

PARTNER PERSPECTIVE

Innovation at The Royal Could Lead to Personalized Mental Illness Treatment

The treatment of mental illness is done through a “trial and error” approach instead of precision medicine, with clinicians trying different types of therapeutic interventions (drugs, psychological and/or other modalities) until the most effective treatment (or combination of treatments) is identified for each patient. This is because the brain mechanisms underlying mental illness remain unclear and the diagnoses are still symptom based.

Innovative clinical scientists at The Royal, one of Canada's foremost mental health care, teaching and research hospitals, want to change this approach.

They're exploring new ground in understanding how mental illness affects the brain using the latest in molecular imaging techniques – a cutting-edge PET-fMRI scanner, the first in Canada dedicated to mental health research.

Better understanding will translate into better treatment – and lead to personalized treatment for every patient.

“We cannot see or touch the organ we are treating. The Royal's new state-of-the-art brain imaging machine will help us make the invisible visible and help transform mental health care as we know it,” says Dr. Zul Merali, president and CEO of The Royal's Institute of Mental Health Research (IMHR), which is affiliated with the University of Ottawa.

This multimillion dollar clinical research tool will be used to investigate the brain circuitry linked to depression, post-traumatic stress disorder, suicide ideation and other mental illnesses.

With the help of this new technology, The Royal will take a significant and innovative step closer to realizing its ultimate goal: to help people living with severe mental illness get better faster.

In-depth knowledge and understanding will lead to the identification of the unique brain biomarkers for individuals with mental illness, and researchers and clinicians at The Royal will then be able to customize



The Royal's Dr. Zul Merali says a new state-of-the-art brain imaging machine will open up new, innovative and personalized treatment for mental illness.

treatments based on a person's biology. Researchers are confident that various research projects involving the PET-fMRI will lead to more effective and efficient diagnoses, treatment and even prevention.

Two Canada Research Chairs (CRCs) are leading this charge – Dr. Georg Northoff who holds the

CRC and heads the research unit in Mind, Brain Imaging and Neuroethics, and Dr. Pierre Blier who holds the CRC in Psychopharmacology. Both CRCs highlight the strong partnership with the University of Ottawa.

Dr. Blier, also director of the IMHR's Mood Disorders Research Unit, wants to reduce the scourge

of suicide, which takes the lives of approximately 4,000 people each year in Canada and some 900,000 worldwide. The sense of hopelessness, the darkness, the stress and the pain that take people to that point of no return are deeply rooted in altered chemical and electrical processes of the brain.

“We hope to identify what brain structures and processes are associated with people experiencing suicidal ideation. We're going to take these clinical observations and then probe further onto these brain areas in our preclinical laboratory work,” says Dr. Blier, who with Dr. Northoff is studying the brain circuitry involved in suicide ideation and measuring how ketamine can eliminate these thoughts.

In the study, low doses of ketamine (sub-anesthetic doses) are administered over 40 minutes. “In a majority of the patients – even in those extremely resistant to traditional antidepressant drugs, we get a robust response within hours,” says Dr. Blier.

After a week or two, however, many symptoms of depression return, but suicidal thoughts remain at bay for a lot longer. The scanner will help monitor the patient's brain activity before and after treatment, allowing the researchers to see where suicidal ideation ‘resides’ in the brain.

The Royal's IMHR is very proud to have made the Top 40 Research Hospitals list each year and for achieving the most significant increase since last year.

Mental health research receives only about 5 per cent of medical research dollars, despite the fact mental illness is the No. 1 medical condition in terms of the years lost to disability and the economic and social costs confronting Canadians, more than heart disease, pulmonary diseases and cancer combined.

Dr. Merali remains hopeful that more research funding and effort will be directed towards leading-edge projects such as the one Drs. Blier and Northoff are undertaking.

“Now, access at home to a PET-fMRI that is dedicated to mental health and neuroscience research will stimulate the development of new personalized treatments for severe, persistent mental illness,” says Dr. Merali.