



VICTORIAN BIOMEDICAL IMAGING CAPABILITY

Delivering the next generation of
discoveries to enhance excellence in
biomedical imaging

vbic.org.au



ABOUT THE VICTORIAN BIOMEDICAL IMAGING CAPABILITY

Victorian Biomedical Imaging Capability (VBIC) provides a coordinated network of capabilities and research capacity in biomedical imaging to support universities and medical research institutes.

VBIC's mission is to deliver the next generation of discoveries and enhance excellence in biomedical imaging.

We collaborate with academic and industry partners from within Victoria, nationally and internationally, delivering world-class imaging capability to drive translational research and global competitiveness in priority health areas.

VBIC's state-of-the-art expertise includes:

- Human and preclinical MRI
- Human and preclinical PET/CT
- Magnetoencephalography (MEG)
- Preclinical magnetic particle imaging
- Human and preclinical MR guided focused ultrasound
- Radiochemistry

**NATIONAL
COLLABORATIVE
RESEARCH
INFRASTRUCTURE
STRATEGY**

**NATIONAL
IMAGING
FACILITY**

VBIC

Monash University
The Florey Institute
University of Melbourne
Swinburne University
Olivia Newton-John
Cancer Research
Institute/ Latrobe University

STUDY DESIGN

Drug candidate
optimisation

Medical therapy
development

Structural & functional
biology

Biomedical validation

USER ACCESS

Clinical & veterinary
services & education

Diagnostic development

Technology development

IMAGING PLATFORMS

MEG, SPECT, PET,
CT, X-RAY/DXA,
7T-MRI, 3T-MRI,
EEG, other

RESEARCH COLLABORATION

CRITICAL KEY RESEARCH IMAGING INVESTMENTS

In 2023, the Victorian Government announced a substantial investment of \$14.83 million to the VBIC, in collaboration with the National Imaging Facility (NIF) through the Victorian Higher Education State Investment Fund (VHESIF).

MONASH UNIVERSITY

Co-funding from VHESIF and NIF, Monash Biomedical Imaging has significantly bolstered the University's radiotheranostics capabilities through the acquisition of a new preclinical PET/CT and the expansion of the radiochemistry facilities, have unlocked the potential for cutting-edge research in radiotheranostics. This advancement plays a vital role in detecting and treating serious diseases.

The funding will play a crucial role in establishing the Australian Precision Radiopharmaceutical Facility (APRF), a world-class GMP-compliant research cyclotron and radiopharmaceuticals manufacturing enterprise which will be a game-changer. Once operational, the APRF will grant access to state-of-the-art, high precision radiotheranostics, expediting the translation of radiopharmaceuticals into clinical trials. This development will significantly benefit the treatment of various conditions, including cancer, cardiovascular disease, infectious diseases and neurological disorders.



Top photo, Dr Michael de Veer, Head of Pre-Clinical Imaging

Bottom photo, Ms Lauren Hudswell, Supervising Nuclear Medicine Technologist

VBIC is a fundamental platform for supporting the innovation- economy.

CRITICAL KEY RESEARCH IMAGING INVESTMENTS

THE FLOREY INSTITUTE

The Australian Epilepsy Project (AEP) is an Australia-wide study designed to change epilepsy treatment by developing a multimodal decision support tool to improve health outcomes in individuals with this life-changing condition.

The Florey Institute is the central AEP Hub, fostering collaborative links with other VBIC sites including Monash University, The University of Melbourne, and Swinburne University.

The AEP has developed a national network of specialist hubs to provide patient access to advanced testing and diagnostics.

VBIC's investment in The Florey's MRI facility at the Melbourne Brain Centre has supported state-of-the-art equipment upgrades that enhance imaging capabilities fundamental to the AEP.

AEP assessments include advanced functional and structural MRI scans accompanied by expert radiology assessment, as well as genetics and neuropsychology testing. Results that are captured as part of the AEP will be used as training data for the development of artificial intelligence models for predicting health outcomes in epilepsy and are also being used by neurologists to inform treatment decisions. The study will also make data sets available to the broader research community fostering collaboration and advancement in epilepsy research as well as fast-tracking the translation of research into clinical care.

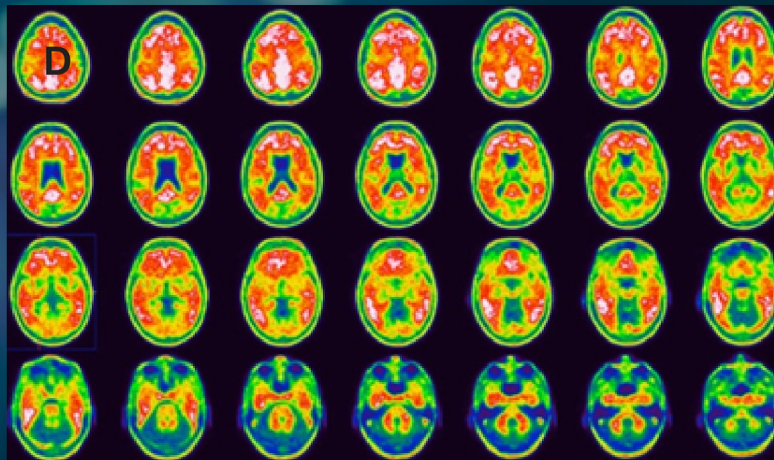
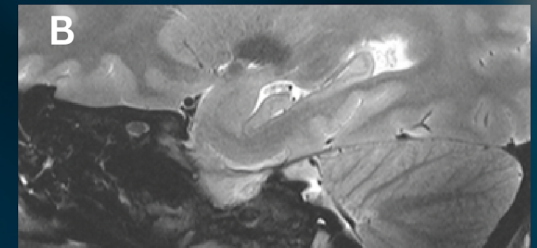
In 2022/23 findings from the AEP have been presented at international and national meetings including the American Epilepsy Society annual meeting; the International Society for Magnetic Resonance in Medicine (ISMRM) Annual Meeting in Toronto, Canada; the 35th International Epilepsy Congress in Dublin, Ireland; the 2023 Melbourne Epilepsy Conference; the ISMRM ANZ chapter meeting; and the National Imaging Facility 2023 Scientific Symposium.

CRITICAL KEY RESEARCH IMAGING INVESTMENTS

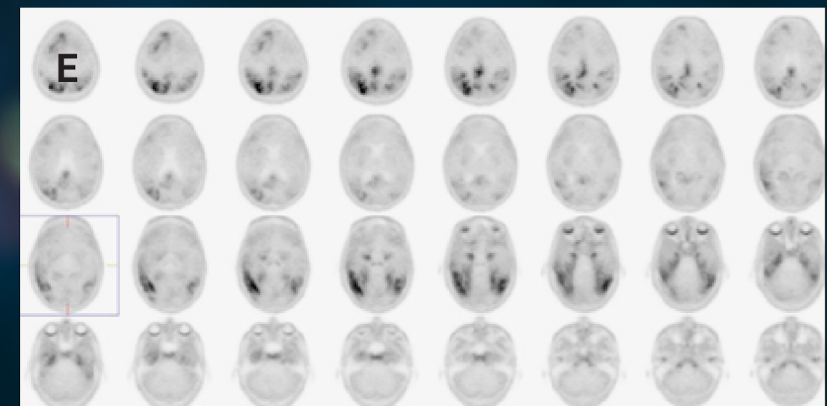
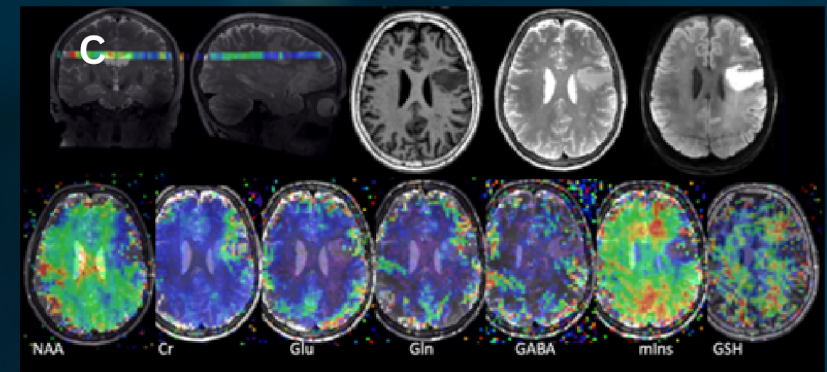
MELBOURNE BRAIN CENTRE IMAGING UNIT - THE UNIVERSITY OF MELBOURNE

Supported by the VHESIF and the National Collaborative Research Infrastructure Strategy (via the National Imaging Facility) the Melbourne Brain Centre Imaging Unit (MBCIU) at the University of Melbourne provides 7T MRI and PET/CT capabilities for Victorian and Australian researchers to acquire structural, functional, and molecular imaging with unprecedented resolution and sensitivity.

The facility undertakes imaging for a range of research projects which include investigations on Stroke, Dementia, Traumatic Brain Injuries together with other neurological disorders.



Images from the 7T MRI system (a) high resolution vascular MRI in stroke patient, (b) image showing hippocampal atrophy in dementia and traumatic brain injury, and (c) neurotransmitter distributions in MS and epilepsy. Images of amyloid (d) and tau (e) distributions in dementia and traumatic brain injury patients using the PET/CT system.



CRITICAL KEY RESEARCH IMAGING INVESTMENTS

OLIVIA NEWTON-JOHN CANCER RESEARCH INSTITUTE/ LA TROBE UNIVERSITY

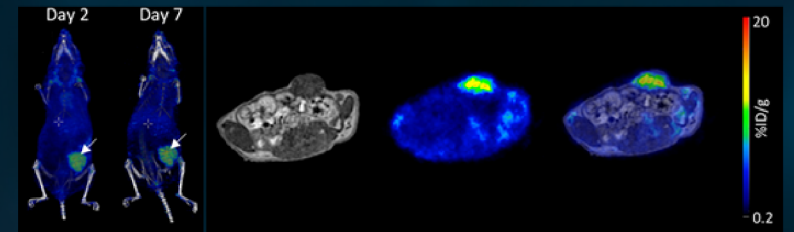
In partnership with the VBIC, and together with funding received from VHESIF and NIF, the Olivia Newton-John Cancer Research Institute and La Trobe University have expanded their preclinical imaging capabilities with a new PET/3T MRI scanner. This advancement in imaging capability will support important drug discovery and testing of treatments before entering early phase clinical trials examining a T2-weighted MRI image acquired using the 3T MRI camera.

Funding has also supported upgrades to radiochemistry facilities which will accelerate the design and development of novel PET imaging probes for preclinical and clinical research. Combined with human PET/CT scanners on site, this open access platform will provide world-class cutting-edge imaging technologies to assist with biomedical research, drug discovery and identifying disease processes in patients.

Through new imaging techniques it will be possible to diagnose conditions such as cancer, dementia and heart disease earlier than previously possible, and develop new drugs which can lead to improved treatments and outcomes for patients and their families.



Top photo left, Dr Ingrid Burvenich, (NIF Fellow) & Angela Rigopoulos (senior research assistant). (top photo right, Dr Artur Cichocki with a radiolabelling module in one of the newly installed hot cells



Bottom photo, 3D PET/CT (left) and 2D (right) PET/MRI showing localisation of newly developed anti-cancer drugs in preclinical tumour models