Welcome to the 25th edition of The Tumour Bank Newsletter. The newsletter highlights how the Tumour Bank enables leading researchers from around the world to learn more about children’s cancer by making available to them donated tumour tissue specimens. Over this time we have had the privilege of informing you of the outcomes from some of the 100+ studies we have supported during the years. These studies have changed the way we think about how childhood cancers form and behave during treatment and given us new ideas for how best to treat patients.

Cancer is a disease that isn’t bound by international borders. It is a disease that, if left unchecked, affects human kind with equal consequence. Regardless of whether they are wealthy or impoverished, educated or illiterate, tribal or technological, from the first, second or third world lands, every family that hears that their child has been diagnosed with cancer is equally devastated. Each one enters an unknown world that is strange, unfamiliar and filled with uncertain outcomes. Despite this dismal outlook, when we learn something new about one person’s cancer, that new knowledge has the potential to benefit many other cancer patients around the world. This is why the work of the Tumour Bank has been so vital. Over the past 25 editions many of the studies we have reported involve international scientists exploring rare tumour types collected from hospitals around the world, including Westmead. These investigations have allowed us to discover new mechanisms that drive the formation of these cancers and highlight new opportunities for how clinicians may treat patients.

So, in our small way, the work of the Tumour Bank allows patients from western Sydney to change the world!!

In this newsletter, you will read about research supported by the Tumour Bank that is exploring the discovery of novel proteins in cancer cells that occur when the basic machinery of the cell gets rearranged during cancer. By understanding these ‘biomarkers’ the researchers hope to identify patients who may benefit from different treatment strategies.

Over the years, the Tumour Bank Newsletter has highlighted many of the studies we have supported around the world. You can see the tribute to the projects we supported over the years as well as the reference to new publications. We look forward to present more reports of the wonderful and exciting research being done with samples provided by the Tumour Bank at The Children’s Hospital at Westmead.
17 Years of Biobanking
– Meet the Faces Behind the Scenes

It gives the Tumour Bank staff an enormous pleasure to highlight some of the amazing people that have supported the work of the Tumour Bank at the Children's Hospital at Westmead over almost two decades of biobanking. It is through the amazing generosity of our community and donors that the Tumour Bank was able to support outstanding research in the area of childhood cancer on the global scale.

These are the faces of a diverse group of individuals who each have contributed to the cause of fighting childhood cancer. Whether it’s by donating a tumour tissue, raising money from kayaking, splicing rope or singing carols, forming a charity to advocate for childhood cancer research or working tirelessly at patients bedsides and behind a lab bench to produce fresh insights, the Tumour Bank is proud to have worked alongside such passionate and dedicated people.
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 is a valuable resource as it 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
• 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
• 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 (address, phone number) be issued with the specimens. The child and family will therefore remain entirely anonymous to the researchers who receive any Tumour Bank specimen.

However, 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
Thanks to multimodal therapy – that is a standard cancer treatment approach that usually includes chemotherapy, radiotherapy and surgery, the overall survival rate for children’s cancer has increased in the last few decades from 10% to nearly 90% today. Despite this overall success, patients who do not respond to standard therapy or suffer from cancer recurrence are still facing a significant worse prognosis and need further treatment options. Scientific and medical communities now believe that in order to achieve more effective treatment options and better outcomes for high-risk patients we need a deep understanding of how molecules behave within cancer cells. It is particularly important to understand how these molecules cause aggressive drug resistant types of cancer. The detailed knowledge of how cancer behaves on a molecular level for each individual patient is considered to be of central importance in determining the risk of cancer aggressiveness. This knowledge allows a clinician to tailor therapy intensity for each patient in order to minimize the morbidity and long term effects associated with the toxic effects of cancer treatment regimens.

In the last four years, my main research interest has been focused on implementing molecular profiling for high-risk paediatric cancer patients to identify potential molecules that can be targeted using a specific approved drug. A retrospective study was undertaken using diagnostic samples representative of the major childhood cancer subtypes of patients who eventually experienced cancer relapse. Fifty frozen samples were selected and obtained from the Tumour Bank at the Children’s Hospital at Westmead (CHW), which also played an instrumental role in liaising with the CHW Histopathology department in order to revise and release seventy further tissue samples. Genomic sequences and gene expression profiles were obtained for each case and validated with traditional methodologies. With this project we gained important information about how frequently particular molecules that can be targeted by existing drugs occur in specific cancers. We also looked at the feasibility of providing high quality results in a timely fashion to enable alternative treatment options to be implemented. Importantly, we also paved the way to establish molecular profiling guidelines to be used in a prospective personalized medicine pilot study and a recent national clinical trial for high-risk childhood cancer patients where targeted therapies will be chosen based on individual profiles.

Molecular Profiling for Personalised Therapy in Childhood Cancer: Searching for Individual Druggable Biomarkers

Dr Federica Saletta
Children’s Cancer Research Unit, The Children’s Hospital at Westmead

Publications

Supported by Tumour Bank


Jonathon Torchia at al “Integrated (epi-)genomic analyses identify subgroup-specific therapeutic targets to CNS rhabdoid tumours.”, Cancer Cell, 30(6), 891-908, 2016.

