



DR. SYLVAIN HOULE, DIRECTOR

Vivian M. Rakoff Positron Emission Tomography Centre

RESearch AT THE VIVIAN M. RAKOFF POSITRON Emission Tomography (PET) Centre concentrates in the following areas: PET Methodology (Radiochemistry and PET Instrumentation); Schizophrenia; Mood and Anxiety Disorders; and Addiction. In addition to our own research, we maintain active collaboration with other scientists within CAMH and with researchers at the University of Toronto.



PET Radioligands Development

The radiochemistry group, led by Dr. Alan Wilson, continues its innovative work in radioligand development. Our new radioligand for the serotonin transporter [C-11]-DASB has generated worldwide interest. This serotonin transporter is the target of the selective serotonin reuptake inhibitors, medication widely used for the treatment of depression. For the first time, we can measure accurately the effects of these antidepressants on the serotonin transporters.

New projects currently under way are attempting to develop a PET radioligand for the norepinephrine transporter as well as one to image amyloid plaques in Alzheimer's disease.

PET Instrumentation

The construction of our new scanner is nearly complete. This will be the most sophisticated PET scanner in existence for brain research and will strengthen our international leadership in psychiatric PET research. Funding for the new scanner was secured by a grant from the Canada Foundation for Innovation and the Ontario Innovation Trust fund.

An internationally renowned PET physicist, Peter Bloomfield, has joined the PET Centre scientific team. His work will focus on maximizing the potential of the new scanner. He will be assisted by PET physicist Dr. Nathalie Ginovart. Dr. Ginovart has recently initiated a new series of pharmacological experiments in rodents using a stereotactic positron probe that provides temporal and spatial resolution superior to those of existing small-animal PET scans.

Investigation of the Mechanism of Action of Antipsychotics

The PET Schizophrenia research program, under the leadership of Dr. Shitij Kapur, continues to explore the role of the dopamine system in schizophrenia. This work attempts to understand antipsychotic medications' mechanism of action in the brain. We continue to link human findings obtained with PET with those obtained from animal research to give us insights in the role of the dopamine system.

We continue to find clinical benefits in the treatment of schizophrenia, such as by optimizing existing treatments and by offering new avenues for developing more effective drugs.

The Neurochemistry of Depression

Headed by Dr. Jeffrey Meyer, this program aims to investigate the neurochemical basis of symptoms for mood disorders and the neurochemical effects of antidepressant treatment.

Recent work has focused on the relationship between changes in serotonin and dopamine receptors and the specific cognitive and neuropsychological abnormalities that are observed during depressive episodes.



We are also investigating dopamine and serotonin transporter regulation. This year, we discovered that the regulation of these transporters has an important role as a vulnerability factor for low monoamines and accompanying symptoms. Treatment studies examine the mechanism of selective serotonin reuptake inhibitors (SSRIs). We are trying to establish the percentage of serotonin reuptake sites occupied during SSRI treatment and the effects of SSRIs upon post-synaptic serotonin receptors.

The Role of Serotonin in Parkinson's Disease

Dr. Stephen Kish, in collaboration with Dr. Mark Guttman, continues to apply the PET Centre's serotonin transporter radioligand to Parkinson's disease. Abnormalities of the serotonin system may explain the onset of depression often experienced by patients with this disease. This research may help elucidate the non-motor aspects of Parkinson's disease.

Investigation of the Neurochemical Sequelae of Ecstasy Use

The effects on the brain of MDMA, better known as ecstasy, remain controversial. Dr. Stephen Kish is using [C-11]-DASB to find definite evidence about the presence or absence of ecstasy's effects on the serotonin transporter.