camh

2019-2020 Seed Funding Competition Awardees:

Awardee: Stephanie Ameis
Project title: Brain Stimulation for Depression in Young Adults with Autism
Abstract: Autism affects more than one per cent of the population, and many who are affected will also experience depression. Depression contributes to increased disability, and social impairment, particularly in young adulthood, and is a risk factor for suicide. However, there are no approved treatments for depression in autism.

Repetitive transcranial magnetic stimulation (rTMS) is a safe and well-tolerated treatment that has been approved by Health Canada. But as no study has examined its use in people with both autism and depression, it is not readily accessible.

We recently completed a preliminary study of rTMS in a small group of young adults with autism. Although we were expecting to see improvement in memory, we found that the strongest effect with rTMS was on reduction of depressive symptoms. We will now recruit 40 young adults with both autism and clinical depression to demonstrate that rTMS can improve depression in this population. The study will be a four-week trial with half of our sample receiving active rTMS and the other half receiving a placebo rTMS. We will track whether symptoms of depression and suicidal thinking improve with active rTMS and will use brain imaging before and after treatment to track changes in the brain so as to understand how treatment works. If our study confirms that rTMS can be used successfully to treat depression in people with autism, we will work to gain approval and access to rTMS as a treatment option for people with these co-occurring conditions.

Awardee: Mounira Banasr
Project Title: Targeting Astrocytes in the Brain to Target More Effective Antidepressant Treatment
Abstract: Major depressive disorder (MDD) is a devastating illness affecting more than four per cent of Canadians and is a leading cause of disability worldwide. However, current treatments provide little benefit to about 50 per cent of patients with MDD. One major setback to developing effective treatments is our limited understanding of the cellular mechanisms involved. We do know that astrocytes make up about 40 per cent of all brain cells, and that they play many critical roles in healthy brain functioning. However, astrocyte anomalies are reported in many neurodegenerative diseases as well as psychiatric illnesses such as schizophrenia, bipolar disorder and MDD. In fact, one of the most consistent findings from post-mortem studies of patients who are depressed is reduced density and number of astrocytes in key brain areas involved in emotion regulation. However, the significance of these reductions remains unclear. A better understanding of the role of these cells in pathology may foster the discovery of potential targets for novel treatment strategies.

Using both human post-mortem tissues from patients with MDD and rodent models of chronic stress, we will identify cellular mechanisms involved in astrocytic pathology associated with MDD and stress-related illnesses and determine whether astrocytes are cells that can be targeted

for a new treatment strategy as well as help us find novel, more effective antidepressant treatment.
Awardee: Pushpal Desarkar
Project title: Do People with Autism Display Greater Neuroplasticity that Underlies Difficulties in Executive Functioning and Core Behavioural Characteristics?
Abstract: Autism is the most common neurodevelopmental disability, the cause of which is still unknown. Robust executive function (EF) difficulties have been directly linked with core behavioural characteristics of autism and with problems in daily functioning, even in adults with autism without any intellectual disability. Because of this link, there is an urgent need to discover brain mechanisms underlying EF difficulties and the behavioural characteristics of autism. Previous research has identified that brain plasticity could be the key to understanding EF difficulties and behaviours in people with autism.

The main goal of this project is to assess plasticity—the ability of the brain to modify itselfin the dorsolateral prefrontal cortex (DLPFC), a key site of brain that regulates EF and behaviour. We have already pioneered a tool to assess plasticity in the DLPFC, using electroencephalography, or EEG, and a type of magnetic brain stimulation.

We anticipate that, compared to control participants, brains in people with autism will display significantly greater plasticity in the DLPFC, and that this will be associated with EF difficulties in the autism group. We also anticipate a significant positive association between plasticity and core behavioural characteristics of autism. If successful, this information will help us identify a potential biological target to develop some brain treatments that can help people with autism with their executive functioning.

Awardee: Cory Gerritsen
Project title: Criminal Justice Involvement in Early Psychosis
Abstract: About three per cent of adults will experience a psychotic disorder in their lifetime. This may involve seeing or hearing things that are not there, having unusual beliefs that are difficult to ignore, and experiencing disruptions in thinking and behaviour. Most people with these symptoms seek help or are brought into the health care system by loved ones. But a substantial minority of people experiencing psychosis for the first time are getting charged criminally, and entering care through the correctional system. In Ontario, more than half of people who enter forensic care have committed violent crimes, and almost one in five people entering the system has committed severe violence because of their symptoms. The forensic system can make healing difficult for both victims and patients, as forensic care is longer and more restrictive than care within the civil (non-forensic) system and carries added stigma. Despite this trend, it is unknown what selectively propels some people in an early psychotic state into getting in trouble with the law. Past studies suggest that this trend may be due partly to social factors (e.g., poor support, economic disadvantage), psychological factors (e.g., low insight, difficulty thinking) and clinical factors (e.g., being untreated for a long time).

Our study will explore what makes this subset of people unique, from both a social and psychological perspective. Participants will include 50 men and women with a diagnosis of first episode psychosis who are entering care after being arrested, along with 50 others who have who entered care through normal pathways. The goal of our research is to find out what makes this

population and their journeys unique, and improve treatment for these clients, who may have been undertreated or otherwise disadvantaged before entering care. What we learn will provide clues as to how we can identify people at risk of early psychosis-related offenses before their illness and social situations propel them toward committing crimes.

Awardee: Sergio Rueda
Project title: The Impacts of Cannabis Legalization on Mental Health and Substance Use Services
Abstract: Canada recently legalized cannabis for non-medical use and new cannabis products, such as edibles and high potency extracts, will soon become available. Accumulating evidence indicates that early-onset, frequent cannabis use is associated with various adverse health outcomes. But the effect of legalization on public health and health service use remains uncertain, as does the effect of legalization on the cognitive function and mental health of its users.

Now is therefore a critical time to monitor the impacts of all forms of legal cannabis use on people with mental health and substance use problems, as well as the emerging needs of clinical service providers and administrators. This research will provide an in-depth investigation of the impacts of legalization on mental health, explore perceived organizational needs, and generate early-phase legalization data that will support future studies about the evolution of cannabis policy. In phase one of this research, a *qualitative* study will involve semi-structured, one-on-one interviews with 50 CAMH service users, 30 service providers, 20 community advisory panel members and 15 administrators. In phase two, a province-wide *quantitative* study will involve an organizational-level, self-administered online survey of more than 1,300 mental health and addiction treatment programs. Key research questions include: What are the anticipated clinically relevant risks and benefits of legalizing cannabis? What are the identified challenges in providing services and what resources are needed to meet new needs?

This research will promote better integration between social policy and clinical research within CAMH and across Ontario, and will inform organizational, community and policy responses to the anticipated challenges of cannabis legalization.

Awardee: Shreejoy Tripathy
Project Title: Neuronal Changes Associated with Aging and Neuropsychiatric Disorders
Abstract: Little is known about how mental health disorders are mediated by changes in neurons and synapses in the human brain. Studying these aspects of brain function requires living brain tissue, which for ethical reasons, is generally not available from human subjects. This lack of knowledge greatly holds back new drug development efforts to help treat neuropsychiatric illness. However, because of our unique access to live brain tissue from neurosurgery patients at Toronto Western Hospital, we can now—for the first time—study how human neuron physiology affects aging and depression.

As part of our research, we will expand on our recent discovery, which revealed that electrical changes occur in the brain cells of older adults. This time, we will ask how mood and cognition alter neuronal functioning in the brain. For example, how does neuronal electrical and synaptic

activity change with depression? We will also perform cutting-edge experiments to identify and isolate newgenes and biological pathways to target in developing better drug treatments. Lastly, we will create a database to store and share these datasets with the broader scientific community.

By using these unique data in combination with a wealth of information from animal studies, we hope to use this knowledge to develop new therapies for mental health disorders.

Awardee: Juveria Zaheer
Project title: Suicide at the Intersections of Faith and Mental Health: Understanding Suicidal Behaviour in Young Muslim Canadians
Abstract: Our preliminary research suggests that suicidal behaviour in young Muslim Canadians may be higher than in the general population. A better understanding of rates and risk factors for suicide in these young Muslim Canadians is urgently needed to identify who is at risk and how best to help them.

Our study aims to estimate the rates of suicide and suicidal behaviour among first and second-generation immigrant youth from Muslim majority countries. Our goal is also to understand the experiences of distress, suicidal thinking and behaviours in young Muslims with a history of suicidal behaviour. This involves exploring their narratives of distress and help seeking. It also involves examining the relationship between their views on suicide and how suicide is described in Islamic religious texts and perceived in Muslim communities.

To conduct our research**,** we will use linked health, immigration and administrative datasets to identify all Ontario youth, age 15 to 24, who were born in or whose mother was born in a Muslim majority country. We will determine who died by suicide or engaged in suicidal behaviour, and the risk factors associated with these outcomes. We will also conduct in-depth interviews with about 40 young Muslims with a history of suicidal behaviour to better understand their lives (families, friends, gender and cultural roles, views on religion) and experiences, suicidal thinking and behaviour. Finally, we will conduct focus groups with young Muslims to help us better understand and interpret our findings.

Our study findings can help us better understand suicide risk and prevention for young Muslims in Canada.