

## New Equipment for Protein Identification

CanSur would like to share in the purchase of a MALDI-TOF system for the Kolling Institute. The MALDI-TOF (Matrix-Assisted Laser Desorption/Ionization) equipment is a very clever system where the specimen such as serum, is placed on a chip (a specialised glass surface) and a solution which makes a matrix with the protein is applied to the surface. When a laser light is fired on the specimen, the matrix vaporises with the protein and is dragged along a tube to a detector. The rate of transfer along the tube is related to the size of the protein. With the use of special enzymes the protein can be split into small components which can be recognised by the attached computer. MALDI-TOF equipment has many uses. Its common use is to identify proteins in samples of blood or tissue. In Dr Sandanayake's bile duct cancer project, similar equipment was used in London to identify a marker in the blood of bile duct cancer patients. The scientists at the Kolling Institute would like to invest in such equipment and CanSur is willing to support this endeavour.

This equipment will be important for two new studies, searching for biomarkers of liver cancer and oesophageal cancer.

Dr Ali Aslani was awarded a PhD for Body Composition Studies of surgical patients. One interesting paper examined the preoperative status of patients with pancreatic cancer and related this to survival. He found that only five patients out of thirty-seven were malnourished, but their survival was not impaired. Twelve had measurements indicating that they had been over-nourished which supports the notion that over-nutrition



Dr Ali Aslani and Professor Ross Smith at the University of Sydney for Ali's graduation

may be a risk factor for pancreatic cancer. Over-nutrition increases growth factors such as insulin, which may be a mechanism linking this finding to the risk of cancer.

In a further study, although nutritional therapy maintained patients in good health when in hospital, they lost weight with muscle in the first month after discharge from hospital. However, the important nutritional measures had recovered after six months. This demonstrates that a patient's nutritional state can be maintained through the period of major surgery and that after a period of adjustment they return to good health.

## Recent Publications from the CanSur Group

Allen BJ, Rizvi SM, Qu CF, Smith RC. Targeted Alpha Therapy Approach to the Management of Pancreatic Cancer. *Cancers* 2011; 3:1821-1843.

Pang TC, Fung T, Samra J, Hugh TJ, Smith RC. Pyogenic liver abscess: an audit of 10 years' experience. *World J Gastroenterology* 2011; 17(12):1622-1630.

Aslani A, Gill AJ, Roach PJ, Allen BJ, Smith RC. Preoperative body composition is influenced by the stage of operable pancreatic adenocarcinoma but does not predict survival after Whipple's procedure, *Journal of the International Hepatobiliary Association (Oxford)* 2010; 12(5):325-333.

Gill AJ, Chou A, Vilain R, Clarkson A, Lui M, Jin R et al. Immunohistochemistry for SDHB divides gastrointestinal stromal tumors (GISTs) into two distinct types *American Journal of Surgical Pathology* 2010; 34(5):636-644.

Xue A, Scarlett CJ, Chung L, Butturini G, Scarpa A, Gandy R et al. Discovery of serum biomarkers for pancreatic adenocarcinoma using proteomic analysis. *British Journal of Cancer* 2010; 103(3):391-400.

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News

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## Chairman's Report

Over the last year we were fortunate to have Dr AiQun Xue lead our laboratory's scientific work and support a number of postgraduate students. Dr Jared Chang completed his Master of Surgery research, Ms Thao Le undertook a BSc(Med) Honours and Dr Nemes Sandanayake and Dr Matthew Wong worked on PhDs. Next year we will have two new students commencing Master of Surgery research – Dr Steven Schlichtemeier and Dr Ada Ng.

The methods developed for pancreatic cancer will also be used to study cancers of the oesophagus, stomach, liver and the bile duct/gallbladder. These tumours present difficult problems for the surgeon and many have aggressive behaviour. We anticipate the biology of these cancers will lead to individualised treatments for them.

CanSur's laboratory benefits from close ties with different research groups in the Kolling Institute studying malignancies of the breast, brain, endocrine glands and ovary along with melanoma. Individualised management of cancer relies on analysis of the surgical specimen to indicate which chemotherapy and radiotherapy will benefit that particular patient. We are developing facilities at the Kolling Institute to help decide which treatment is most likely to improve survival and quality of life.

The Directors of CanSur, Professor Ross Smith, Mr John Burgess, Dr Tom Hugh, A/Professor Jaswinder Samra, A/Professor Garrett Smith and Dr Steven Leibman all have a passion towards improving patient outcome through a better understanding of cancer biology. CanSur proudly supports the laboratory.

As Chairman of the Cancer Surgery Research Foundation, I sincerely thank all our supporters who have allowed us to pursue our programme which has been very energetic. I would like to present more details of the highlights of the last year in this newsletter.

## Personalised Medicine for Pancreatic Cancer.

Personalised Medicine means using results from the laboratory such as the pattern of gene abnormalities in the cancer tissue which show changes in proteins and responses to different treatments. We have been studying how altered genes affect protein patterns in cancer cells. These proteins can be easily measured to

indicate the subtype of a particular cancer. We will keep patients cancer cells alive in the laboratory so we can test their response to various treatments. This will lead to a better selection of treatments so that the treatment most likely to be effective will be offered to the patient. Furthermore, this will avoid complications arising when treatments are used which are unlikely to be effective. This test will take about six weeks so that patients will benefit from the results of studies on their own cancer. This project has been funded by a Ramsay Hospital grant where the chief investigators are A/Professor Samra, Dr A Xue and Professor Ross Smith.



New PhD Student Dr Matthew Wong, Professor Ross Smith and Dr AiQun Xue

Dr Matthew Wong is undertaking a PhD, supervised by Professor Ross Smith, Professor Robert Baxter and Dr Nick Pavlakis. He is also supported by CanSur and is under the guidance of Dr AiQun Xue. In her PhD Dr Xue demonstrated that several growth factors were over-expressed in some pancreatic cancers resulting in more rapid tumour growth. Dr Wong is interested in determining the best method of blocking these mechanisms using new treatments which are currently available for the treatments of other cancers. We are working closely with Professor Baxter in this project because he is a world expert in growth factors. Professor Baxter agrees that our findings provide an intriguing insight into pancreatic cancer and he is also studying how this mechanism applies to breast and other cancers. This collaboration emphasises the benefit of adjacent laboratories. Many new agents have been developed to block growth factor mechanisms in order to decrease growth and hopefully destroy the cancer. This is an important advantage of our laboratory being situated in the Kolling Building.

## Bile Duct Cancer – Earlier Detection



Dr Neomal Sandanayake has taken a three year break from training in Gastroenterology to discover new blood-borne markers of bile duct and gallbladder cancer. For the first part of his study he was based at the University College London, working closely with physicians, surgeons and protein biochemists. Using MALDI-TOF equipment he identified a new protein in blood which is increased in patients with bile duct cancer but not when there is an inflammatory cause of a blocked bile duct. There are several reasons for increased amounts of such a protein in cancer patients. It may be produced by the cancer or it may be the body's response to the cancer. However, Dr Sandanayake's work demonstrated that the protein was manufactured in cancer tissue by performing special staining of surgical specimens from patients with bile duct cancer treated at Royal North Shore Hospital. The manuscript from this paper is now under review in an international journal. This work will lead to further studies to confirm the finding then will need to be made available for patients faced with these dilemmas. Hopefully, it will help to make a diagnosis earlier when surgical treatment can be curable.

The importance of this work is that it is sometimes very difficult to know if a blocked bile duct is due to cancer or another pathology that would not need surgery. In cases where the diagnosis is unclear, a better blood test would lead to a greater confidence in offering operation at an earlier stage when surgery would have a better cure rate.