



Impact Report

Children's Cancer Centre Biobank (prev. Tissue Bank)



THE VISION

For over 150 years, The Royal Children's Hospital (RCH) has been providing world-class paediatric healthcare to children and their families. Our vision is to be a GREAT children's hospital. This vision is underpinned by our leadership in healthcare, education and research.

Philanthropy provides the hospital with the means to continue innovative care, research and education that fall outside basic government funding, giving our staff the tools to continue to provide child health services that are among the best in the world.

PROJECT OBJECTIVES

Throughout this past year we have continued to build a world class cancer biobank to facilitate translational research to implement a precision approach to treating paediatric cancer patients.

Our project objectives are:

- To process and store all available tissues collected from consenting participants. We continue to meet our primary outcome measure making regular improvements in the percentage and type of specimens banked and ensuring quality specimens are processed according to international standards.
- To increase the number of samples disseminated for eligible translational research projects. Of the 1,591 participants who offered their consent and had a sample collected, 857 participants have had their sample distributed for translational research purposes. Therefore 54% of patients have had their specimen utilised in a research project.
- To increase the number of specimens processed and provided to facilitate patient participation in international clinical trials.

In the past year, the CCC Biobank has supported tissue processing requirements for an additional three clinical trials.

ACHIEVEMENTS

What did the project achieve?

Increased and improved distribution of samples as part of:

- Ongoing support for international clinical trial applications
- Novel clinical molecular testing • Local, national, and international translational research projects

Which RCH Strategic Priority did this project address and how?

The CCC and MCRI work in partnership toward achieving the best outcomes possible for children diagnosed with cancer. The CCC has an active research arm for international collaborative large scale clinical trials and our Biobank provides sample processing and storage to ensure that these valuable resources are available for research purposes internationally. Our Biobank strengthens the current partnership with the Victorian Comprehensive Cancer Centre as the paediatric lead in ongoing attempts to develop a molecular-based personalised approach to treatment of cancers.

The Biobank is a core enabling platform that allows the CCC to perform world class research and knowledge transfer to improve care for paediatric patients. This allows RCH to achieve strategic priorities: Establish a sustainable RCH Global Health Program and Build-on Campus and Parkville Precinct Partnerships.

KPI 1

To bank all paediatric solid and liquid tumour samples from patients presenting to the CCC. We conduct regular audits using multi-disciplinary team meeting notes which outline new diagnoses. This ensures all newly diagnosed and relapsed patients are approached and offered participation in the CCC Biobank.

KPI 2

To increase the number of samples disseminated for ethically approved eligible translational research projects

List of newly approved research projects:

- 21005 MERLOT_MINCHACA
 - Translocation of ER Chaperones to the Cell surface in Paediatric Glioblastoma Multiforme Angelica Merlot and Alexis Minchaca (Cancer Targets and Therapeutics Team in the Tumour Biology and Targeting Group, Children's Cancer Institute Australia)
- 21006 DUN
 - Phospho-proteo-genomics for the improved understanding of high-grade brain cancer Applicant: Matt Dun (School of Biomedical Science and Pharmacy, College of Health, Medicine and Wellbeing, University of Newcastle).
- 21007 CHU
 - Mutational Landscape of Juvenile Granulosa Cell Tumours Applicants: Simon Chu (Hormone Cancer Therapeutics Laboratory, Hudson Institute of Medical Research) and Peter Fuller (Centre for Endocrinology and Metabolism, Hudson Institute of Medical Research).

- 22001 ARCUCCI_JENKINS

- Examining the characteristics of brain cancer and identifying new treatments for patients Misty Jenkins and Valeria Arcucci (WEHI)

- 22002 NEESON •

Investigating the tumour immune microenvironment in autologous primary and metastatic osteosarcoma and posterior fossa ependymoma.

Paul Neeson (Group Leader, Cancer Immunology Program, Peter MacCallum Cancer Centre), David Eisenstat (Head of Department, Children's Cancer Centre, The Royal Children's Hospital and Group Leader, Cancer/Neuro-Oncology, Murdoch Children's Research Institute) and Jordan Hansford (Oncologist/Neuro-Oncologist Women's and Children's Health Network, Hospital Research Foundation Group Paediatric Proton Oncology Fellow, McClurg Brain Cancer Fellow SAHMRI, Affiliate Professor South Australian Immunogenomics Cancer Institute, Faculty of Health and Medical Sciences University of Adelaide).

KPI 3

To provide samples for clinical research purposes, including the development of novel molecular testing approaches.

The Biobank is a core enabling platform that allows the CCC and MCRI to perform world class research and knowledge transfer to improve the care for paediatric patients. The CCC has an active research arm for international collaborative large scale clinical trials and our Biobank provides sample processing and storage to ensure that these valuable resources are available for research purposes internationally.

Was new knowledge created for the hospital and/or the community and if so how was it disseminated?

We have consolidated a research enabling platform that will benefit both the hospital and community. The Biobank is an essential resource that is standardised with similar banks in the world's best paediatric cancer research centres such as St. Jude Children's Research Hospital and Dana-Faber / Boston Children's.

The Biobank allows us to collaborate in adequately powered international studies through sample and knowledge sharing ensuring we remain at the forefront of cutting edge, world class cancer research. This new knowledge was disseminated in the form of peer reviewed scientific manuscripts and conference presentations.

Our Biobank is critical for the ongoing delivery of excellence in patient care and has become a central and essential element of cancer research on campus. Success will be measured by our increased ability to utilise specimens collected into the Biobank for applications such as clinical trials, clinical molecular testing and translational research projects. The primary output is research published using CCC Biobank samples.

Thus far 25 publications have acknowledged the contribution of our Biobank.

Five new manuscripts were published which used samples obtained from the CCC Biobank. Timothy N. McOwan, Lauren A. Craig, Anne Tripdayonis, Kathy Karavendzas, Michael M. Cheung, Enzo R. Porrello, Rachel Conyers and David A. Elliott. (2020) Evaluating anthracycline cardiotoxicity associated single nucleotide polymorphisms in a paediatric cohort with early onset cardiomyopathy. *Cardiooncology*. 2020; 6: 5.

Marcel Doerflinger, Gabrielle M. Haeusler, Connie S. N. Li-Wai-Suen, Julia E. Clark, Monica Slavin, Franz E. Babl, Zoe Allaway, Françoise Mechinaud, Gordon K. Smyth, Richard De Abreu Lourenco, Bob Phillips, Marc Pellegrini, and Karin A. Thursky (2021) Procalcitonin and Interleukin-10 May Assist in Early Prediction of Bacteraemia in Children With Cancer and Febrile Neutropenia. *Front Immunol*. 12: 641879.

Lauren M Brown, Soroor Hadiyah-zadeh, Teresa Sadras, Hannah Huckstep, Jarrod J Sandow, Ray C Bartolo, Hansen J Kosasih, Nadia Davidson, Breon M Schmidt, Stefan Bjelosevic, Ricky W Johnstone, Andrew I. Webb, Seong Lin Khaw, Alicia Oshlack, Melissa J Davis, Paul G Ekert (2022) SFPQ-ABL1 and BCR-ABL1 utilize different signalling networks to drive B-cell acute lymphoblastic leukaemia. *Blood Adv*. Apr 12;6(7):2373-2387.

Breon Schmidt, Lauren M. Brown, Georgina L. Ryland, Andrew Lonsdale, Hansen J. Kosasih, Louise E. Ludlow, Ian J. Majewski, Piers Blombery, Paul G. Ekert, Nadia M. Davidson, Alicia Oshlack (2022) ALLSorts: a RNA-Seq classifier for B-Cell Acute Lymphoblastic Leukemia. *Blood Adv*. Jul 26;6(14):4093-4097. Gabrielle M Haeusler, Alexandra L Garnham, Connie SN Li-Wai-Suen, Julia E Clark, Franz E Babl, Zoe Allaway, Monica A Slavin, Françoise Mechinaud, Gordon K Smyth, Bob Phillips, Karin A Thursky, Marc Pellegrini and Marcel Doerflinger (2022) Blood transcriptomics identifies immune signatures indicative of infectious complications in childhood cancer patients with febrile neutropenia. *Clin Transl Immunology*. 11(5): e1383.

The following two publications are under review:

Teresa Sadras, Fatimah Jalud, Hansen J. Kosasih, Lauren M. Brown, Charles de Bock, Lachlan McAloney, Ashley Ng, Christopher R. Horne, Louise E. A. Ludlow, Alicia Oshlack, Seong L Khaw, James Murphy, Paul G Ekert (2022) Unusual PDGFRB fusion reveals novel mechanism of kinase activation in Ph-like B-ALL.

Claire Sun, Paul Daniel, Gabrielle Bradshaw, Melissa Loi, Nicole Chew, Hui Shi, Sarah Parackal, Mateusz Koptyra, Shazia Adjumain, Christie Sun, Wai Chin Chong, Dasun Fernando, Caroline Drinkwater, Motahharez Tourchi, Dilru Habarakada, Dhanya Sooraj, Diana Carvalho, Elisabet Fernandez, Hoang Nguyen, Mia Porksen, Anh Doan, Duncan Crombie, Monty Panday, Matt Dun, Louise Ludlow, Bryan Day, Brett Stringer, Naama Neeman, Jeffrey Rubens, Eric Hutton Raabe, Maria Vinci, Jamie Fletcher, Paul Ekert, Biljana Dumesvska, Maria Tsoi, Nur Farh

What are the long-term impacts of your project?

The project will have long-term impacts which will be communicated to the Foundation.

Over the past nine years, the Biobank had led the way in establishing best practice on campus for sample processing methods, governance, database management and storage practices. Furthermore, our Biobank is one of only five world-class paediatric tumour tissue banks in Australia and comprises a collection of tumour tissue that has been preserved for future research purposes.

Being able to store tumour tissue is essential for any research program and will allow our team and others to make an international contribution to understanding the causes and treatment of childhood cancer. This material is essential for furthering our understanding of the mechanisms underpinning childhood cancer development and long-term outcome.

Have there been any changes to the timeline or activity of the project that differs from the original approved application?

No

If you have any questions or would like to provide feedback, please contact:

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