



TRIO 
CORE FACILITIES



The Translational Research Institute (TRI) is a unique model for collaboration and commercialisation translating medical research into clinical treatment.

With around 1000 researchers, clinicians, students and support staff, TRI was formed through the collaboration of the Australian and Queensland Governments, The University of Queensland, the Queensland University of Technology, Mater Research and Metro South Health, part of Queensland Health.

The seven story TRI building is located adjacent to the Princess Alexandra Hospital and incorporates four floors of state-of-the-art laboratories, facilities for research support, administration and teaching. TRI's Clinical Research Facilities are located at the PA Hospital and Centre for Children's Health Research (CCHR) enabling human trials of new drugs and therapies.

World-class, emerging technologies are available to all researchers through shared specialist Core Facilities. This highly specialised equipment is also available to external researchers and institutions.

An overview of the Core Facilities at TRI:

LEVEL 1

Biological Research Facility
Gnotobiotic Facility
Preclinical Imaging Facility

LEVEL 4

Microscopy Facility
Flow Cytometry Facility

LEVEL 5

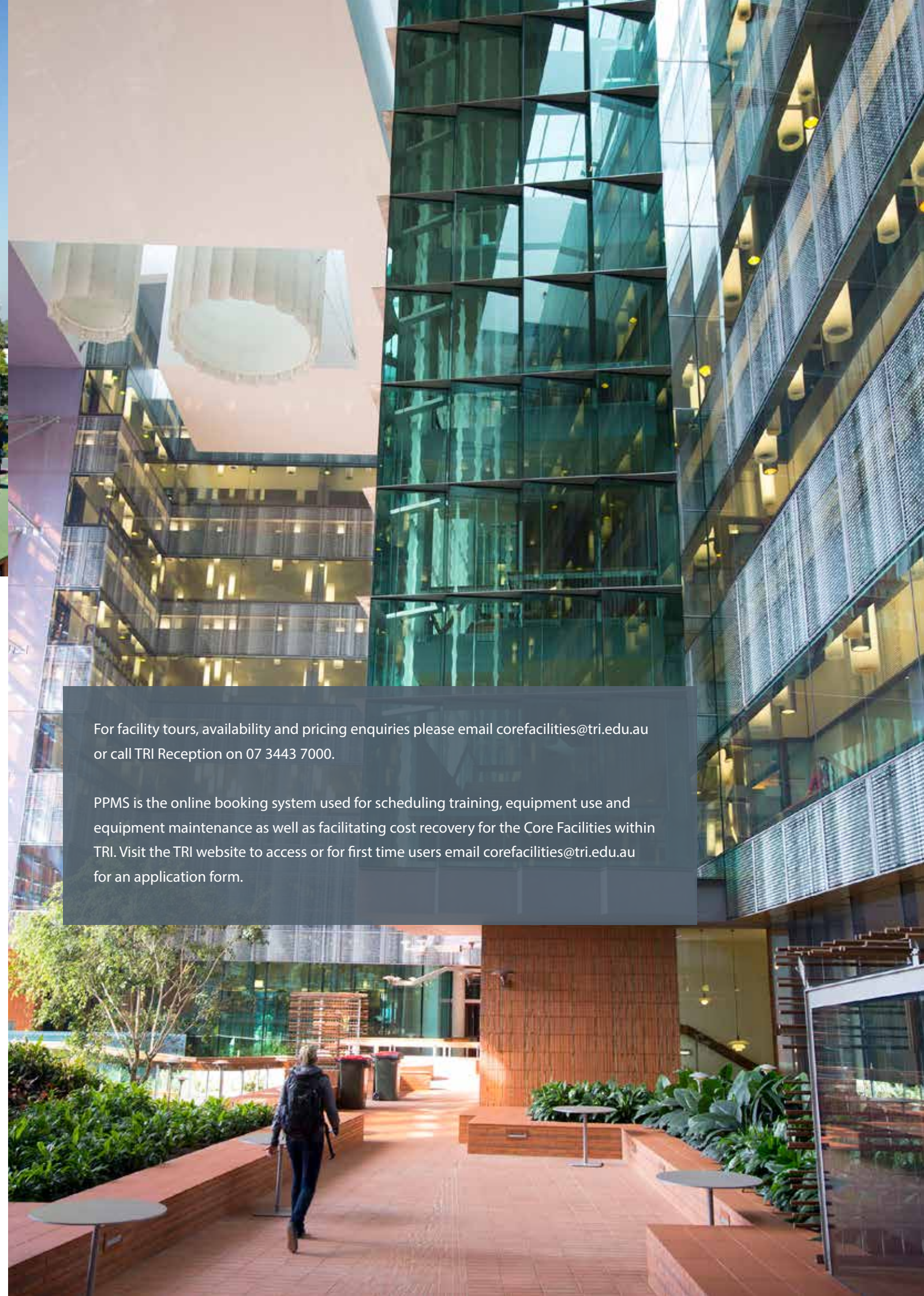
Proteomics Facility
Histology Facility

PRINCESS ALEXANDRA HOSPITAL - R WING

Clinical Research Facility

CENTRE FOR CHILDREN'S HEALTH RESEARCH

TRI@Childrens (TRIC) Clinical Research Facility



For facility tours, availability and pricing enquiries please email corefacilities@tri.edu.au or call TRI Reception on 07 3443 7000.

PPMS is the online booking system used for scheduling training, equipment use and equipment maintenance as well as facilitating cost recovery for the Core Facilities within TRI. Visit the TRI website to access or for first time users email corefacilities@tri.edu.au for an application form.

Biological Research Facility

The TRI Biological Research Facility (BRF) was established to provide research support and animal husbandry to the researchers of TRI. The core was developed to facilitate effective research whilst assuring humane care and use of animals, ensuring compliance with all relevant state and federal regulations. We have a number of specialised functions including surgical facilities, rodent housing and other equipment. The facility also houses the Preclinical Imaging and Gnotobiotic facility.

The BRF is able to offer veterinary services and full breeding colony management.

The TRI BRF is operated as Specific Pathogen Free or 'SPF', making it 'cleaner' than many other BRFs. By excluding defined pathogens which are known to compromise animal health, the facility ensures a higher level of general health. This provides a stable background for assessing pathology or physiology in research. SPF is considered of great benefit, if not essential, for work with immunodeficient strains.

Technical services include:

- Data collection
- IV injections
- Grafting
- Blood and tissue collection
- Irradiation
- Tumour monitoring
- Surgery support
- Other specialised experimental manipulations

BRF staff are also able to provide all levels of user training including:

- Animal handling
- Technical procedures
- Anaesthesia and analgesia
- Surgical models
- Aseptic technique
- Animal database systems
- Germ-free and gnotobiotics



The Biological Research Facility is a full service core facility, committed to providing quality care for animals and full research support for users.

Gnotobiotic Facility

Research has established that microbes (eg bacteria, fungi etc) play a significant role in human health due to their effect on biological processes in the body such as immune regulation, physiology, development and lifespan. Investigators are interested to study how different types of microbes can affect disease models and whether we can treat or prevent disease by using "bugs as drugs". Germ-free (sterile) and Gnotobiotic (defined-flora) research has applications in many fields of medical research including: allergy, cancer, autoimmunity and gastrointestinal disorders.

TRI's Gnotobiotic facility is the only one of its kind in Queensland.

Housing options include:

CLASS BIOLOGICALLY CLEAN – FLEXIBLE FILM ISOLATORS

For breeding or long-term studies in larger numbers

TECNIPLAST POSITIVE PRESSURE ISOCAGES

Hermetically sealed, HEPA filtered single cage isolators offering flexibility and cost-effective housing for research use. Ideal for studies with multiple gnotobiotic groups.

TECNIPLAST DISPOSABLE STERILE SINGLE USE CAGING

Disposable caging available for research use and for transfer of mice to other facilities. Ideal for short-term studies requiring daily procedures. Mice can be housed inside a biosafety cabinet for the duration of the study, reducing the risk of contamination from repeated interventions.

The facility offers housing and technical services to internal and external researchers:

- Production of gnotobiotic and germ-free mice
- Facilities to conduct gnotobiotic and germ-free research
- Technical services and expertise to conduct experimental projects on researcher's behalf

C57Bl/6 and BALB/c strains currently available for purchase, with IVF rederivation to be available soon.



Preclinical Imaging Facility

The Preclinical Imaging Facility provides researchers access to a variety of high-end *in vivo* and *ex vivo* imaging instruments. Located within the TRI's Biological Resources Facility (BRF), a specific pathogen-free PC2 facility, researchers can utilise multiple imaging modalities in a single longitudinal study. Facility staff provides comprehensive hands-on training on image acquisition and data analysis. They also offer advice on experimental design, project development, grant and animal ethics applications.

Instruments available include:

VISUALSONICS VEVO 2100/LAZR (HIGH-FREQUENCY ULTRASOUND AND PHOTOACOUSTICS)

Ultrasound applications include measuring tissue volume, vascularity, perfusion, cardiac function, and performing image-guided injections. Photoacoustics enable quantification of endogenous (eg oxygenated haemoglobin) and exogenous (eg inorganic nanoparticles, dyes) contrast agents.

PERKIN ELMER IVIS SPECTRUM (OPTICAL IMAGING)

High sensitivity bioluminescence, fluorescence and/or Cerenkov imaging of samples *in vivo*, *ex vivo* and *in vitro*. Applications include monitoring of cancer progression (eg primary tumour growth and metastatic spread), tracking of adoptively transferred immune cells, and bio-distribution of fluorescently-labelled nanoparticles.

LIONS AUSTRALIA BRUKER SKYSCAN 1272 (ULTRA-HIGH RESOLUTION microCT)

State-of-the-art *ex vivo* microCT scanner capable of producing ultra-high resolution images (voxel resolution down to 0.35 microns). Applications include imaging of bone (trabecular), teeth, bone defect models, biomaterials, inorganic materials, and tumours in soft tissue (eg lungs).

SIEMENS INVEON MULTI-MODALITY (MICROPET-CT)

microPET-CT applications include tumour glucose metabolism, tumour imaging, bio-distribution of novel radiotracers, and brain dopamine metabolism. The microCT is often used for application such as longitudinal assessment of osteogenesis, calcification of biomaterials, osteoporosis and patient-derived tissue explants.

BRUKER MINISPEC LF50H (NUCLEAR MAGNETIC RESONANCE)

Uses nuclear magnetic resonance principles to accurately quantify fat mass, lean tissue mass and free fluid mass in mice. The gold standard method for *in vivo* fat and lean tissue measurement in the pharmaceutical industry.

FAXITRON ULTRAFOCUS 100 (2D X-RAY)

Fully shielded X-ray cabinet system allowing for rapid acquisition (<10sec) of high resolution 2D X-ray images. Applications include assessment of bone structure, x-ray angiography of organs, and visualising of implants.

TARGETED RADIONUCLIDE THERAPY

Targeted radionuclide therapy involves the use of antibodies, peptides or other bioactive molecules conjugated with radioisotopes that emit toxic radiation. Major applications in oncology.



Proteomics Facility

Proteomics is the study of proteins in a system and is used for a variety of applications such as identifying proteins, studying protein modifications and quantifying protein levels.

The TRI Proteomics Facility is located on level 5 and provides expert services in sample analysis, access to specialised equipment, as well as training and assistance.

Services include:

PROTEIN IDENTIFICATION ASSAY

Study of 1 to 1000 proteins in a single sample. Commonly used to compare samples a protein level between different experimental conditions, such as control vs treatment in cells.

TARGET PROTEIN QUANTITATION

Development of custom assays for quantification of target proteins and peptides.

Instruments available include:

BIORUPTOR HOMOGENISER

Tissue homogenisation and DNA fragmentation

DIRECT DETECT

Direct protein and peptide quantitation.

OFF-GEL ELECTROPHORESIS

Isoelectric focusing of analytes.

BRAVO ROBOT

Sample preparation.

LC-QQQ

Targeted/quantitative proteomics.

LC Q-EXACTIVE PLUS

Proteomics Identification (discovery, qualitative)

Proteomics Quantitation (labelled)

Proteomics Quantitation (label free / DIA)

Proteomics Targeted Quantitation (PRM)

Proteomics Characterisation (post-translational modification)

LC Q-EXACTIVE HF - NEW

1.5x faster or 1.7x higher resolution than the Q Exactive Plus

Proteomics Identification (discovery, qualitative)

Proteomics Quantitation (labelled)

Proteomics Quantitation (label free / DIA)

Proteomics Targeted Quantitation (PRM)

Proteomics Characterisation (post-translational modification)



Histology Facility

The TRI Histology Core Facility aims to provide flexible services and high quality products with an efficient turn-around time to both TRI researchers and external clients. We are located on the level 5 east wing (Room 5031) and provide training and access to a range of specialised equipment.

The facility offers both full service and self service facilities to meet the histological needs of the researcher.

Instruments available include:

TISSUE PROCESSOR

Infiltrates human and animal tissue with paraffin wax to preserve tissue integrity and morphology. Capacity of 300 cassettes per run.

EMBEDDING STATION

Enables preparation of paraffin wax blocks from paraffin-processed human and animal tissue for subsequent microtome sectioning and long-term storage.

SLIDE AND CASSETTE PRINTERS

Prints xylene and alcohol resistant labels onto slides and cassettes. Helps to minimise human error and improve legibility.

MICROTOMES

Two Leica microtomes are available (one semi-automated) for thin sectioning of paraffin blocks.

CRYOSTATS

Two cryostats are available for thin sectioning of fresh or fixed frozen tissue. A tungsten blade is available for use in the Leica for sectioning of mineralised bone samples. Cryosectioning is ideal for rapid results and can improve immunohistochemical detection of antigens.

AUTOMATED IHC PLATFORM

The Ventana Discovery Ultra is a fully flexible platform programmable to process slides for immunohistochemistry (IHC), in situ hybridization (ISH), immunofluorescent (IF) and multiplexed staining. Services are customised for each project as required.

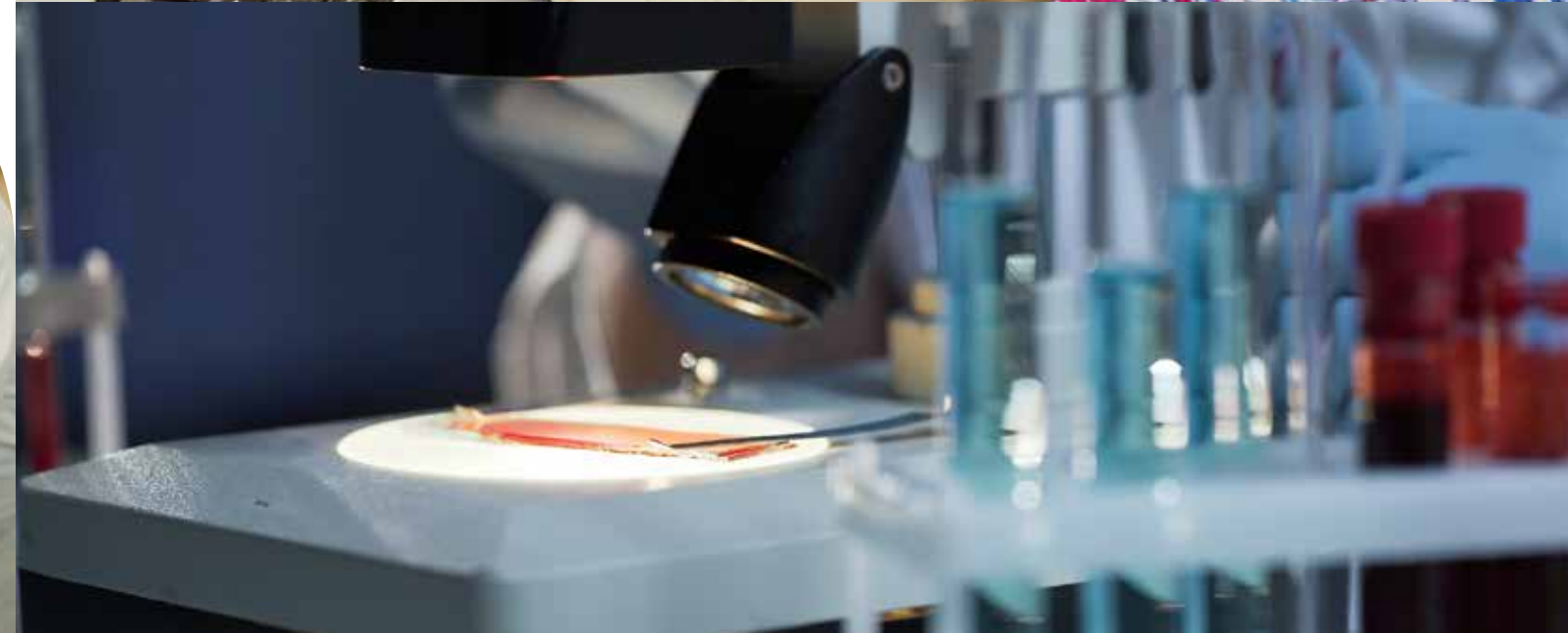
AUTOMATED STAINER AND COVERSLIPPING PLATFORM

Automated for fast, high quality staining services and application of coverslips to the finished product.

AUTOMATED TISSUE MICROARRAYER

The TMA Grand Master allows selection and extraction of specific regions of interest on donor blocks and their subsequent insertion into recipient blocks can be randomised or directed as required. Combining several hundred different samples into one paraffin block allows for high throughput slide preparation and staining and unbiased screening for diagnostic and research purposes.

It is quick and easy to create TMA blocks up to 558 cores @ 0.6mm diameter with great precision. The instrument can also extract and automatically transfer tissue samples to standard 0.2 ml PCR tubes.



Flow Cytometry Facility

Flow Cytometry is a widely used and highly versatile technology applied to studying cell populations and their phenotype and/or function on a multi-parametric level. By using cell sorters it is possible to isolate specific cell populations to high levels of purity for further research applications.

The TRI Flow Cytometry Suite is located on level 4 east and provides researchers with the opportunity to access a wide variety of analysers as well as offering high-speed cell sorting of up to 6 populations at once, or indexed-single cell deposition into the wells of a variety of plates.

The suite houses a number of analysers:

BD ACCURI C6

Two lasers (488, 633nm) to detect up to 4 fluorochromes. Easy to use software with no voltage adjustment.

BECKMAN COULTER GALLIOS (TWO MACHINES)

Three lasers (407, 488, 633nm) to detect FSC, SSC & 10 fluorochromes with an automatic 32-tube carousel loader and KaluzaG operating software.

BECKMAN COULTER CYTOFLEX S (TWO MACHINES)

Four lasers (405, 488, 561, 638nm) to detect up to 13 fluorochromes. Accommodates a variety of tubes as well as 96 well plates.

BD LSR FORTESSA X-20 (THREE MACHINES)

Five lasers (355, 405, 458, 561, 640nm) to detect up to 18 fluorochromes. Fitted with a high throughput sampler allowing the use of 96 and 384 well plates.

MERCK-MILLIPORE IMAGESTREAMX MARK II

Imaging cytometer with a range of lasers and high resolution imaging channels at a variety of magnifications.

MINDRAY BC-5000 VETERINARY HAEMATOLOGY ANALYSER

Automated 5-part diff unit for performing cell counts and haematological analysis on whole blood, bone marrow and a variety of other samples from a range of species (human, mouse, rat, and a selection of other companion and agricultural animals).

BD FACSymphony A5

Six laser (355, 405, 488, 561, 640, 785nm) instrument with 50 detection parameters. Fitted with a high throughput sampler allowing use of 96 or 384 well plates.

Access to a collection of analysis computers with a range of software is also available. All cell sorters have temperature controlled environments for sample tubes and collection tubes/plates.

Analysis software provided includes FlowJo V.10.2, Kaluza V1.3, BD FACSDiva V8.0.1, BD Accuri C6 software, IDEAS image cytometry software.

The staff within the TRI Flow Cytometry Suite have a combined expertise of over 60 years, and are available for consultation regarding experimental design, sample preparation, panel design and data analysis.

Cell sorting instruments available include:

BECKMAN COULTER MOFLO ASTRIOS EQ

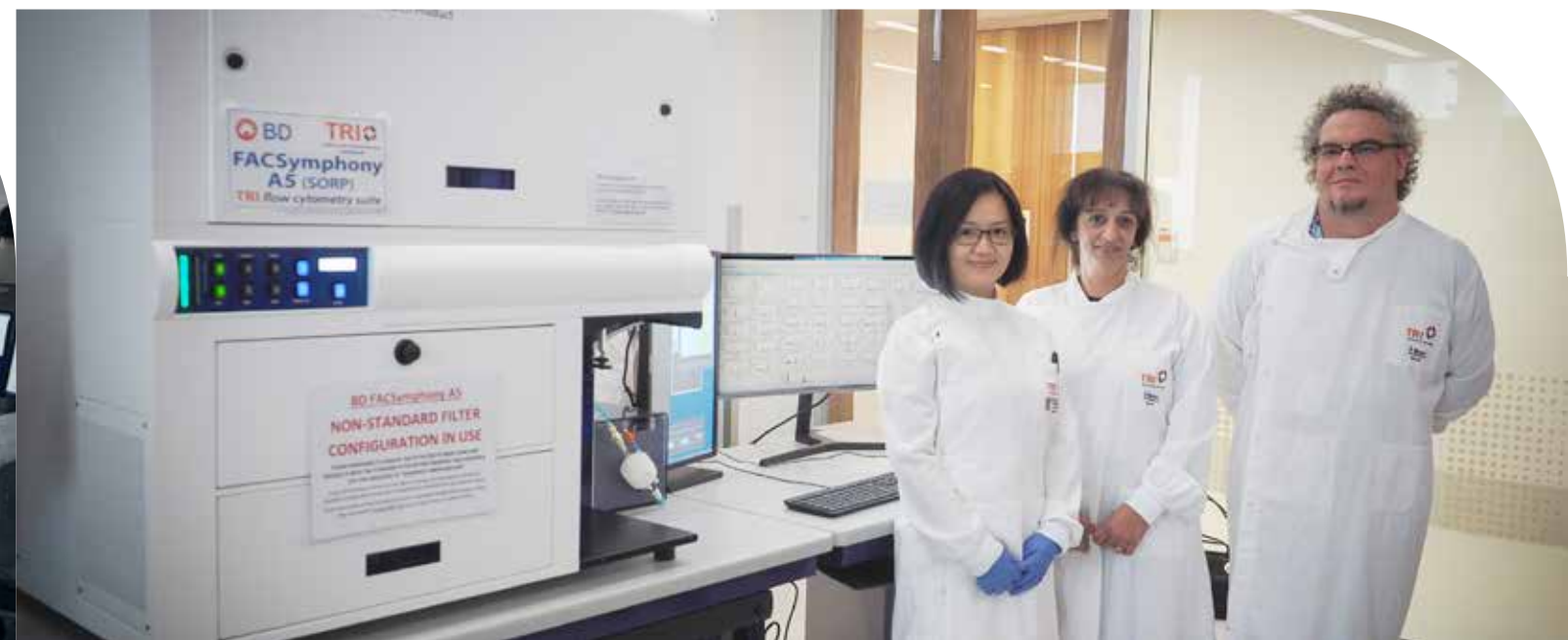
Seven lasers (350, 405, 488, 532, 560, 592, 645nm) to detect 24 fluorochromes. Capable of 6-way cell sorting into a variety of tubes and sorting into a variety of plates including indexed-single cell deposition. Housed in a class-II biosafety cabinet and suitable for sorting human and GM samples.

BD FACSARIA FUSION (TWO MACHINES)

Five lasers (355, 405, 488, 561, 640nm) to detect 18 colours. It can sort up to 4 cell populations at once into a variety of tubes and sorting into a variety of plates including indexed-single cell deposition. Housed in a class-II biosafety cabinet and suitable for sorting human and GM samples.

MILTENYI BIOTEC AUTOMACS PRO SEPARATOR

Automated bead based cell separation to isolate or enrich your cell populations housed in a class-II biosafety cabinet. Used as an alternative or complement to flow sorting.



Microscopy Facility

Facility staff are available to assist with equipment selection, training, induction, operation, optimisation and advice on how to get the best images from your samples, as well as subsequent image analysis. The Microscopy Facility also provides support for specific microscopes throughout TRI.

Instruments available include:

NIKON UPRIGHT BRIGHTFIELD MICROSCOPE WITH CAMERA

For specimens on slides.

OLYMPUS BX63 UPRIGHT EPIFLUORESCENCE MICROSCOPE

Fully motorised brightfield and fluorescence scanning of tissue sections or cells on slides.

OLYMPUS IX73 INVERTED EPIFLUORESCENCE MICROSCOPES WITH CAMERA

Manual microscopes, excellent for viewing flasks and culture dishes as well as quick snapshots of slides.

OLYMPUS VS120 AUTOMATED BRIGHTFIELD SLIDE SCANNING

100 slide capacity per run, with associated software for whole slide quantification. Can be used for imaging whole tissue sections with the ability to zoom to single cell level. 20X or 40X magnification, now with polarisation imaging for fibrosis studies.

PERKIN ELMER VECTRA III 6 SLIDE AUTOSCANNER WITH SPECTRAL CAMERA

For TSA multiplexing up to 9 fluorescent colours and removal of tissue autofluorescence. Teamed with powerful software for cell quantification and analysis - Inform, Spotfire, can be linked with FCS flow cytometry software.

OLYMPUS IX81 LIVE CELL IMAGER AND PHASEFOCUS LIVECYTE LIVE CELL IMAGING

Fully incubated, long term imaging of brightfield and fluorescence in multiwell slides and plates (from 6well – 384well). New technology: label free phase contrast live cell imaging.

OLYMPUS CONFOCAL IMAGING

Olympus FV1200 with 4 detectors and 7 lasers and Olympus FV3000 with superior software for more complex experiments with 4 GaSP detectors and 7 lasers. Allows high resolution imaging, confocal, Z stacks, mosaic, FRET, FRAP. Supported by deconvolution software.

OLYMPUS LASER SURFACE SCANNING

Olympus LEXT OLS4100 laser scanning Microscope is for non-contact 3D observation and measurement of surface features at 10 nanometer resolutions.

OMX BLAZE 3D SIM SUPER-RESOLUTION IMAGING

Fast, 4-fold improvement vs confocal, 3 lasers and 2 cameras for image resolutions greater than that of confocal microscopes.

NIKON/SPECTRAL SPINNING DISC CONFOCAL

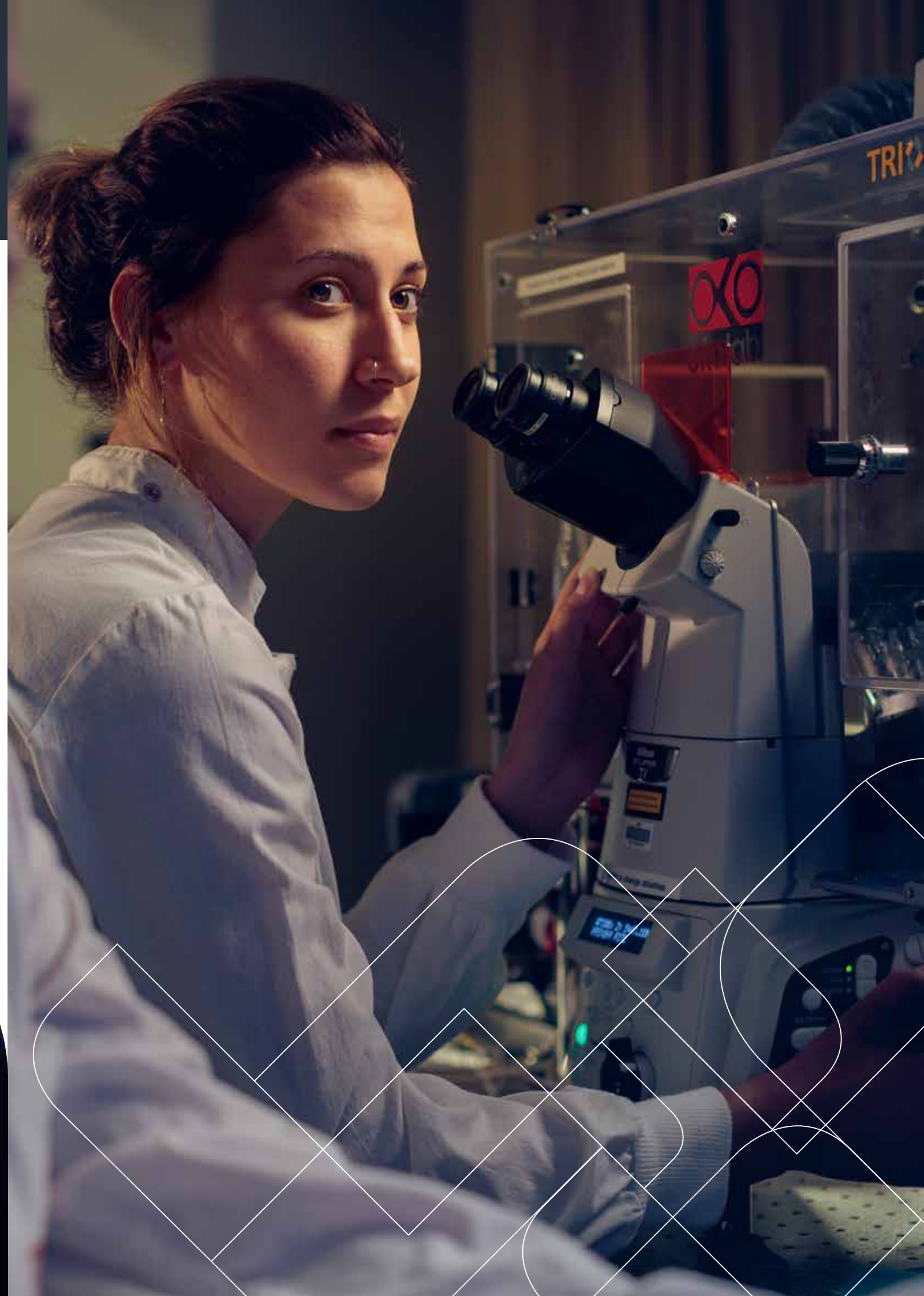
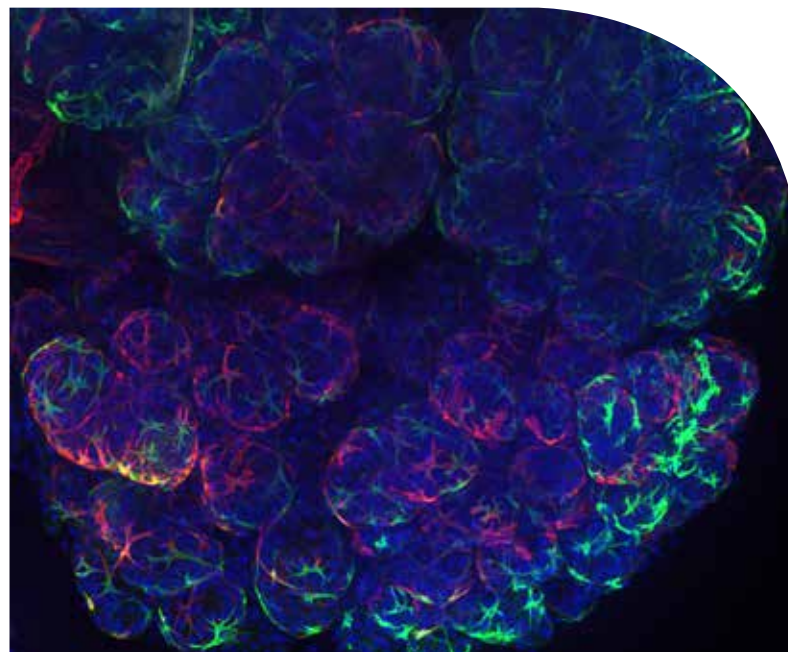
Live imaging of intracellular processes in cellular organelles, 5 lasers, TIRF, laser ablation, high res camera and high speed camera, fully incubated.

MULTIPHOTON

Tunable IR lazer (690-1040nm+), live animal and deep tissue imaging, FLIM.

ANALYSIS SOFTWARE AVAILABLE

Imaris, Visiopharm, NIS elements, InForm and Spotfire.



Clinical Research Facility

TRI at Childrens (TRIC)

TRI has two Clinical Research Facilities, the CRF and TRI@Childrens (TRIC).

The TRI Clinical Research Facility (CRF) has been designed as a multipurpose research centre and is located on the Princess Alexandra Hospital campus, directly across from the main TRI building on levels 4 and 5 of R-Wing.

The CRF is well appointed and provides the specialised facilities and equipment required for conducting human research studies in a safe and controlled environment. It includes both clinical and non-clinical research spaces.

The on-site Nurse Manager, Research Nurse(s) and Office Coordinator manage day-to-day operations and provide specialist support and assistance to researchers with their clinical research activities. In addition, the PAH Digital Hospital systems have been rolled out to include the CRF. The CRF can accommodate both investigator-initiated and pharma-led research studies.

Services offered include:

- Trial design and development advice
- Trial feasibility evaluation
- Ethics and governance documentation and submission management
- Project management and co-ordination
- Patient recruitment assistance

Types of research that can be conducted within the CRF include:

- Interventional research programs for new trials of new medicines and medical devices
- The investigation of disease mechanisms
- Genetic and diagnostic evaluations
- Exercise testing and movement studies
- Skin imaging

What's available at the CRF:

- Nutritional suite
- Exercise gym
- Temperature controlled rooms
- Phlebotomy facilities
- Vectra imaging system
- Four bed ward
- Short stay rooms
- Clinical nurses station
- Small laboratory for sample processing
- Patient waiting area
- Pharmacy storage
- Frozen storage
- Nursing support

The Translational Research Institute @ Childrens (TRIC) is a multipurpose research centre, located at the Centre for Children's Health Research on the Queensland Children's Hospital Campus. TRIC is a managed core facility specifically designed for paediatric human research in a controlled, safe environment.

TRIC provides a range of facilities including office and open plan desk space, clinical consultation rooms, procedure rooms, a small lab for sample processing and separate children's and adult waiting areas.

TRIC offers seamless integration of research with both ambulatory and community-based care.

Types of research that can be conducted within the children's clinical research facility include:

- Any clinical research activity where the participant selection and the type of procedure is considered minimal or low risk
- Both investigator-initiated and commercially-sponsored research studies can be accommodated

Resources available at TRIC:

- Open plan desks
- Shared office space
- Telephone booths
- Calm room
- Small interview rooms
- Laboratory (4 bench)
- Medium/large consult rooms
- Observation room (2 beds)
- Procedure and examination rooms
- Separate adult and childrens wait rooms



Contact the TRI Core Facilities Team

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Queensland
Government

Princess Alexandra
Hospital
BRISBANE • AUSTRALIA



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Institute of Health and Biomedical Innovation



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

mater
research

Patheon
part of Thermo Fisher Scientific