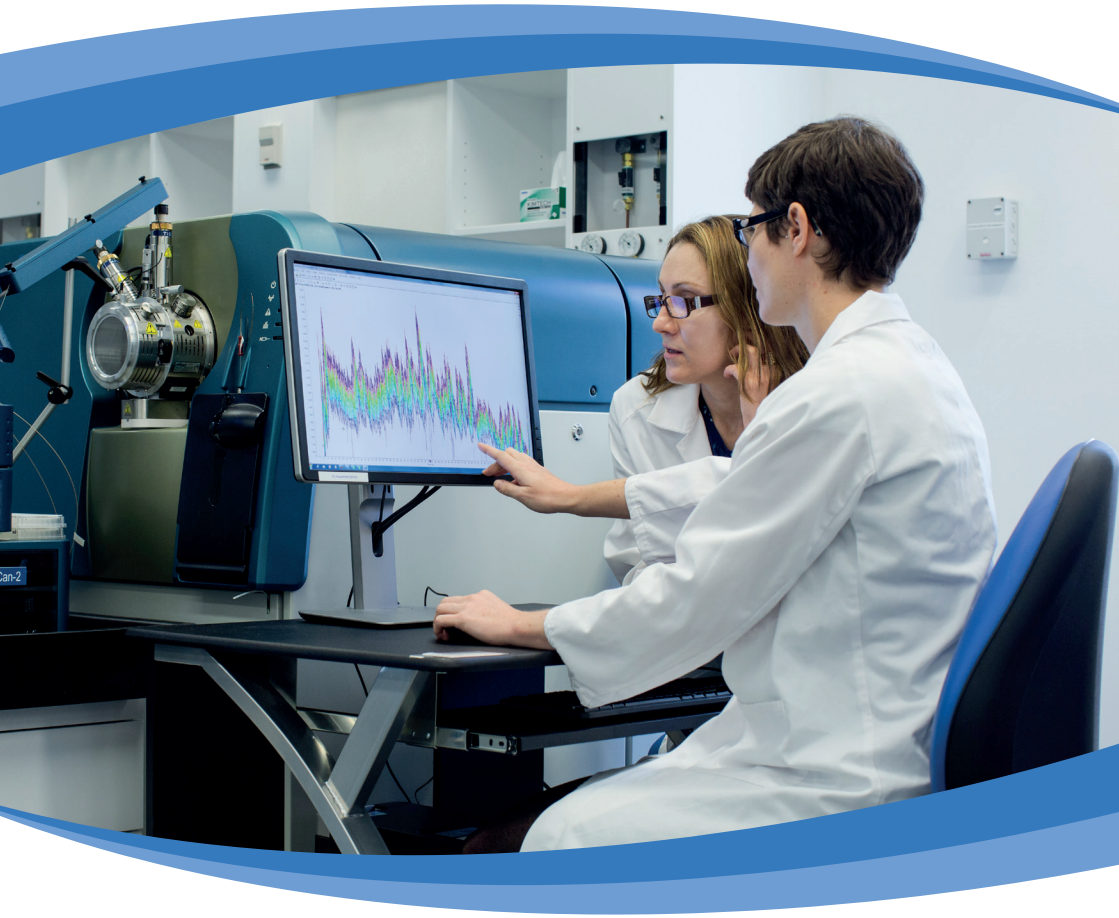
ProCan®

ACRF International Centre for the Proteome of Human Cancer



CHILDREN'S MEDICAL RESEARCH INSTITUTE

Jeans for Genes®

CANCER MOONSHOT

ProCan is an international partner of the US Government's 'Cancer Moonshot' initiative that aims to make a decade's worth of advances in cancer prevention, diagnosis, and treatment, in five years. The alliance will increase collaboration and flow of information between cancer researchers and research organisations to accelerate the pace of cancer research globally. *ProCan* and Australian collaborators signed the Cancer Moonshot's first international Memorandum of Understanding.

ProCan is a new, international centre located within Children's Medical Research Institute (CMRI) in Sydney, Australia. It will significantly improve the speed and precision of cancer diagnosis and provide personalised treatment.

"We expect *ProCan* to result in profound changes to the way cancer is diagnosed and treated."

Professor Roger Reddel, Executive Director, CMRI

ProCan is a global collaboration that aims to:

- Measure many thousands of proteins in ~70,000 cancers of all types where the treatment outcome is known.
- Create a vast, publicly-available database of the proteome of all human cancers for researchers worldwide to mine for further discoveries.
- Correlate tumour protein expression patterns with clinical and other data such as pathology, tumour genomes and clinical outcomes.
- Develop enhanced cancer diagnosis and treatment decision tools for the cancer clinician.
- Identify new drug targets to help develop new, more precisely targeted cancer treatments.

ProCan was officially opened in September 2016.

Unprecedented scale and speed

Analyse 70,000 cancer samples and patient data

ALL cancer types

Cancer proteome database complete within 5-7 years

Proteomics on an Industrial Scale

ProCan is a custom-designed laboratory research facility equipped to conduct cancer proteomics analysis on an industrial scale. The facility houses a set of Barocyclers (PBI 2320EXT) to rapidly process many solid tumour samples from as little as 1 mg of biopsy tissue; six mass spectrometers (Sciex Triple TOF 6600) to collect quantitative proteome data of up to 70,000 catalogued human tumours and panels of cancer cell lines; and bioinformatics capability to move big data to the cloud in real time, allowing data interrogation and future data-re-mining by researchers globally.

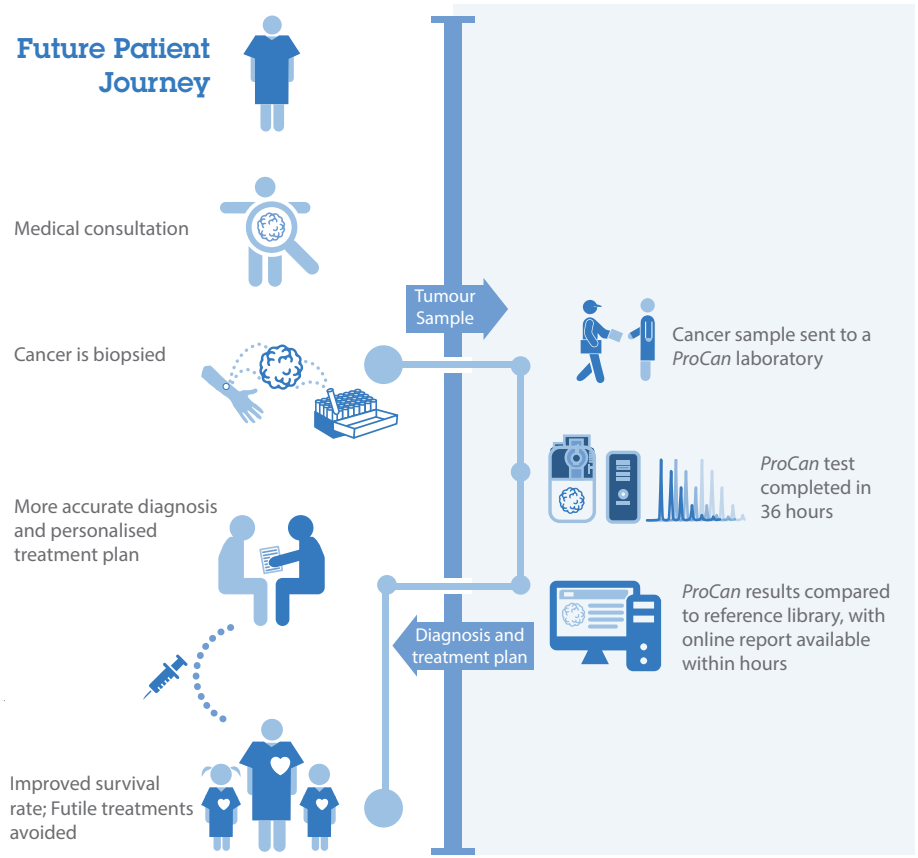
ProCan is the only proteomic centre of this scale in the world, that is dedicated to cancer research. It is designed to operate in factory mode in order to process the huge number of samples under strict SOP's (Standard Operating Procedures). This will ensure consistency across all instruments and throughout the life of the program and will enable simple future scale-up of the facility, eventually for clinical purposes.

ProCan operates in close proximity to CMRI's Biomedical Proteomics Facility. The latter is a research facility located on the floor above *ProCan*, housing eight mass spectrometers in a custom-built laboratory. It is dedicated to basic neuroscience work and drug development and offers core proteomics expertise. *ProCan* and the Biomedical Proteomics Facility together represent an ideal synergy of research with industrial proteomics capabilities, in the largest proteomic facility in Australia.

Industrial Workflow Operation by SOPs

Tumour Sample	Protein and peptides	SWATH-MS files	Data analysis	Results
Tiny 1mg Biopsies	Tumour liquefied and digested	Microflow delivery to mass spectrometers	Data storage and discovery platforms	Diagnosis and treatment decision tool

ProCan 2022 Vision



Children's Medical Research Institute (CMRI)

ProCan is located within CMRI - Australia's first paediatric medical research institution. Established in 1958 by doctors at the Royal Princess Alexandra Hospital for Children (then located in Camperdown, Sydney), today, the Institute operates from modern facilities in Westmead, Western Sydney and is situated adjacent to the Children's Hospital at Westmead. CMRI works in partnership with all organisations in the Westmead Research Hub, including children's and adult hospitals, medical research institutes, NSW Health Pathology and the University of Sydney.

ProCan Timeline

2015

Grant awarded

ACRF $10m Grant Award and equipment purchased

2016

ProCan launch

US Government signs first international Cancer Moonshot MOU with CMRI

2017

Scale up processes and collaborations

Up to 8,000 samples processed

Operation and data analysis commences

2018

Expand sample analysis

(cum.) 20,000 samples processed.

Digital library populated with data

2019

Open access library made available

(cum.) 30,000 samples processed.

2020

Diagnostic algorithm developed

First cancer test replacements launched (upon regulatory approval).

First version of new diagnostic developed

2022

Clinical use of new diagnostic tools

(cum.) 50-70,000 samples processed

Revolutionising cancer research, diagnostics and treatment planning

The first industrial-scale proteomics centre dedicated to cancer

World's largest database of 70,000 human cancer proteomes over 5 -7 years

Initial Funding Partners:

AUSTRALIAN CANCER RESEARCH FOUNDATION

THE UNIVERSITY OF SYDNEY

NSW GOVERNMENT Health

NSW GOVERNMENT cancer institute NSW

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