).

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Office Phone #	Lab Phone #	Address
416-340-4010	416-581-7500	200 Elizabeth Street, N9-946

Project Title

Technical and Clinical Validation of a Tissue Processing Platform.

Project Description

In order to facilitate the adoption of rapid, point-of-care diagnostics in lung transplantation, a solid lung biopsy section must be processed quickly. Currently, biopsies are taken and stored in liquid nitrogen for downstream analysis, at which time the samples are ground, manually, using a mortar and pestle. This is not practical for use with point-of-care diagnostics, especially those requiring a rapid turn-around time.

Currently, there are no predicate devices that exist as single-use-only (SUO) biopsy processing technologies. As such, this work aims to develop a rapid and efficient platform for nucleic acid extraction from lung tissue biopsies for use in downstream analysis. The development of the proposed device will encompass the following aims:

Objective 1 - Technical Validation of the Tissue Processing Device

1.1 Platform Limitation Determination

- Characterization of the biopsy for optimal performance

Objective 2 - Clinical Validation of the Tissue Processing Device

2.1 Optimization of MagBead characteristics for application-specific uses

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416-813-7654 x 309419	416-813-7654 x 309452	686 Bay Street

Project Title

Pathophysiology of DGKE-associated atypical hemolytic-uremic syndrome (aHUS).

Project Description

Our lab has two main "arms". First, we have expertise in doing gene discovery using whole exome sequencing focusing on patients with rare pediatric kidney diseases. Second, we then perform functional analyses in cell and animal models to figure out how/why the novel genes identified through our genomic studies cause diseases. Right now, our efforts are channeled into delineating the pathophysiological processes that lead to the formation of blood clots in small vessels of the kidneys of infants that have mutations in a gene named DGKE. This condition, atypical hemolytic-uremic syndrome, is serious for patients because most develop renal failure. A better understanding of the disease should help identify potential treatments - currently there are none.

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IMS Supervisors Recruiting SURP 2018 students

First Name	Family Name	Email
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Office Phone #	Lab Phone #	Address
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Project Title

Role of miR-26a in abdominal aortic aneurysm (AAA) progression

Project Description

The focus of the project is to elucidate the role of miR-26a in abdominal aortic aneurysm (AAA) progression. In vitro testing for various markers under stress/inflammatory conditions replicating cellular processes that occur in AAA may help elucidate the mechanism of action of miR-26a. Testing will be done on vascular smooth muscle cells and endothelial cells.

Experience with tissue culture and basic molecular biology techniques would be an asset, but not absolutely critical to the project.

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416-323-7727	416-323-7727 x 2215	790 Bay Street, Suite 420

Project Title

Characterization of HUCPVC-derived extracellular vesicles as potential cell-free therapies.

Project Description

Mesenchymal stromal cells (MSCs) derived from various tissues including bone marrow, adipose tissue and umbilical cord tissue have gained much attention in the field of regenerative medicine and immune-therapies.

It has recently been discovered that extracellular vesicles (EVs), including exosomes, secreted by MSCs can mediate some of their regenerative properties.

We have optimized methods for the isolation of human umbilical cord derived perivascular cells (HUCPVCs), a rich source of MSCs with high regenerative potential, and characterized the small RNA content of these EVs using next generation sequencing.

The objectives of the summer project will be to 1) validate the expression of candidate miRNAs, identified through gene pathway analysis, that could be involved in mediating the pro-angiogenic, anti-inflammatory and neuroprotective effects of HUCPVCs, 2) to compare the effect of culture conditions (ie. hypoxia) on the profile of miRNAs secreted and 3) to investigate the regenerative and immunomodulatory properties of HUCPVC-EVs using in vitro assays. Previous experience with cell culture and molecular biology techniques as well as bioinformatics is preferred.

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IMS Supervisors Recruiting SURP 2018 students

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416-581-7501	416-851-7500	Latner Thoracic Surgery Research Laboratories, 101 College Street, PMCRT 2nd fl. 2-817, Toronto, ON M5G 1L7

Project Title

Acute lung injury in lung transplantation.

Project Description

To be supervised by a graduate student or a research fellow, to participate in a biomarker discovery, validation and pathway analyses. The student is expected to conduct literature review, bioinformatics analyses, experimentation including cell culture and biochemical studies and/or immunohistological studies. Students with previous research experience are encouraged to apply.

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IMS Supervisors Recruiting SURP 2018 students

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David	Malkin	david.malkin@sickkids.ca

Office Phone #	Lab Phone #	Address
416-813-5348	416-813-8206	The Hospital for Sick Children, 555 University Avenue, Toronto. M4G 1X8

Project Title

Molecular determinants of chemoprevention in Li-Fraumeni syndrome.

Project Description

Li-Fraumeni syndrome (LFS) is a genetic disorder in which carriers of a mutant TP53 gene are at high lifetime risk of a wide spectrum of early onset cancers. Our lab is exploring the genetic architecture of tumors from LFS patients to identify potential targets for early tumor detection in circulating plasma, as well as potential targets for novel chemoprevention strategies. The student will work under the direct supervision of a graduate student/post-doctoral fellow in utilizing skin-derived fibroblasts from LFS patients to examine how different agents that activate mutant p53 may inhibit transformation. At the same time, the student will have the opportunity to expand their work to include a murine model of LFS (that habours mutant p53) to explore the effects of these agents *in vivo*. This work will entail some working knowledge of genetics and./ or cell biology.

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Project Title

Ultrasound activation of nanoscale contrast agents for cancer.

Project Description

Cancer is a leading cause of premature death in Canada. A major obstacle in cancer treatment remains the effective and uniform delivery of cancer drugs to solid tumours *in vivo*. In this project, the student will optimize new nanometer-scale agents that can be activated by ultrasound to locally deliver cancer drugs at a precise location as determined by medical imaging. The student will be responsible for synthesizing and characterizing the agent, and determining the biological impact of the ultrasound trigger on target and non-target cells and tissue, with and without the drug. A strong background in basic chemistry, biology, physics and/or hands-on experience with in vitro cell and *in vivo* mouse tumour models would be an asset. A strong work ethic, a desire to learn, and the ability to work effectively in a team environment is required.

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IMS Supervisors Recruiting SURP 2018 students

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Project Title

The influence of heterogeneity in HIV risk and adherence to pre-exposure prophylaxis: a mathematical modeling study.

Project Description

The student will study the influence of heterogeneity in HIV susceptibility (risk of acquisition) and heterogeneity in adherence to HIV pre-exposure prophylaxis (PrEP) on the predicted impact of PrEP in reducing transmission at a population level. The student will modify an existing mathematical model of HIV transmission and PrEP among gay, bisexual, and other men who have sex with men in Ontario. Required experience/background skills include: undergraduate mathematics (calculus, numerical methods, linear algebra, probability distributions) and/or systems or fluid dynamics; experience with scripting and/or programming languages (specifically, R/Matlab/Octave; and/or JAVA, C++, etc.); attention to detail, scientific reproducibility, and aptitude in data-visualization. An understanding of HIV epidemics in Canada, and experience in the field is preferred. The student will also perform the relevant literature review to identify parameters for the model; and fit probability distributions to empirical data. The student will work with a team of mathematical modelers, epidemiologists, community researchers with lived experience, and clinicians engaged in HIV prevention and care.

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Office Phone #	Lab Phone #	Address
416-813-7718		The Hospital for Sick Children, 555 University Avenue, Toronto, ON M5G 1X8

Project Title

Cardiac Precision Medicine Program.

Project Description

The Cardiac Precision Medicine Program of the Ted Rogers Centre for Heart Research is a program focused on developing individualized genome-driven therapies for heart failure including congenital heart disease. Much of the research undertaken by the program is driven by retrospectively banked specimens and data from the programs biorepository (Heart Centre Biobank Registry) of over 8,000 enrolled participants. Students may participate in a variety of research activities related to this program which could include: research tool development, obtaining family history, reviewing questionnaires, reviewing medical records, data entry, analyzing genetic & environmental risk factors for heart disease based on population, writing a proposal, gathering and analyzing data for their project and submitting results for presentation.

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Project Title

Imaging Alterations in Endocannabinoid Metabolism in Clinical High Risk and First Episode Psychosis Institution.

Project Description

In this study, trainees will investigate the link between markers of oxidative stress, Glutamate and GABA in the brain and different PET markers in the Central Nervous System (CNS). This work is done in collaboration with Dr. Napopon Sailasuta. Dr. Sailasuta is Senior Scientist in the Research Imaging Centre in the Campbell Family Mental Health Research Institute at the CAMH and Dr. Pablo Rusjan Senior Scientist at the PET imaging Center. Together with Dr. Mizrahi novel neurochemical biomarkers in schizophrenia and those at risk will be investigated to uncover novel molecular targets for newer interventions.

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Istvan	Mucsi	istvan.mucsi@utoronto.ca

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Project Title

Developing a linguistically and culturally competent guide to kidney transplantation for Chinese Canadians.

Project Description

We will develop an education program about kidney transplantation (KT) that will address culturally defined barriers and specific health education needs of Chinese Canadians. Compared to dialysis or deceased donor kidney transplantation (KT), living donor KT (LDKT) is the optimal treatment for most patients with advanced kidney disease. Compared to Caucasians, Chinese Canadians are less likely to undergo LDKT. In Ontario, Chinese Canadians are also less likely to register to deceased organ donation compared to the general public. Lack of transplant related knowledge, lack of understanding of the transplant process, lack of awareness about the benefits of LDKT, concerns about safety of the donor or culturally determined negative attitudes towards surgery or LDKT contribute to barriers for patients to pursue LDKT. We will conduct focus groups among Chinese Canadians (patients with advanced kidney disease and members of the community) to understand culture specific barriers to kidney transplantation and living donor transplant and their culture specific education needs. We will then engage patients, community leaders and faith leaders to help us produce culturally competent kidney transplant education package.

Students` role: Literature review; organizing a professional and patient panel; organizing collaborations with external community groups; organizing focus groups, enrolling patients; contributing to content analysis; data entry, data cleaning; preparing abstracts, posters for conferences.

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IMS Supervisors Recruiting SURP 2018 students

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Office Phone #	Lab Phone #	Address
416-340-4084		Toronto General Hospital, PMB 11C-188, 585 University Avenue, Toronto, ON

Project Title

Developing a linguistically, culturally and religiously competent guide to kidney transplantation for Muslim Canadians.

Project Description

We will study the cultural and religious barriers that prevent Muslim communities from accepting kidney transplantation. We will develop a culturally and religiously sensitive educational package about kidney donation and living donor kidney transplant (LDKT) to address cultural and religious barriers and specific health education needs of Muslim Canadians. Kidney transplantation (KT) is the optimal treatment for most patients with advanced kidney disease. Compared to Caucasians, patients with South Asian and Middle-Eastern background are less likely to receive LDKT.

Many of these patients belong to the Muslim community. Lack of transplant related knowledge, lack of understanding of the transplant process, lack of awareness about the benefits of LDKT and concerns about the religious position of Islam about LDKT and organ donation contribute to barriers to transplant.

We will conduct focus groups among members of the Muslim Canadian community (patients with kidney disease and members of the community) to understand culture specific and religious barriers to transplant. We will engage patients, community leaders, Muslim organizations and faith leaders to help us produce culturally and religiously sensitive KT education package.

Students` role: Literature review; organizing collaborations with external community groups; enrolling patients; organize focus groups; contributing to content analysis; data entry, data cleaning; preparing abstracts, posters for conferences.

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Office Phone #	Lab Phone #	Address
416-340-4084		Toronto General Hospital, PMB 11C-188, 585 University Avenue, Toronto, ON

Project Title

Electronic patient reported outcome measures to guide systematic symptom and distress management among kidney transplant recipient.

Project Description

Patient Reported Outcome Measures (PROMs) are “report of the patient’s health condition that comes directly from the patient, without interpretation by a clinician or anyone else”. PROMs include instruments that assess the impact of the disease and treatment from the patient’s perspective, and assess symptoms, emotional, cognitive and physical functioning and Quality of Life. Integrating patient reported outcome measures (PROMs) into routine clinical care improves the accuracy and completeness of clinical assessment and the prediction of illness trajectory.

To use PROMs to inform clinical management we need tools with superb measurement characteristics that are not burdensome. The tools developed by the NIH Patient Reported Outcomes Measurement Information Systems (PROMIS) project are generic measures, that can be used in diverse patient populations. They can be administered as computer adaptive tests (CATs) that are computer based questionnaires that administer the participant’s next question based on previous responses. The system produces an accurate, reproducible score, with reduced question burden.

We will develop an electronic patient reported outcome measure platform, primarily using PROMIS CATs for regular symptom, distress and adherence monitoring in kidney transplant recipients. We will validate these tools and will run clinical implementation pilots to assess feasibility and sustainability.

Students` role: Literature review; organizing collaborations with external community groups; organizing focus groups, enrolling patients; contributing to content analysis; data entry, data cleaning; preparing abstracts, posters for conferences.

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Office Phone #	Lab Phone #	Address
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Project Title

Ethnocultural barriers to living donor kidney transplantation (LDKT).

Project Description

We investigate ethnocultural barriers to LDKT in patients with chronic kidney disease (CKD). Compared to dialysis or deceased donor kidney transplantation (KT), LDKT is the optimal treatment for most patients with advanced CKD. Compared to Caucasians, patients with East or South Asian or African Canadian background are less likely to undergo LDKT. The reasons for this ethnic disparity are unknown.

In the study we assess ethnocultural background; transplant knowledge and readiness to accept LDKT using validated questionnaires. Questionnaires will be completed on iPad tablets. Hypothesis: Compared to Caucasians, patients of Asian or African background are less likely to have a potential LD identified and are less ready for LDKT. Three research sites are involved: Kidney Transplant Programs at Toronto General Hospital and at St. Michael's Hospital and the Renal Program at Humber River Hospital. Potential other sites: Sunnybrook Hospital; Scarborough General Hospital; Brampton Civic Hospital.

Patients who are referred for assessment for KT will be invited to participate. Target sample size is 600.

Students' role: Literature review; enrolling patients; collecting data using electronic data capture system; data entry, data cleaning; analysis of data using STATA statistical software; preparing abstracts, posters for conferences; writing manuscripts. Experience with STATA is an advantage.

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416-340-4084		Toronto General Hospital, PMB 11C-188, 585 University Avenue, Toronto, ON

Project Title

Psychosocial barriers to living donor kidney transplantation (LDKT).

Project Description

We investigate psychosocial barriers to LDKT in patients with chronic kidney disease (CKD). Compared to dialysis or deceased donor kidney transplantation (KT), LDKT is the optimal treatment for advanced CKD. However, only 30-40% of kidney transplant recipients receive LDKT in Canada. The reasons for the underutilization of LDKT are not known.

Modifiable psychological problems such as depression and avoidant attachment style are important determinants of poor interpersonal and patient-healthcare provider relationship and may prevent effective communication with potential living donors.

We assess depression, anxiety, and adult attachment style; readiness to accept LDKT using validated questionnaires. Questionnaires are completed on iPads. Hypothesis: Depression and avoidant attachment is associated with reduced odds of having a potential LD identified and less readiness for LDKT. Three research sites are involved: Kidney Transplant Programs at Toronto General Hospital and at St. Michael's Hospital and the Renal Program at Humber River Hospital. Patients referred for assessment for KT will be invited to participate. Target sample size is 600.

Students' role: Literature review; enrolling patients; collecting data using electronic data capture system; data entry, data cleaning; analysis of data using STATA statistical software; preparing abstracts, posters for conferences; writing manuscripts. Experience with STATA is an advantage.

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IMS Supervisors Recruiting SURP 2018 students

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Daniel	Mueller	daniel.mueller@camh.ca

Office Phone #	Lab Phone #	Address
416-535-8501 x 36851		250 College Street, Room 132

Project Title

Unraveling the genetic overlap between outcome to antipsychotic medications with risk of schizophrenia and obesity using polygenic risk scoring.

Project Description

Schizophrenia (SCZ) is a severe, devastating disorder with a life-time prevalence of 1% and is treated primarily with antipsychotic (AP) drugs. Despite clinical efficacy of APs, these medications are associated with common side effects such as marked antipsychotic-induced weight gain (AIWG). Gene involved in AIWG have shown to 'overlap' with some genes implicated in obesity and other metabolic disturbances including metabolic syndrome. For example, studies have shown that obesity-risk genes such as MC4R and FTO are also associated with AIWG. The aim of the study is to use our GWAS data set to explore genetic overlap between AIWG and risk for diabetes type 2 (T2D), antipsychotic response and risk of schizophrenia. The genetic overlap will be assessed using the polygenic risk scoring (PRS), an important discovery tool in computational genomics. Given that AIWG is also associate with better response to treatment, we hypothesize that correlation between treatment response and severity of AIWG might be genetically correlated.

The successful candidate will be supervised to learn PRS as well as standard bioinformatic program such as PRSice and PLINK. Previous experiences with R and/or SPSS, would be an asset. Basic knowledge about human genetics is required.

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IMS Supervisors Recruiting SURP 2018 students

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416-813-7654 x 302328	416-813-7654 x 303388	PGCRL, SickKids

Project Title

Regulating Neutrophil Extracellular Trap (NET) formation.

Project Description

Neutrophils can cast NETs that can trap microbial pathogens and/or damage tissues and organs. Unregulated NETosis can cause severe damage to lungs. Therefore, it is important to regulate unwanted NET formation to treat NET-mediated inflammatory lung diseases.

My lab aims to determine the molecular mechanisms responsible for NETosis and to identify drugs that could regulate NET formation. Without the understanding of mechanisms appropriate drugs cannot be discovered with systematic studies.

The SURP students will participate in one of the several ongoing projects that aim to determine the molecular mechanisms and to identify drugs for regulating NETosis. These projects are suitable for 3rd or 4th year students who have strong background in molecular biology, biochemistry and immunology with sufficient hands on research skills.

Typical experiments involve NETosis assays (Sytox Green plate reader), immunocytochemistry, confocal microscopy, Western blots, statistical tests, data analyses/interpretation and generating figures.

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416-813-6459	416-813-301868	555 University Ave, Toronto, ON M5G1X8

Project Title

Insight into Nephrotic Syndrome (INSIGHT).

Project Description

INSIGHT is a longitudinal observational study of childhood nephrotic syndrome aiming to determine genetic, serologic and environmental factors contributing to nephrotic syndrome and disease progression. Participants are recruited from Toronto, Ontario and surrounding regions. INSIGHT is a designed to investigate the influence of socio-demographic, environmental, clinical, and genetic factors in short- and long-term outcomes of nephrotic syndrome. The overall aims of this study are to determine 1) socio-demographic, environmental, and genetic factors that influence disease susceptibility; 2) rates of steroid treatment resistance and steroid treatment dependence, and identity factors that may modify treatment response; 3) clinical and genetic factors that influence disease susceptibility and progression to chronic kidney disease and end-stage renal disease; and 4) the interaction between course of illness and socio-demographic, environmental, and clinical risk factors. The student may be expected to participate in patient recruitment and follow-up activities in a clinical setting. The student will also be expected to do data entry, verification and analysis. Prior experience with a patient recruitment is essential.

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IMS Supervisors Recruiting SURP 2018 students

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Project Title

The impact of HIV antiretroviral exposure in utero on brain development.

Project Description

The specific risks associated with exposure of the developing fetus to HIV anti-retrovirals (ARVs) in utero are not fully known. Treatment strategies have shifted to earlier initiation of ARVs, which means that the majority of HIV+ women come into a pregnancy having already initiated ARVs for their own health. This implies that the developing fetus is exposed for the entire duration of pregnancy to ARVs for which we have limited pregnancy-relevant safety/toxicity data. Data suggests that infants exposed in utero to ARVs may have neurological deficits. The objective of this study is to establish the effects of in utero exposure to ARVs on brain morphology in a mouse model.

We are looking for a motivated student, with exceptional attention to detail, a good work ethic, and a friendly, collaborative attitude who will assist in the performance of these experiments. The student will be working with a research associate. The project will involve histological examination of mouse brains and potentially other organs, including sectioning, staining, and microscopic examination. The project may require handling and sacrificing of mice.

Training will be provided. The student may be required to complete a mouse-handling course. Occasional work on the weekend may be required.

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IMS Supervisors Recruiting SURP 2018 students

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Office Phone #	**Lab Phone #**	**Address**
416-978-0343	same	160 College Street, Rm 530

Project Title

Antibody-antisense conjugates control gene expression in glioblastoma stem cells.

Project Description

Glioblastoma stem cells (GSCs) are invasive, treatment-resistant brain cancer cells that cause cancer recurrence. Downregulated in renal cell carcinoma (DRR), also called FAM107A, is a genetic driver of GSC invasion. To prevent GSC invasion we aim to specifically target and reduce DRR/FAM107A expression. We are developing antibody-antisense oligonucleotide conjugates using antibodies against antigens expressed on the glioblastoma stem cells, such as CD44 and EphA2, and chemically modified antisense oligonucleotides (AONs) against DRR/FAM107A designed as a chimera of DNA and 2'-deoxy-2'-fluoro-beta-D-arabinose (FANA) for increased nuclease stability and mRNA affinity. Specifically, the student will be performing drug screens and running western blots. Other activities could include studying trafficking of the antibody-drug conjugates by using commercially available reagents to label cell compartments or performing flow cytometry to measure antigen expression and drug internalization. Some experience with cell culture would be preferred but not required.

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IMS Supervisors Recruiting SURP 2018 students

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Project Title

Developing a Novel Protein Delivery Strategy for Treatment of Spinal Cord Injuries.

Project Description

The Shoichet laboratory has developed a minimally invasive hydrogel for sustained delivery of therapeutic proteins to spinal cord injuries. The objective of this project is to improve upon the current hydrogel design to allow controlled release of multiple proteins from the delivery vehicle. The student will be responsible for expressing therapeutic proteins of interest in E.coli, purifying proteins for use, fabricating hydrogels, and evaluating protein release from the hydrogels. Controlled release of proteins will be optimized by varying the properties of the hydrogel. Since the student will be participating in a range of activities in the lab, there will be opportunities to gain significant expertise in hydrogel chemistry, molecular biology, and protein engineering. Prior wet lab experience is recommended, and any previous experience in a biology or chemistry lab is an asset.

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Project Title

Defining the immunocellular/molecular pathways driving autoimmune disease.

Project Description

This project is aimed at discovery of the cellular and molecular pathways that lead to the aberrant immune responses driving rheumatoid arthritis (RA) and other autoimmune diseases. The specific goal of this research is to identify immune cellular/molecular profiles associated with important clinical outcomes such as drug nonresponsiveness. To this end, the project will involve the analysis of blood samples from RA patients using immunoprofiling technologies such as flow cytometry and transcriptome profiling.

The patients to be studied have been followed since the time of disease, with blood samples collected before and after treatment and across the course of disease. By using multiplexed flow cytometry analysis to study cells stained with a spectrum of immune cellular markers, the immune cell subsets will be quantitated and assayed for activation status in each patient over the course of disease. Similarly transcriptome profiling performed using RNA-Seq will allow for characterization of immune cell gene expression profiles in each patient across time.

Together these data will provide new understanding of the causes of RA, and potentially, diagnostic biomarkers for guiding patient treatment. This summer studentship will thereby provide opportunities to gain expertise in some key approaches and technology utilized in translational immunology research.

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Project Title

Identification of early predictors of response to telephone cognitive behavioural therapy for disordered eating in obesity management.

Project Description

Obesity is a complex medical condition with multiple drivers including mental health related factors. Our research lab has conducted a series of trials examining the efficacy of telephone-based cognitive behavioural therapy (tele-CBT) in patients with severe obesity who are pre- and post-bariatric (weight loss) surgery. To date, 4 studies have been completed that have led to a large CIHR funded multi-site randomized controlled trial examining the long-term efficacy of tele-CBT after bariatric surgery. The SURP student will have a unique opportunity to conduct research using data from the 4 previously completed studies to identify early predictors of response to tele-CBT before and after bariatric surgery. We hypothesize that early improvements in binge eating and emotional eating symptoms will be significant predictors of eventual response and remission of symptoms at the conclusion of treatment. Additional demographic and clinical factors will be explore within the dataset will be analyzed. The student will be supported by a large interprofessional research team from the Toronto Western Hospital Bariatric Surgery Psychosocial Program including psychiatrists, psychologist, surgeons, internists, nurse practitioners and other health care professionals. Students should have experience in quantitative research – advanced statistical support will be provided by our research lab.

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Project Title

Development and Evaluation of an Assessment Tool to Assess Adaptive Expertise in Medical Psychiatry Training.

Project Description

Medical psychiatry care focuses on improving the health outcomes for patients with both physical and mental health issues. The complexity of clinical care in this area requires the development of adaptive experts who are equipped for future learning and to solve newly emerging problems arising in clinical practice. Adaptive expertise has been extensively studied in our research lab and has guided the development of education programs from medical school to clinical practice through the Medical Psychiatry Alliance (https://www.medpsychalliance.ca).

The following project will aim to building on this existing research to develop a tool for identifying the level of adaptive expertise in medical education curricula. The study will include the development of the adaptive expertise assessment tool using literature and collected study data. The tool will be piloted with clinician-educators to evaluate its utility in improving the integration of curriculum components to foster adaptive expertise in future practice. The study will provide students with experience using qualitative methodology.

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416-603-5177		Toronto Western Hospital EW7-449, 399 Bathurst St., Toronto, ON M5T 2S8

Project Title

Chlorhexidine allergy in dialysis patients and staff.

Project Description

Chlorhexidine is commonly used as an antiseptic agent in healthcare settings, primarily as a skin and wound disinfectant but also in cosmetics and several pharmaceutical products, such as in eye drops, mouthwashes, creams, hand rinses, toothpaste and deodorants. It is also used as an anti-infective agent lining catheters or central lines. However it has been found to cause both contact allergic responses and systemic, anaphylactic responses, especially when used during cystoscopy or surgery. Occupational allergic responses have also been reported in health care workers and it has been suggested that the frequency of responses has been increasing. Patients with end-stage renal disease being treated with chronic hemodialysis, and the staff caring for these patients often have repeated local exposure to chlorhexidine skin solution and therefore may be at risk of anaphylaxis if subsequently exposed to chlorhexidine during surgical procedures.

We wish to identify the frequency of chlorhexidine allergy among hemodialysis staff and patients at a tertiary care hospital, using a questionnaire and skin prick testing. Those with positive results will undergo tests for specific serum IgE antibodies and additional skin tests with common environmental allergens. The student would preferably be a medical student or have health care experience.

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416-603-55248		1E426, Toronto Western Hospital, 399 Bathurst St., Toronto, ON M5T 2S8

Project Title

Improving Access to Depression and Anxiety Care in Systemic Lupus Erythematosus.

Project Description

The student will participate in on of a number of ongoing and proposed clinical research studies relating to systemic lupus erythematosus (SLE) with particular focus on outcome measures for cognitive impairment in SLE, anxiety and depression and quality of life and associated factors related to these complications.

The student will perform background research, collect clinical data, administer instruments patient reported outcome measures, collate information and participate in the analysis of the data and will be expected to present results of their work at local and possibly national scientific meetings and prepare a manuscript for submission to scientific journals.

The student will be exposed to clinical research methodology as well as learn the clinical features, assessment and management of patients with rheumatic diseases.

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IMS Supervisors Recruiting SURP 2018 students

First Name	Family Name	Email
David	Urbach	david.urbach@wchospital.ca

Office Phone #	Lab Phone #	Address
416-323-7712	416-340-4800 x 8316	76 Grenville Street, Room 8332

Project Title

Safety of medical devices in Canada.

Project Description

Undertake case studies of devices that have been subject to Priority 1 (serious) recalls reported to Health Canada. The student will create a clinical vignette describing the device/health technology, the condition that it addresses, and the reasons for the recall. The student will then perform a systematic literature review to assess the nature of the evidence available regarding the safety and effectiveness of the device at the time that it was being marketed. This is part of a larger ongoing study of medical device recalls in Canada.

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Office Phone #	Lab Phone #	Address
416-323-7712	416-340-4800 x 8316	76 Grenville Street, Room 8332

Project Title

Virtual-care platforms to enable ambulatory surgery.

Project Description

Students will participate in the development and evaluation of mobile-device based digital platforms to monitor patients after surgical procedures in an ambulatory surgery setting. The project uses existing digital mobile applications intended for community care, and is developing peripheral devices to monitor physiologic status after surgery.

The student will be involved in data collection, data analysis and reporting.

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First Name	Family Name	Email
Murray	Urowitz	m.urowitz@utoronto.ca

Office Phone #	Lab Phone #	Address
416-603-5828		1E410B, Toronto Western Hospital, 399 Bathurst St., Toronto, ON M5T 2S8

Project Title

Prognosis Studies in Systemic Lupus Erythematosus.

Project Description

The student will participate in one of a number of ongoing and proposed studies related to the prognosis of systemic lupus erythematosus. These studies include assessment of outcomes in these patients and the factors related to these outcomes.

The student will collect clinical data, administer instruments of health status, collate information and participate in the analysis of the data. The student will be exposed to clinical research methodology as well as learn the clinical features, assessment and management of patients with rheumatic diseases.

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Derek	van der Kooy	derek.van.der.kooy@utoronto.ca

Office Phone #	Lab Phone #	Address
416-978-1960	416-978-0553	160 College Street., 11th Floor Room 1102, Toronto, ON M5S3E1

Project Title

Learning and memory in C. elegans.

Project Description

Our goal is to use the power and specificity of modern molecular genetics to reveal the component processes of learning and memory. In undertaking a mutational screening approach to learning and memory, we have taken advantage of the best-known multicellular organism, the nematode C. elegans. C. elegans has proven to be an excellent molecular model for mammalian (including human) biochemical functions. We will use the C. elegans learning and memory genes discovered to find their relevant mammalian homologues. Most important, the C. elegans mutants should allow us to ask if we can separate associative from non-associative learning, short from long-term memory, and learning and memory in one sensory modality from that in another sensory modality.

DESCRIPTION OF STUDENT PARTICIPATION: The students will participate in the initial screens for new learning mutant worms, as well as all of the behavioural testing to determine if the deficits are in learning, memory storage of the recall of memories.

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First Name	Family Name	Email
John	Vincent	john.vincent@camh.ca

Office Phone #	Lab Phone #	Address
416-535-8501 x 36487		250 College St, R32, CAMH, Toronto M5T 1R8

Project Title

Molecular Genetics of Autosomal Recessive Genes for Autism and/or Intellectual Disability.

Project Description

Our overall objective is to find genes/variants for autism spectrum disorder (ASD), using families from consanguineous populations, with an emphasis on autosomal recessive (AR) inheritance. The trio study design (proband + mother + father) can also identify X-linked mutations, de novo autosomal dominant mutations, as well as copy number variants. Our strategy will employ whole exome sequencing (WES). All genes identified will then be screened in outbred ASD (and ID) cohorts by targeted sequencing. We will also explore commonalities in biological pathways. This will be the first time such a comprehensive genetic analysis involving both consanguineous and non-consanguineous cohorts will have been attempted in ASD research.

Our aims are to use trio exome sequencing to identify candidate ASD genes, to corroborate through cross-referencing with other large ASD and intellectual disability sequencing efforts, also through targeted next generation sequencing, in outbred populations, to compare phenotypic features where a candidate gene/mutation is shared across multiple cases or trios, and to confirm the effects of the mutation either at mRNA or protein level.

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Tom/Golnaz	Waddell/Karoubi	tom.waddell@uhn.ca; Golnaz.karoubi@uhnresearch.ca
Office Phone #	**Lab Phone #**	**Address**
416-340-3432		200 Elizabeth St. Toronto, ON, M5G2C4

Project Title

In vitro 3D co-culture model of lung epithelium using iPS derived lung progenitor cells.

Project Description

Current systems for the study of lung epithelium are inadequate. Traditionally, alveolar epithelial cells (AECs) are grown on flat surfaces, which do not replicate the mechanical environment that cells perceive within the alveoli of the lung. We have developed a simple, physiologically relevant cell culture system that better models the architecture of the alveolus. Using a novel algae-derived hydrogel molding technique we have fabricated hollow cavity silicone culture surfaces with varying curvatures. We now propose to add another level of complexity by adding in a supporting endothelial cells layer using human iPS derived endothelial cells.

This is a great opportunity for a strong undergraduate student with previous background in cell culture (ideally human ES or iPS cells) to evaluate the feasibility of generating a multicellular airway biomimetic model using iPS derived airway epithelial progenitors and endothelial cells. This model advances the design of tissue mimetics that can be used for disease modeling and evaluation of novel therapies for the lung.

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Tom/Golnaz	Waddell/Karoubi	tom.waddell@uhn.ca; Golnaz.karoubi@uhnresearch.ca
Office Phone #	**Lab Phone #**	**Address**
416-340-3432		200 Elizabeth St. Toronto, ON, M5G2C4

Project Title

Revascularization of tracheal scaffolds.

Project Description

Tracheal reconstruction is required in cases of cancer, trauma and airway stenosis. Our laboratory has been studying decellularization of donor allografts for many years and have been able to repopulate these grafts with recipient specific cells. One key component to survival of these grafts is improvement of the blood supply. A unique technique for revascularization of these grafts is to coat these allografts with different biomaterials allowing repopulation of endothelial cells and improving revascularization. In this study, the study will assist in different aspects of the project. These including techniques such as decellularization of tracheal allografts, cell culture, immunohistochemistry, immunofluorescence and histology in order to assess the survival of endothelial cells used to repopulated different biomaterials allowing revascularization of tracheal scaffolds.

The student will be provided with the appropriate mentorship during their time in the laboratory.

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Tom/Golnaz	Waddell/Karoubi	tom.waddell@uhn.ca; Golnaz.karoubi@uhnresearch.ca
Office Phone #	**Lab Phone #**	**Address**
416-340-3432		200 Elizabeth St. Toronto, ON, M5G2C4

Project Title

Sentinel flaps in lung transplantation.

Project Description

Lung transplantation is the only life-saving treatment for patients suffering from end stage lung disease and improves quality of life. The long-term outcome of lung transplantation is very poor (only half of patients survive 6 years) and depends on transbronchial biopsies which can be life threatening to patients. Our study is novel and looks at concordanced between skin flaps and lung transplanted in combination. Patients involved in this study will have transplantation of both lung and skin at the same time. These patients will be followed for a course of one year. They will obtain weekly biopsies to look for different signs of rejection. The student involved in this study will assist in various laboratory techniques including histology, immunohistochemistry, immunofluorescence, RNA extraction and PCR analyzing concordance between lung and skin biopsies.

The student will also follow the patient in the clinic in order to assess any visible changed in the skin flaps. This is a unique opportunity for students to be involved in the field of vascularized composite allotransplantation.

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Office Phone #	Lab Phone #	Address
416-535-8501 x 34010	416-535-8501 x 32084	CAMH, Rm 323, 250 College St., Toronto, ON M5T 1R8

Project Title

Animal model and clinical studies in schizophrenia and PTSD.

Project Description

Students will have the opportunity to participate in a wide range of research related to psychiatric disorders. Projects include a clinical study investigating the cannabinoid content of medical cannabis used by patients with PTSD, and a randomized clinical trial of memory reconsolidation blockade in PTSD. We are also performing a genetic linkage analysis of families with high rates of relatively homogeneous forms of bipolar disorder. Other non-clinical projects focus on the characterization of mutant mouse and zebrafish models with mutations in schizophrenia susceptibility genes. Techniques include brain histology, immunohistochemistry, protein biochemistry, animal behavior analysis and basic molecular biology.

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E. Ann	Yeh	ann.yeh@sickkids.ca (please direct applications to Research Manager - stephanie.grover@sickkids.ca)
Office Phone #	**Lab Phone #**	**Address**
416-813-7654 x 203796		555 University Avenue

Project Title

Risk factors, interventions and outcome in paediatric neuroinflammatory disorders.

Project Description

The overarching goal of the research in our lab is (1) to understand risk factors and outcomes in children with inflammatory disorders of the central nervous system, including multiple sclerosis, optic neuritis, transverse myelitis, acute disseminated encephalomyelitis, and autoimmune encephalitis, (2) to explore the processes that contribute to symptoms, disease activity, and progression in these disorders, and (3) to examine interventions which can provide protective or reparative strategies in these children.

We are currently performing longitudinal studies to understand the nature of the relationship between levels of physical activity, sedentary behavior, and sleep on disease activity and symptoms in youth with MS. We are also performing an interventional trial to improve physical activity behaviors in children with MS. We are also preparing for a pilot clinical trial of a specific remyelinating agent for children with demyelinating disorders, with a focus on the visual system.

Students involved in our laboratory will be involved in one of many projects focused on the areas outlined above.

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Clement	Zai	clement.zai@camh.ca

Office Phone #	Lab Phone #	Address
416-535-8501 x 34809		250 College Street

Project Title

Genetics of Suicidal behaviour and Related Phenotypes.

Project Description

Suicides claim over 800,000 lives each year worldwide, with over 3,000 in Canada. With each suicide death, there are as many as twenty suicide attempts, making suicidal behaviour a serious public health concern. Suicide risk is influenced by many factors including genetics. Our research goal is to unravel the genetic component and molecular mechanism underlying suicide and suicide attempt, and suicidal ideation. We will be re-contacting participants from a large pharmacogenomics study, IMPACT (http://impact.camhx.ca/en/home.php). In a series of interviews and surveys, we will be assessing research participants on their personal and family history of suicidal ideation/behaviour and severity, personality traits, life events, and psychiatric diagnosis. We will also be analyzing genomic and epigenomic data on changes in suicidal ideation during the IMPACT study.

A background in molecular genetics, structured clinical interviews, and basic statistics is recommended.

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416-864-6060 x 77654	416-864-6060 x 77648	619 LKSKI, 209 Victoria St., Toronto, ON M5B 1T8

Project Title

The role of type II alveolar epithelial cells as a therapeutic agent in treating ARDS.

Project Description

The proposed study is a proof of concept to assess the potential role of type II alveolar epithelial cells as a therapeutic agent in treating ARDS.

The 2 main types of lung cells that make up the alveolar space, which is essential for gas exchange function of the lung, are known as alveolar type I (AEI) and alveolar type II (AEII) epithelial cells. AEI are cells that covers 95% of the alveolar surface area and form the air-blood barrier between the lung and blood vessel. AEII are secretory epithelial cells with the ability to release proteins, known as surfactant proteins that prevent lung collapse due to surface tension.

Recently, studies have found that AEII also function as the stem cells in adult lungs (1). Under quiescent and normal conditions, AEII have a slow growth and proliferation rate. After lung injury, AEII are able to multiply and transition to become AEI cells (2), suggesting AEII cells have regeneration properties. Indeed, the lung is capable of regeneration and has been shown to be induced by increased breathing tension (3), such as deep breathing.

The proposed study is a proof-of-concept to assess the potential role of AEII as a therapeutic agent in treating ARDS. We will assess the therapeutic potentials of endogenous and exogenous AEII cells through 2 models: a) increased breathing tension by periodic mild exercise and b) administration of isolated AEII from donor mice, respectively. In the exogenously administered AEII model, fibroblasts will also be co-administered to improve AEII's survival and proliferation.

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416-603-5800 x 2702	416-603-5800 x 2209	7KD-407, 60 Leonard St., Toronto Western Hospital/Toronto Western Research Institute, Toronto, ON M5T 2S8

Project Title

Spontaneous recurrent seizures in a mouse of extended hippocampal kindling.

Project Description

He or she is expected to participate several experiments, such as 1) hippocampal electrical stimulation and EEG recordings in free moving mice, 2) conduct behavioral tests (water maze, rotrad and open field) in mice; 3) conduct brain histological experiments (brain sectioning, staining and image process), and 4) EEG, behavioral and histological data analysis. A student with experiences in the above experiments is encouraged to apply.