MALAGHAN INSTITUTE OF MEDICAL RESEARCH

Issue 34, 2007

scope

Wellington Region Foundation supports Malaghan Research

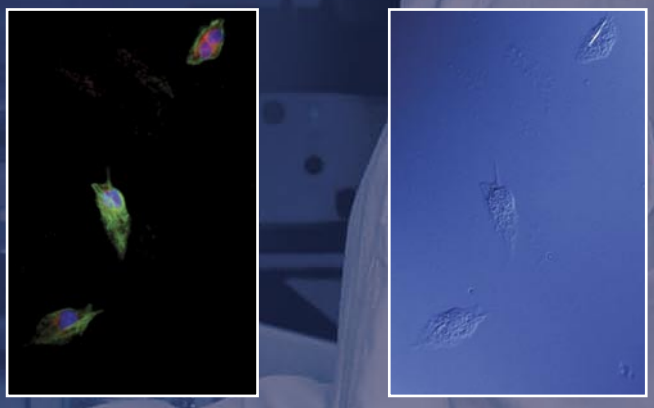
At the start of this year two of the Malaghan Institute's most innovative research programmes received a funding boost from the newly formed Wellington Region Foundation. The first of these programmes, headed by Dr Jacquie Harper, seeks to identify new tools for treating and managing arthritis, while the second, led by Associate Professor Thomas Bäckström, is pioneering the development of effective therapies for sufferers of Multiple Sclerosis.

Gout is an extremely painful recurring arthritic disease affecting a great number of New Zealanders, and is the main focus of the arthritis research supported by the Wellington Region Foundation. The inflammatory response in gout is triggered by the formation of uric acid (MSU) crystals in and around the joints.

Elizabeth Chia and PhD student Willy-John Martin are using these crystals to activate different immune cell types in the laboratory to determine which cells are responsible for initiating and driving the inflammation seen in this disease.

Continued inside

"...this work also aims to identify which cells produce the key inflammatory molecules involved in a gout attack, with the ultimate goal of identifying new targets for drug development."



Two microscopic images of gout inflammatory cells. Note the presence of a gout crystal in the top right-hand cell.

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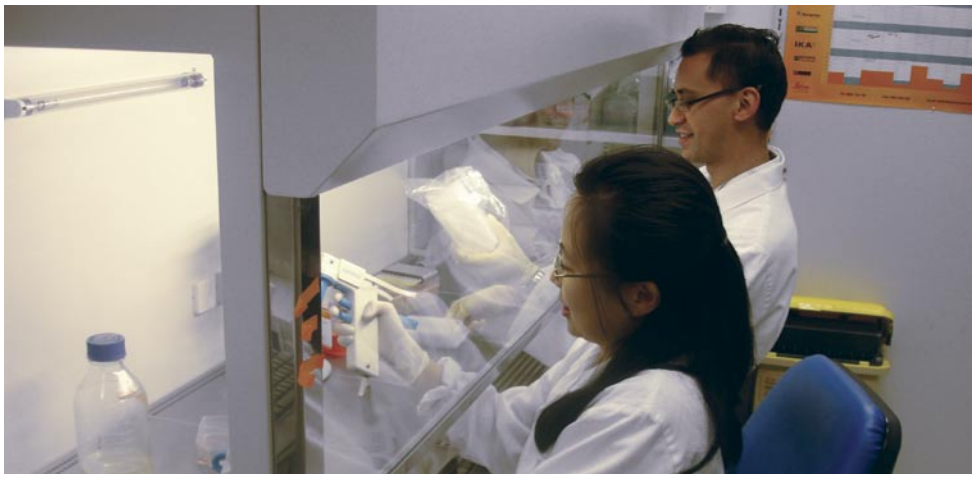

Elizabeth Chia and Willy-John Martin working in the laboratory

PhD student Clare Bai

The above research programme runs in parallel with the Arthritis Group's Clinical Gout Study. This study is designed to characterise the inflammatory responses of immune cells isolated from the blood of healthy volunteers and of gouty arthritis patients. Dr Rebecca Grainger is a qualified Rheumatologist working on the study (see Scope Issue 32) and is undertaking the clinical research as part of her PhD project.

The Arthritis Group's basic research protocols have now been successfully translated into a clinical setting and Dr Grainger is currently recruiting patients for participation in the clinical study. The results of this study will provide important information on why some individuals are more prone to developing gout than others, and will facilitate the development of preventative strategies for improved management of this disease.

More than 1:1,400 New Zealanders currently suffer from Multiple Sclerosis (MS). MS is an autoimmune disease of the central nervous system that results in functional disability, and can render a person unable to write, speak or walk.

With funding support from the Wellington Region Foundation, PhD student Clare Bai is studying T regulatory cells, a specialised immune cell type thought to play a crucial role in preventing autoimmunity.

Clare's research will contribute towards the development of immunotherapeutic agents that activate these cells for the treatment of organ-specific autoimmune diseases such as MS.

We are extremely grateful to the Wellington Region Foundation for supporting these research projects. This is the largest and most significant grant that the Foundation has thus far awarded.

The Wellington Region Foundation is a unique charitable trust that attracts gifts, trusts and legacies, and invests them in the greater Wellington region. Its primary aim is to provide a simple, effective and lasting way for people in the greater Wellington region to give to local causes now and in the future.

The Foundation's Trustees are:
Kevin O'Connor
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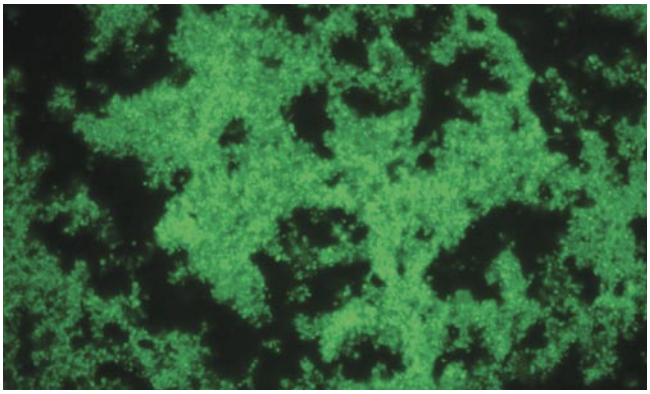
See back cover for Wellington Region Foundation contact details.

BioNanoParticles - revolutionising vaccine delivery & design

They might sound like something from a science fiction novel or Hollywood blockbuster, but BioNanoParticles, originally developed by Professor Bernd Rehm and directed by Dr Gavin Clark at Massey University, are a revolutionary vaccine-delivery technology being investigated at the Malaghan Institute by Associate Professor Thomas Bäckström and Dr Ian Hermans. These particles are so tiny that they cannot be seen with the naked eye. In fact a grain of salt is a million times larger than a BioNanoParticle, yet Assoc Prof Bäckström and Dr Hermans plan to use these particles to develop custom-made vaccines that are less expensive and more effective than current vaccine strategies. The ease with which vaccines can be produced using this new biotechnology will be a major benefit in the face of current influenza pandemics and future global health threats such as an avian-influenza pandemic. The BioNanoParticles will also provide practical immunotherapy for common conditions like cancer and autoimmunity.

So what is a BioNanoParticle? As the name implies, BioNanoParticles are particles produced naturally by many species of bacteria, which use them for storing energy. At the core of the particles is a bed of lipids, while the outer surface is covered in proteins. It is these proteins that can be modified for the development of custom-made vaccines. For example, if interested in producing a vaccine against cancer, the bacteria can be manipulated to produce BioNanoParticles coated with the relevant tumour proteins. The particles are then harvested from the bacteria and used as vaccines to initiate a tumour-specific immune response.

Before this can happen a lot more work has to go into understanding the key cellular and molecular interactions involved in BioNanoParticle-mediated vaccine delivery, and Assoc Prof Bäckström and Dr Hermans are currently seeking funding to undertake this research. This is a very exciting new technology at the forefront of vaccine research, and we look forward to watching this story unfold.



BioNanoParticles

Malaghan scientist honoured with prestigious award

We are very proud to announce... **Professor Franca Ronchese,** Head of the Malaghan Institute's Cancer Immunotherapy group (pictured left), was awarded joint winner of the 2006 inaugural New Zealand Immunology award.

This award is named in honour of internationally renowned New Zealand scientist Dr Jim Watson and recognises the outstanding contribution Prof Ronchese has made to the field of immunology at both the national and international levels.

Prof Ronchese's groundbreaking research explores how dendritic cell vaccines, also used in the Malaghan Institute's cancer vaccine trials (see Scope Issue 33), are affected by other cells in the immune system.

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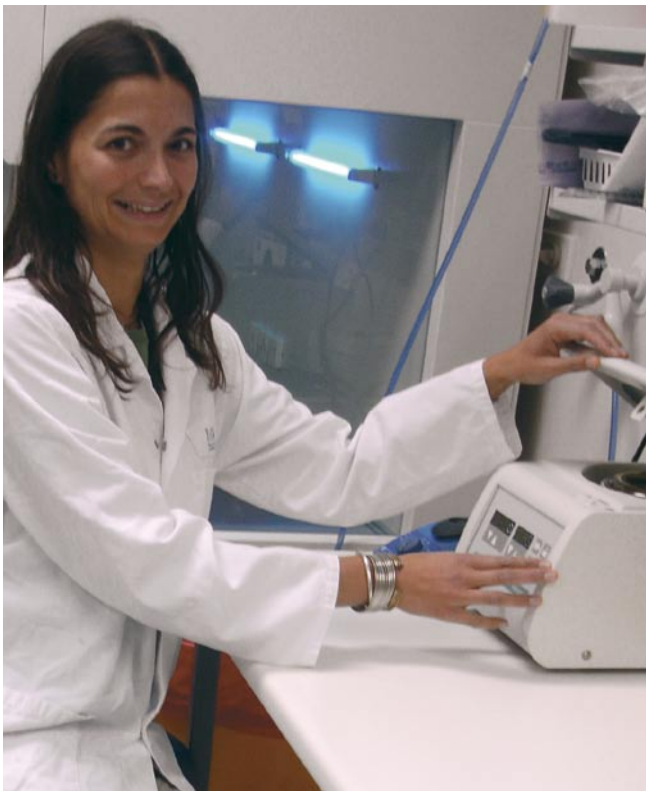
Getting to the bottom of NZ's rotavirus infections



"...ever thought being a scientist was all glitz and glamour?"

Well, consider Infectious Diseases researcher Natalie Redshaw (pictured above), whose job it is to purify and characterise rotaviruses from infected children's faeces!

Rotaviruses belong to a large family of viruses that cause diarrhoeal disease in mammals and birds. In New Zealand nearly one in forty preschool children are hospitalised each year for gastroenteritis caused by rotavirus infection.

Last year the Infectious Diseases Group, headed by Dr Joanna Kirman, established a national multi-centre rotavirus strain surveillance study to monitor New Zealand's rotavirus strains before the introduction of a commercial rotavirus vaccine.

The aim of vaccination is to replace the first "severe" infection with a vaccine, thus when the child is exposed naturally to the infection they will develop only mild disease.

Protection from infection is thought to be dependent on the particular type of virus so it is important to understand what rotavirus types are present in New Zealand, and how these change from year to year.

An interesting finding from this study is that there is a clear difference in the geographical distribution of rotavirus strains across New Zealand. This information will be vital for predicting the potential effectiveness of the vaccines that will be introduced to New Zealand.

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**

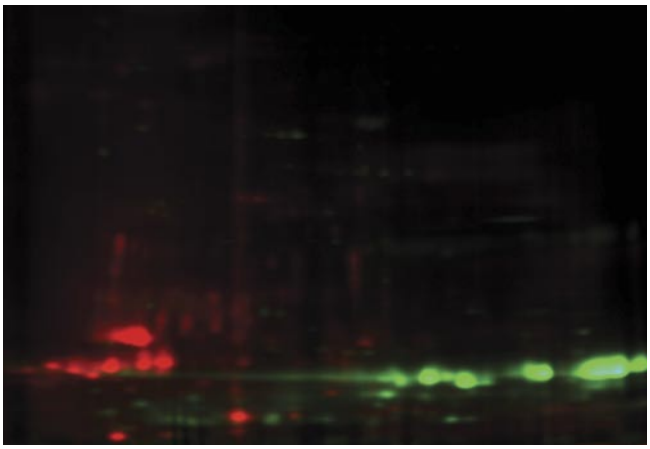
Parasite allergens - can you spot the difference?

Asthma is a disease of the airways in the lungs and is characterised by periodic attacks of wheezing, chest-tightness, and coughing. New Zealand has one of the highest rates of asthma in the world and although there are treatments available that reduce the frequency and severity of asthma attacks, there is currently no cure for this disease. The Asthma Group, headed by Professor Graham Le Gros, is researching the underlying immune responses that give rise to asthma, with the goal of developing vaccines and therapies for the treatment of individuals with established disease.

The disease-causing immune responses seen in allergic asthma are very similar to those triggered by invading parasites or worms. In fact it is thought that asthma results from a malfunctioning immune system mistakenly recognising pollen or house-dust mites as parasites. To study the mechanisms of this disease, the Asthma Group uses the nematode parasite *Nippostrongylus brasiliensis*, which secretes allergens that set-off the equivalent of an asthmatic immune response. Prof Le Gros believes that identifying the chemical feature(s) common to parasite allergens and pollens may hold the key to identifying a potential treatment for asthma.

Since the parasite allergens cannot be seen with the naked eye, Shiau-Choot Tang and PhD student Marina Harvie are using a revolutionary new technology called "Fluorescence 2D Difference Gel Electrophoresis" or "DIGE", to look for any similarities between the protein allergens released by invading larval and adult parasites. This technique enables the scientists to visualise tiny amounts of the parasite proteins as individual coloured spots. Larval proteins appear as red spots while adult proteins appear as green spots. Any proteins that are common to the two life stages will show up as yellow spots (resulting from the mixing of red and green together).

Initial results suggest that there are no proteins in common between the released larval and adult parasite allergens, so the hunt continues for the common chemical feature that fools the immune system into initiating an asthmatic response.



Larval (red) and adult (green) parasite proteins. Each spot represents a unique protein

bio-strategy

Thank you to the generous supporters of the Malaghan Institute Scope newsletter - Issue 34

GLOBAL SCIENCE

0800 MALAGHAN (0800 625244) TO MAKE A CREDIT CARD DONATION

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Please call 0800 MALAGHAN (0800 625244) to find out how to become a regular donor

Waikanae Lions Club Garden Trail

2007 promises to be a great year for the Malaghan Institute. We started the year off with the Waikanae Lions Club holding their annual Garden Trail during Wellington Anniversary weekend. The club very generously named the Malaghan Institute as the sole beneficiary for the proceeds raised by the ticket sales. Twelve beautiful gardens were open to the public and over 2000 visitors passed through the gates during the weekend. Overall a total of $26,000 was raised!

We would like to say thank you very much to the garden owners for their fabulous hospitality and a huge thank you to the Waikanae Lions Club for organising such a great event.

Presentation of Malaghan Institute Director Professor Graham Le Gros with the proceeds raised from the Waikanae Lions Club Garden Trail

Wellington Region Foundation

We are also incredibly grateful to the Wellington Region Foundation for donating $120,000 towards our Arthritis and Multiple Sclerosis research programmes (see front cover). This is a newly formed Foundation and deserves all the support we can give them.

WELLINGTON REGION FOUNDATION

For further information about the Wellington Region Foundation, please contact Adrienne Bushell, Marketing Manager, on (04) 472 2470.

Did you know?

The Malaghan Institute can host a tour group through our research facilities. If you are a member of a community group that might be interested in learning more about what goes on here, then please contact the Fundraising and Communications Manager, Tanya Shennan, on (04) 499 6914 ext 811 or by email tshennan@malaghan.org.nz. We are also happy to organise for one of our Scientists to come out to your group's meeting and give a presentation.

2007 Malaghan Street Appeal

The Garden Trail was a hard act to follow, but on Friday 23 February the Wellington Friends Committee undertook another huge fundraising event by way of the Annual Lollipop Street Appeal. We were slightly luckier this year with the weather, and again had around 200 fantastic volunteers out and about in the Wellington CBD, the Hutt Valley, Porirua and the Kapiti Coast. The red of the Malaghan Lollipop could be seen everywhere on the day and we had a great response from the public, raising over $42,000 for Malaghan research programmes. Thank you to AMI who once again sponsored the appeal and also had collections in their branches nationwide.

Thanks also to the hardworking Wellington Friends Committee members who put in so much time and effort to make this a success.

Up-Coming Events

June 21 **Sileni Winery Dinner**
An annual dinner hosted by the Hawkes Bay Friends Committee with Guest speakers and a great evening of fine food and even finer wine. Tickets are expected to be $75 and are available by emailing Beth at peterkay@clear.net.nz

October 26 **Malaghan Golf Tournament** (Hawkes Bay)

November 2 **AMI Malaghan Golf Tournament** (Auckland)

November 9 **ING Malaghan Golf Tournament** (Wellington)

For any information about the Golf, please email Tanya Shennan on tshennan@malaghan.org.nz who will redirect your enquiry to the relevant Friends Committee.

MALAGHAN INSTITUTE OF MEDICAL RESEARCH

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