

scope

Exploiting the immune system to fight disease

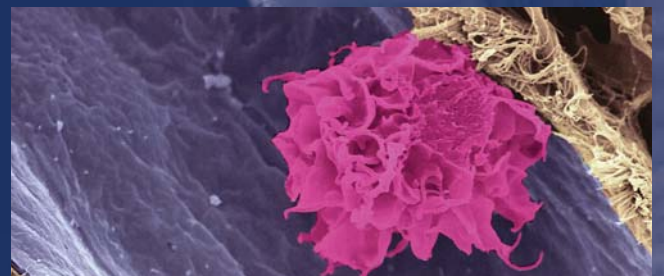
Cancer is responsible for nearly a third of all deaths in New Zealand. While several treatments are available, they are often ineffective at completely eradicating the disease and better therapies with fewer side effects are required. One such approach that holds great promise for cancer treatment is immunotherapy.

Cancer immunotherapy exploits the body's immune system, a network of specialised cells that protect us against diseases caused by infectious agents such as bacteria, viruses and parasites. Immune responses are marshalled much like a military operation, with dendritic cells in command, and T cells serving as the "foot soldiers" capable of selectively killing off diseased tissue.

The goal of the Malaghan Institute Vaccine Research group, lead by Dr Ian Hermans, is to understand the cellular interactions involved in generating immune responses, and to use this knowledge to design more effective vaccines against diseases such as cancer.

Continued inside

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A specialised cancer-fighting immune cell

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The possibility that even more potent cancer vaccine-induced immune responses might be generated by activating unique immune cells called natural killer T cells (NKT cells), is currently being investigated by Senior Research Officer Kathryn Farrand. Kathryn has shown that she can induce very powerful anti-tumour immune responses using a synthetic compounds that is known to stimulate NKT cells in combination with different compounds that mimic bacterial components. These interesting results have important implications for the design of effective anti-cancer vaccines.

An important characteristic of NKT cells is their ability to alter or control the immune responses in a range of different diseases. Recent studies have shown that NKT cells are present in high numbers in the lungs of asthma patients where they are thought to play an important role in the maintenance and/or enhancement of asthma symptoms.

Early results from the research of PhD student Nina Dickgreber, suggest that NKT cells may either exacerbate or reduce the inflammation in the lungs depending on when they become activated during disease progression. Nina is

now investigating whether appropriately timed treatment with compounds that stimulate NKT cells can favourably alter the course of disease.

We are very excited to announce that Dr Hermans has recently received funding to implement a phase I glioma (brain cancer) trial in collaboration with Wellington neurosurgeon Dr Martin Hunn. The glioma trial will complement the phase III melanoma vaccine trial currently being undertaken at the Malaghan Institute (see Scope Issue 33) and cements the Institute's placing as a world-class cancer vaccine research facility.

Clinical trials such as those being undertaken at the Malaghan Institute are crucial to establishing whether tailor-made anti-tumour vaccines are likely to be effective. If so, exciting opportunities exist to incorporate these vaccines with other carefully selected treatments appropriate to a patient's particular cancer.



Kathryn & Nina in the Central Biochemistry Lab

Malaghan welcomes new team members...

In May of this year we bid a sad farewell to Julie Walton who has overseen the Malaghan Institute clinical trials for the past four years.

The Malaghan Institute is pleased to welcome Evelyn Bauer, who will be taking over the position of Clinical Trials Manager. Evelyn has extensive research experience in the preparation of vaccines and is fully trained in the observance of Good Manufacturing Practice (GMP) standards.

*(L) Clinical Trials Project Manager Evelyn Bauer
(R) Malaghan Institute research fellow Dr Bridget Stocker*



Jogging the memory of anti-cancer immune responses



Rachel Perret working in the laboratory

Life-long immunisation against diseases such as the measles, polio, and tetanus is possible because the immune system is very good at remembering infections with viruses or bacteria. However, the current methods of immunisation that we use to vaccinate against cancer seem to give only relatively short-lived protection.

This is because tumours arise from cells from within the body, so can often escape recognition as “foreign” by the immune system.

Rachel Perret, a PhD student within the Cancer Immunotherapy group headed by Professor Franca Ronchese, is studying “memory” immune responses to cancer, that is, can we teach the immune system to fight cancer for a long time? This is important because cancer is often a chronic disease in which cancer cells hide in a dormant state in different parts of our bodies, and we need the immune system to remain alert so that it can fight any tumours that may appear.

Rachel has found that immune cells activated in the test tube in a certain way are not only able to immediately start attacking tumours in our experimental models, but more importantly, that these immune cells remember what the cancer looks like and destroy any tumours that reappear at later stages.

This is a very exciting development and Rachel is now focused on further elucidating the mechanism by which these immune cells are generated.

This information will provide valuable insight into improving current methods of cancer immunotherapy and will enable us to design better vaccination strategies.

Malaghan welcomes new team members continued...

Another welcome addition to the Malaghan Institute team is our latest research fellow Dr Bridget Stocker. Dr Stocker has recently returned from a Foundation for Research Science and Technology funded fellowship in Zurich where she worked on the development of tuberculosis vaccines at Switzerland’s prestigious Federal Institute of Technology (ETH). Upon returning to New Zealand, Dr Stocker has begun work on the development of tuberculosis medications within the group of Professor Graham Le Gros.

Dr Stocker has also joined forces with Dr Ian Hermans from the Malaghan Institute and Dr Mattie Timmer from Victoria University to develop

anti-cancer agents based on accumulating evidence that tumour growth can be controlled by the immune system. The team has identified glycolipid structures that they believe will prompt the immune system to destroy cancerous cells. The researchers plan to use their expertise in synthetic chemistry and immunology to develop and test the glycolipids either as a stand-alone therapy or in combination with other treatment regimes.

To help fund this research, Dr Stocker and the team have received a two-year \$60,000 grant from The Cancer and Bowel Research Charitable Trust.

Fundamentally new approaches to cancer treatment

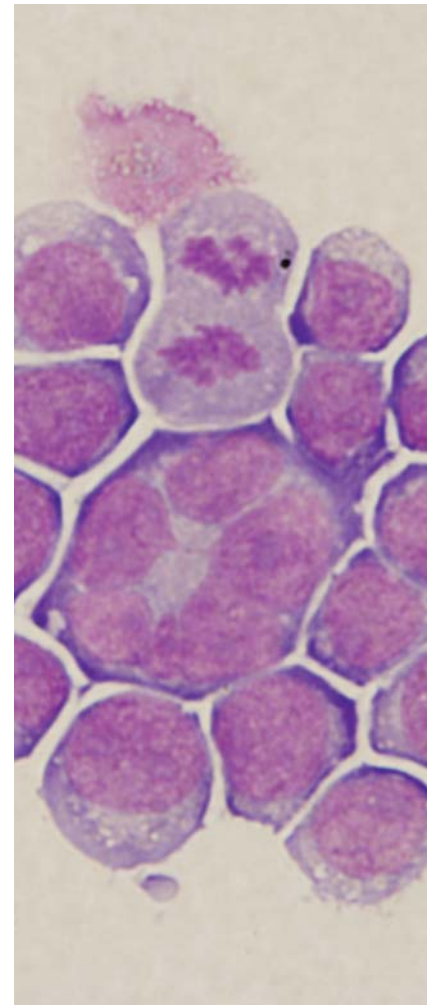
In the hostile environment of an actively growing tumour, the basic essentials for growth are in short supply and cancer cells must adapt to these changes in order to survive.

The Cancer Cell and Molecular Biology group led by Professor Mike Berridge is developing new approaches to cancer treatment that are based on understanding how cancer cells flourish under reduced oxygen and nutrient conditions and how they adapt to these stresses.

Prof Berridge's group has identified a vital life support system at the surface of cancer cells that enables them to adapt to their changing environment. The group has also shown that this system is the primary target of several anticancer drugs, some of which are being evaluated in international clinical trials for cervical, prostate and drug-resistant ovarian cancer.

These drugs were shown to interfere with the ability of cancer cells to derive energy using a life support system and the cell surface to halt the growth of human leukaemic (HL60) cells and cells from solid tumours. These results suggest that targeting this cancer cell surface survival pathway will result in anti-tumour effects.

In April of this year, Thai student Chakorn Rassameephauengphou initiated a PhD project to explore the enzyme targeted by these drugs at the cell surface. In related work, Prof Berridge is examining whether cancer stem cells (see Scope Issue 33) are also susceptible to drugs that compromise this survival pathway.



A cluster of Human leukemia HL60 cells dividing and showing individual chromosomes (see top cell)

The Ultimate Gift

The ultimate gift to show your support for the research of the Malaghan Institute, and our hopes for a disease-free future, is a bequest in your will.

As a charity, the Malaghan Institute relies on the generosity of its supporters to continue our work, and a gift in your will is a way of ensuring our research into Cancer, Asthma, Arthritis, Multiple Sclerosis and Infectious Diseases will protect future generations from disease well beyond your lifetime.

To receive information about leaving a gift in your will and how these funds are managed, please tick the box below and enter your contact details on the reverse of this form.

Yes, please send me information on how I can leave a gift in my will and invest in a disease-free future



Woodford House Fundraising

Woodford House, the prestigious girls school located in the Hawkes Bay, was the site of an extraordinary fundraiser for the Malaghan Institute. Heather Anderson, a senior student and Megan Deacon, the school's Sports Coordinator, decided to shave their heads in order to raise money for cancer research at the Institute.

They raised over \$5000 for their efforts - Thank you Heather and Megan for your fantastic sacrifice!



Graham Malaghan, Chairman of the Malaghan Institute Trust Board meeting Heather and Megan and Woodford House Headmistress Rebecca Cody.

\$120,000 Ryman Presentation

Each year, Ryman Healthcare Ltd selects a charity to raise money for and in 2006 the Malaghan Institute was the lucky recipient. All around New Zealand the residents at the Ryman Healthcare Villages held raffles, garage sales and the like and raised a phenomenal \$60,000!

This was then matched dollar for dollar by the Ryman management and on May 29th 2007, the Malaghan Institute received a cheque for \$120,000.

On behalf of all the scientists here at the Institute, we wish to say a huge thank you to Ryman Healthcare Ltd and to all the residents of the Ryman Healthcare Villages who helped raise this money which will go a long way toward helping find treatments for the diseases affecting New Zealanders.

Malaghan research on TV3

Some of you might have seen the news segments on the TV3 News about the research being done at the Malaghan Institute. There were two short clips focusing on the Gout trial and the Melanoma Vaccine trial respectively. It was wonderful to have our research shown in such a high profile arena and reach such a large audience.

Grants received in 2007 (Jan-Aug)

We would like to thank the following supporters for their generosity which has enabled us to purchase vital equipment this year:

- Infinity Foundation Ltd
- H B Williams Turanga Trust
- Ryman Healthcare
- Waikanae Lions Club
- Wellington Region Foundation
- AMI Insurance
- Pelorus Trust

Want to help?

Volunteering is a great way to become more involved in your community by giving some of your precious time to a worthy cause. We have several ways in which you can help, including but not limited to, collecting during the street appeal.

If you are interested in being a volunteer for the Malaghan Institute and would like some more information, **please contact the Fundraising and Communications Manager:**

**Tanya Fulcher, on 04 499 6914 ext 811
or by email tfulcher@malaghan.org.nz.**

Up-Coming Events

October 29th Malaghan Golf Tournament (Hawkes Bay)

November 2nd AMI Malaghan Golf Tournament (Auckland)

November 9th ING Malaghan Golf Tournament (Wellington)

Looking ahead to 2008...

February 29th 2008 Street Appeal – keep an eye out for our collectors!



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