A CAREER IN MEDICAL RESEARCH

With a first class BSc Honours degree in Biochemistry from the University of Otago, Anna Pilbrow could have done a doctorate at almost any university in the world. Now, just over half way through her PhD project, Anna is pleased that she decided on a career in medical research at the Christchurch School of Medicine and Health Sciences..

“I really like the working environment,” she says. “We have both clinicians and scientists working together on the same research topics, trying to understand heart failure and heart attacks. I worked as a summer student and got to know the researchers who are now my supervisors. They’re really supportive; prepared to take time to help and advise me.”

Anna is just one of 55 PhD candidates at the school, most of whom are working alongside experienced scientists and clinicians, trying to understand disease and how to improve New Zealanders health. While PhD candidates often work in a laboratory, some also research in areas such as Mental Health or Public Health , which are not usually laboratory based.

Anna has an Otago University Postgraduate Scholarship, which pays for fees and a living allowance, and is investigating genetic risk factors in heart disease as part of the internationally recognised Christchurch Cardioendocrine Research Group. She is studying how changes within particular genes that code for heart enzymes result in poor outcomes amongst people who have had a heart attack.

“In particular, we are trying to understand more about the genetic changes in a heart enzyme called ACE, which has been associated with identifying people at risk of having a heart attack. Our aim is to target medication for those people most at risk of dying after a heart attack,” she explains.

Being able to do medical research which is going to be of direct benefit to people’s health is something that Anna finds very positive. “It’s nice to be able to explain to my grandmother the kind of research I do, and how it might be used in the future. I really enjoy the applied aspect of the work.”

“Right from the start of my PhD I have been treated as an independent researcher, my supervisors give me guidance, but don’t tell me what to do every day. There’s the excitement of the project developing in new directions as we make new findings; and the labs here are right at the forefront of their research areas.”

When she has finished her doctorate, like many students Anna will be offered positions overseas. She will be gaining experience in much larger laboratories on what is known as a ‘postdoctorate’ scholarship, for up to four or five years.

“But I’ll definitely come back to New Zealand. The calibre of medical research here is as high as anywhere in the world.”

For further information on PhD options contact Dr Ruth Helms, Manager Academic Programmes, (03) 364 0527. ruth.helms@chmeds.ac.nz

NEW COMPLEMENTARY AND ALTERNATIVE MEDICINE WEBSITE

Interested in health supplements or alternative medicines? Not sure how well they work as therapies? Well, now there is help available. The School has been involved in the development of the first New Zealand complementary and alternative medicine (CAM) website which provides objective assessment of alternative medicines.

The site can be found at www.cam.org.nz and is being developed by the NZ Health Technology Assessment group at the School and funded by the Ministry of Health. NZHTA Director, Dr Ray Kirk, says it is easy to read and non-technical, and contains summaries of all the most objective information on CAM from around the world, and will be continually developed.

The site is also aimed at health practitioners interested in using CAM products that are supported by scientific evidence, so it is right up to date with accuracy. The School is also investigating the possibility of a national centre for CAM research which would be a collaborative venture between tertiary partners and Crown Research Institutes

Christchurch School of Medicine and Health Sciences, University of Otago.
2 Riccarton Avenue Christchurch. Ph: (03) 364 0530. Fax: (03) 364 0525. www.chmeds.ac.nz

Christchurch School of Medicine and Health Sciences
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Connecting with the Community

Welcome to the third edition of our Community Newsletter. We are now well into the 2004 academic year, which has already seen a number of major highlights for our staff and students.

At our Inaugural Ceremony held in February we were delighted to make three further Gold Medal Teaching Awards to senior staff to recognise their outstanding contributions to teaching. Dr Peter Moller, Associate Professor Philip Bagshaw, and Dr Philip Parkin have each made very major contributions to undergraduate teaching. We have also decided to establish a Gold Medal Award for Excellence in Research and the first awards in this category will be made at our Inaugural Ceremony in 2005.

The University Faculty of Medicine will be reviewed by the Australian Medical Council in August this year. The dossier describing the undergraduate programme is very impressive and we have received favourable feedback from students currently enrolled in the course. We continue to work towards the redevelopment of our undergraduate curriculum and the establishment of our graduate entry pathway.

Staff at Christchurch are making an outstanding contribution to this process, and we have now established a number of Working Groups focussed on the details of graduate entry. For the first time this will provide an opportunity for graduates from the Canterbury region to enrol directly in a medical course in their own area.

canterbury medical research foundation

Staff have also received prestigious awards. Dr Ann Richardson, in the Department of Public Health & General Practice, has recently received a University of Otago Vice-Chancellor's Award for Excellence in Teaching, and is one of two nominees for the Prime Minister's Tertiary Teaching Excellence Awards. Professor Peter Joyce, our Deputy Dean and Professor in Psychological Medicine, was recently awarded the Senior Researcher's Medal by the Australian and New Zealand College of Psychiatrists.

The Van der Veer Centre for Parkinson's Diseases and Brain Research was opened in May. We are delighted at this joint venture project, which has been made possible by the generous bequest from the estate of the late Cass Van der Veer. The Canterbury Medical Research Foundation is to be congratulated for its outstanding leadership in fostering the development of this Centre, and the appointment of Professor Tim Anderson as Chair.

Professor Ian Town
Dean.

CHILDREN'S CANCER RESEARCH

Neuroblastoma is one of the most common cancers affecting children under the age of three, but for paediatric oncologists it is still a major challenge to diagnose and treat. In many cases the development of these tumours of the nervous system varies greatly, despite early biopsy and analysis, and this makes treatment much more difficult.

The Children's Cancer Research Group at the School, led by Paediatric Oncologist Dr Michael Sullivan and Scientist Dr Glen Reid is investigating ways of improving diagnosis and treatment of these cancers, by understanding their molecular character.

"Our focus is to improve understanding of the different types of neuroblastoma or cancer of the developing nervous system, and the treatment that can be applied," explains research scientist Dr Reid." What we have at the moment is a series of 'grey gradations' in understanding neuroblastoma tumours, making it difficult to work out how they will develop; whether a particular tumour will regress or spread."

The Group is classifying tumours through the use of microarray which allows the analysis of tens of thousands of genes at the same time, and relating this information to the age of the child, stage and prognosis of the disease, response to therapy and whether the tumour has spread.

"Through microarray analysis of genetic samples we're able to develop tumours which have similar characteristics and which may indicate outcome for the patient," says Dr Reid.

"They may all look the same in terms of clinical characteristics, but gene expression under microarray will provide much more accurate information; whether the tumour will regress or progress into a more aggressive and dangerous phase. We're looking for molecular signs which will allow us to classify tumours more precisely."

The Children's Cancer Research Group is also examining hepatoblastoma, a cancer of the liver in children. Little is known about this rare disease or its molecular characteristics, as these originate in the developing gut of the fetus.

Surgical removal is usually the first treatment with all these cancers if they haven't spread, and the tumour is still at an early stage. If the tumour is very large often chemotherapy is used to shrink the tumour before surgery says Dr Sullivan.

The other important tool the Research Group will utilise is the Evolving Fuzzy Neurol Network (EFuNN), which has been developed by the Knowledge Engineering Laboratory (KEDRI) at the Auckland University of Technology.

When the Group has enough data on different tumours, it will feed this information into EFuNN along with clinical and chromosomal changes from patients. The aim is to see if this computer tool can assist with the prediction of clinical outcome by combining all factors characterising a tumour. This research is assisted by funding from the NZ Cancer Society and donations.

Dr Michael Sullivan, and Dr Glen Reid, Children's Cancer Research Group

IMPROVING TREATMENT FOR BREAST CANCER

Research scientist Dr Grant McKenzie is built like an All Black forward and working hard at the frontline of one of the most acute medical puzzles in the country. What causes breast cancer and what is the best way to treat the disease?

Originally from Waimate, Grant received his doctorate in how genes affect wool colour, previously working in animal research at Lincoln University. He then accepted a position as a post-doctoral Research Fellow in the Cancer Genetics Research Group at the School where he now investigates genetic changes and breast cancer.

"It's a fascinating area and one of high need," he says. "After all 2000 women a year are diagnosed with breast cancer in New Zealand. One of them was a close relative, which gives me extra motivation to find out how this disease develops, and what we can do about it," he says.

Dr McKenzie and his research colleagues spend their day working in a brightly lit, modern laboratory with sophisticated equipment, utilising computers to analyse genetic mutations associated with breast cancer and leukaemia. As with the leukaemias, abnormal genetic changes are the major cause of breast cancer, and if scientists can improve understanding of these mutations, this will result in new drugs which better target treatment.

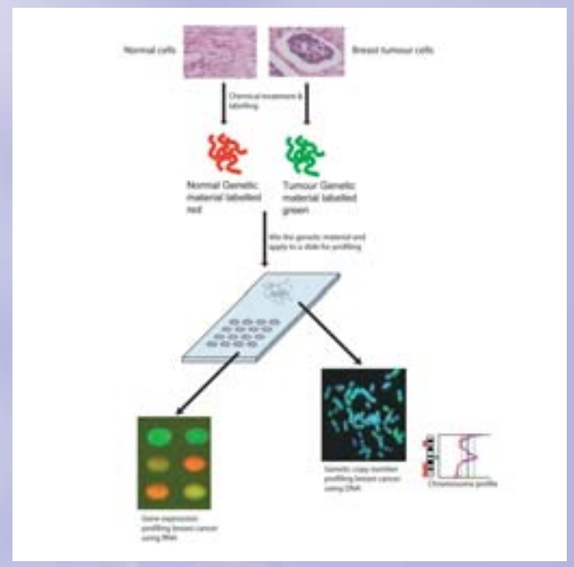
"Breast cancer is not just one disease", says Dr McKenzie. "Genetic profiling is showing one of at least five genetic patterns may be found in tumour cells, and the type of pattern can determine the course of the disease. The problem is that our ability to identify the different tumour patterns and to understand their consequences is not great, which means that doctors may not be using the best drug for a particular tumour."

For the Christchurch study, tumour samples are collected from consenting women with breast cancer, then forwarded to the laboratory for analysis. As with all biomedical research, this requires collaboration between scientists performing the experiments, oncology clinicians who consult patients, surgeons, pathologists, radiologist, nurses and others. "We are very fortunate in having excellent collaboration across many departments at the School and Christchurch Hospital enabling this study to happen."

"In the laboratory, we take a small amount of tumour tissue and extract genetic material. Then we label this tumour material with a green dye which makes it fluorescent. We then take a sample from a normal person and label that with a red dye, so that we have two contrasting colours. We mix those two colours together on a microscope slide which has chromosomes on it, and the DNA will stick to the chromosomes", Dr McKenzie explains.

By this method, PhD candidate Logan Walker can then observe if there has been a genetic change by using a powerful microscope relaying images to a computer screen.

"What we are looking for is more or less DNA in a particular tumour, as shown by different ratios between the red and green fluorescing dyes," explains Dr McKenzie.



Experimental methods involved in finding out genetic changes in breast cancer

The same process is also carried out with RNA using a specialised technique called "microarray expression profiling". Scientists can examine thousands of genes at one time. Yellow shows no change, red that a gene has been switched on, and green that a gene is turned off. These kinds of abnormal genetic changes can lead to uncontrollable cell growth and the development of breast tumours.

Internationally, genetic profiling studies have been applied to the analysis of many different types of cancer, and there is great potential from the outcomes of this research for improved diagnosis and better targeted treatment with reduced exposure to toxic chemotherapies.. A further result is that pharmaceutical companies may also design drugs that target changes associated with tumour growth.

The Cancer Genetics Research Group receives support from the Cancer Society of New Zealand, Canterbury Medical Research Foundation, Lottery Health and the University of Otago.