Western
BrainsCAN
Transforming brain research.

IMAGING CORE

MAGNETIC RESONANCE IMAGING (MRI)

MRI is a powerful non-invasive imaging technology that allows us to make high resolution 3D images of brain structure and function. It is often used by radiologists for disease detection, diagnosis and treatment monitoring, but more advanced MRI approaches can allow us to map brain function and the connections between different brain areas. This gives a much more complete picture of how the brain works than standard radiological images.

Another application of advanced MRI is to study the brain's chemistry—so called neurochemistry. This allows us to examine many of the molecules that neurons and other cells in the brain use to communicate with each other.

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MRI, particularly functional MRI, is an indispensable tool in modern neuroscience. MRI machines use powerful magnets. The higher magnetic fields allow increased speed, resolution and contrast compared to clinical MRI scanners.

The Centre for Functional and Metabolic Mapping (CFMM, cfmm.robarts.ca) at Western's Robarts Research Institute houses Canada's only collection of high-field (3 T human) and ultra-high field (7 T human and 9.4 T small animal) state-of-the-art MRI systems. 1 T (Tesla) is 20,000 times the earth's magnetic field. These MRI scanners are used to establish the anatomical, metabolic and functional characteristics of normal brain development and healthy aging across the lifespan; as well as establishing the brain basis of developmental, neuropsychiatric and neurodegenerative deficits.

Animals and humans studied in the Rodent Cognition, Non-Human Primate and Human Cognition & Sensorimotor Cores are scanned in the CFMM, the results used by the Computational Core to generate models of brain function, as well as to visualize and plan neurosurgical procedures.

Accelerator Projects

Imaging visually-evoked cortical activity
Butler, Blake

Magneto-vestibular stimulation (MVS): effects on behaviour and resting state networks
Corneil, Brian

Genetic manipulation of lactate metabolism to regulate memory and Alzheimer's disease pathogenesis.
Cumming, Robert

Imaging fetal brain connectivity in high risk pregnancy: Can it influence the incidence of neurodevelopmental and psychiatric problems?
de Ribaupierre, Sandrine

Development of fMRI compatible reversible deactivation to examine cerebral networks
Lomber, Stephen

Investigating VTA, SNc, and dopamine projections in the brain using MRI
MacDonald, Penny

Relating functional and structural signatures of Parkinson's disease to changes in dopamine signaling: A PET/fMRI study
MacDonald, Penny

Further information on BrainsCAN research can be found at brainscan.uwo.ca

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