Welcome to the first edition of The Tumour Bank Bulletin for 2019. After an enjoying a relaxing few weeks over the Christmas and New Year break, the team at the Kolling Institute Tumour Bank are back for a fresh start to the year.

The Kolling Institute Tumour Bank ended 2018 on a high note when we were informed in late December that we had attained certification from the NSW Biobank Certification Program, which was discussed in the previous edition of The Tumour Bank Bulletin. Our certified status represents our completion of all the requirements set out by the University of British Columbia Office of Biobank Education and Research Biobank Certification Program, which has been adopted and implemented by NSW Health. All staff members at the Kolling Institute Tumour Bank put a lot of time and energy into preparing and updating the documents that were to be assessed by the NSW Biobank Committee. The enormous effort was lead by Ussha Pillai (Senior Tumour Bank Officer) who has been heavily involved in instigating and coordinating the certification process. Without her consistent hard work, the Kolling Institute Tumour Bank would not have achieved certification in 2018, so thank you Ussha.

In this edition of The Tumour Bank Bulletin we present research being conducted by Dr Steven Schlichtemeier and Professor Ross Smith who, along with their research team, have been using liver samples from the Kolling Tumour Bank to investigate potential prognostic measurements of hepatocellular carcinoma, a cancer that arises in the liver.

World Cancer Day is held on 4th February in an international effort to increase awareness of this pervasive disease, and educate people on how to reduce their chances of developing it. We will take a look at this important campaign and highlight how the Kolling Institute Tumour Bank is helping to contribute to the World Cancer Day movement.

Enjoy the latest edition of The Tumour Bank Bulletin and we hope you have a great start to 2019.
Primary liver cancer is a malignant tumour that arises in the tissue of the liver. The most common form of primary liver cancer is hepatocellular carcinoma (HCC), which develops from the main cell type of the liver, called hepatocytes. Although a relatively uncommon form of cancer in Australia, ranking fifteenth for males and twentieth for females, the incidences of liver cancer have been progressively rising over the past few decades. The latest reportable figures indicate that 1864 people died in 2016 as a result of liver cancer. The five year survival rate for the disease is a disappointing 18%.

There are currently no screening programs for liver cancer in Australia. Chronic infection with hepatitis B or C viruses is the greatest known risk factor for liver cancer. These long term infections lead to cirrhosis of the liver, which generates an environment suitable for the development of cancer. Other factors that can increase the risk of developing liver cancer include:

- liver scarring
- fatty liver disease
- genetic disorders such as haemochromatosis
- type 2 diabetes
- high alcohol consumption
- obesity

The most common treatments for primary liver cancer are tumour ablation (technique for destroying a solid tumour without surgical removal) and chemotherapy delivered directly into the cancer. Specialised radiation therapy, surgery and cryotherapy as also options for a small number of patients. Typically, HCC responds poorly to conventional cancer treatments, but the advent of new and more effective therapies, including biological agents that specifically target the molecular basis of cancer growth and spread, is expected to make a significant clinical impact in the coming years. Cancer control strategies are dependent upon those affected and their healthcare professional’s ability to prevent liver disease progression to cirrhosis, together with the eradication or management of the viral infection.

The understanding of HCC biology and of viral hepatitis has greatly increased in recent years as a result of collaborations between clinicians, epidemiologists, public health practitioners and researchers.

Contributing to this field of research is Dr Steven Schlichtemeier, a colorectal surgery fellow, and Professor Ross Smith, who is the head of the Cancer Surgery Research Laboratory at the Kolling Institute as well as a member of the management committee at the Kolling Institute Tumour Bank. Dr Schlichtemeier and Prof Smith conducted research into how certain proteins expressed in the liver differ between HCC tissue and that of normal liver tissue located nearby. The aim of the project was to identify these proteins and correlate the findings with established clinical measures such as microvascular invasion, tumour size, disease-free and overall survival. This understanding could potentially lead to the use of new prognostic biomarkers for patients diagnosed with HCC.

Using a specific form of mass spectrometry, a technique employed to measure different masses within a sample, Dr Schlichtemeier and Prof Smith analysed liver tissue samples from 30 patients with confirmed HCC. In combination with statistical analysis, the researchers identified four proteins that could differentiate HCC from adjacent normal liver tissue. Notably, the proteins exhibited different patterns of expression when correlated with the clinical factors included in the study. One protein in particular, identified in the study as m/z 9,961, was significantly underexpressed in HCC tumours that showed microvascular invasion, as well as in patients with a shorter disease-free survival period after surgery to remove the tumour.

The paper SELDI-TOF MS Analysis of Hepatocellular Carcinoma in an Australian Cohort, has recently been accepted by the Journal of Surgical Research and can be read in full at:

www.hepcinfo.co.nz/what-is-hep-c/
With a progressively aging population, and the advent of tests allowing for the earlier detection of many conditions, the number of people being given the news of a cancer diagnosis is growing each year in Australia. According to Cancer Australia, it is estimated that 138,321 new cases of cancer were diagnosed last year, and 48,586 people died as a result of the disease.

In general terms, cancer is the unregulated growth of abnormal cells. These atypical cells replace, damage or invade the surrounding normal tissue of the organ they arise from, known as the primary site. In many cases the abnormal cells do not remain confined to one particular organ, but spread to distant sites through the bloodstream or lymphatic system, resulting in secondary cancers.

Just as different types of cells make up the numerous organs and structures of our body, these cells can give rise to different types of cancer. Cancers are broadly categorised into groups based on the cell type they arise from:

- **Carcinoma:** begins in the skin or in tissues that line or cover internal organs, such as melanoma
- **Sarcoma:** begins in bone, fat, muscle, blood vessel, or other structural tissue, such as osteosarcoma
- **Leukaemia:** begins in the tissues that make blood cells, such as the bone marrow, such as acute myeloid leukaemia
- **Lymphoma and myeloma:** starts in cells of the immune system, such as Hodgkin lymphoma
- **Central nervous system cancer:** begins in the brain or spinal cord, such as glioma

A significant number of cancer diagnoses, particularly in high socioeconomic countries such as Australia, can be attributed to preventable causes. Part of the World Cancer Day ‘I am, I Will’ campaign is to motivate people to take more of an active role in curbing their risk of developing cancer. Some lifestyle factors people can consider looking at in an effort to decrease their risk include:

- Making healthy lifestyle choices such as regular exercise, eating a healthy diet, limiting alcohol, avoiding tobacco products and responsible sun exposure.
- Knowing about the signs and symptoms of cancer and early detection guidelines.
- Educating yourself and others about the links between certain lifestyle behaviours – including smoking, poor diet, and lack of physical activity – and cancer risk.

February 4th is World Cancer Day, a day for individuals, organisations and governments to band together and raise awareness about the disease, which is estimated to effect 1 in 2 people worldwide. A global initiative coordinated by the Union for International Cancer Control, World Cancer Day was established in 2000 at the World Summit Against Cancer for the New Millennium in Paris. This summit gave rise to the Charter of Paris Against Cancer, which ‘aims to promote research, prevent cancer, improve patient services, raise awareness and mobilise the global community to make progress against cancer’.

Through its own, local approach, the Kolling Institute Tumour Bank plays an important role in the mission championed by World Cancer Day in providing biospecimens and associated clinical data to medical researchers. These clinicians and scientists are continually researching to better understand the biological foundations of cancer, as well as investigating more effective and less invasive ways of detecting and diagnosing the disease.

Although the staff at the Kolling Institute Tumour Bank work hard to source and maintain its collection of tissue and blood samples, it is the participants who really make the biobank, and the important research that stems from it, possible. Without the kind donations from patients undergoing surgery at Royal North Shore Hospital, North Shore Private Hospital and the Mater Hospital, the Kolling Institute Tumour Bank would not be able to contribute to valuable cancer research, and further the mission of World Cancer Day.
Do you want to help us find a cure for cancer?

The University of Sydney’s Kolling Institute of Medical Research located at Royal North Shore Hospital needs you to join us in the fight against cancer.

To help find a cure, we are analysing blood samples from cancer patients and comparing them with those from healthy volunteers.

We are looking for healthy volunteers who:
- Have not had cancer
- Have not donated to our banks before
- Are over the age of 18 (no upper age limit)
- Have not been hospitalised in the last 6 months

If you are interested in participating please contact us on 9926 4771 to arrange a time.

The Kolling Institute Tumour Bank relies solely on grants to build and maintain the collection of samples required to allow important medical research to continue. If you would like to make a donation to support the running of our tumour bank we would love to hear from you.

Please visit the Sydney Vital website and click on the ‘Make a Donation’ tab to complete our donation form.

www.sydneyvital.org.au/biobank

This project has been approved by the Northern Sydney Local Health District Human Research Ethics Committee
Version 1. 3rd July 2014