



Changing the way we think about food allergy

Latest research at the Malaghan Institute of Medical Research has highlighted a process by which children might become allergic to peanuts, without ever tasting them.

In July 2011, Dr Elizabeth Forbes-Blom and Prof Graham Le Gros were awarded funding from the Health Research Council of New Zealand to investigate the early immune responses that take place during the development of food allergy, of which peanut allergy is the most dangerous and long-lasting.

For a child to develop an allergy to foods such as peanuts, their immune system has to first see the peanuts and become sensitised to them. It is the resulting runaway immune response that is responsible for the symptoms of food allergy such as swelling, skin irritations and breathing difficulties.

However, parents of allergic children will often say that their child has never eaten peanuts, so how are the immune systems of these children becoming sensitised? Dr Forbes-Blom believes that in special situations it can be through their skin.

Using unique laboratory food allergy models, Dr Forbes-Blom and colleagues showed that exposure of the skin to peanuts can lead to the development of peanut specific allergic immune responses. Their work also highlighted the importance of concomitant Staph infections in amplifying this process in individuals with eczema.

Collectively Dr Forbes-Blom's findings, which were published in the international journal of Clinical & Experimental Allergy, support previous clinical data that under some circumstances, having a child's skin come into contact with certain foods such as peanuts is all that is required for them to become allergic to them – something that needs to be taken into consideration when developing treatments for food allergy sufferers.

OUR RESEARCH
Food allergy

OUR RESEARCH
Gouty arthritis

AMI ROUND THE BAYS
Run be-cause

From the Director



Every day kiwi families are faced with important decisions relating to their health.

For some parents it might be whether or not to allow their young child to attend a friend's birthday party because of the serious risks associated with that child coming into contact with a food they are allergic to. Others might be lying in bed at night, listening to their baby's cough, trying to decide whether it warrants a visit to the after hours medical clinic, but questioning whether they are simply overreacting. Or the individual that has been suffering through the crippling pain of their throbbing sore toe, trying to continue on with life as normal, rather than bothering anyone because they are sure 'it will be better in the morning'.

Here at the Malaghan Institute we are recognised for our leading research into the big diseases affecting New Zealanders such as cancer. However, our independence means that we also have the ability to research some of the less popularised diseases in our community, such as food allergy, bronchiolitis and gout, which can be just as debilitating to the lives of the people living with them. In this issue of Scope we are proud to update you on these community-based research programmes.

Prof Graham Le Gros

Why food allergy research is a high priority

Food allergy has been increasing in incidence and prevalence throughout the world and imposes a significant burden of disease and health cost on our community.

However, despite extensive research into the potential genetic or clinical associations of allergic disease, little progress has been made in understanding why.

Food allergies occur when the immune system, which normally serves to protect us against parasites, viruses and bacteria, mounts an attack on harmless protein components in the food. The resulting allergic reactions can range from mild discomfort to serious and life threatening events, with anaphylaxis (the rapid onset of breathing difficulties, skin reactions, vomiting) the most severe form of food allergy.

There are few treatment options for individuals with food allergy beyond avoiding the allergy inducing food. Some patients might also undergo desensitisation therapy, where they are gradually exposed to the food allergen in a controlled manner to get

their immune system tolerant to the protein allergens in the food. However, this approach is not always effective and the mechanism by which it acts is not well understood.

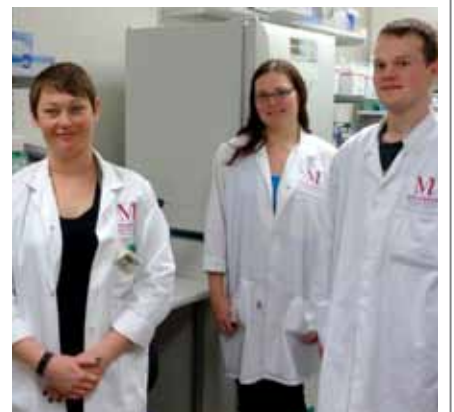
Food allergy is not an isolated disorder and is often linked with other diseases in what is described as the 'allergic march', where one form of allergy manifests to another over a period of time. For example, children under the age of three who have eczema and food allergy, tend to go on to develop asthma. Then, as their asthma improves, they can be affected by hay fever in their teenage years.

Further research on the immune mechanisms involved in controlling food allergy is therefore desperately needed so we can improve the lives of children living with the disorder and halt its progression into other forms of allergic disease as they get older.

Meet the allergy team

While the overall research is being supervised and developed by Prof Graham Le Gros, three key members of the investigating team are Dr Elizabeth Forbes-Blom, Marcus Robinson and Catherine Plunkett.

These three dynamic scientists have been working on various aspects of this project since late 2008 and are all passionate about the work being done.



Dr Elizabeth Forbes-Blom, Catherine Plunkett and Marcus Robinson

Gouty arthritis – more than a pain in the big toe!

Gout is an extremely painful recurring arthritic disease affecting a great number of New Zealanders, and is the main focus of the Arthritis & Inflammation Group, led by Dr Jacquie Harper.

Gout is caused by the build-up of crystals of uric acid in the joints, which trigger an inflammatory immune response. It is this immune response that is responsible for the swelling, heat and intense pain felt in the affected joint.

The main risk factor for gout is hyperuricaemia or high levels of uric acid in the blood. Hyperuricaemia can occur for a number of reasons including genetics, poor renal function or excessive cell death following injury. In 20% of hyperuricaemics, uric acid crystallises in the extremities resulting in gout.

Acute gout is the most common form of the disease, where an individual will often go to bed feeling fine, but wake in the morning with a painful swollen toe that stays that way for up to two weeks. If acute gout doesn't self-resolve, it can progress

into tophaceous gout – a crippling condition where excessive crystal build-up can lead to irreversible joint damage.

Dr Harper's research is currently focussed on understanding how the immune system reacts to these crystals. Previously it was believed that particular immune cells called monocytes enter the inflamed joint and change into cells that resolve inflammation. However her team has now shown that these cells in fact develop into proinflammatory macrophages and are primed to exacerbate inflammation in the presence of ongoing crystal deposition in the joint. Their work suggests that these monocytes might be an effective drug target for future therapies aimed at easing the pain of acute gouty arthritis.

Call for volunteers for gouty arthritis clinical study

Dr Harper's research group are undertaking a gouty arthritis clinical study in collaboration with Wellington Rheumatologists Dr Andrew Harrison and Dr Rebecca Grainger, and they are currently seeking volunteers. This study builds on previous clinical work published by this team in the *Journal of Rheumatology* last year, which revealed vital information showing that hyperuricaemia may increase inflammatory immune responses to the uric acid crystals. Gout patients about to commence urate lowering therapy are now being recruited for a follow-up clinical study that will investigate the effects of lowering blood uric acid levels on their inflammatory immune response to uric acid crystals.

Please contact Dr Harrison on aharrison@wnmeds.ac.nz if you would like information on how to be involved in this study.

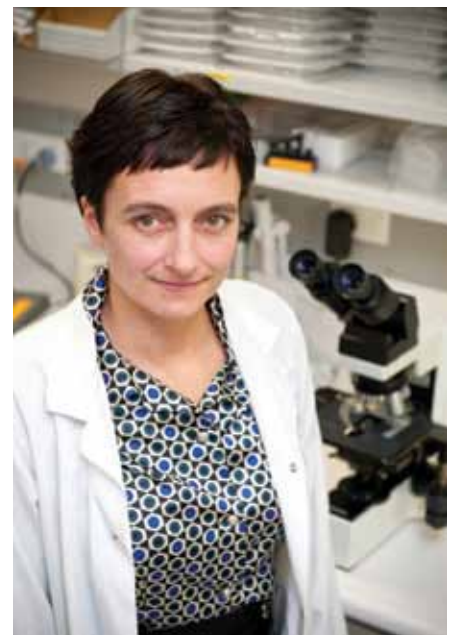
THE SCIENTIST BEHIND THE RESEARCH: DR JACQUIE HARPER

Arthritis & Inflammation Group Leader, Dr Jacquie Harper, first became excited about science thanks to a stream of enthusiastic high school science teachers who set her on the road to a career in research. These teachers should be very proud of their former student, as Jacquie went on to study at Otago University where she completed both her undergraduate degree and her PhD. From there she undertook post-doctoral research at the prestigious National Institutes of Health (NIH) in the USA.

Dr Harper is a long serving

member of our staff, having come to the Malaghan Institute in 1999 as a Research Fellow, ready to apply her skills in chemistry and biology to tackle the task of finding the anti-inflammatory components in bacteria. Just three years later she was heading her own team as Group Leader of the Arthritis & Inflammation research group.

Dr Harper says that her multi-disciplinary training allows her to combine a passion for understanding what drives inflammation in arthritis with developing new anti-inflammatory treatments for ameliorating disease.



When a baby's cough and cold turns into something a lot more serious

The leading cause of hospitalisation of babies and infants in New Zealand is bronchiolitis - a viral infection that causes severe breathing difficulties.

Visit an early childhood facility and you can guarantee that there will be at least one child there with a finger strategically placed to sample the delights of the contents lurking up their nose. Dr Joanna Kirman's Infectious Diseases team is interested in the same thing, only a sterile swab is used to do the digging!

Dr Kirman is part of an international collaborative study led by Dr Tristram Ingham from the Wellington Asthma Research Group, University of Otago, Wellington, involving over a thousand Wellington children under the age of two. The

purpose of the study is to understand why some kiwi kids, particularly Māori and Pacific infants, are more likely to develop severe lower respiratory tract infections and require hospitalisation. The 'nasal samples' will be tested by Dr Kirman to determine what respiratory viruses are present in them - one of several different risk factors being explored in the study.

The researchers will also investigate whether vitamin D deficiency is associated with increased bronchiolitis severity. Vitamin D is produced in

human skin when the body is exposed to ultraviolet (UV) light, such as sunlight. During winter months, when bronchiolitis infections are most common, children tend to spend more time indoors and therefore produce less vitamin D.

By identifying the specific risk factors that contribute towards New Zealand's high bronchiolitis hospitalisation rates, Dr Kirman and colleagues will be able to provide recommendations for intervention strategies that mitigate their impact.



Infectious Diseases researchers Dr Joanna Kirman, Fenella Rich and Kelly Prendergast.

In the Media: Vaccination

With the vaccination debate again hitting the headlines with the recent outbreak of measles in Auckland, we feel it is important to note that, as an immunology research institute, the Malaghan Institute strongly advocates for the practice of vaccination in our communities.

Vaccination as we know it today has been around since the early 1800's when Edward Jenner used cowpox to vaccinate against the much deadlier smallpox virus. The premise behind his work was to expose patients to a small dose of the less harmful virus thereby spurring the body to mount an immune response, so that if exposed to small pox, a much lesser infection occurred and was not fatal.

Today, vaccines have been developed to combat many diseases that would otherwise cause a dangerous level of illness and even death. These include measles, rubella, pertussis and influenza. The controversy over the safe use of vaccines has

been a modern development with concerns being raised about the correlation of the rise in autism and childhood cancers to the prolific use of vaccines today. To date, no credible research has been published that proves this causal link.

The Malaghan Institute conducts research based on the immune system and as such, we believe in using the power of our own bodies to fight infection. We also believe the immune system can be manipulated to provide a better defence against disease than if left to its own devices - a clear example of this is vaccination. The Institute wholeheartedly agrees with the science behind vaccination and would encourage all people, parents in particular who are considering vaccination for their children, to carefully research whether or not the risks of side effects of vaccination outweigh the risks of the getting the full infection. When carefully considered in this way, vaccination is the clear winner.

Run be-cause

We had a taste of it last year and are thrilled to make it official for the next two years. With the support of AMI Insurance and Sport Wellington, the Malaghan Institute would like to announce that we've been chosen as the official charity for the AMI Round the Bays 7km run/walk. This is such exciting news!

The AMI Round the Bays attracts over 10,000 participants from the greater Wellington area and offers an event for any level of fitness. If you're super keen then the half marathon might be for you, or still keen but maybe your legs aren't, then there's a 7km walk/run event. The 2012 event



is Sunday 26 February so put it in your diary, as we want to have our Malaghan supporters out in force.

How can you help? We'd love to have as many people fundraising for Malaghan and standing on the start line. You could participate with your family, your work mates or even your book club. We're giving you enough time to gather your loved ones together to train and plan, and raise donations from all the people you know. If you don't want to participate but you do want to support Malaghan, we can put you in touch with a

Malaghan runner/fundraiser and you can donate towards their efforts.

Why is it important to us? We love Wellington and this is a great way to support our local community. It's also an active way to raise awareness of the Malaghan Institute, the important research we do and the great partnership with AMI Insurance.

We'll keep you posted over the coming months, but if you'd like to find out more about how you can help, please contact Victoria Hale, on 04 499 6914 ext 821, or email vhale@malaghan.org.nz.

Keeping a good relationship running

At the Malaghan Institute we're dedicated to building strong, meaningful relationships.

As part of our sponsorship philosophy, the Malaghan Institute seeks partnerships with companies that are truly committed to making their names synonymous with the things that make the Malaghan Institute great.

These include a commitment to improving the human condition, a

strong involvement in the community and a dedication to excellence.

We have found a great partner in AMI Insurance who proudly support the work we do. Like us they're a New Zealand owned organisation who are committed to supporting communities and establishing a positive future for all New Zealanders.

They are a New Zealand owned company formed in 1926 and have been supporting the Malaghan

Institute since 1996. The partnership has seen AMI supporting our activities from running to golf, laboratories to research. The AMI promise – to care, assist and deliver – is the basis for their relationship with us and we can't wait to run side by side in the AMI Round the Bays on 26 February 2012.



News under the microscope



Malaghan Institute in the Media Spotlight

In early September, the Malaghan Institute's Immunoglycomics Group Leader, Dr Bridget Stocker, was interviewed on the Radio New Zealand 'Nine to Noon' programme. Dr Stocker was recently recognised in a special edition of the European Journal of Organic Chemistry, dedicated to women in chemistry who have made a significant contribution to their field and spoke about some of her research in her interview with Kathryn Ryan. Also in September, a TVNZ crew visited the Institute to film a story about our allergy research. This research has been granted HRC funding and is making exciting inroads into better understanding the allergic response and childhood food allergies. Reporter Rebecca Edwards interviewed Prof Graham Le Gros about the research and the progress being made.

To hear Dr Stocker's interview, or to view the ONE NEWS clip, visit our website: www.malaghan.org.nz

Rotary Club of Port Nicholson Donates \$20,000

The Rotary Club of Port Nicholson held their annual Quiz and Charity Auction in May with the proceeds split between three worthy charities. The Malaghan Institute was the main recipient and was recently presented with a very generous cheque for \$20,000. This will be used to support the new Immunohistochemistry Station, a cutting-edge technology that will be of importance to our future research work.

Malaghan PhD student finalist in Prime Ministers Prize

Top achieving Malaghan PhD student, Emma Dangerfield, has progressed to the final round of the Prime Minister's Prize. Emma is nominated in the 'Prime Minister's MacDiarmid Emerging Scientist' category and gave her address to the panel in late August. The winners will not be announced until early 2012, but we wish Emma all the best!



New Senior Research Fellow welcomed

The Institute welcomes new Senior Research Fellow, Dr Olivier Gasser, who comes to us all the way from Europe. Dr Gasser is here to work on the new Melanoma Clinical Trial which has begun its preparatory work. He will be working closely with Dr Ian Hermans with hopes that the trial itself will be ready to start in late 2012. Welcome Dr Gasser!



Recent Grants (Jun - Sept 2011)

Our sincere thanks to the following Trusts and Foundations for their recent support:

- Infinity Foundation Ltd
- HB Williams Turanga Trust
- The Lion Foundation
- BEA Trust

Five ways to support our research:

As New Zealand's leading independent medical research institute, the Malaghan Institute is reliant on grants and public support for its valuable work. We are registered with the Charities Commission and all donations over NZ\$5 are tax deductible. There are several ways for you to get more involved.

To find out more, contact Victoria Hale on 04 499 6914 x 821 or email vhale@malaghan.org.nz alternatively, visit our website www.malaghan.org.nz

1. MAKE A DONATION
2. SET UP AN AUTOMATIC PAYMENT
3. LEAVE A BEQUEST IN YOUR WILL
4. BE A SPONSOR (corporate or individual)
5. JOIN A VOLUNTEER FRIENDS GROUP