A new network of biobanks: working together to treat cancer

By Rose Boutros, PhD
Project Coordinator, ANZCHOG Biobanking Network
Tumour Bank, The Children’s Hospital at Westmead

Advances in medical research over the past two decades, including sequencing of the human genome are driving personalised therapies for cancer care. This is placing a lot of pressure on biobanks to deliver high quality biospecimens to researchers, and some biobanks don’t have the capacity to meet these demands. Childhood and adolescent/young adult (AYA) cancers present an additional challenge because many of these cancers are rare, which means that researchers struggle to access sufficient high quality samples for their studies.

As a solution to this problem, biobanks are teaming up to form biobanking networks. Networking means that valuable resources and expertise can be shared, and this leads to larger numbers of better quality biospecimens available for research.

The Australian and New Zealand Children’s Haematology/Oncology Group Biobanking Network (ANZCHOG-BN) was established in 2017 by Professor Jennifer Byrne from the Children’s Cancer Research Unit at The Children’s Hospital at Westmead, in conjunction with ANZCHOG. ANZCHOG is the national organisation for Australian and New Zealand health professionals and researchers working to improve outcomes for children and adolescents with cancer; through quality research, facilitation of innovative paediatric clinical trials and promotion of best practice in clinical care.

ANZCHOG-BN’s mission is to accelerate progress in research and treatment outcomes for children and young people with cancer. This will be achieved by promoting and improving biobanking of childhood and AYA cancer samples at hospitals, research institutes, and universities in Australia and New Zealand.

Networking of biobanks means that valuable resources and expertise can be shared among multiple biobanks. This can lead to larger numbers of better quality biospecimens being available for research.

The network is made up of all nine existing paediatric and AYA cancer biobanks across both countries, including the Tumour Bank at The Children’s Hospital of Westmead. This means that researchers can now access thousands of cancer specimens from across the biobanking network, with a single application form.

More information about the ANZCHOG-BN can be found on our website: anzchog-bn.org or by emailing anzchog-bn@health.nsw.edu.au
The long-term goal of research into childhood malignancies is to reduce the incidence of cancer and to improve the outlook of children suffering from cancer. It is through research that we will gain the knowledge about cancer that will eventually lead to new approaches in therapy. However, such research is dependent upon the availability of cancer specimens for the scientists to study.

Histological stains used to demonstrate anatomical structures on a light microscope.

Photos by Nicole Mackie and Albert Chetcuti

Investigating Genetic Causes of Childhood Cancer

By Dianne Sylvester
PhD Candidate, Molecular Oncology Group, Children’s Cancer Research Unit

When a child is diagnosed with cancer, one of the first questions a family asks is “what caused this to happen?” For the majority of childhood cancer patients there is no obvious explanation. Yet for over 20 years, oncologists at the Cancer Centre for Children together with The Children’s Hospital at Westmead’s Tumour Bank have been collecting tumour tissue samples and information about patients who may have an underlying genetic cause to their cancers. Of particular interest to our research project are patients who developed cancer at least twice, or who have a parent or sibling who also developed cancer.

With the advent of new technologies, scientists are now able to analyse these particular patient samples to investigate the genes for causes of cancer. Our research group used a technique called exome sequencing where we can simultaneously analyse many genes for mistakes (called mutations) that may have contributed to the development of a patient’s cancer. Upon examining genes in patients who were suspected to have a genetic cause for their diagnosis, we have found that a proportion of patients do indeed have a mutation in a cancer-causing gene that may in turn have contributed to the development of their illness.

Further research is required to confirm if all the mutations that we have detected in these genes actually play a role in the development of childhood cancer. However, we are optimistic that if we know more about the genetic mistakes that cause some children to develop cancer, we can work towards earlier diagnoses, better therapies and ultimately prevention.
The Tumour Bank
The Children’s Hospital at Westmead’s Tumour Bank is a collection of cancer specimens, contributed by patients and obtained through the normal course of treatment. These samples are placed in long-term storage and made available to research scientists, both nationally and internationally, for future investigations into the improvement in the diagnosis and treatment of children with cancer.

Since 1998, the Tumour Bank has stored more than 40,000 samples from 3,788 patients, representing 50 different types of cancers.

The aim of the Tumour Bank is to encourage and facilitate research to improve prevention, diagnosis and treatment of childhood cancer. By providing samples to research groups, the Tumour Bank helps us to:
• Understand the molecular mechanisms which lead to cancers in children,
• Develop tests that enable screening for those children at an increased risk of cancer,
• Aid the establishment of new molecular-based diagnostic tests which will assist in the selection of the most appropriate treatments, and
• Identify targets for potential new cancer remedies.

The Tumour Bank has already provided tumour specimens to many research groups both nationally and internationally. Many people and departments throughout the Hospital play a role in the activities of the Tumour Bank. In particular, the Tumour Bank is supported by:
• Children’s Cancer Research Unit
• Cancer Centre for Children
• Histopathology and Haematology Departments
• Medical Records Department
• Information Technology
• Public Relations
• Fundraising

Consent
Many patients and parents support the Tumour Bank through the donation of tumour tissue, blood and bone marrow samples. These samples are removed from patients in the operating theatre or in the clinic during the normal course of treatment.

A consent form tells patients and parents about the Tumour Bank. This form, once signed, gives permission for samples to be stored in the Tumour Bank and later given to scientists studying childhood cancers.

“The decision to give us permission to collect samples from your child for the purpose of research is voluntary.”

If a patient or parent decides not to give permission, or to withdraw it at a later time, the child’s care will not be affected in any way.

Collection and storage
The Tumour Bank receives resected tumours and biopsies as well as blood, bone marrow and cerebral spinal fluid specimens that have been removed for diagnostic purposes from patients in the operating theatre or in the clinics. Once the diagnostic process is complete, the residual tissue specimens are transferred to special low-temperature cryogenic vials and immediately snap-frozen in liquid nitrogen. This freezes the samples very quickly and preserves proteins and genetic material within the sample. Once frozen, the samples are placed in numbered boxes and stored in a freezer at -80°C.

In some circumstances, specimens stored within other Hospital departments may be requested by the Tumour Bank to further support research applications.

Database
Once stored, each sample is recorded on the Tumour Bank database. Information recorded includes:
• Age of the patient and age at diagnosis,
• Type of cancer,
• History of the cancer,
• Results of pathology tests, and
• Type of treatment received.

Privacy
When the samples are provided for research, the child’s name will not appear on the sample. At no time will any personal contact details (such as the patient’s address, phone number) be issued with the specimens. The child and family remain entirely anonymous to the researchers who receive any Tumour Bank specimen.

If the findings of the research could help us with a child’s treatment, the coding on the sample will allow the Tumour Bank staff to forward the results to the doctor who is caring for the child.

More information
Please check the Tumour Bank page on schn.health.nsw.gov.au or you can email us on tumourbankchw.schn@health.nsw.gov.au
From Splicing Ropes to Building Hope: The Sydney Mariners

Mr Bob Foster, now 85, started doing something simple, but the impact of his efforts grew and continues to grow. Through providing a simple service to the owners of boats at the Birkenhead Point Marina, splicing ropes so they could safely moor their crafts, Bob raised awareness of the needs of some sick children at The Children’s Hospital at Westmead. For every job he did, he requested no fee for himself, but rather a donation to the Tumour Bank in support of childhood cancer research at the Hospital. Bob’s efforts were recently rewarded with the Hospital acknowledging him as a Premier Partner, recognising his efforts to secure over $80,000 in donations.

Bob’s commitment has recently inspired other members of the Birkenhead Marina to reach out in support of our cancer patients. In July 2018 Sunseeker cruisers—wanting to bring our cancer patients some cheer and enjoyment—arranged a cruise on Sydney Harbour on a luxury cruiser. A small band of families enjoyed a fabulous day out. Bob shows that a little bit of care can grow a whole lot of hope.

Publications

Supported by Tumour Bank


The Tumour Bank
Locked Bag 4001 (Westmead)
NSW 2145 Australia
Phone (02) 9845 0000
schn.health.nsw.gov.au

Artwork by Alikiage, Aged 2

Artwork by Kathlin, Age 5