Annual Report

2010 | 2011

MALAGHAN INSTITUTE
OF MEDICAL RESEARCH

Contents

About Us

Malaghan Institute Staff, 2011.

The Malaghan Institute of Medical Research is New Zealand's leading independent medical research institute and is a charitable trust. The mission of the Malaghan Institute is to improve the human condition through biomedical research.

Our scientists are dedicated to the prevention and treatment of cancer, asthma & allergy, arthritis, multiple sclerosis and infectious diseases.

At the Malaghan Institute we believe that the key to fighting illness lies in harnessing the immune system, the body's own natural defence against disease. Increasingly we are able to apply new insights into how immune reactions are triggered and controlled at a molecular level, including clues for how specific aspects of the immune response are governed by the genes within cells. As we increase the depth of our understanding of the immune system the potential benefits for New Zealanders are limitless. In addition to our drive for making discoveries, the Institute is committed to the development of New Zealand scientists and clinicians.

The Institute has an international reputation as a cutting-edge medical research and training facility, housing New Zealand's brightest and most creative scientists, doctoral students and post-doctoral fellows. To ensure that the vital research at the Institute persists, we rely on contestable grants, corporate sponsorship, trusts, bequests and donations.

Over the last 30 years, the Malaghan Institute has built an international network of collaborators and supporters who are helping us combat the diseases that affect New Zealanders. Working with these worldwide organisations ensures that our scientists keep abreast of the latest developments in the international arena, thus maintaining our research at a world class level. On a national scale, whilst still preserving our independent status, the Institute works closely with tertiary institutions, Crown Research Institutes, hospitals and clinics throughout New Zealand.

Chairman's Report

New Zealand has a unique resource in the Malaghan Institute. For 17 years the Director and his team have pioneered immunology research in our country, bringing higher awareness and clinical trials to establish the benefits for our community.

We now see others around the country developing similar activities, and the key will be to avoid duplication of critical resources. The Institute will reach out and offer its resources to ensure that the outcomes are secured in an efficient manner; this desire to reach out can be seen in the strong collaborations we are developing internationally.

When it comes down to it, people and money are the key ingredients that make the Malaghan Institute successful and we are an organisation that actually does research. We don't just promote the need for it, or raise funds for it, or talk about it; the Malaghan Institute has scientists and laboratories often occupied 7 days a week and all hours of the day.

It takes very special people to dedicate their lives to research, often turning away more financially rewarding opportunities. They must have the desire to beat others to the discovery; to accept risk, leadership and the disappointments of failure. These people are our greatest resource and are led by a focused and passionate Director; I know he is very demanding of them, and is constantly looking to recruit new talent, subjecting the work and individuals to international peer reviews.

In addition to our staff we have a wonderful team of Friends and I chair a great Board of Trustees that give their time to the affairs of the Institute, supporting the Director and his team.

As for the other key ingredient, money, nothing really happens without it. New Zealand's Universities and CRI's are comparatively well funded to undertake the various tasks that the taxpayer and the Government require of them; expectations are that the secured funding will continue over long periods of time.

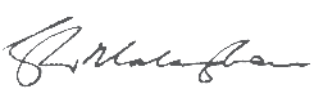
The Institute does not enjoy such security, so we must plan and accomplish our own funding for much of our infrastructure and the support of key researchers. We do this by reaching out and our goal is to match the dollars received from contestable taxpayer sources with another dollar from sponsors, friends and individuals.

Yes, money is important, but it is the long-term stability of income that is paramount. The best way an individual or group can help us, is to assist in building up our Capital Endowment Fund. The income from this is the resilient ongoing funding stream for all our future activities, giving confidence and security to the discovery path.

We are also discussing with the government the possibility of extending the long-term capability funding currently enjoyed by CRI's to independent institutes such as the Malaghan, this will ensure our research and discovery accomplishes the clinical outcomes for the community at the cutting-edge of international knowledge.

We do enjoy wonderful support from the wider community, from which we receive generous donations. The same must be said of the corporate community and especially those organisations that provide grants to allow our research to occur, such as the Health Research Council, Lotteries Commission, Cancer Society, Marsden Fund and many others.

People and money; these are the ingredients of an internationally competitive and recognised institution of research excellence. I am available to talk to you at any time to enlist your support for a great team of researchers.



Mr Graham Malaghan FCILT
CHAIRMAN

Director's Report

Approval by the US Food and Drug Administration (FDA) of Provenge, the world's first therapeutic dendritic cell cancer vaccine, provided a significant boost to us here at the Malaghan Institute. Provenge symbolises recognition by the regulatory authorities and the health profession of the potential of cell-based therapies for treating cancer, while encouraging further research in this type of treatment.

For over a decade the Malaghan Institute has been developing a technology that will be effective against cancers such as melanoma or glioblastoma multiforme. However translating these basic research discoveries into novel clinical therapies such as Provenge is no easy undertaking. It takes time, patience, and an extensive network of clinical and research partners. It also requires significant investment of capital to ensure the technology is safe and reliable.

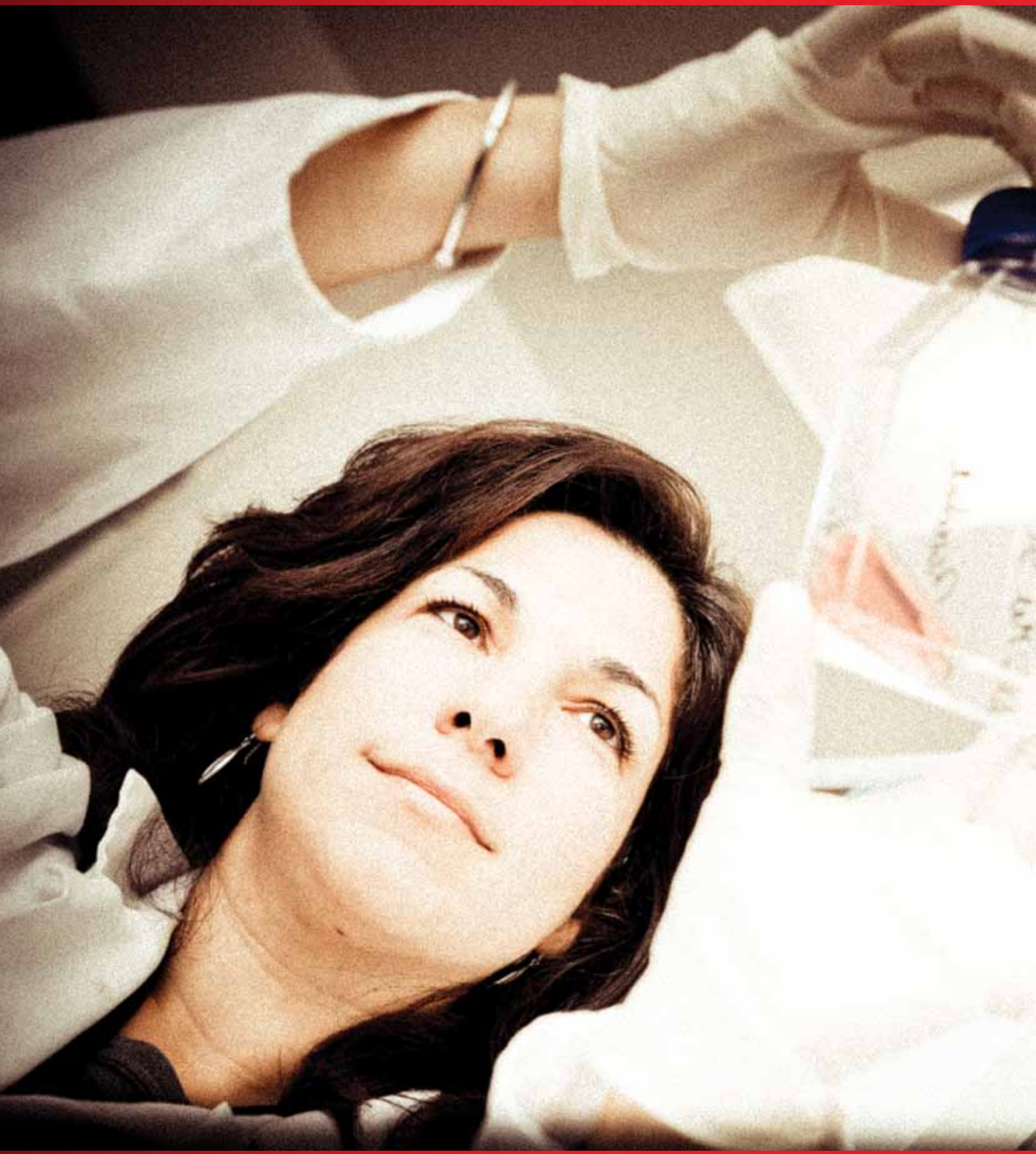
While in principle our independence allows us the freedom to research diseases we feel require the most attention, a caveat of this is that we can only carry out research that has sufficient funding. A case in point was our success in this year's Health Research Council of New Zealand funding round, which has enabled us to progress our food allergy research. On the flipside however, our breast cancer vaccine clinical trial had to be put on hold due to financial constraints imposed on the Breast Cancer Research Trust funding the work, as a result of the Christchurch earthquakes.

Our reliance on the small pool of contestable funding available to us in this country makes us vulnerable, and our Chairman and Trust Board are looking at ways we can grow our Capital Endowment Fund so we can survive these times of funding upheavals, something you can read more about in the Chairman's Report.

For cellular vaccines to make a real impact in the clinical arena, we need to be able to provide clinicians with detailed information on how a patient's cells and tissues are responding to their treatment, and it is my belief that the technology of flow cytometry holds the key in this regard. Here at the Malaghan Institute we have the people, we have the infrastructure, and now thanks to investment by the Hugh Green Charitable Trust we have the backing to be able to use our state-of-the-art flow cytometry facility to support clinicians in the treatment of their patients. This field of immune profiling is making headlines throughout the international research community and I am proud that the Malaghan Institute is poised to be an integral part of it.

To the individuals, family trusts, corporate sponsors and volunteers that support the Malaghan Institute and share in our vision for the future – my sincere gratitude to you all. It is your belief in us that drives us to push forward and strive for success in all that we do. Over the past 12 months we have laid the groundwork for several exciting new endeavours such as 'immune profiling', which are highlighted in this annual report - now let's see where that takes us in 2012.

Prof Graham Le Gros FRSNZ
DIRECTOR



Research

The Malaghan Institute holds a special and distinctive place in the New Zealand health research scene.

Scientists at the Malaghan Institute specialise in the fields of cellular immunology, infectious disease, immune models of human disease, and the development of immune system-based therapies and vaccines. The focus of their research is to deliver medical research discoveries that provide tangible health benefits to the community.

Research Group

Arthritis & Inflammation

Dr Jacquie Harper, Odette Shaw, Stefanie Steiger, Dr Shujie He, Lisa Shaw.

RESEARCH INTERESTS

The primary goal of Dr Jacquie Harper's Arthritis and Inflammation Research Group is to improve the management of inflammatory diseases such as gouty arthritis.

Gout is one of the most common and painful forms of arthritis and is caused by a 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.

Dr Harper's research team is using models of gout to learn more about the onset, duration and resolution of the inflammatory immune responses to uric acid crystals. As part of this research they are undertaking a clinical study in collaboration with Wellington Rheumatologists Drs Andrew Harrison and Rebecca Grainger, to determine how lowering blood uric acid levels affects a gout patient's inflammatory immune response.

The Arthritis and Inflammation Group is also searching for new therapies for treating inflammation. They have been investigating the effect of diet on models of inflammation with collaborators at Plant and Food Research, University of Auckland and Monash University (Melbourne).

They have also continued research modelled on the carbohydrate-lipid based anti-inflammatory compounds found in bacteria for their potential to modify inflammatory immune responses, working with Industrial Research Limited, University of Otago and AgResearch Ltd.

An important outcome of this work will be the identification of effective drug targets for the development of improved therapies that ease the inflammation associated with gouty arthritis and numerous other human diseases.

RESEARCH GROUP MEMBERS

Group Leader:
Dr Jacquie Harper BSc(Hons), PhD(Otago)

Postdoctoral Research Fellows:
Dr Shujie He MSc, PhD, MBChB(Jilin, China), Dr William John Martin BSc, MSc(Hons) (Waikato), PhD(VUW)

Senior Research Officer:
Odette Shaw BSc(Hons)(Otago)

Research Officer:
Lisa Shaw BSc, MSc(Otago)

PhD students:
Rene McLaughlin BBmedSc(Hons) (VUW), Stefanie Steiger DipSci (MLU, Germany), Blake Paget BBmedSc(Hons)(Auckland)

Visiting Masters student:
Hannah Burrowes BSc(Canterbury)

RESEARCH FUNDING

Arthritis New Zealand · Foundation for Research, Science & Technology · New Zealand Lottery Health Research · Wellington Medical Research Foundation

Research Group

Asthma & Allergic Diseases

RESEARCH INTERESTS

The long-term goal of Prof Graham Le Gros' Asthma and Allergic Diseases Research Group is to develop vaccines against asthma, allergy and human hookworm.

Understanding the signals that trigger the initiation of asthma and allergy is critical for the identification of specific treatments that selectively suppress the allergic Th2 immune response. Prof Le Gros' research group is using murine models, immunological assays and structure/function analyses to generate much needed information in this poorly understood field. Important outcomes of this work will be the development of generally applicable vaccines and therapies for the treatment of individuals with established disease, and the identification of improved immunological markers for monitoring human airway inflammation and allergy.

The flip-side to allergic responses is that they are the ones that protect against parasitic diseases. The Asthma and Allergic Diseases Research Group are therefore applying their knowledge of the allergic immune response to the development of a vaccine against human hookworm, one of the great neglected tropical diseases that infects one billion people globally. Using the rodent model of human hookworm, *Nippostrongylus brasiliensis*, in combination with cytokine and cell knockout murine models, they are looking for putative targets both for vaccine design and testing of vaccine efficacy in the field.

RESEARCH GROUP MEMBERS

Group Leader:
Prof Graham Le Gros BSc(Massey), Dip Immunol(Otago), MPhil(Auckland), PhD(Auckland), FRSNZ

Visiting scientists:
Dr Gavin Painter BSc(Hons), PhD(Otago) from Industrial Research Limited, Dr Irene Salinas BSc(Alicante, Spain), Mres(Plymouth, UK), PhD(Murcia, Spain) from the National Institute of Water and Atmospheric Research

Postdoctoral Research Fellows:
Dr Elizabeth Forbes-Blom BSc(VUW), PhD(ANU), Dr Marina Harvie BSc(Hons), PhD(VUW)

Senior Research Officers:
Mali Camberis BSc(VUW), Melanie Prout BSc(Hons)(VUW), Shiau-Choot Tang Grad Dip Sci(VUW)

Research Officer:
Catherine Plunkett BBmedSc(Hons)(VUW)

PhD students:
Ryan Kyle BBmedSc(Hons) (VUW), Helen Mearns BSc(Hons), MSc (Cape Town RSA), Marcus Robinson BBmedSc, MSc(Hons) (VUW)

Melanie Prout, Shiau-Choot Tang, Mali Camberis, Marcus Robinson, Catherine Plunkett, Ryan Kyle, Prof Graham Le Gros, Helen Mearns, Dr Elizabeth Forbes-Blom.

RESEARCH FUNDING

AgResearch Ltd Hamilton · Fonterra Co-operative Group Ltd · Foundation for Research, Science & Technology · Health Research Council of New Zealand · Industrial Research Ltd · Marjorie Barclay Trust · Maurice Wilkins Centre · New Zealand Lottery Health Research · Rex & Betty Coker Scholarship · Springhill Charitable Trust & Frimley Foundation · Wellington Medical Research Foundation

Research Group

Cancer Cell & Molecular Biology

An Tan, Dr James Baty, Carole Grasso, Prof Mike Berridge.

RESEARCH INTERESTS

The main focus of Prof Mike Berridge's Cancer Cell & Molecular Biology research programme is to apply new knowledge and technologies to the treatment of human diseases, with a particular emphasis on cancer and diseases involving altered energy metabolism.

The Malaghan Institute is a world leader in developing safe vaccination strategies for treating cancer and is trialling these in late stage melanoma and glioblastoma patients. Recently, highly targeted melanoma drugs against the mutant BRAF oncogene have shown dramatic early effects in the clinic and have been FDA approved for human use. Nevertheless, drug-resistant tumour cells persist, leading to recurrence.

The Cancer Cell & Molecular Biology Research Group are working to combine immunotherapy with highly targeted anticancer drugs that should not be immunosuppressive, with the aim of improving patient outcome. They have also developed models of childhood brain tumours and are working to improve treatment of these cancers through vaccination.

Prof Berridge's research team is also investigating the role of intercellular mitochondrial trafficking in health and disease. Using mitochondrial genome knockout melanoma and breast cancer models that exhibit long lag periods to tumour growth, they have shown that tumour growth is dependent on acquisition of a mitochondrially-encoded gene from the tumour microenvironment. This 'transforming' event also facilitates metastasis to the lung and is best explained by intercellular mitochondrial transfer via membrane nanotubes, a phenomenon previously described *in vitro*.

To further investigate the role of intercellular mitochondrial transfer in health and disease, they have initiated a collaboration to build a synthetic mitochondrial genome encoding a fluorescent marker protein that will be transfected into tumour cells, and embryonic stem cells depleted of their mitochondrial genome, to generate mice with fluorescently-labelled mitochondria. This new technology will be applied not only to tumour biology but also to the mitochondriopathies, to degenerative muscle, brain and cardiovascular disease, and to normal and ageing physiology.

RESEARCH GROUP MEMBERS

Research Group Leader:
Prof Mike Berridge BSc, MSc(Hons), PhD(Auckland)

Postdoctoral Research Fellow:
Dr James Baty BSc(Hons) (VUW), PhD(Otago)

Research Fellow:
An Tan BSc(VUW)

Research Officer:
Carole Grasso BSc(Hons) (West of England)

MSc student:
Alanna Cameron BBmedSc(VUW)

RESEARCH FUNDING

Breast Cancer Research Trust · Cancer Society of New Zealand · Child Health Research Foundation · Genesis Oncology Trust · Melanoma Research Alliance · New Zealand LAM Trust/ LAM Australasia Research Alliance · Wellington Medical Research Foundation

Research Group

Cell Survival

RESEARCH INTERESTS

The primary focus of Dr Melanie McConnell's Cell Survival Research Group is to understand how cancer cells survive stress, and to apply this knowledge to the development of effective cancer therapies.

Cancer cells have to survive free radicals, lack of oxygen, reduced nutrients, immune attack and changes in metabolism. During chemotherapy and radiation treatment of cancer patients, cancers are subjected to further stress. Despite this, some cells survive and cause relapse and metastasis. This is thought to be due to the presence of cancer stem cells, which are drug and radiation resistant.

Dr McConnell's research group has established various methods to isolate, identify and characterise cancer stem cells using cell culture, human tumour culture, flow cytometry, real-time RT-PCR and immunofluorescence microscopy. They use murine models of brain tumours, breast cancer and melanoma to study the properties of self-renewal, therapy resistance and metastasis. The stress response and cellular survival pathways active in tumour cells are related to cancer cell phenotype and to patient survival.

In other work the Cell Survival Research Group is looking at how cellular survival pathways can be used to best advantage in diseases where accelerated cell death occurs, such as motor neurone disease.

RESEARCH GROUP MEMBERS

Research Group Leader:
Dr Melanie McConnell
BSc(Hons), PhD(Otago)

Visiting Scientist:
Dr Patries Herst BSc, MSc(Nijmegen, Netherlands), MPhil(Waikato), PhD(Otago) from the Department of Radiation Therapy, University of Otago

Postdoctoral Research Fellow:
Dr Heli Matilainen MSc, PhD(Jyvaskyla, Finland)

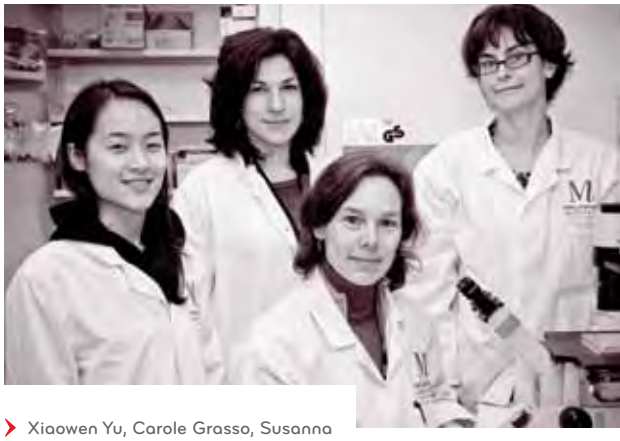
Senior Research Officer:
Kate Broadley BSc(Massey)

Research Officers:
Carole Grasso BSc(Hons) (West of England), Xiaowen Yu BBmedSc(Hons)(VUW)

MSc student:
Susanna Brow BSc, BBmedSc(VUW)

RESEARCH FUNDING

Breast Cancer Research Trust · Cancer Society of New Zealand · Melanoma Research Alliance · Motor Neurone Disease Association of New Zealand · New Zealand Lottery Health Research · The estates of Ellen, Sinclair, Barbara and Alison Wallace · Wellington Medical Research Foundation



Xiaowen Yu, Carole Grasso, Susanna Brow and Dr Melanie McConnell.

Research Group

Immune Cell Biology

RESEARCH GROUP MEMBERS

Group Leader:
Prof Franca Ronchese PhD(Padua), Dip Microbiology

Postdoctoral Research Fellow:
Dr Shujie He MSc, PhD, MBChB (Jilin, China)

Clinical Research Fellow:
Dr Robert Weinkove MA(Cantab), MBBS(London), MRCP(UK), FRCPath(UK)

Senior Research Officers:
Evelyn Hyde MSc(Distinc)(Otago), Shiau-Choot Tang Grad Dip Sci(VUW), Dr Jianping Yang MB(Shanxi Medical University)

PhD students:
Naomi Baker BMLSc(Otago), Sabine Kuhn Diplom Biologie(LMU Munich, Germany), Joel Zhi-long Ma BSc(Hons)(Singapore), Marie Petrie-Deely BBmedSc(Hons)(VUW)

MSc student:
Sonai Lim BBmedSc(VUW)

RESEARCH INTERESTS

The primary research interest of Prof Franca Ronchese's Immune Cell Biology Research Group is dendritic cells – specialised immune cells that can process environmental cues into signals that activate or switch off immune responses.

Dendritic cells are ideal targets for the development of immunotherapies for diseases such as cancer, where the immune system is underactive; or allergy and autoimmune disease, where dendritic cells play an important role in maintaining inflammation.

Prof Ronchese's research team collaborates with other groups in Wellington and overseas to address the following questions:

- Can 'lazy' dendritic cells in tumours be activated so they more effectively initiate and maintain stronger immunity to tumours?
- What are the weapons that immune cells require to successfully attack cancer?
- How do dendritic cells initiate allergic immune responses?
- What is the best way to target dendritic cells to reduce allergic inflammation?

Dr Jianping Yang, Sonai Lim, Prof Franca Ronchese and Sabine Kuhn.

RESEARCH FUNDING

Cancer Society of New Zealand · Foundation for Research, Science & Technology · Haematology Society of Australia and New Zealand · Health Research Council of New Zealand · Maurice Wilkins Centre · New Zealand Lottery Health Research · Rotary Club of Wellington Central Trust · Victoria University of Wellington · Wellington Medical Research Foundation

Research Group

Immunoglycomics

Anna Win-Mason, Dr Bridget Stocker, Dr Mattie Timmer, Emma Dangerfield.

RESEARCH FUNDING

Cancer Society of New Zealand · Genesis Oncology Trust · Health Research Council of New Zealand · Industrial Research Limited · New Zealand Lottery Health Research · Victoria University of Wellington · Wellington Medical Research Foundation

RESEARCH INTERESTS

The goal of Dr Bridget Stocker's Immunoglycomics Research Group is to understand the role of carbohydrates in immune responses, and to apply this knowledge to the development of more effective therapies for diseases such as asthma, cancer and tuberculosis.

In the same way that genomics and proteomics have fuelled discoveries in all biological sciences, Immunoglycomics, the unravelling of the role of glycoconjugates in immune processes, is now thought to be an emerging research field that will generate significant new scientific knowledge.

Although it is known that glycoconjugates play critical roles in cellular events, such as cell signalling, bacterial and viral infection, and the metastasis of tumour cells, detailed knowledge about the identity and mode of action of the glycoconjugates involved is lacking. To better understand the role of glycoconjugates in biology, the Immunoglycomics Research Group uses the latest synthetic methodology, including recently developed novel 'protecting-group-free' strategies, to gain access to unique molecular probes and tools that can then be used to understand the role of specific immune cells and enzymes in disease.

These studies will provide the first detailed insight into how carbohydrate structures can influence the immune system and the knowledge gained will be used to aid in the diagnosis and treatment of disease.

RESEARCH GROUP MEMBERS

Research Group Leader:
Dr Bridget Stocker BSc (Hons, 1st class), PhD(VUW)

Senior Research Fellow and Co-Group Leader:
Dr Mattie Timmer (VUW) MSc, PhD(Leiden, Netherlands)

Research Officer:
Stephanie Chee BSc(VUW)

PhD students:
Janice Cheng BBmedSc(Hons) (VUW), Hilary Corkran BSc(Hons) (Massey), Emma Dangerfield BBmedSc(Hons)(VUW), Ashna Khan BSc(USP, Fiji), PGDip(Auckland), Gert-Jan Moggré MSc(Netherlands), Stefan Munneke BSc, MSc(Netherlands), Janelle Sauvageau BSc, MSc(UL, Canada), Anna Win-Mason BSc(Hons)(VUW)

Research Group

Infectious Diseases

RESEARCH GROUP MEMBERS

Group Leader:
Dr Joanna Kirman BSc(Hons), PhD(Otago) – WMRF Malaghan Haematology Fellow

Senior Research Officer:
Fenella Rich BSc(Hons), DPH(Distinc) (Otago)

Research Officer:
Hannah Kelly BBmedSc(Hons)(VUW)

PhD students:
Lindsay Ancelet BSc(Hons)(USask, Canada), MSc(Toronto, Canada), Kelly Prendergast BBmedSc(Hons)(VUW)

MSc student:
Cornelia Walker DipHumanBiol(Philipps, Marburg, Germany)

Hons student:
Ramakrishna Gopalakrishnan BTech(Anna, Chennai, India)

Dr Joanna Kirman, Fenella Rich, Kelly Prendergast.

RESEARCH INTERESTS

The major focus of Dr Joanna Kirman's Infectious Diseases Research Group is to reduce the incidence of tuberculosis (Tb) in New Zealand through the development and implementation of more effective Tb vaccines.

Tb kills more people worldwide than any other bacterial disease and highly lethal outbreaks of extensively drug resistant forms of the *Mycobacterium tuberculosis* bacteria have highlighted the need for more effective therapies. It is Dr Kirman's belief that the only long-term solution to controlling the spread of Tb is through vaccination.

The current Tb vaccine, BCG, fails to reliably protect against adult Tb lung disease. Efforts to develop a new, more effective vaccine for Tb have been hampered by a lack of understanding of the immune responses required for long-term protection.

The Infectious Diseases Research Group is using well-established laboratory models of Tb to identify the key cytokines and cell types responsible for mediating immunity against *M. tuberculosis* for the development of new vaccines. They are also investigating the effect of worm infections on vaccine efficacy, a major concern in the impoverished countries where Tb rates are at their highest.

In other work Dr Kirman and colleagues are involved in an international collaborative study with Dr Tristram Ingham from the Wellington Asthma Research Group, University of Otago, Wellington. The purpose of this study is to understand why New Zealand children, particularly Maori and Pacific infants, are more likely to develop severe lower respiratory tract infections and require hospitalisation.

RESEARCH FUNDING

Health Research Council of New Zealand · Maurice Wilkins Centre · New Zealand Lottery Health Research · The Royal Society of New Zealand Marsden Fund · University of Otago · Victoria University of Wellington · Wellington Medical Research Foundation

Research Group

Multiple Sclerosis

RESEARCH INTERESTS

The Malaghan Institute's Multiple Sclerosis research programme is headed by Dr Anne La Flamme, an Associate Professor at Victoria University of Wellington's School of Biological Sciences.

Dr La Flamme's primary research interest is in the immune regulation of disease. In particular, her work focuses on the pivotal role of one specific immune cell, the macrophage, in the regulation of pro-inflammatory diseases such as multiple sclerosis (MS).

Macrophages are multifunctional immune cells and are key mediators of inflammatory immune processes. Dr La Flamme's research group has shown that treatments that alter a macrophage's state of activation, and thus alter the immune 'climate', can prevent central nervous system inflammation and progressive paralysis in a mouse model of human MS. Additionally, Dr La Flamme and colleagues are investigating if these treatments or other immune factors can regulate microglia (brain-resident macrophages) function in the brain.

Identification of the disease-inhibiting pathway(s) by which these macrophage-altering treatments prevent disease may uncover much-needed therapeutic targets to inhibit or reduce the severity of MS.

In complementary studies, Dr La Flamme's research group is also collaborating with other New Zealand and international researchers, to identify alternative drugs for treating multiple sclerosis.

RESEARCH FUNDING

The Great New Zealand Trek Charitable Trust · Neurological Foundation of New Zealand · New Zealand Lottery Health Research · Victoria University of Wellington · Wellington Medical Research Foundation

Dr Anne La Flamme.

RESEARCH GROUP MEMBERS

Dr La Flamme's research group is based at the School of Biological Sciences, Victoria University of Wellington

Group Leader:
Dr Anne La Flamme BS(MIT), MS, PhD(Washington)

Senior Research Officer:
Bhagyashree Manivannan

Research Officer:
Amanda Peers-Adam

PhD students:
David O'Sullivan, Sarrabeth Stone, Delgertsetseg Chuluundorj, Marie Kharkrang

Masters student:
Lucas Pitt

Honours student:
Madeleine White

Research Group

Vaccine Research

Tram Nguyen, Kathryn Farrand, John Gibbons, Dr Troels Petersen, Dr Ian Hermans, Sara McKee.

RESEARCH INTERESTS

The overall goal of Dr Ian Hermans' Vaccine Research Group is to design more effective vaccines against diseases such as cancer. It is known that white blood cells called T cells can kill tumour cells. Vaccines that induce the activity of T cells therefore hold considerable promise as new therapeutic agents.

Dr Hermans' research team is looking at the specific immune cell populations involved in eliciting effective immune responses to vaccination, including the dendritic cells responsible for stimulating T cells, and other less well-known cells such as Natural Killer T (NKT) cells that contribute to the induced response. Working together with chemists, they are aiming to define compounds that can be incorporated into vaccines to ensure optimum, coordinated activity of all of the immune cells involved.

They are also exploring how other therapies for cancer, such as chemotherapy, radiation and hyperthermia, affect the immune system, with a view to combining these therapies with vaccination.

The Vaccine Research Group works closely with New Zealand leaders in the fields of immunology, medicinal chemistry and clinical oncology to test their vaccines in cancer patients.

RESEARCH FUNDING

Cancer Society of New Zealand · Foundation for Research Science & Technology · Health Research Council of New Zealand · Just Paterson Real Estate · Neurological Foundation of New Zealand · Robert McClelland Trust · Royal Australasian College of Surgeons · Surgical Research Trust · The Graham Hall Bequest · The Royal Society of New Zealand Marsden Fund · The Thompson Family Foundation, Inc. · Victoria University of Wellington · Wade Thompson · Wellington Medical Research Foundation

RESEARCH GROUP MEMBERS

Research Group Leader:
Dr Ian Hermans BSc(Hons)(Otago), MSc(Distinc)(Otago), PhD(VUW)

Senior Research Fellows:
Dr Olivier Gasser MSc(Strasbourg, France), PhD(Basel, Switzerland), Dr Troels Petersen MSc, PhD(Copenhagen)

Clinical Research Fellows:
Mr Martin Hunn MBChB(Otago), FRACS, Dr Peter Ferguson MBChB(Otago)

Clinical Trials Manager:
Evelyn Bauer NZCSc, Cert Animal Sci & Tech(Massey)

GMP Research Assistant:
Brigitta Mester MSc(Hungary)

Research Nurse:
Catherine Wood RN, BN, PGDipHealSci

Senior Research Officers:
Kathryn Farrand MSc(Massey), Deborah Knight MSc(Otago)

Research Officer:
Ching-Wen Tang MSc(Otago)

PhD students:
John Gibbons BBmedSc(Hons)(VUW), Sara McKee BSc(Hons)(Otago), Taryn Osmond BBmedSc(Hons)(VUW), Dianne Sika-Paotonu BSc, BBmedSc, MBmedSc(Hons)(VUW)

Honours student:
Tram Nguyen BBmedSc(VUW)

Cancer

OVERVIEW

Cancer develops when cells in the body accumulate genetic changes that lead to loss of growth control. Normally cells grow, divide and die in an orderly fashion, in response to signals from their environment. In cancer cells however, these cues are lost and the cells continue to grow and divide in an uncontrolled manner.

It is a sobering fact that despite decades of research and the investment of billions of dollars of funding, cancer death rates have changed little over the past 50 years. What's more, cancer remissions are often transient, drug resistance is a major problem and drug withdrawal can result in an aggressive return of the disease. New, more effective cancer therapies are needed urgently if we are to turn these statistics around.

Cancer is a disease that has afflicted people throughout recorded history and is the leading cause of death in New Zealand.

Immunotherapy holds great promise for the treatment of cancer. The immune system has all the properties that are required to complement existing cancer treatments. Immune cells are specific and have the capacity to discriminate between normal and cancer cells, they have powerful effector capacity and can recruit inflammatory cells to destroy neoplastic tissue, and they can migrate to different tissues and eliminate residual metastatic disease.

In 2010 the US Food and Drug Administration (FDA) approved the use of the world's first therapeutic dendritic cell cancer vaccine Provenge for the treatment of certain forms of advanced prostate cancer. Considerable work still needs to be done however before cancer vaccine therapies can be made accessible to the majority of cancer patients.

HOW THE MALAGHAN INSTITUTE IS TACKLING CANCER

Over half of the scientists at the Malaghan Institute are involved in research programmes devoted to realising the full potential of cancer immunotherapy.

Recently there has been a new focus on the cancer stem cell, or tumour initiating cell, and the identification of ways to target immunotherapies against these drug and radiation resistant cancer cells. By learning more about the basic biology of cancer stem cells and the pathways they use to survive chemotherapy and radiotherapy treatments, Malaghan Institute scientists hope to develop safe and effective ways to eradicate them.

Over the past decade the Malaghan Institute has made significant progress in translating its cancer basic research into real outcomes for patients - a 'bench to bedside' philosophy that ▸

RESEARCH HIGHLIGHT

USING MAGNETIC NANOPARTICLES TO ENHANCE MRI DETECTION

Dr Ian Hermans and Clinical Research Fellow Dr Peter Ferguson are part of a multi-disciplinary programme headed by Dr Richard Tilley from Victoria University of Wellington that is investigating the medical application of magnetic nanoparticles.

Magnetic nanoparticles are becoming increasingly important in many biomedical applications, such as drug delivery, hyperthermia and magnetic resonance imaging (MRI).

Dr Tilley has developed and patented a novel synthesis process for producing superparamagnetic nanoparticles, which Dr Ferguson then tested for their ability to work as contrast agents that enhance what can be 'seen' inside the body using MRI.

"Working in collaboration with Wellington Hospital, Dr Ferguson was able to show that the superior magnetic properties of the nanoparticles significantly enhanced the utility of using MRI to detect developing tumours or to evaluate the immunogenicity of our dendritic cell vaccine," says Dr Hermans.

"This is just the beginning," he says. "The particles can be adapted to carry chemotherapeutic drugs to tumours, and can also be heated up in a tumour by exposing a patient to an alternating magnetic field (providing 'hyperthermia' treatment)."

"We are currently applying for funding to investigate these processes more closely." M

Cheong S, Ferguson P, Feindel KW, Hermans IF, Callaghan PT, Meyer C, Slocombe A, Su CH, Cheng FY, Yeh CS, Ingham B, Toney MF, Tilley RD (2011) Simple synthesis and functionalization of iron nanoparticles for magnetic resonance imaging. **Angew Chem Int Ed Engl**, 50:4206-9

has led to three clinical trials including the current Phase I glioblastoma multiforme trial. This work is supported by a close working relationship with clinicians from the Wellington Blood and Cancer Centre and Wellington Hospital, and access to the Institute's state-of-the-art GMP (Good Manufacturing Practice) facility.

By combining the disciplines of immunology, cell biology and drug discovery in a programme that involves immunologists, biochemists, molecular biologists, chemists and clinicians, this research has the potential to launch a new era in cancer treatment.

By combining the disciplines of immunology, cell biology and drug discovery … has the potential to launch a new era in cancer treatment.

USING CANCER VACCINES IN THE CLINIC

It is clear that different cancer vaccination strategies or immunotherapies will benefit different people, in much the same way that some individual's immune systems seem to work better than others. The only way of knowing how a newly developed immunotherapy will work in patients, after having shown promising results in experimental models, is to carry out a clinical trial.

In late 2008 the Malaghan Institute initiated a Phase I clinical trial in collaboration with the Capital & Coast District Health Board to test the feasibility and safety of using dendritic cell vaccines in combination with temozolomide chemotherapy for the treatment of patients with recurrent glioblastoma multiforme, a highly aggressive brain tumour that is resistant to current therapies.

The custom-made vaccines used in the trial are created by loading dendritic cells isolated from the patient's blood with tissue from their surgically-removed tumour.

Personalised vaccines, such as those being used in the glioblastoma multiforme clinical trial, are very intensive to produce but they do offer a broad immunity that recognises the unique features of an individual patient's tumour tissue.

Complementing the clinical trials is an extensive basic immunology research programme involving several of the Institute's research groups, aimed at understanding anti-tumour immune responses and how they can be more effectively elicited with vaccines.

Four recent developments in this area that were published by Malaghan Institute scientists in leading international scientific journals over the past year are highlighted in this section.

"there are still many pieces missing from this puzzle … to fully understand the extraordinary intricacies of the immune system."

RESEARCH HIGHLIGHT

A PUZZLE, A PARADOX AND ULTIMATELY A PROMISE OF MORE EFFECTIVE CANCER TREATMENTS

For over a decade Prof Franca Ronchese's research team has been developing different approaches for stimulating effective anti-tumour immune responses.

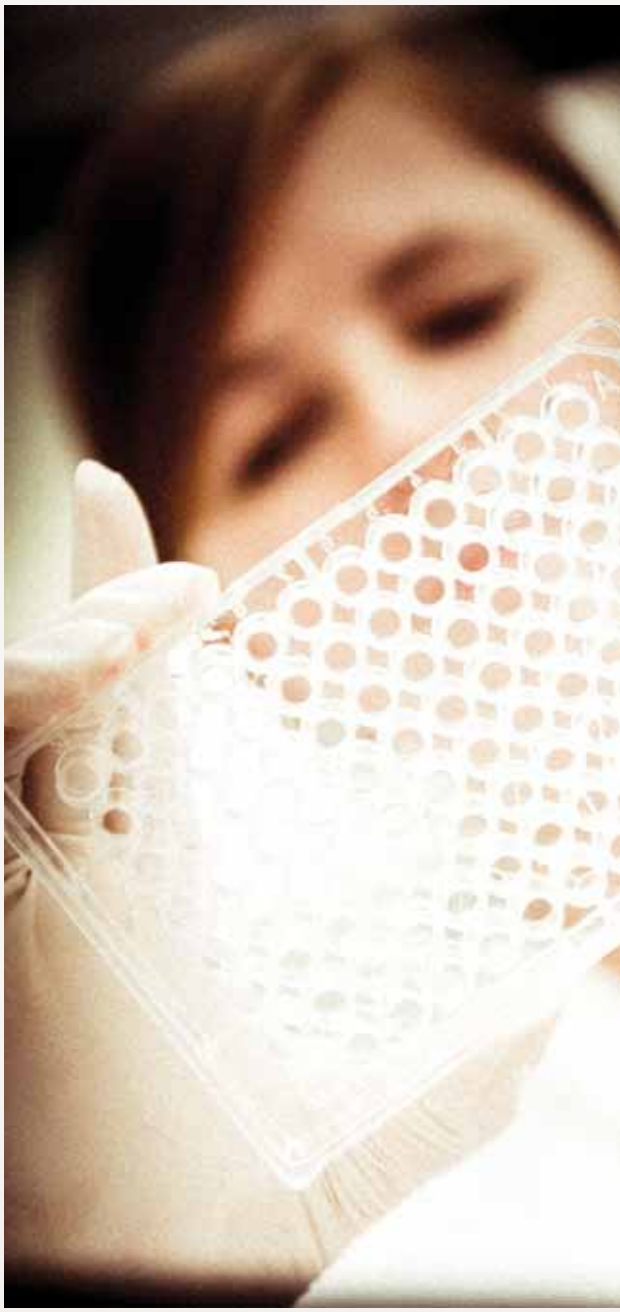
"Tumours differ from normal cells but they don't always activate a spontaneous immune response in the same way that a virus would," says Prof Ronchese. "This is because tumours have numerous escape strategies that they use to avoid detection. The cancer vaccine works by helping the immune system to 'see' the tumour, whilst also providing it with the appropriate signals required to kick-start it into action."

One such signal is a compound from marine sponges called α-galactosylceramide (α-GalCer), which has been shown in laboratory studies to stimulate even greater vaccine induced anti-tumour immune responses when used in combination with the dendritic cell vaccine.

"Our research has revealled, somewhat unexpectedly, that α-GalCer also causes the death of a specific population of host dendritic cells shortly after vaccination," says Prof Ronchese. "Intriguingly, these results suggest that protecting dendritic cells from death might make the effects of α-GalCer even more powerful."

"What they also show is that there are still many pieces missing from this puzzle that need to be addressed if we are to fully understand the extraordinary intricacies of the immune system and how best to tap into it to treat disease."

Simkins HM, Hyde E, Farrand KJ, Ong ML, Degli-Esposti MA, Hermans IF, Ronchese F (2011) Administration of alpha-galactosylceramide impairs the survival of dendritic cell subpopulations *in vivo*. **J Leukoc Biol,** 89:753-62



HOW DOES THE MALAGHAN INSTITUTE MAKE A CANCER VACCINE?

Working within the Malaghan Institute's Keith & Faith Taylor Cancer Research Laboratories, a dedicated suite of GMP laboratories designed specifically for the development of immunotherapeutic vaccines, Clinical Trials Project Manager Evelyn Bauer produces tailor-made cancer vaccines from a patient's own cells.

After receiving a patient's tumour biopsy Evelyn evaluates it to determine whether or not there are sufficient usable cells in the sample for preparing a vaccine. If there are, the tumour cells are killed by irradiation so that they cannot continue to grow when injected back into the patient.

The killed tumour cells are then 'fed' to dendritic cells grown from the patient's blood, which digest the tumour into tiny pieces that can be recognised by the immune system. The vaccine thus generated is then injected back into the patient, where the dendritic cells present the tumour pieces to the patient's T cells and instruct them to hunt out and destroy the tumour.

Each patient receives multiple vaccinations to ensure that the immune system is fully informed about the task it has to perform.

RESEARCH HIGHLIGHT

REDUCE, REUSE, RECYCLE – TARGETING THE THREE R'S OF CANCER SURVIVAL

Solid tumours such as brain tumours are highly resistant to chemotherapy and radiation. One reason for this is a 'reduce, reuse, recycle' strategy that these tumours use to survive treatment. By developing a cancer drug that targets this recycling pathway, Dr Melanie McConnell and colleagues have struck upon a novel approach for combating otherwise resistant and aggressive cancers.

As part of a collaborative cancer drug discovery programme with Dunedin researchers Prof Rob Smith and Dr Lesley Larsen, Dr McConnell and Prof Mike Berridge developed and tested a series of novel anti-cancer drugs. One of these compounds, PMT7, was chosen as a candidate for further study based on its ability to kill certain types of previously drug-resistant cancer cells.

"Autophagy is a form of cellular recycling where a cell starts breaking itself down and reusing its components to sustain its growth," says Dr McConnell. "It is often induced in response to chemotherapy, where it aids cancer cell survival."

"We discovered that one of the ways PMT7 works is by blocking autophagy - in doing so it kills the highly resistant glycolytic cancer cells that rely on this pathway in order to survive."

Targeting cellular recycling is a promising new area of drug discovery that warrants further investigation.

Broadley K, Larsen L, Herst PM, Smith RAJ, Berridge MV, McConnell MJ (2011) The novel phloroglucinol PMT7 kills glycolytic cancer cells by blocking autophagy and sensitizing to nutrient stress. **J Cell Biochem**, 112:1869-79

RESEARCH HIGHLIGHT

TAKING THE GUESSWORK OUT OF TREATING CANCER

Research undertaken by Malaghan Institute scientists Dr Patries Herst and Prof Mike Berridge, and Assoc Prof David Ritchie and colleagues from the Peter MacCallum Cancer Centre in Melbourne, has provided a vital new tool for clinicians that will aid them in selecting more appropriate treatments for patients with acute myeloid leukaemia (AML).

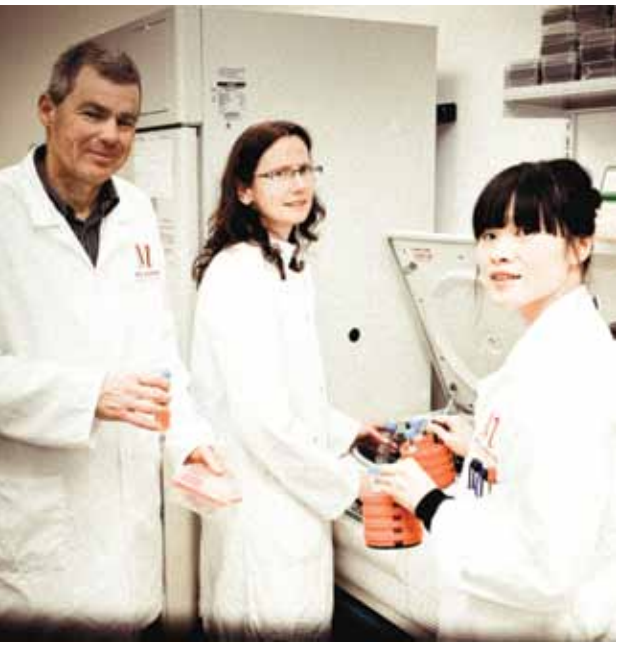
"Being able to predict which AML patients will respond to a particular treatment will remove some of the guesswork and improve patient outcomes," says Prof Berridge.

AML is a cancer of the white blood cells and is the most common type of acute leukaemia diagnosed in New Zealand adults. It is treated using chemotherapy or bone marrow transplantation, however a treatment that works well for one patient may have little effect in another patient with the same cancer. This is due in part to the many different strategies used by cancer cells to evade treatment and survive.

"Cancer cells grow and divide frequently and therefore require a continuous supply of energy," says Prof Berridge. "Normally this energy comes from the mitochondrial energy factories located within the cell. However, AML cells have found other ways of meeting their energy needs."

Their study revealed that patients whose cancer cells did not rely on their mitochondria for energy production did much better than patients whose cancer cells were reliant on this source of energy, thus providing clinicians with a way to better predict patient outcomes before starting treatment.

Herst PM, Howman RA, Neeson PJ, Berridge MV, Ritchie DS (2011) The level of glycolytic metabolism in acute myeloid leukemia blasts at diagnosis is prognostic for clinical outcome. **J Leukoc Biol**, 89:51-5



Asthma & Allergy

Allergic diseases such as asthma, food allergy, eczema and allergic rhinitis (including hay fever) are caused by an overreaction of the immune system to harmless environmental triggers. In fact it is only one part of the immune system that seems to be activated – the so-called Th2 immune response that normally functions in protecting against parasitic worm infections.

Asthma is the world's most common chronic disease in children and its prevalence in New Zealand is amongst the highest in the world, affecting approximately 20% of six to 14 year olds. Food allergies are also on the rise, particularly amongst children, and in serious cases can lead to food-induced anaphylaxis and death.

The treatment of immune-mediated diseases of excessive immune activation, such as asthma and allergy, usually involves the use of non-specific immune suppressive agents such as corticosteroids. Although effective at inhibiting the undesired immune response to allergens, these treatments are non-specific in their mechanism of action and can leave patients more susceptible to common infections such as influenza.

Surprisingly little is known about the signals that trigger the initiation of the allergic immune responses but scientists at the Malaghan Institute hope to change this by using murine models, immunological assays and structure/function analyses to generate much needed information in this poorly understood field.

The majority of the Institute's asthma and allergy research is undertaken in Prof Graham Le Gros' Asthma & Allergic Diseases Research Group. A postdoctoral research fellow in this group, Dr Elizabeth Forbes-Blom, specialises in the study of food allergy and is currently developing unique laboratory models for understanding the early events in the allergic immune response. Other senior research group leaders involved in asthma and allergy research at the Malaghan Institute include Prof Franca Ronchese, Dr Bridget Stocker and Dr Jacquie Harper.

Important outcomes of this work will be the development of generally applicable vaccines and therapies for the treatment of individuals with established disease, and the identification of improved immunological markers for monitoring human airway inflammation and allergy.

Asthma, eczema and food allergies continue to increase in developed countries and are now recognised as a major global health issue.

RESEARCH HIGHLIGHT

DISSECTING THE TH2 IMMUNE RESPONSE

Interleukin 4 (IL-4) production is a key regulatory event that occurs early in the allergic Th2 immune response, and CD4+ T cells and basophils are thought to be the key cell types responsible for mediating its production.

While IL-4 producing CD4+ T cells are well described in the literature, less is known about IL-4 production from basophils. Previously, Prof Graham Le Gros' Asthma & Allergic Disease Group has shown that basophils accumulate in tissues following infection with the nematode parasite *Nippostrongylus brasiliensis* and are an important source of IL-4.

Using a novel fluorescent reporter system, they were able to further their initial findings by showing that IL-4 production from basophils and CD4+ T cells varied depending on whether this was the first time the immune system had seen the parasite, or if it was responding to subsequent reinfection.

"We found that basophils were the major producers of IL-4 during the initial immune response to parasite infection, whereas CD4+ T cells were the predominant source of IL-4 following a secondary infection," says Prof Le Gros. "In both primary and secondary *N. brasiliensis* infections, we found IL-4 expressing basophils in the lung, liver, lymph nodes and blood."

"Overall our data indicate that basophils represent a significant source of IL-4 in the generation of immune responses to parasites and allergens, and we are currently focused on learning more about this unique population of immune cells."

van Panhuys N, Prout M, Forbes E, Min B, Paul WE, Le Gros G (2011) Basophils are the major producers of IL-4 during primary helminth infection. **J Immunol**, 186:2719-28

RESEARCH HIGHLIGHT

WHY AVOIDING PEANUTS MIGHT NOT PREVENT FOOD ALLERGY

In a recent study that will be published in the journal of Clinical & Experimental Allergy, Prof Graham Le Gros and Dr Elizabeth Forbes-Blom have shown that under certain circumstances, having skin come into contact with peanuts is all that is required for the development of an allergic immune response.

"A child doesn't just suddenly become allergic to peanuts," says Prof Le Gros. "Their immune system has to have seen the peanuts beforehand, and become sensitised to them. Parents of allergic children will often say however that their child has never eaten peanuts, so we wanted to know how and why these children go on to develop peanut allergies."

To address this question, Dr Forbes-Blom developed unique laboratory food allergy models to investigate whether other routes in the body, such as skin contact, were relevant for sensitising the immune system to peanuts.

The skin of most patients with eczema is colonised with *Staphylococcus aureus*, and superantigens produced by these bacteria can make their allergic skin irritations significantly worse.

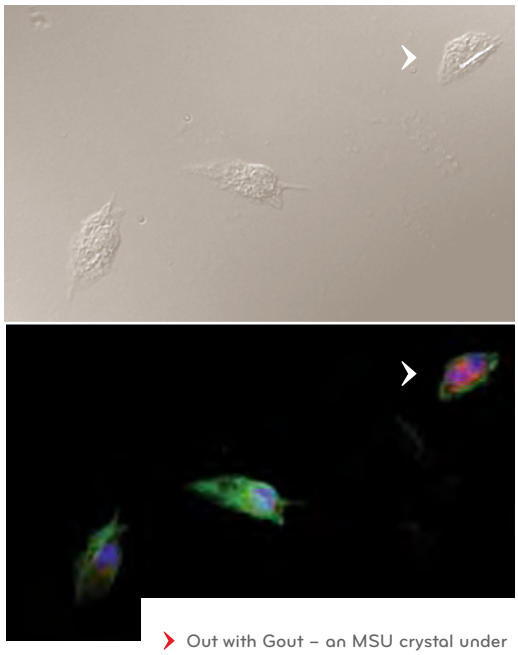
"We showed that the superantigens were able to amplify the immune response that develops in response to peanut extract coming into contact with the skin," says Prof Le Gros.

"Our results support previous clinical findings that repeated exposure of the skin to peanuts can lead to the development of peanut specific allergic immune responses. They also highlight the importance of concomitant Staph infections in amplifying this process in individuals with eczema."

Forbes-Blom E, Camberis M, Prout M, Tang S-C, Le Gros G Staphylococcal derived superantigen enhances peanut induced Th2 responses in the skin. **Clin Exp Allergy**, (in press)

Arthritis & Inflammation

The prevalence of gout in New Zealand is twice that observed internationally and it is three times more common in Maori and Pacific populations.



Out with Gout – an MSU crystal under attack by an inflammatory immune cell (arrow). To signal the presence of the crystal, the immune cell is producing inflammatory molecules (pink).

Gout is an extremely painful recurring arthritic disease affecting a great number of New Zealanders. 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 can stay that way for up to two weeks. If acute gout doesn't self-resolve, it can progress into tophaceous gout – a crippling and debilitating condition.

Gout is caused by the build-up of crystals of uric acid (MSU) 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.

The Institute's Arthritis and Inflammation research programme, led by Dr Jacquie Harper, is focused on identifying the cellular processes involved in MSU-induced inflammation using acute models of gout. Supporting this work are clinical studies investigating the effect of uric acid on inflammatory immune responses in patients compared to healthy volunteers. These studies are working towards identifying new therapeutic targets and markers of disease progression.

In addition to gout research, Dr Harper and colleagues are involved in collaborative research programmes focused on investigating the effect of diet on models of inflammation and on the development of carbohydrate-lipid based compounds that have the potential to either enhance or suppress inflammatory immune responses for the treatment of disease.

GOUTY ARTHRITIS CLINICAL STUDY

Dr Jacquie Harper's Arthritis and Inflammation Research Group is currently running a gouty arthritis clinical study in collaboration with Wellington Rheumatologists Dr Andrew Harrison and Dr Rebecca Grainger.

This study builds on previous clinical work published by this team in the Journal of Rheumatology in 2010, which revealed that hyperuricaemia may increase inflammatory immune responses to the uric acid crystals. Their study showed that neutrophils isolated from gout patients and individuals with hyperuricaemia are 'primed' to respond to gout-causing MSU crystals, and release high levels of inflammation-causing agents that contribute to disease onset and severity.

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 MSU crystals.

RESEARCH HIGHLIGHT

THE CHANGING FACE OF THE IMMUNE RESPONSE DURING ACUTE GOUTY ARTHRITIS

The causative agent of gouty arthritis (MSU crystals) is well documented, however the cellular interactions that underpin the initiation and resolution of an acute gout attack remain poorly understood.

Dr Jacquie Harper and Dr William John Martin have made significant progress in this area by following how the immune system responds to the presence of MSU crystals during an acute episode of gout. Surprisingly, they found that non-inflammatory monocytes recruited into the site of damage by the MSU crystals, went on to differentiate into proinflammatory macrophages, something that went against the current dogma in the field. This work has now been published in one of the top international rheumatology journals.

"Previously it was believed that monocytes enter the inflamed joint and change into cells that resolve inflammation," says Dr Harper. "However our 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 research is now focused on determining what processes orchestrate the development of the pro-inflammatory macrophages during the gout inflammatory response.

Dr Harper was invited to present this work at the prestigious World Congress on Inflammation in Paris in June 2011.

Martin WJ, Shaw O, Liu X, Steiger S, Harper JL (2011) Monosodium urate monohydrate crystal-recruited monocytes differentiate into M1-like proinflammatory macrophages in a peritoneal murine model of gout. **Arthritis Rheum,** 63:1322-32

Infectious Diseases

A high magnification image of the *Nippostrongylus brasiliensis* worm as it crawls through the hairs on skin. This image is courtesy of Dr Peter Ferguson from the Malaghan Institute and David Flynn from the Electron Microscopy Unit at Victoria University of Wellington.

For the past 16 years the World Health Organization (WHO) has labelled tuberculosis (Tb) a global emergency. Tb claims a staggering 1.7 million lives and newly infects 8.9 million people every year, making it the leading cause of mortality by an infectious disease, after HIV. In New Zealand there are approximately 350 notifications of Tb cases per year.

Tuberculosis kills more people than any other bacterial disease.

Hookworm is a leading cause of maternal and child fatalities in developing countries. Once in a host, hookworms suck blood voraciously from the walls of the small intestine causing significant risk of anaemia, a decrease in red blood cells, and loss of iron and protein in the gut.

Highly lethal outbreaks of extensively drug-resistant Tb and evidence of emerging drug resistance in hookworm control, have highlighted the need for more effective therapies to control these diseases.

Dr Joanna Kirman's Infectious Diseases Group and Prof Graham Le Gros' Parasitology team believe the only long-term solution to controlling infectious disease is through vaccination, and are using well established models of Tb and parasite infection in combination with cytokine and cell knockout mouse models to achieve this goal. Complementing this research is a drug discovery platform involving Dr Bridget Stocker's Immunoglycomics Research Group.

The knowledge and technologies emerging from these research programmes will provide valuable insight into which cytokines and cells need to be targeted both for vaccine design and testing of vaccine efficacy in the field. M

RESEARCH HIGHLIGHT

MALAGHAN INSTITUTE RESEARCH REVEALS CLUE TO TACKLING TUBERCULOSIS

Dr Joanna Kirman's Infectious Diseases Research Group is part of an international effort focused on reducing the incidence of tuberculosis through the development and implementation of more effective Tb vaccines.

"Our struggle to develop a good Tb vaccine has stemmed in part from a poor understanding of the immune mechanisms that orchestrate protection against Tb," says Dr Kirman.

Identifying which components of the extensive network of cells, tissues and organs that constitute the immune system are the most critical for protecting against Tb, is akin to finding the proverbial needle in a haystack.

To get around this onerous undertaking, Dr Kirman and colleagues developed a novel strategy that involved trapping immune cells at specific sites in the body, and then looked to see how this influenced the ability of the immune system to protect against Tb.

In doing so, they were able to show that following vaccination, the immune cells present at the site of infection in the lungs played an essential role in controlling the growth of Tb bacteria in the early stages of disease.

"Our research suggests that a vaccine needs to drive the protective cells to the lung if we want to achieve good protection against Tb," says Dr Kirman.

Connor LM, Harvie MC, Rich FJ, Quinn KM, Brinkmann V, Le Gros G, Kirman JR (2010) A key role for lung-resident memory lymphocytes in protective immune responses after BCG vaccination. **Eur J Immunol**, 40:2482-92

RESEARCH HIGHLIGHT

SCIENTISTS MAKE BREAKTHROUGH IN FIGHT AGAINST HOOKWORM PARASITE

Human hookworm infection is currently controlled through frequent use of antihelminthic drugs in school-age children, however, high rates of re-infection occur soon after treatment and there is evidence of emerging drug resistance.

"Vaccination is currently viewed as the only long-term solution for reducing the enormous burden this disease imposes on developing countries," says Prof Graham Le Gros.

"Before we can start developing a vaccine against the parasite, we first need to identify the immune mechanisms that can protect against hookworm infection."

Using a rodent model of human hookworm infection called *Nippostrongylus brasiliensis*, Prof Le Gros' research team showed that the lung was the critical site for establishing immunity against parasite infection.

"Our findings imply that for a vaccine to be effective it must target the immune cells resident in the lung and stimulate a specific kind of immune response that we have yet to discover."

More than 1 billion people worldwide are infected with helminth parasites.

In 2010 the Health Research Council of New Zealand granted $1.2 million to Prof Le Gros to further develop this pioneering research. The outcome of which could alleviate suffering and economic stalemate for over one billion people worldwide.

Harvie M, Camberis M, Tang SC, Delahunt B, Paul W, Le Gros G (2010) The lung is an important site for priming CD4 T-cell-mediated protective immunity against gastrointestinal helminth parasites. **Infect Immun**, 78:3753-62

Multiple Sclerosis

Multiple sclerosis (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. Women are almost three times more likely to develop MS than men. While some MS treatments are available to help manage the disease, they are not equally effective in all patients and often have side effects associated with medium to long-term use.

Researchers at the Malaghan Institute are using a multipronged approach to develop more effective therapies for controlling the aberrant immune responses that occur in organ specific autoimmune disorders such as MS.

The first approach is to understand the basic biology of MS in experimental laboratory models, in order to identify potential therapeutic targets or new markers of disease progression. In conjunction with this work is a research programme aimed at identifying and testing novel compounds that could be used to halt disease progression.

Research Associate Dr Anne La Flamme, who is an Associate Professor in the School of Biological Sciences at Victoria University of Wellington, is responsible for overseeing the Malaghan Institute's MS research. Malaghan Institute Research Group Leader Dr Jacquie Harper has also undertaken some autoimmunity research as part of her greater Arthritis and Inflammation research programme.

Multiple Sclerosis affects one in every 1,500 New Zealanders – one of the highest frequencies of this disease worldwide.

RESEARCH HIGHLIGHT

WORKING TOWARDS A CURE FOR MULTIPLE SCLEROSIS

There is currently no cure for multiple sclerosis - however Malaghan Institute scientists believe that specialised cells found in the blood might hold the key to improving the quality of life of the thousands of New Zealanders affected by this disease.

In an 'Outstanding Observation' published in Immunology and Cell Biology, Drs Jacquie Harper, Thomas Bäckström, Clare Slaney and Anne La Flamme describe how blood cells called monocytes may play a role in the development of MS.

Monocytes are a type of white blood cell that moves quickly to sites of infection to stimulate inflammatory responses. They are also capable of suppressing inflammation in certain disease contexts. It is this latter function that was the subject of the Health Research Council of New Zealand funded research.

"Our data showed that the ability of the blood monocytes to suppress inflammation and thus protect against the development of autoimmunity is impaired in an experimental model of MS," says Dr Harper.

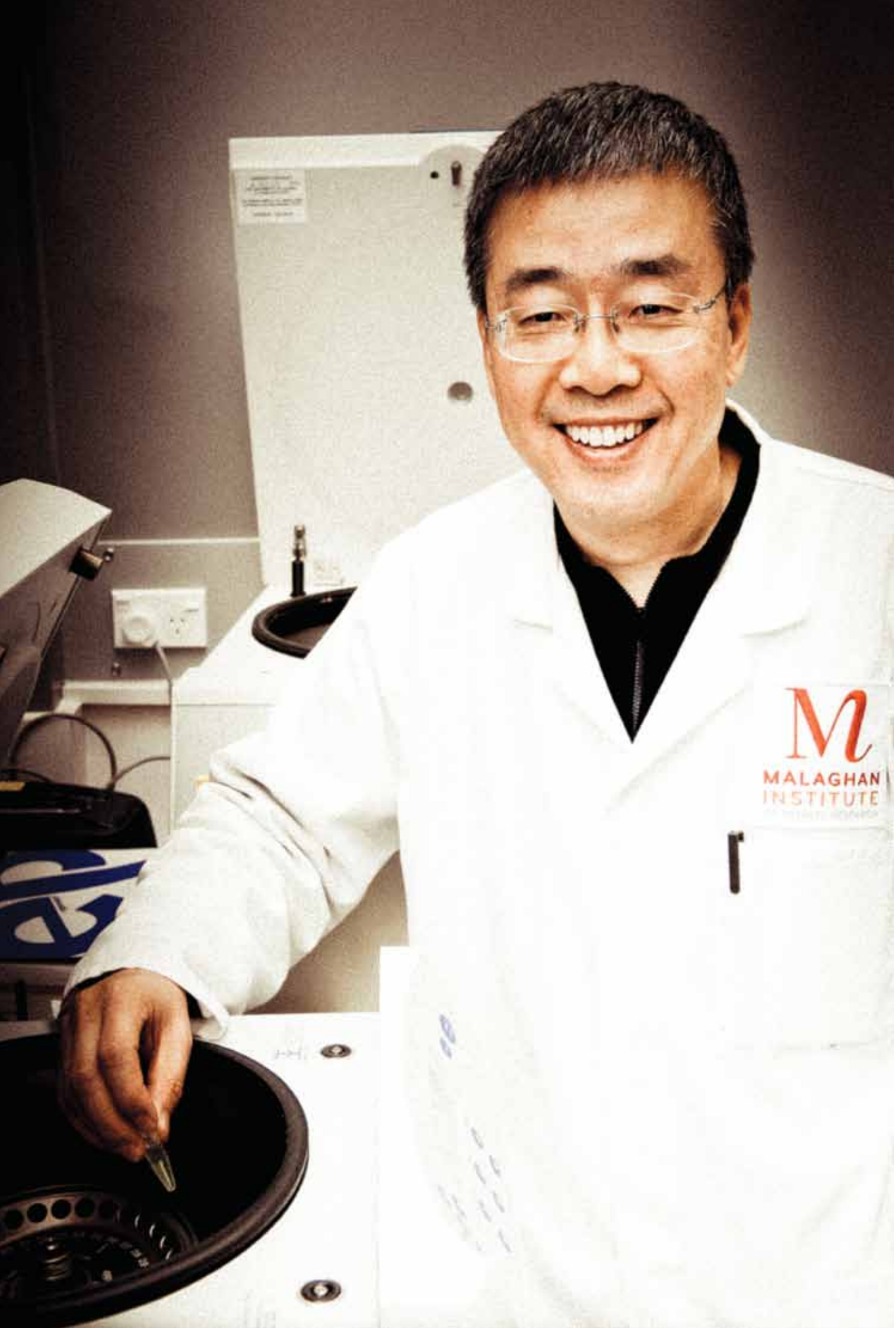
"As such, these monocytes are no longer able to prevent inflammatory cells from destroying the central nervous system of MS sufferers," she says. "If we can find a way to reactivate suppressor function in the monocytes of MS sufferers, we might be able to provide a new treatment for MS that could delay or even prevent the progression of this disease."

Slaney CY, Toker A, La Flamme A, Bäckström BT, Harper JL (2011) Naïve blood monocytes suppress T-cell function. A possible mechanism for protection from autoimmunity. Outstanding Observation, **Immunol Cell Biol,** 89:7-13

A History of Innovation

A TIMELINE OF THE MALAGHAN INSTITUTE'S MAJOR ACHIEVEMENTS IN MEDICAL RESEARCH

1980-1995	**Causes of atherosclerosis** - significant new knowledge generated in understanding the basis for atherosclerotic plaque formation during cardiovascular disease **Breakthrough in understanding blood cell formation** – discovered that erythropoietin promotes platelet production
1997	**Vaccine for treating cancer** – developed novel method for making a vaccine against tumours that uses the body's own dendritic cells and tumour tissue
1998	**Phase I non-Hodgkin's lymphoma clinical trial** – study showed that dendritic cell vaccines can be successfully produced from patients with advanced disease, supporting the use of immunotherapy in the treatment of cancers such as non-Hodgkin's lymphoma
2000	**Using Tb vaccine to block development of allergic asthma** - discovered that specific kinds of bacterial lung infections alleviated the symptoms of allergic asthma in experimental models
	Development of high throughput drug discovery assay – based on novel enzymatic pathway used by cancer cells and inflammatory cells to meet their energy and metabolic requirements
2003	**Adjuvant for improved cancer vaccine** - discovered compound extracted from marine bacteria can greatly improve anti-tumour immune responses
2004	**Phase III melanoma clinical trial** - in 2004 the Malaghan Institute and Wellington Hospital Blood & Cancer Centre, in collaboration with the Queensland Institute of Medical Research, undertook a phase III melanoma vaccine clinical trial
2005	**Novel therapy for multiple sclerosis** - discovered that a toxin from bacteria could be used to treat disease symptoms of MS in a laboratory model of the disease
2006	First in NZ to receive Medsafe approval of GMP laboratories for the manufacture of cellular vaccines against cancer
2007	**Identification of arthritis drug candidates from NZ environment** - used drug discovery assay to screen NZ's marine and terrestrial plants and organisms, identified lead compounds with anti-inflammatory activity
2008	**Potential immunotherapy for asthma** – discovered that killing of airway dendritic cells improves allergic airway inflammation
	Launch of phase I clinical trial - to test the feasibility and safety of using dendritic cell vaccines in combination with temozolomide chemotherapy for the treatment of patients with recurrent glioblastoma multiforme
2009	**Green chemistry** - less toxic chemical process developed for making a specific class of chemical compounds used in medical therapy
2010	**Early gout detection** - gouty arthritis clinical study identified markers of disease susceptibility
	Hookworm vaccine - made pivotal discovery that could lead to a vaccine against hookworm, a parasite that infects an estimated one billion people worldwide
	Tb vaccine development – identified BCG vaccine induced immune cells that provide long-term protection against Tb
2011	**Gouty arthritis** – challenged current dogma that monocytes function to resolve inflammation during an acute gout attack, instead showing that they exacerbate inflammation
	Food allergy – discovered process by which individuals may become pathologically sensitised to food allergens early in life


MALAGHAN
INSTITUTE

New Areas of Research & Development

RESEARCH HIGHLIGHT

LYMPHANGIOLEIOMYOMATOSIS

Lymphangioleiomyomatosis (LAM) is a progressive and invariably fatal rare lung disease that afflicts young women in their reproductive years. It causes shortness of breath, chest pains, coughing and lung collapse and there is no known cure.

While LAM is not presently classified as a cancer, LAM cells have cancer cell-like properties including loss of cell growth control and abnormal differentiation, and there is evidence for LAM cell metastasis from lung tissue. Since November 2009 the NZ LAM Trust/LAM Australasia Research Alliance has helped fund research by Dr James Baty and Prof Mike Berridge to explore the feasibility of treating LAM using the immunological therapies being developed for treating cancer.

Dr James Baty and Prof Mike Berridge.

Dr Baty is currently working with rapamycin, a drug that is now being applied in the treatment of LAM patients, and metformin, a drug used in the treatment of Type II diabetes, to investigate the dual action of these compounds on LAM cells compared with lung cells from control patients.

In addition, high-dose vitamin C, which has beneficial pro-oxidant activity in some cancer patients, is also being tested. A collaboration with Professor Vera Krymskaya, University of Pennsylvania, will explore the effects of these treatments on cells with an inactivating mutation that underpins LAM.

RESEARCH HIGHLIGHT

FINDING A WAY TO PROMOTE CELL SURVIVAL IN INDIVIDUALS WITH MOTOR NEURONE DISEASE

In a research programme supported by the Motor Neurone Disease Association of NZ and the Estates of Ellen, Sinclair, Barbara and Alison Wallace, Dr Melanie McConnell and Masters student Susanna Brow are using their knowledge of cell survival to identify ways to prolong the life of neurons in individuals with motor neurone disease.

Patients with motor neurone disease suffer increasing weakness of the muscles, due to the death of the neurons that feed into them and there is currently very little that can be done to prevent this. Dr McConnell and Susanna believe that targeting the activity of the cell survival protein SIRT1 might hold the key to delaying or preventing neurodegeneration.

Susanna Brow and Dr Melanie McConnell.

SIRT1 is a key mediator of stress responses and has been shown to be upregulated in neurons. However, little is known about its expression in neighbouring astrocytes, which play a critical role in signalling to neurons to keep them alive. Dr McConnell and Susanna are addressing this question by treating normal astrocyte cells with stresses that induce a MND phenotype, before and after SIRT1 activation.

Careful examination of the precise effects of SIRT1 activation in these cells will aid in the development of approaches for treating individuals with motor neurone disease.

Immunoglycomics

Immunoglycomics is the study of the role of carbohydrates in immune responses. It is known that certain glycolipids such as α-galactosylceramide (α-GalCer) boost the immune response in favour of enhanced anti-tumour activity. While the tumour-derived peptide effectively acts as the 'ignition' and turns the immune response 'on', the glycolipid acts as the 'throttle' and controls the intensity of the immune response.

The Institute's Immunoglycomics Group, led by Dr Bridget Stocker and Dr Mattie Timmer (VUW), are using the latest synthetic methodology, including their patented 'protecting-group-free' strategies, to synthesise novel glycolipids to enhance the immune response to tumours. They have also generated fluorescently labelled glycolipids to investigate where these glycolipids circulate in the body.

The molecular structures of the allergens that trigger asthma and the role they play in influencing Th2 immune responses are also being determined. It is anticipated that these studies will provide the first detailed insight into the relationship between glycoconjugate structure and Th2 bias, and will lead to the identification of specific Th2 targets that will aid in the diagnosis and treatment of asthma and allergy.

In view of the problems associated with current tuberculosis (Tb) treatments, Dr Stocker and colleagues are working towards the development of new drugs to treat the disease. They are also developing novel molecular probes based on cell wall components of *Mycobacterium tuberculosis*, the causative agent of Tb, which can be used to elucidate mechanisms underlying the pathogenesis of the disease. As part of these studies, they have identified the minimum lipid length that is required to generate a macrophage-induced immune response to one of the key cell wall components of *M. tuberculosis*.

Dr Bridget Stocker.

RESEARCH HIGHLIGHT

DR BRIDGET STOCKER ACKNOWLEDGED FOR HER SIGNIFICANT CONTRIBUTION TO CHEMISTRY

2011 is the International Year of Chemistry, commemorating 100 years since Madame Marie Curie was awarded the Nobel Prize in Chemistry. To mark this occasion the international European Journal of Organic Chemistry published a special issue dedicated to Women in Chemistry, and Dr Bridget Stocker was one of the elite group of female scientists selected to feature in it.

The journal states that "this issue was compiled to highlight women in organic chemistry who have made a significant contribution to their field," which is an incredible testament to the work that Dr Stocker and her team are doing here at the Malaghan Institute.

Win-Mason AL, Dangerfield EM, Tyler PC, Stocker BL, Timmer MSM (2011) Asymmetric Strecker and carbamate annulation methodology for the synthesis of amino-imino-hexitols. [Personal invitation, featured on cover and profile], **Eur J Org Chem**, 4008-14 (article); **Eur J Org Chem** 3578 (profile)

Alfonso Schmidt, Kylie Price.

Flow Cytometry

Flow cytometry is a powerful technology that allows researchers and clinicians to understand cells based on the way they scatter light, and on the fingerprint of the markers they express. Nearly every scientist at the Malaghan Institute utilises flow cytometry as a research tool in their quest to develop immune-based therapies for the treatment of diseases such as cancer, asthma, multiple sclerosis, arthritis and infectious diseases.

The applications of flow cytometry are immense. For instance, it is now recognised that when a cancer-killing immune cell invades a tumour, the tumour produces chemicals that act to slow down its activity. Flow cytometry enables the scientist to purify this immune cell and to determine what type of stimulus is needed to reinstate its cancer-killing function.

Significant amounts of information can be obtained from single cells due to the advanced technology of the Malaghan Institute's cytometers, particularly the LSRII, which is the only one of its kind in this country. The LSRII has five lasers and the ability to measure up to 18 different parameters on a single cell at very high speeds. Using large numbers of colours in flow cytometry is called multiparametric analysis, and this tool gives the Malaghan Institute the ability to push the frontiers of discovery in all fields of research.

The Flow Cytometry Suite provides crucial services, support and training not only to Malaghan Institute research staff, but also to the wider scientific community. In addition to supporting health research focused groups in Auckland and Otago, Flow Cytometry Manager Kylie Price has worked with scientists from the National Institute of Water and Atmospheric Research (NIWA), the Centre for Marine Environmental and Economic Research and several other departments within the School of Biological Sciences at Victoria University of Wellington, and AgResearch in Ruakura and Grasslands.

Flow Cytometry Suite Manager: Kylie Price BSc(Otago), MSc(Hons)(VUW)
Flow Cytometry Assistants: Brigitta Mester MSc(Hungary), Alfonso Schmidt BSc(Chile)

RESEARCH HIGHLIGHT

HUGH GREEN CHARITABLE TRUST SUPPORTS MALAGHAN FLOW CYTOMETRY

In recognition of the pivotal importance of the Malaghan Institute's state-of-the-art Flow Cytometry Suite, the Hugh Green Charitable Trust generously donated $100,000 towards the facility in 2011.

With her new title of Hugh Green Flow Cytometry Fellow, Manager Kylie Price is committed to fulfilling her vision for the Institute's Flow Cytometry Suite as a supportive hub of expertise and technology for all New Zealand science and health researchers.

"The future of flow cytometry lies in its potential for increasing improvements to human health through profiling of the immune subsets in blood from patients undergoing treatment for diseases such as cancer," says Kylie.

"This 'immune profiling' is still in the research phase of its development but holds the promise of greatly improved individualised therapies for patients."

Hugh Green and Kylie Price.

Research Funding

AgResearch Ltd, Hamilton

To Prof Le Gros to support the project "Immunomodulation of the inflammatory responses that result from adverse reactions to milk"

Arthritis New Zealand

To Dr Harper to support the project "Impact of hyperuricaemia on monocyte/ macrophage phenotype in gouty arthritis"

Breast Cancer Research Trust

To Prof Berridge and Dr McConnell to support the project "Unleashing the power of the immune system on breast cancer"

Cancer Society of New Zealand (National Body)

To Prof Berridge and Dr Hermans to support the project "Targeting tumour stem cells to improve immunotherapy"

To Prof Berridge and Dr McConnell to support the project "Intercellular mitochondrial transfer in tumourigenesis and metastasis"

To Dr Hermans to support the project "Using dendritic cell immunisation to sensitise malignant glioma to chemotherapy"

To Dr McConnell to support the project "How does chemotherapy alter the immunophenotype of glioblastoma multiforme?"

To Taryn Osmond to support the PhD project "Mechanisms of induction of anti-tumour immune responses by dendritic cells"

To Prof Ronchese to support the project "Using the power of mycobacteria to boost anti-tumour immunity"

To Dr Stocker to support the projects "Glycolipid adjuvants: enhancing cancer vaccines" and "Mechanisms of induction of anti-tumour responses by dendritic cells"

Child Health Research Foundation

To Prof Berridge to support the project "Activating the immune system against cancer: Application of dendritic cell immunotherapy to childhood brain cancers & central nervous system leukaemia"

Fonterra Co-operative Group Ltd

To Prof Le Gros to support the project "Anti-allergy effects of dairy ingredients"

Foundation for Research Science & Technology

To Dr Forbes-Blom (Post-doctoral Fellowship) to support the project "Getting to the guts of allergic inflammation"

To Dr Harper to support the projects "Berry fruits for treating inflammation" and "Fruit foods for inappropriate inflammation"

To Dr Hermans and Dr Harper to support the project "Carbohydrate nanotechnology - large, carbohydrate containing immuno-pharmaceuticals"

To Prof Ronchese to support the project "Reversing evolution – making lambs immune to worms"

Genesis Oncology Trust

To Prof Berridge to support the project "Metabolic constraints on tumour metastasis"

To Dr Stocker to support the project "TDMs as potent immunomodulators in cancer therapy"

Haematology Society of Australia & New Zealand

To Prof Ronchese and Dr Weinkove to support the project "Effect of invariant natural killer T cell stimulation on dendritic cell function in chronic lymphocytic leukaemia"

Health Research Council of New Zealand

To Dr Ferguson to support a clinical fellowship for the project "Novel magnetic nanoparticles as contrast agents for magnetic resonance imaging" and Mr Hunn to support a clinical fellowship for the project "Improving immunotherapy for high grade glioma"

To Dr Harper (originally to Assoc Prof Bäckström) to support the project "Inhibition of autoimmune diseases by superantigen-peptide conjugates"

To Dr Hermans, Dr Petersen and Dr Stocker to support the project "Mechanisms of induction of anti-tumour immune responses by dendritic cells"

To Dr Hermans to support the programme "Vaccine-based immunotherapy of cancer"

To Dr Kirman to support the project "Whiti Te Ra: Bronchiolitis disparities among Maori and Pacific children"

To Prof Le Gros and Dr Forbes to support the projects "New strategies for the treatment and prevention of food allergy" and "Cellular mechanisms underlying food allergen sensitisation"

To Prof Le Gros to support the projects "Candidate cytokines involved in allergic airway disease" and "Novel vaccine approaches for protecting against helminth parasites"

To Prof Ronchese and Dr Jordan (VUW) to support the project "Defining the characteristics of effective anti-tumour T cells"

To Prof Ronchese and Prof Le Gros to support the projects "Role of dendritic cells in allergic sensitisation", "Cytotoxic T lymphocyte-mediated immunotherapy of allergic airway inflammation" and "Manipulating antigen presentation to control disease"

To Dr Stocker to support the project "Deciphering the molecular fingerprint of allergens"

Hugh Green Charitable Trust

To support the Flow Cytometry Suite and Kylie Price as the Hugh Green Fellow

Industrial Research Ltd

To Prof Le Gros to support the project "Development of GL-2, isolated from *Bifidobacteria infantis*"

To Dr Timmer (VUW), Dr Sims (IRL) and Dr Stocker to support the project "Extraction, characterisation and organic synthesis of glycolipids present in Biofidobacteria strains"

Just Paterson Real Estate (in memory of Sally Paterson)

To Dr Hermans to support glioblastoma research

Keith Seagar Research Fund

To support cancer research

Marjorie Barclay Trust

To Prof Le Gros to support asthma research

Maurice Wilkins Centre

To Dr Kirman and Prof Le Gros to support the project "Development & testing of novel DNA and protein 'dormancy' vaccines against *Mycobacterium tuberculosis*"

To Prof Ronchese to support the project "Immune responses in mouse lymph nodes"

Melanoma Research Alliance

To Prof Berridge and Dr McConnell to support the project "Therapeutic targeting of melanoma stem cells"

Motor Neurone Disease Association of New Zealand - The estates of Ellen, Sinclair, Barbara and Alison Wallace

To Dr McConnell to support the project "Sirt 1 Protein"

Neurological Foundation of New Zealand

To Dr Hermans and Mr Hunn to support the project "Dendritic cell therapy for glioblastoma multiforme"

New Zealand LAM Trust/LAM Australasia Research Alliance

To Prof Berridge to support the project "Self-renewal properties of LAM cells"

New Zealand Lottery Health Research

To Dr Harper to support the project "Nk1.1 upregulation on MSU-activated macrophages"

To Dr Harper and Dr Kirman to support the project "T cell suppression by myeloid-derived suppressor cells: A rational therapeutic target *in vivo*"

To Dr Kirman to support the projects "Identifying memory CD4+ T cell subsets that protect against Tuberculosis" and "Alkenylamine inhibitors of *M. tuberculosis*"

To Prof Le Gros and Dr Stocker to support the project "A sweet solution to asthma"

To Dr McConnell to support the project "Are SOX2-positive tumour stem cells responsible for tumour formation?"

To Prof Ronchese to support the project "Activation of intra-tumoural dendritic cells for anti-tumour immunity"

To Dr Stocker to support the project "TDMs as vaccine adjuvants for the prevention of *M. tuberculosis*"

Rex & Betty Coker Scholarship

To Prof Le Gros to support a PhD scholarship

Robert McClelland Trust

To Dr Hermans and Mr Hunn to support the project "Dendritic cell therapy for glioblastoma multiforme

Rotary Club of Port Nicholson

To support the operating costs of the Immunohistochemistry Station

Rotary Club of Wellington Central Trust

To Naomi Baker to support the PhD project "Th2 immune responses *in vivo*"

Royal Australasian College of Surgeons

To Mr Hunn to support the project "Dendritic cell therapy for high grade glioma"

Springhill Charitable Trust & Frimley Foundation

To Dr Forbes-Blom to support the project "Histopathologic findings in experimental food allergy"

Surgical Research Trust

To Mr Hunn to support the project "Dendritic cell therapy for high grade glioma"

The estates of Ellen, Sinclair, Barbara and Alison Wallace

To Dr McConnell to support the "Stem cell research" programme

The Graham Hall Bequest

To Mr Hunn to support the project "Dendritic cell therapy for high grade glioma"

The Great New Zealand Trek Charitable Trust Inc

To Dr La Flamme to support multiple sclerosis research

The Royal Society of New Zealand Marsden Fund

To John Gibbons to support the PhD project "Investigating the role of langerin+ CD8α+ dendritic cells in the immune response to tumours"

To Dr Petersen, Dr Hermans and Dr Kirman to support the project "Towards better vaccines: Investigating the role of langerin+ CD8+ dendritic cells in innate and adaptive immunity"

The Thompson Family Foundation, Inc. through the Victoria University of Wellington Foundation

To support the cancer vaccine programme

University of Otago

To Lindsay Ancelet to support the PhD project "Characterisation of the CD4+ memory T cell subset that protects against tuberculosis"

Victoria University of Wellington

To Janice Cheng to support the PhD project "The role of glycolipids in cancer immunotherapy"

To Dr Ferguson to support the project "Magnetic nanoparticles"

To Sabine Kuhn to support the PhD project "Using natural adjuvants to enhance the anti-tumour immune response"

To Kelly Prendergast to support the PhD project "The role of langerin+ CD8+ dendritic cells in systemic BCG infection"

Wade Thompson

To support the cancer vaccine programme

Wellington Medical Research Foundation

To Dr Baty and Prof Berridge to support the project "Self-renewal properties of LAM cells"

To Dr Forbes-Blom and Prof Le Gros to support the project "Unplugging food allergy"

To Dr Harper to support the project "Impact of urate-lowering therapy on monocyte/macrophage phenotype in Gouty Arthritis"

To Dr Kirman to support the project "Characterising protective CD4+ memory T cell subsets that mediate protection against Tuberculosis"

To Dr McConnell to support the project "Sirt1, Stress and Survival"

To Dr Petersen to support the projects "Characterisation of cross-presenting langerin positive dendritic cells in the spleen" and "Painting cancer cells with immunomodulatory antibodies: a novel approach to improve cancer vaccines"

To Prof Ronchese to support the projects "Mechanisms of dendritic cell killing by effector CD8+ T lymphocytes", "Characterisation of dendritic cells cultured in Flt3L for tumour immunotherapy" and "Activation of intra-tumoural dendritic cells for anti-tumour immunity"

To Dr Stocker to support the projects "Imino sugars as inhibitors of *M. tuberculosis* - biological evaluation of a new class of Mycobacterial arabinan biosynthesis inhibitors" and "Fluorescent probes to study glycolipid uptake and trafficking in cancer immunotherapy"

Education

The success of the Malaghan Institute is dependent on the calibre of the people who do their research here. For this reason, the Institute has always had an active commitment to education.

The Malaghan Institute has a long-standing affiliation with New Zealand Universities and is held in high regard as one of the foremost organisations for students to complete a Doctorate of Philosophy (PhD) in Immunology.

Students who undertake postgraduate research at the Malaghan Institute are sought after around the world because of the intensive training they receive in cutting-edge technologies and ideas.

The Malaghan Institute currently has over 20 postgraduate students enrolled in PhD, Masters and Honours research programmes. Each summer the Institute also hosts undergraduate students who have an interest in science and are of the calibre to take on and benefit from an assigned research project. Working with close direction from the Institute's Research Group Leaders and senior research staff, the students are able to conduct meaningful work and learn what a career in research offers.

The Malaghan Institute is proud of its reputation for mentoring New Zealand's brightest and most creative postgraduate students.

PHD STUDENT JANICE CHENG SHINES IN 3 MINUTE THESIS COMPETITION

In June 2011, Immunoglycomics PhD student Janice Cheng won the 'English as a second language' category of Victoria University of Wellington's 3 Minute Thesis Competition (3MT).

First held at the University of Queensland in 2008, the 3MT competition invites postgraduate students to present a three minute speech on their thesis topic and its significance to the wider community. Janice chose to present one particular area of her research at the competition - the development of a 'glowing glycolipid' to understand cancer vaccination.

Janice says that the biggest thing she learnt from this experience is the power of effective communication. "While we know that the research we are doing here at the Malaghan Institute is something very special, and so are happy to give up our weekends and evenings to continue it, this is of little value if we cannot communicate its significance to people outside the Institute," she says.

"It doesn't matter if we are speaking to the general public, students interested in a career in science, or politicians deciding how much government funding to allocate to research, we have to be clear and efficient in what we say if we are to get these people on board with what we are doing," says Janice. "This is a skill I feel every scientist needs to be able to grasp."

Publications

2010

Berkofsky-Fessler W, Buzzai M, Kim MK, Fruchtman S, Najfeld V, Min DJ, Costa FF, Bischof JM, Soares MB, McConnell MJ, Zhang W, Levine R, Gilliland DG, Calogero R, Licht JD (2010) Transcriptional profiling of polycythemia vera identifies gene expression patterns both dependant and independent from the action of JAK2V617F. **Clin Cancer Res,** 16:4339-52

Berridge MV, Herst PM, Tan AS (2010) Metabolic flexibility and cell hierarchy in metatastic cancer. **Mitochondrion**, 10:584-8

Brooks CR, Weinkove R, Hermans IF, van Dalen CJ, Douwes J (2010) Invariant natural killer T cells and asthma: Immunologic reality or methodological artifact? **J Allergy Clin Immunol**, 126:882-5

Connor LM, Harvie MC, Rich FJ, Quinn KM, Brinkmann V, Le Gros G, Kirman JR (2010) A key role for lung-resident memory lymphocytes in protective immune responses after BCG vaccination. **Eur J Immunol**, 40:2482-92

Harvie M, Camberis M, Tang SC, Delahunt B, Paul W, Le Gros G (2010) The lung is an important site for priming CD4 T cell mediated protective immunity against gastrointestinal helminth parasites. **Infect Immun**, 78:3753-62

Perea-Blazquez A, Price K, Davy SK, Bell JJ (2010) Diet composition of two temperate calcareous sponges: *Leucosolenia echinata* and Leucetta sp. from the Wellington South Coast, New Zealand. **Open Marine Biology J**, 4:65-73

Prata C, Grasso C, Loizzo S, Sega FV, Caliceti C, Zambonin L, Fiorentini D, Hakim G, Berridge MV, Landi L (2010) Inhibition of trans-plasma membrane electron transport: a potential anti-leukemic strategy. **Leuk Res**, 34:1630-5

2011

Ainge GD, Compton BJ, Hayman CM, Martin WJ, Toms SM, Larsen DS, Harper JL, Painter GF (2011) Chemical synthesis and immunosuppressive activity of dipalmitoyl phosphatidylinositol hexamannoside. **J Org Chem**, 76:4941-51

Ataera H, Hyde E, Price KM, Stoitzner P, Ronchese F (2011) Murine melanoma-infiltrating dendritic cells are defective in antigen presenting function regardless of the presence of CD4+CD25+ regulatory T cells. **PLoS One**, 6:e17515

Broadley KW, Hunn MK, Farrand KJ, Price KM, Grasso C, Miller RJ, Hermans IF, McConnell MJ (2011) Side population is not necessary or sufficient for a cancer stem cell phenotype in glioblastoma multiforme. **Stem Cells**, 29:452-61

Broadley K, Larsen L, Herst PM, Smith RAJ, Berridge MV, McConnell MJ (2011) The novel phloroglucinol PMT7 kills glycolytic cancer cells by blocking autophagy and sensitizing to nutrient stress. **J Cell Biochem**, 112:1869-79

Cheng JM, Chee SH, Knight DA, Acha-Orbea A, Hermans IF, Timmer MS, Stocker BL (2011) An improved synthesis of dansylated α-galactosylceramide and its use as a fluorescent probe for the monitoring of glycolipid uptake by cells. **Carbohydr Res**, 346:914-26

Cheng JMH, Gulab SA, Timmer MSM, Stocker BL, Gainsford GJ (2011) Methyl 6-azido-6-deoxy-&alpha-D-galactoside. **Acta Cryst**, E67, o1941-2

Cheng JM, Khan AA, Timmer MS, Stocker BL (2011) Endogenous and exogenous CD1-binding glycolipids. **Int J Carb Chem**, (Review) Article ID 749591, 13 pages

Cheong S, Ferguson P, Feindel KW, Hermans IF, Callaghan PT, Meyer C, Slocombe A, Su CH, Cheng FY, Yeh CS, Ingham B, Toney MF, Tilley RD (2011) Simple synthesis and functionalization of iron nanoparticles for magnetic resonance imaging. **Angew Chem Int Ed Engl**, 50:4206-9

Finlayson R, Pearce AN, Page MJ, Kaiser M, Bourguet-Kondracki ML, Harper JL, Webb VL, Copp BR (2011) Didemnidines A and B, indole spermidine alkaloids from the New Zealand ascidian Didemnum sp. **J Nat Prod**, 74: 888-92

Forbes-Blom E, Camberis M, Prout M, Tang S-C, Le Gros G Staphylococcal derived superantigen enhances peanut induced Th2 responses in the skin. **Clin Exp Allergy**, (in press)

Girvan RC, Knight DA, O'Loughlin CJ, Hayman CM, Hermans IF, Webster GA (2011) MIS416, a non-toxic microparticle adjuvant derived from *Propionibacterium acnes* comprising immunostimulatory muramyl dipeptide and bacterial DNA promotes cross-priming and Th1 immunity. **Vaccine**, 29:545-57

Harper JL, Hayman CM, Larsen DS, Painter GF, Singh-Gill G (2011) A PIM2 analogue suppresses allergic airway disease. **Bioorg Med Chem**, 19:917-25

Herman DA, Ferguson P, Cheong S, Hermans IF, Ruck BJ, Allan KM, Prabakar S, Spencer JL, Lendrum CD, Tilley RD (2011) Hot-injection synthesis of iron/iron oxide core/shell nanoparticles for T(2) contrast enhancement in magnetic resonance imaging. **Chem Commun (Camb)**, 47:9221-3

Herst PM, Berridge MV Beyond targeted anti-cancer chemotherapy: stem cells, metabolic flexibility and integrated systems approaches to cancer cure. **Current Pharma Biotech**, (in press)

Herst PM, Howman RA, Neeson PJ, Berridge MV, Ritchie DS (2011) The level of glycolytic metabolism in acute myeloid leukemia blasts at diagnosis is prognostic for clinical outcome. **J Leukoc Biol**, 89:51-5

Khan AA, Chee SH, McLaughlin RJ, Harper JL, Kamena F, Timmer MSM, Stocker BL Long chain lipids are required for innate immune recognition of trehalose diesters by macrophages. **ChemBioChem**, (in press)

Leong AG, Herst PM, Stephens JM, Harper JL Indigenous New Zealand honeys exhibit multiple anti-inflammatory activities. **Innate Immunity**, (in press)

Manivannan B, Rawson P, Jordan TW, Karanja DM, Mwinzi PN, Secor WE, La Flamme AC (2011) Identification of cytokeratin 18 as a biomarker of mouse and human hepatosplenic schistosomiasis. **Infect Immun**, 79:2051-8

Martin WJ, Shaw O, Liu X, Steiger S, Harper JL (2011) Monosodium urate monohydrate crystal-recruited noninflammatory monocytes differentiate into M1-like pro-inflammatory macrophages in a peritoneal murine model of gout. **Arthritis Rheum**, 63:1322-32

Petersen TR, Sika-Paotonu D, Knight DA, Simkins HM, Hermans IF (2011) Exploiting the role of endogenous lymphoid-resident dendritic cells in the priming of NKT cells and CD8+ T cells to dendritic cell-based vaccines. **PLoS One**, 6:e17657

Sauvageau J, Sims I, Stocker BL, Timmer MS Glycolipid compounds. **Provisional patent filed**, May 2011

Simkins HM, Hyde E, Farrand KJ, Ong ML, Degli-Esposti, Hermans IF, Ronchese F (2011) Administration of α-galactosylceramide impairs the survival of dendritic cell subpopulations *in vivo*. **J Leukoc Biol**, 89:753-62

Singh-Gill G, Larsen DS, Jones JD, Severn WB, Harper JL, Painter G **US Patent 10/580147**, "Synthetic molecules having immune activity" has been allowed as at 23rd March 2011

Slaney CY, Toker A, La Flamme A, Bäckström BT, Harper JL (2011) Naïve blood monocytes suppress T-cell function. A possible mechanism for protection from autoimmunity. Outstanding Observation, **Immunol Cell Biol**, 89:7-13. Commentary: Saha P, Geissmann F (2011) Toward a functional characterization of blood monocytes. **Immunol Cell Biol**, 89:2-4

Timmer MSM, Dangerfield EM, Cheng JMH, Gulab SA, Stocker BL (2011) Rapid synthesis of 1-Deoxygalactonojirimycin using a carbamate annulation. **Tetrahedron Lett**, 52:4803-5

Toker A, Slaney CY, Bäckström BT, Harper JL Glatiramer acetate enhances CD11b+Ly6G- monocyte suppression of autoreactive T cells in EAE. **Scand J Immunol**, (in press)

van Panhuys N, Prout M, Forbes E, Min B, Paul WE, Le Gros G (2011) Basophils are the major producers of IL-4 during primary helminth infection. **J Immunol**, 186:2719-28

Wilmes A, O'Sullivan D, Chan A, Chandrahasen C, Paterson I, Northcote PT, La Flamme AC, Miller JH (2011) Synergistic interactions between peloruside A and other microtubule – stabilizing and destabilizing agents in cultured human ovarian carcinoma cells and murine T cells. **Cancer Chemother Pharmacol**, 68:117-26

Win-Mason AL, Dangerfield EM, Tyler PC, Stocker BL, Timmer MS (2011) Asymmetric strecker and carbamate annulation methodology for the synthesis of amino-imino-hexitols. [Personal invitation – Women who have made notable contributions to Organic Chemistry; featured on cover and profile], **Eur J Org Chem**, 4008-14 (article); **Eur J Org Chem**, 3578 (profile)

Win-Mason AL, Jongkees SAK, Withers SG, Tyler PC, Timmer MSM, Stocker BL Stereoselective total synthesis of amino-imino-hexitols via carbamate annulation. **J Org Chem**, (in press)

Zang Q, Gulab SA, Stocker BL, Baars SM, Hoberg JO (2011) Synthesis of an acyclic C1 to C11 fragment of peloruside B. **Eur J Org Chem**, 2011, 4465-71

Full details of all 'in press' publications will appear in the 2011/2012 Annual Report.

Seminars

2010

August

Dr Irene Salinas, Postdoctoral Research Fellow, NIWA, Wellington. An introduction to the world of fish immunology

Prof Swee Tan, Hutt Valley District Health Board & Gillies McIndoe Research Institute, Wellington. Lessons we learned by getting to know strawberry birthmarks (Haemangioma)

September

Dr Axel Heiser, Senior Scientist AgResearch, Hopkirk Institute, Palmerston North. Strategies for the immunotherapy of cancer using RNA transfected dendritic cells

Sach Jayasinghe, FlowJo Application Scientist ANZ, TreeStar Inc. FlowJo advanced analysis instructional seminar

October

Prof Ian Reid, Faculty of Medical & Health Sciences, University of Auckland. Therapy of bone disease through manipulation of bone resorption

Assoc Prof Stephen Ralph, School of Medical Science, Griffiths University, Gold Coast, Australia. Mitocans and galectin inhibitors as novel approaches for cancer chemotherapy and immunotherapy

Dr Rob Weinkove, Malaghan Institute of Medical Research. Designing successful cellular immunotherapy for leukaemia

Prof Tony Kettle, Department of Pathology, University of Otago, Christchurch School of Medicine. Interactions of neutrophils and urate during inflammation

November

Dr Han Chong Toh, Head of Oncology, National Cancer Centre, Singapore. Immunotherapy for nasopharyngeal carcinoma – from allotransplant to vaccines to adoptive T cells

Dr Alex McLellan, Department of Microbiology and Immunology, University of Otago, Dunedin. Soluble MHC as a tool for diagnostics and for exosome study

Helen Mearns, Malaghan Institute of Medical Research. Defining the biological role of IL-25 T helper 2 immune responses

Prof Gregory Bancroft, London School of Hygiene and Tropical Medicine, UK (ASI Speaker). Cell mediated immune responses to *Burkholderia pseudomallei*, the causative agent of human melioidosis: what can we learn from Tb?

2011

February

Dr Siouxsie Wiles, Sir Charles Hercus Fellow, School of Medical Sciences, University of Auckland. Biophotonic imaging: shedding light on biological processes *in vivo*

Dr Alison Thorburn, School of Biomedical Sciences, Faculty of Medicine, Nursing & Health Sciences, Monash University, Victoria, Australia. Microbes, the immune system and disease

Dr Geoff Chambers, School of Biological Sciences, Victoria University of Wellington. Bibliometric statistics in the PBRF age

Dr Becky Metcalf, Postdoctoral Fellow, Imperial College, London. Working towards improved management of HIV and Tb infections

Prof John Fraser, Head of School of Medical Sciences, University of Auckland. Staphylococcal defence against innate immunity

Dr John Holloway, University of Southampton School of Medicine, United Kingdom. Genes and environment in the early life origins of asthma and COPD

March

Dr Vera Krymskaya, University of Pennsylvania Medical Center, USA. Rare lung diseases: from mechanisms to therapeutic targeting

Catherine Wood, Research Nurse, Malaghan Institute of Medical Research, Cancer Centre, CCDHB. When arms don't cut it: the highs and lows of participating in the GBM TMZ DCV trial

Assoc Prof Anne La Flamme, School of Biological Sciences, Victoria University of Wellington. Multiple Sclerosis research programme

April

Assoc Prof Richard Geary, University of Otago, Christchurch, Consultant Gastroenterologist, Christchurch Hospital. IBD research in Canterbury – a clinician's view of the road ahead

Dr Haley Ataera, Center for Cell & Gene Therapy, Baylor College of Medicine, Houston, Texas, USA. Redirecting virus specific T cells towards cancer targets

Dr Olivier Gasser, Department of Biomedicine/Immunobiology, University Hospital, Basel, Switzerland. Immune recovery in HIV-infected individuals during anti-retroviral therapy

Sara McKee, Malaghan Institute of Medical Research. Enhancing cytotoxic T cell responses to virus-like particles using an iNKT cell ligand

May

Dr Melanie McConnell, Malaghan Institute of Medical Research. Therapy resistance and cancer stem cells

Dr Peter Ferguson, Malaghan Institute of Medical Research. Improving MRI contrast with iron nanoparticles

Dr James Triccas, Department of Infectious Diseases & Immunology, University of Sydney, Australia. Tuberculosis: chronic infection and new vaccines

Lindsay Ancelet, Malaghan Institute of Medical Research. Kicked in the guts: complications using lymphopenic mice to study CD4+ T cell memory to mycobacteria

June

Prof Foo (Eddy) Liew, Division of Immunology, Infection & Inflammation, Glasgow Biomedical Research Centre, University of Glasgow, UK. Novel cytokines in infection and inflammatory diseases

Prof Andrew Mercer, Director, Virus Research Unit, Department of Microbiology & Immunology, University of Otago, Dunedin. Strategies for survival: viral manipulation of the host response to infection

Prof Paola Ricciardi-Castagnoli (SIgN, Singapore), Prof Kiyoshi Takeda (WPI, Osaka University, Japan), Dr Ranjeny Thomas (University of Queensland, Australia). NZ ASI BRANCH MEETING

July

Taryn Osmond, Malaghan Institute of Medical Research. Splenic CD8α+ langerin+ DCs: how important are they for a CD8+ T cell response?

Dr Gib Bogle, Auckland Bioengineering Institute, Maurice Wilkins Centre, University of Auckland. Agent-based, multi-scale modelling of the T cell immune response

Operations & Governance

The Malaghan Institute is a charitable trust with tax-exempt status. With no host organisation or direct government funding, the Institute relies on fully-costed grants and public donations to support its research programmes.

The Trust Board provides the Institute with strategic guidance and oversight, while the management of the Institute is overseen by the Director, Prof Graham Le Gros.


MALAGI
INSTIT

Trust Board Profiles

MR GRAHAM MALAGHAN
(Chairman) FCILT, Hon. DSc (VUW)

Appointed Chairman of the Malaghan Institute Trust Board in 1990. Commenced employment at General Foods Corp in 1967, and was appointed General Manager of Refrigerated Freight Lines in 1970, acquiring the company in 1987. Was founding Chairman of Tasman Express Line and a member of the LTSA for six years. In 2009 was awarded an Honorary Doctor of Science from Victoria University of Wellington for his key role in rebuilding the Malaghan Institute into the largest independent medical research organisation in New Zealand. Current directorships include several private companies.

MR JOHN BEATTIE
LLB (VUW)

Obtained a law degree from Victoria University (1975) and was a Fulbright Scholar to Cornell University (1979). Has been a Trustee of the Malaghan Institute since 1988 and is a Director of Malcorp Biodiscoveries Limited, a subsidiary of the Malaghan Institute, is also Chairman of the NZ Diabetes Foundation and the NZ Sports Hall of Fame. He is a Trustee of the Wanaka Festival of Colour and an Executive Director of the Infinity Investment Group and Pegasus Town Limited. He has been a partner in national law firm Kensington Swan, General Manager of Brierley Investments Limited and was the co-founder of Genesis Research & Development Limited with Jim Watson another Trustee of the Malaghan Institute.

PROF DAVID BIBBY DSc (Loughborough University)

Appointed to the Malaghan Institute Trust Board in December 2004. Is currently Pro Vice-Chancellor & Dean of the Faculty of Science, Pro Vice-Chancellor of the Faculty of Engineering, and Pro Vice-Chancellor of the Faculty of Architecture and Design at Victoria University of Wellington. Holds a PhD in nuclear chemistry and was awarded a DSc in 1995 for his research into zeolites and catalysis. Moved to New Zealand in 1975 to join the DSIR Chemistry Division where he became Group Manager Research before joining Industrial Research Ltd in 1992, initially as General Manager of Communications, Electronics and IT and then as General Manager of Science Development. In 2003, took up his present position at Victoria University of Wellington.

ASSOC PROF JOHN CARTER
BMedSc, MBChB(Otago), FRACP, FRCPA

Joined the Malaghan Board of Trustees in 2003. Did postgraduate work at the Fred Hutchinson Cancer Research Centre and the University of Washington. Clinically practices as a haematologist with a focus on stem cell transplantation. Is the immediate past Chair of both the New Zealand Blood Service and Scots College, and is currently Medical Leader of the Wellington Blood and Cancer Centre and an Associate Professor of the University of Otago.

PROF PETER CRAMPTON
MBChB, PhD, FAFPHM, MRNZCGP

Appointed to the Malaghan Institute Trust Board in 2008. Is currently Pro-Vice-Chancellor of the Division of Health Sciences, and Dean of the Faculty of Medicine, for the University of Otago. Is a specialist in public health medicine with his research focused on social indicators and social epidemiology, health care policy, and health care organisation and funding.

MR BRYAN JOHNSON
BCA (VUW)

Appointed to the Malaghan Institute Trust Board in 1998. Obtained a commerce degree from Victoria University of Wellington in 1963. Was a senior partner in the Stockbroking company Jarden & Co for 25 years and became Chairman after the sale of the business to Credit Suisse First Boston in 1991. Retired from CSFB in December 2000 to further develop his Marlborough winery and vineyard, Spy Valley. Has been a director of various corporations, such as Brierley Investments, Royal Sun Alliance and recently retired as Chairman of the Duke of Edinburgh's Award and was a Trustee of the Wellington Stadium Trust.

MR RAY C KINGSTON

Appointed to the Malaghan Institute Trust Board in June 2009. Until 2008 was Executive Chairman of Link International Group Limited, a company he founded in 1996. With an extensive background in the

commercial sector, he has been a Director of many companies in both the private and public sector. Currently serves as Chairman and Director of a number of private commercial enterprises, and is also a current board member and/or Trustee of - King's College Auckland, King's College Foundation, General Trust Board of the Anglican Church, First Foundation Capital Trust, and a number of other related community organisations.

PROF GRAHAM LE GROS
BSc(Massey), Dip Immunol(Otago), MPHIL (Auckland), PhD(Auckland), FRSNZ

Appointed to the Malaghan Institute Trust Board in 1995. Was awarded a Fogarty Fellowship at the NIH, Washington DC in 1987-1989, then took a scientist position with Ciba-Geigy in Basel Switzerland for five years before returning to New Zealand to take up the appointment as Research Director of the Malaghan Institute in 1994. Is a Professor of the Department of Biological Sciences, Victoria University of Wellington, and has been elected as a Fellow of the Royal Society of New Zealand.

MR MATTHEW MALAGHAN
BCom, MCIT

Appointed to the Malaghan Institute Trust Board in August 2008. Graduated from Otago University in 1994 with a Commerce degree. Subsequent employment with Refrigerated Freight Lines in Auckland and Melbourne, and Sea Containers Group in London, Madrid and Buenos Aires. Returned to New Zealand in 1999. Owns and operates property and mineral processing businesses in New Zealand and Australia. Member of the Chartered Institute of Logistics and the NZ Institute of Directors.

MR DAVID MOSSMAN
BVSc, MRCVS, MNZIF

Appointed to the Malaghan Institute Trust Board in 2005. Attended Lincoln College and then graduated from the University of Queensland in 1965 with a Veterinary Degree. Awarded the Australian College of Veterinary Scientists college prize in 1978 and in 1984 the Coopers NZ Farm Management Award for significant innovative farm management in New Zealand. Keynote speaker at the World Angus and Hereford Conferences. A Member of the Lindisfarne College Board 1981-85. Managing Director of private Farming, Forestry, Finance and Property Companies. Chairman of the Hawkes Bay Friends of the Malaghan Institute since 1999 and retired rural veterinarian since 2001.

MR GARY QUIRKE BCA, CA, FCILT

Appointed to the Malaghan Institute Trust Board in 2001, when he was Managing Director of P&O Nedlloyd in New Zealand. Has an extensive background in the commercial sector both in New Zealand and overseas and is a member of the Institute of Chartered Accountants and Fellow of the Chartered Institute of Logistics and Transport. Is currently involved in business management consultancy roles in service industries.

DR JIM WATSON PhD (Auckland)

Appointed to the Malaghan Institute Trust Board in 1993. Has been the Chief Executive of Genesis Research & Development Corporation Limited, (1997-2004), a company he co-founded in 1994. Has held Professorships at the University of California, Irvine (1976-1981) and the University of Auckland (1981-1993) serving as Head of the Department of Molecular Medicine (1983-1993). Was a Director of the Foundation for Research, Science and Technology (1999-2002), President of the Australasian Society of Immunology (2001), the President of the Royal Society of New Zealand (2003-2006) and a Member of the Government's Growth and Innovation Advisory Board (2001-2004). Is currently Chief Executive of Caldera Health Limited, a prostate cancer company.

MR C DAN WILLIAMS CA

Appointed to the Malaghan Institute Trust Board in 2005. Joined an antecedent firm of Deloitte in 1958 and following four years with the firm in London was admitted as a Partner in 1972, initially as the partner responsible for establishing the tax division and following that as a Business Advisory Partner. Retired in 2001 and is now a Consultant to the firm. Has a number of Private Company Directorships with emphasis on financial management.

Operations Report

2010 was, in many ways, a year of preparation for significant work to come. With new clinical trials being planned we needed to ensure that our facility is capable of supporting an expansion of our clinical research programme. Our fantastic new vaccine production laboratories, officially opened last May, successfully went through a rigorous audit process with Medsafe to ensure they met the strict standards required for manufacturing medicines.

We set up a new laboratory specifically for isolating individual cell types from patient samples through Flow Cytometry, a vital resource that has been generously supported by the Hugh Green Charitable Trust. By providing a dedicated, isolated laboratory for this process we are able to analyse potentially hazardous human biological samples. We now feel better equipped than anyone in New Zealand to carry discoveries from basic immunological research directly through to new treatments and therapies that could make a genuine difference to the way we treat disease in this country.

The terrible impact of the Canterbury earthquakes also served as a reminder that we can never be over-prepared for such disastrous events. I'm sure we were not the only organisation in New Zealand that took another look at its emergency response and business continuity plans this year. Such a stark reminder of the risks with which we live actually brought to light some fresh and innovative ways to address the challenges of securing and stabilising weighty and top-heavy equipment in an open laboratory. We can only hope we never have occasion to gauge its success.

The demands of scientific research are such that we must ensure we provide a rapidly evolving technology platform to remain competitive. New techniques, new equipment and new software from around the globe are constantly opening up opportunities for new insight into the workings of the immune system.

It is an ongoing challenge for an independent research institute in New Zealand to remain at the cutting edge. We are incredibly indebted to the individuals, trusts and organisations who help fund the purchase of new equipment for us.

Their support, this year as always, has been critical to keeping the Malaghan Institute at the forefront of the search for biomedical discoveries.

Michal Zablocki
CHIEF OPERATING OFFICER

The Science Support Teams

ADMINISTRATION

PA to Director and Human Resources:
Gabrielle Dennis RSA(English), Pitmans

Purchasing Coordinator:
Carolyn Hallsmith

Administrative Assistant:
Federico Iglesias BCA(Hons) (UADE, Argentina)

BRU

BRU Deputy Manager:
Hannah Larsen BSc(Queensland)

BRU Administration Manager:
Charlotte Cheriton

Staff Scientist:
Xiaodong Wang Dip Med Tech, Dip Midwifery(Shanxi)

BRU Research Assistants:
Patrick Cavanagh BSc(Hons)(VUW), Ben Harvie NZ Dip Bus(Whitireia), Stephanie Huck BSc(Massey), Kelly Locke-Nelson, Laura McVeigh BSc(Hons)(Leeds, UK), Amanda Payne BSc(Otago), Ashlie Price BSc(VUW), Ian Saldanha BSc, PGDipSci(Otago), DipVetNursing(OtagoPolytech)

OPERATIONS

Chief Operating Officer:
Michal Zablocki BA(Hons)(Bristol), PGDipBA(VUW)

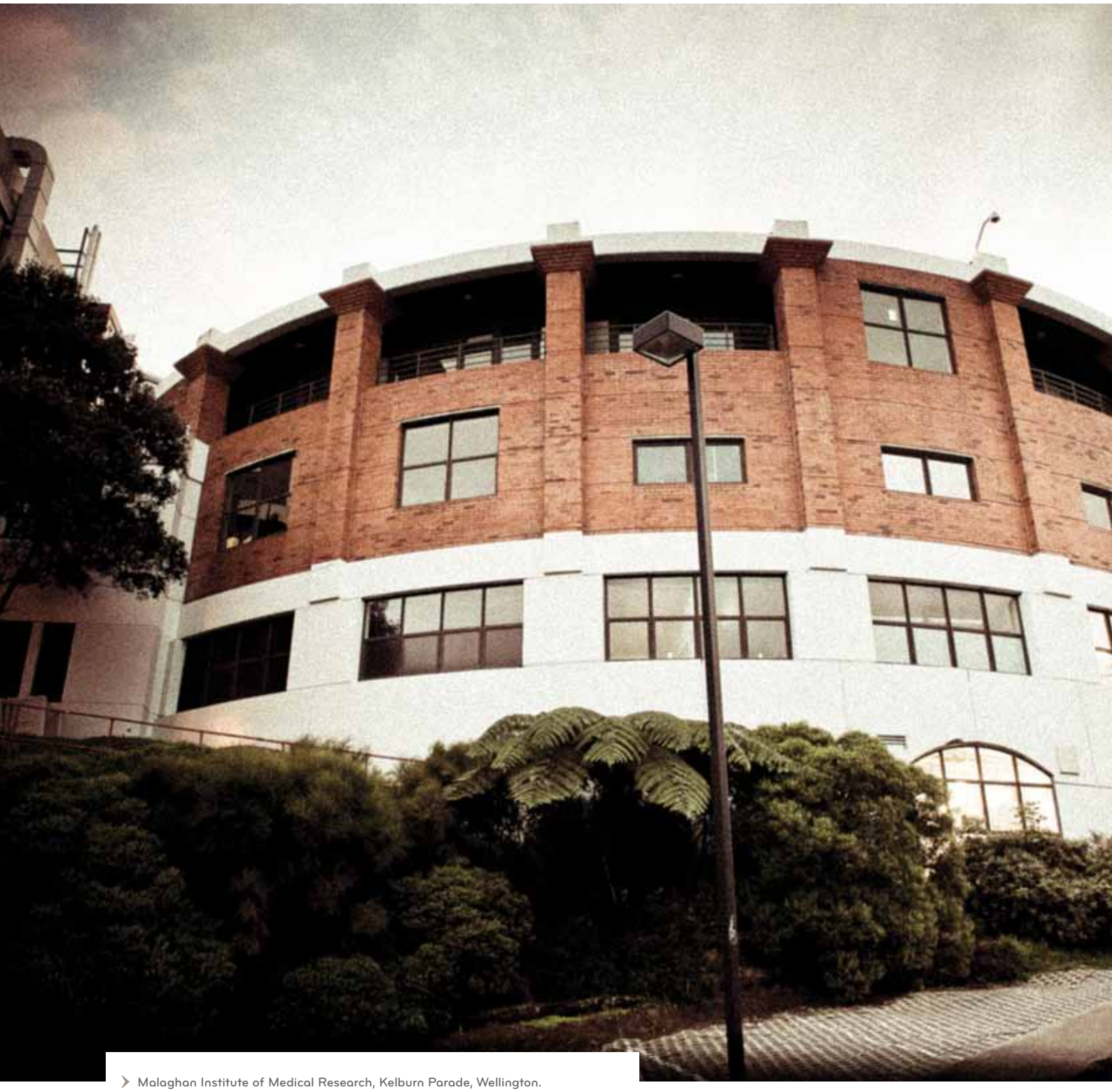
Facilities Manager:
Darrell Smith MSc(Hons)(VUW), (Dip A.T.)(Wgtn Polytech), BSA(Massey), Cert Building Mgmt(VUW), Electrical Applied Service Cert(WelTec)

Security and Reception Manager:
Dominique Hawinkels NZCS, DipBusStudies(Massey)

Systems Manager IT:
Andrew Hamer-Adams

Operations Laboratory Assistant:
Laurence Fallon

Domestic Services:
Apii Ulberg



Malaghan Institute of Medical Research, Kelburn Parade, Wellington.

Finance Report

In the Finance Department we are very conscious of our responsibility to ensure that maximum value is extracted from every dollar received by way of donation or grant. Primarily this is done by providing our scientists with the best possible information and management reporting systems. The Institute recognises the need to broaden and grow its funding base. This would provide us with more stability, and enable our scientists to confidently pursue their research objectives. Science is not cheap.

The Institute is constantly evaluating what has been done, the outcomes achieved, and the lessons learned. From this we chart a new strategy with new objectives to propel us forward. Our Capital Endowment Fund is a vital component of our future; it gives us the ability to underwrite promising research before long-term formal funding can be secured. It also underpins the infrastructure of the Institute by providing funding from investment income.

As the Institute grows and develops we have re-evaluated our team. To provide a structure that will continue to produce timely and accurate financial information we have employed Aimee de Koning as our financial accountant. One of the major components of her role is to provide the group leaders with timely financial information to track the progress of their grants. As the current funding environment becomes more fragmented this becomes increasingly more complex. She also provides a much needed backup to us all.

We look forward to the coming year where we can continue to support our scientists, now, as a team of three.

THE YEAR IN BRIEF	2011	2010
Operating Income ($000)	6,751	5,959
Operating Expenditure ($000)	7,249	6,557
Net Operating Deficit (before Depreciation)	(499)	(598)
Number of staff	56	64
Number of students	25	19
Total staff and students	80	83

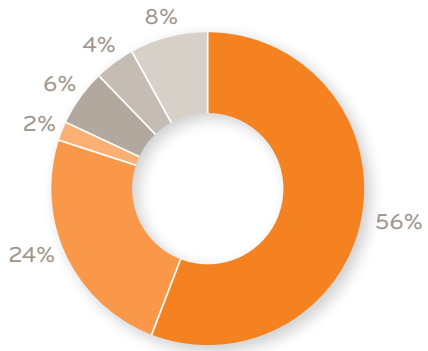
THE FINANCE TEAM

Finance Manager:
Susie Whelan CA, NZIMDip

Assistant Accountant:
Janine Gray BCA(VUW)

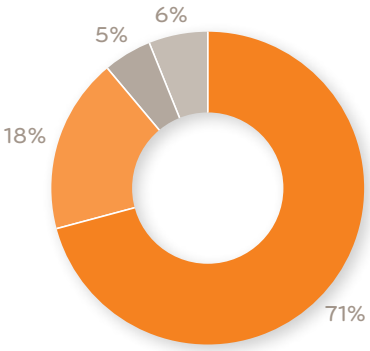
Financial Accountant:
Aimee de Koning BCA(VUW)

Financial Overview



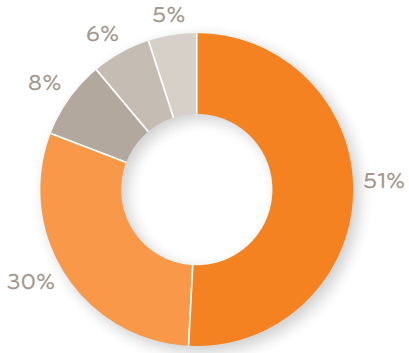
INCOME

	Contestable Grants – Government
	Contestable Grants – Non-Government
	Other Funding
	Donations
	Bequests
	Investment Income



EXPENDITURE

	Science
	Laboratory Support
	Development & Communications
	Administration



STAFF NUMBERS – HEADCOUNT

	Science
	Students
	Laboratory Support
	Development & Communications
	Administration

Financial Overview [CONTINUED]

For the Year Ended 31 July	2011 CONSOLIDATED	2010 CONSOLIDATED
Income – Operating		
Donations	440,375	596,378
Scientific Grants	6,090,430	5,061,196
Sundry	219,990	301,149
	6,750,795	**5,958,723**
Expenses – Operating		
Salaries	3,993,337	3,888,991
Science & Laboratory Support	2,999,308	2,452,730
Other	256,794	215,440
	7,249,439	**6,557,161**
Operating (Deficit)	**(498,644)**	**(598,438)**
Income – Other		
Grant Income	265,340	448,415
Capital Endowment Fund - Investment Income	507,208	311,718
Capital Endowment Fund - Bequests	333,167	265,273
Research Reserve transfer	46,979	–
Income retained in Capital Endowment Fund	(418,246)	(34,402)
	734,448	**991,004**
Depreciation	(472,950)	(587,904)
Net Deficit	**$ (237,146)**	**$ (195,338)**

Financial Overview As at 31 July	2011 CONSOLIDATED	2010 CONSOLIDATED
Current Assets	4,009,674	4,212,308
Current Liabilities	(3,096,866)	(3,219,422)
Fixed Assets	1,406,594	1,617,844
Investments	3,725,565	3,300,118
Total Equity	**$ 6,044,967**	**$ 5,910,848**

Additional Acknowledgements

In addition to the staff of the Malaghan Institute who are listed throughout this Annual Report, we would also like to acknowledge the following people and organisations who are very generous in giving their time and expertise to support the operations of the Malaghan Institute of Medical Research.

RESEARCH CONSULTANTS

Assoc Prof John Carter, Wellington Blood & Cancer Centre and University of Otago

Prof Brett Delahunt, University of Otago

Dr Peter Ferguson, Wellington Hospital

Prof Michael Findlay, Cancer Trials NZ, University of Auckland

Dr Andrew Harrison, Dept of Medicine, Wellington School of Medicine & Health Sciences

Assoc Prof David Ritchie, Peter MacCallum Cancer Centre, Melbourne, Australia

ADVISORS

Auditors	Deloitte
Bankers	The National Bank
Investments	David Wale (retired in March 2011)
	First NZ Capital – Chris West & Ralph Goodwin
Solicitors	Simpson Grierson

Community Engagement

Support from the community underpins the Malaghan Institute of Medical Research and we are extremely grateful to have a wonderful network of donors, sponsors and volunteers who work tirelessly to ensure our research can continue.

This support enables us to remain independent and allows us to follow a journey of discovery that is dictated by research and hope; a hope that all our supporters share in.

Fundraising Report

The 2010/2011 year will be remembered because of the devastating earthquakes in Canterbury; these events have shaped the country and left their mark; both physically and emotionally. In amongst this tragedy there is one thing that stands out for us, it's the unyielding generosity of New Zealanders to each other. These gifts of generosity have taken the form of time, animal care, clothes, beds, houses, blankets, water and many many other practical solutions to tragedy. It's such a terrible thing to happen but there's something empowering about the response, it reminds us that we live in a country that acts like a large family.

The Malaghan Institute's year in comparison has had a firmer footing, but marked by the same generosity from New Zealanders. Every donation shows us that there are supporters out there applauding our success and challenging us to discover more. These contributions make it possible for us to undertake research with discoveries that will improve human health and life expectancy.

This year has seen some changes within the team and the activities we support. The biggest and most obvious one was the rebrand of the Malaghan Institute, which was rolled out in April 2011. It presented a new persona for us, and we now have a brand that reflects who we are and is expressed using a warmer colour palette. The team also expanded with the inclusion of the new National Development Director, Viv Bernard, who came into the Institute mid-June.

Some highlights from this reporting period:

- Our dedicated Friends groups raised over $110,000 by holding their annual charity golf days; as well as a cocktail evening, two bridge tournaments and a Christmas Fair.
- Over 350 visitors came through the doors for a tour of the Institute, which was made up of 15 groups.
- We spoke at 13 events and reached over 680 listeners.
- Four large events were held at the Institute with an excess of 300 people in attendance.
- Over $165,000 was received in donations via our direct mail appeals.
- To reach this outstanding total, over 2100 individual donations were generously given.
- Run for Research attracted 60 participants, had the support of 15 volunteers and raised over $30,000.

None of this would be possible without the dedicated support of our loyal volunteers, supporters and donors who willingly get involved in our work. All the funds we raise go directly towards supporting the scientists and their vital research goals of finding better treatments and cures for cancer, asthma & allergy, arthritis, MS and infectious disease.

Without this financial assistance, the work would stop, so thank you to all who have shown commitment to our organisation this year.

THE DEVELOPMENT TEAM

National Development Director:
Viv Bernard

Development Operations Manager:
Tanya Fulcher, BSc(VUW)

Appeals & Relationship Manager:
Victoria Hale, BCA, BSc(VUW)

Marketing Manager:
Annabel Lush, LLB,
Dip Bus(Marketing)(Auckland)

Science Communications Adviser:
Debbie Scarlett, BSc(Hons), PhD(Otago)

Sponsor's Message

Partnerships are important to the Malaghan Institute, and we are fortunate to have an active supporter in AMI Insurance. Their support as a 'Run for Research' partner meant that we were able to be a charity recipient of the 2011 Round the Bays event. The continued relationship with AMI Insurance will bring exciting opportunities in the coming years.

PROUD SPONSOR 'RUN FOR RESEARCH'

AMI Insurance is proud to continue our support of the Malaghan Institute of Medical Research. We share many values with the Malaghan Institute making our relationship more than just a sponsorship. We are both dedicated to making a positive influence on the lifestyle of New Zealanders.

In 2011, AMI supported the Institute in its first year as one of two charities at the AMI Round the Bays run/walk in Wellington, which enabled the Malaghan 'Run for Research' team to raise over $20,000. In 2012, Malaghan will be the official charity at this event and we hope to once again assist with fundraising to support the many worthwhile projects the Institute is engaged in.

At AMI we have a strong affinity with the communities in which we operate and a commitment to supporting those who support us. We have a large presence in the Wellington community with 6 local branches.

While 2011 has been an extraordinary year of catastrophes and weather events – from a tornado on Auckland's North Shore, to flooding and local slips in the Hawke's Bay, to the devastation caused by the Christchurch earthquakes where our Head Office is located, AMI still enjoys the continued loyalty and support of our customers. We remain a strong business with almost 500,000 customers, 1.2 million policies, 73 branches and 21 agencies throughout the country.

I would like to take the opportunity to thank all those at the Malaghan Institute for their continued support of AMI.

John Balmforth
CHIEF EXECUTIVE OFFICER
AMI Insurance

Tours, Speakers and Events

As well as conducting ground-breaking research into cancer, asthma, arthritis, MS and infectious disease, a key goal of the Malaghan Institute is to educate the community about the importance of medical research. One way that this is achieved is by engaging with the community through tours, science talks and events.

The following provides an overview of our community activity:

TOURS

Careers Advisers

Heretaunga Probus Club

Kapiti Golden Group

Kenepuru Probus Club

Kilbirnie Salvation Army Companions Club

Kristin College

Lower Hutt Combined Probus Club

Onslow College

Raumati Probus Club

Riverleigh Hospital & Retirement Village

Students for National Chemistry Quiz

Study at Vic Day

Tawa Probus Club

The Hunter Club (VUW)

Wellington High School

SPEAKERS

Chilton Saint James

Eastern Suburbs Retired Persons Association

Foxton Te Awahou Lions Club

Johnsonville Probus Club

Kapiti Probus Club

Neurological Foundation Brain Awareness Week - Wellington

Rimutaka Lions Club

Rotary Club of Plimmerton

Rotary Club of Port Nicholson

Rotary Club of Port Nicholson Quiz & Charity Auction

The Royal Society of New Zealand Marie Curie Lecture Series – New Plymouth

U3A Central Wellington

VUW Lecture Series – Nelson

VUW Lecture Series – New Plymouth

EVENTS

2011 AMI Round the Bays – RUN FOR RESEARCH

Day of Immunology Public Lecture

Day of Immunology Quiz Night

Neurological Foundation Brain Awareness Week – Wellington & Auckland

VUW Science Careers Expo (expo stand)

If you are interested in finding out more about Malaghan Institute tours, speakers or events please contact:

Victoria Hale: Appeals & Relationship Manager, 04 499 6914 ext. 821, vhale@malaghan.org.nz

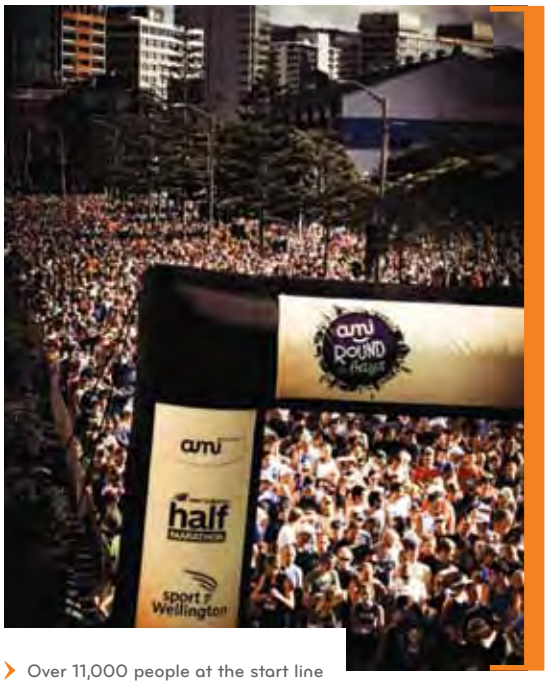
2011 RUN FOR RESEARCH

This year on Sunday 20 February, 60 runners, joggers and walkers joined the Malaghan Institute's inaugural RUN FOR RESEARCH team at the AMI Round the Bays in Wellington.

The event was a great opportunity for the Malaghan Institute to engage with the community and raise both awareness of, and funds to support its research. With over 11,000 people taking part in the AMI Round the Bays it also provided an excellent opportunity for the Institute to gain exposure through an event that promotes a healthy lifestyle and community involvement.

The community showed wonderful support with the team being made up of people who felt passionate about supporting the Malaghan Institute and doing their part. The team slogan, 'Every Step Brings Us Closer to a Cure', was something that everyone took seriously. Not only were they prepared to "lace up" and complete the 7kms around the bays of Wellington, they also did a fantastic job of fundraising during the lead up to the event, bringing in over $20,000 in donations.

Our thanks to everyone who took part and all the wonderful donors, both here in New Zealand and overseas, who gave to support our research.



Over 11,000 people at the start line of the 2011 AMI Round the Bays.

Prof Graham Le Gros, Dr Joanna Kirman and Dr Anne La Flamme

'Marriage' between the immune system and microbes was chosen as the theme.

CELEBRATING DAY OF IMMUNOLOGY 2011

Since 2005, the 29th of April has marked Day of Immunology in many countries across the globe. This year's event fell on the same day as the Royal Wedding so 'marriage' between the immune system and microbes was chosen as the theme for the Malaghan Institute's Day of Immunology celebrations.

A series of short public lectures were given by senior Malaghan Institute scientists Prof Graham Le Gros, Dr Joanna Kirman and Dr Anne La Flamme, discussing how microbes can be used to regulate immune responses that affect diseases including cancer, asthma, diabetes and atherosclerosis.

The lectures took place at Victoria University of Wellington and were open to all members of the public. Each lecture was then followed by a 'reception' where attendees had the chance to speak directly with the presenters.

To complement these lectures, the Malaghan Institute also hosted a quiz night on the 5th of May called "Plagues and Pestilence". This event proved to be a fun and informative way for the public to learn more about immunology.

Both events were filled to capacity making this year's Day of Immunology celebrations our most popular yet.

We would like to acknowledge the Australasian Society for Immunology for supporting our 2011 Day of Immunology events.

Friends of the Malaghan Institute

The Malaghan Institute is very fortunate to have the support of five regional volunteer Friends committees. These wonderful people work extremely hard on our behalf, not only to raise funds for our work, but also to raise overall awareness of the Malaghan Institute. Our sincere thanks go to these amazing people who give their time to our cause.

WELLINGTON COMMITTEE

Susan Laurenson (Chair)
Judy Blair
Adrienne Bushell
Maureen Cameron
Gaye Carroll
Eleanor Harford
Jennie Johnston
Jill Kinloch
Emma Lawler
Carole Martin
Fiona Matthews
Suzanne Szusterman
Denise Udy
Jane Wilton

Wellington Events

Malaghan Institute Charity Golf Tournament 1
Winter Cocktail Party 2

HAWKES BAY COMMITTEE

David Mossman (President)
Denise Bull (Chair)
Margie Dick
Beth Kay
Bry Mossman
Andy Neilson
Rosemary O'Connor
Jan Paterson
Angie Piper
Bruce Speedy
Lynn Spence
John Stovell
Terry Thornton

Hawkes Bay Events

Malaghan Institute Charity Golf Tournament 3
Facilitated the Wairarapa Friends 'Director's Dinner'

AUCKLAND COMMITTEE

Mary Collow
Beverley Ferguson
Trudi Gardner
Elaine Haggitt
Alison McKenzie
Margaret Malaghan
Steve Marshall
Jane Parlane
Raewyn Roberts
Julie Sobiecki

Auckland Events

AMI Insurance Malaghan Golf Tournament 4
Auckland Christmas Fair

TAUPO COMMITTEE

Anne Velvin (Chair)
Merryn Herrick
Kathryn Uvhagen
Rick Whitlock
Adele Wilson
Doug Wilson

Taupo Events

2010 Charity Bridge Tournament
2011 Charity Bridge Tournament

WAIRARAPA COMMITTEE

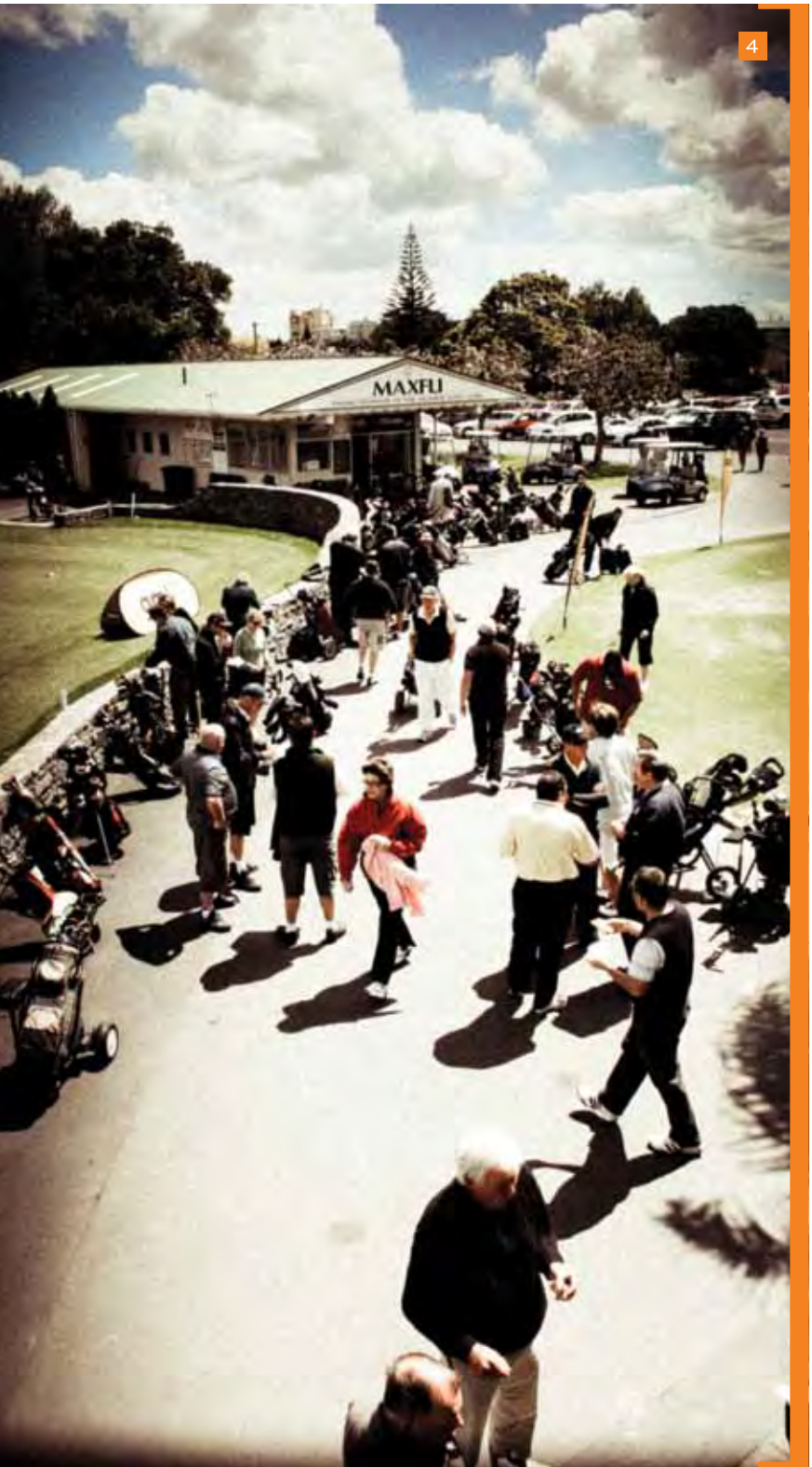
Campbell Moon (Chair)
Sally Campbell
Debbie Clinton-Baker
Michael Clinton-Baker
Mary des Bonnets
Gretel Dick
Joy Mebus
Jill Moon
Barbara Sheehan
Ted Sheehan

Wairarapa Events

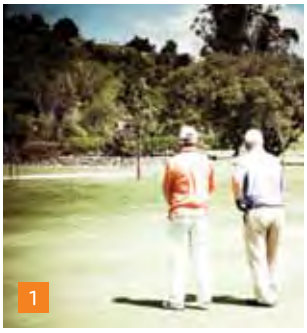
Wairarapa Friends 'Director's Dinner'


2


3


4


4


1


1


2


2

Funding Sources

Thank you to the following individuals, organisations, businesses, Trusts and Foundations who helped support the Malaghan Institute from 1 Aug 2010 – 31 July 2011:

Grants, Trusts and Foundations

This list excludes those already listed on pg 36-38 under Research Funding

Arthur N Button Charitable Trust
BEA Trust
Carol Tse (No 2) Family Trust
Cuesports Foundation Limited
Deane Endowment Trust
H B Williams Turanga Trust
Infinity Foundation Limited
Margaret Neave Charitable Trust
Pinel Family Trust
SE Leuchars Family Trust
The Douglas Charitable Trust
The Johnson Charitable Trust
The Lion Foundation
The Nick Lingard Foundation
The Southern Trust
The Thompson Family Foundation, Inc.

Major Corporate Supporters

AMI Insurance Ltd
Frank Millar & Co (Wgtn)
Just Paterson Real Estate
Spy Valley Wines

Corporate Supporters

Blair Gowrie Investments Ltd
BNP Paribas Security Services
Buzz Channel Ltd
MBW Holdings Limited
Redvespa Consultants Limited
The Art of Giving
Wakefield Health Ltd

Special Donors

J Arbuckle
Sloane Bayley (ran Auckland Marathon)
A Bidwill
Bowman Todd Memorial
W Bullard
R Butland
A Chapman
A & J Cockburn
J C Cowling
G Davidson
J Dean
M Denton
M J Farrelly
Foxton Te Awahou Lions Club
J Holdsworth
L Hyde
F Lee
Lions Club of Kapiti
M H Livingstone
M & L McClelland
O R Nees
R Pilgrim
Port Nicholson Rotary Club
D G Preston-Thomas
L Prickett
J Robb
Rotorua Aikido Club
R Selwyn
S & L Smith
St Lukes Mission Guild
R W Stannard
B Street
Sugar Charity Ltd
P Thompson
C M Tisdall
Titahi Bay Wellness Group
J D Todd
Waikanae Auxiliary Cancer Society
M I Wallace
V Ward
K Watson
M Wilkinson

Event Sponsors

Alan Chapman
AMI Insurance Ltd
AMP Capital Investors
ANZ Bank
AXA Global Investors
Blue Star
Brooklands Land Co
Business World Travel
Cameron Partners
Campbells Orchard
Coca Cola Amatil Ltd
D G Glen Logging Ltd
Danntor Consulting Ltd
Datam Ltd
Datastor NZ Ltd
Fliway International Limited
Gaze Commercial
Hemisphere Freight
HSBC
Industrial Processors Ltd
Inspire Photography
JB Were
Jeff Gray European Ltd
Jennifer Timmings
John Holt Memorial Trust
Just Paterson Real Estate
Lexus of Wellington
Libby Warren
Lion Nathan
Loyalty New Zealand Ltd
Marianne Muggeridge
Mazda NZ
McKay Shipping Limited
Motel Broking Services Ltd
Onesource Limited
Opus International Consultants Ltd
Parker & Associates
Peak Horticulture Ltd
Pearson Investment Advisory Ltd
Port of Napier
Porter Hire
Premier House
Prime Ministers Department
RAPP New Zealand
Royston Hospital Ltd
Sean Plunkett
Senate Communications
SHOTT Beverages Ltd
Simpson Grierson
Spence Trust
Spy Valley Wines
Stevenson Group
Swarbrick Beck McKinnon
The National Bank of New Zealand
Tip Top
VetEnt Wairoa
Wakefield Health Ltd
Wendy & John Thompson Trust
Whakatu Coldstores Ltd
Zibibbo Restaurant & Bar

Event Supporters

A G Davies
Allpress Expresso
Ambeli Restaurant
Annie Hodgkinson
Arthur Ormond
Avatar Estate
Bay Expresso
Bay Ford Hastings
Beauty & Beyond
BF Richardson
Blue Moon Collection
Boulcott Street Bistro
BP Oil New Zealand
Brett Trigger
Brittain Wynyard Ltd
Bry & David Mossman
Bularangi Harley Rentals & Tours
Cable Bay Restaurant
Caffe L'affare
Cancer Society of NZ - Wellington Region
Cape Kidnappers
Casito Miro
Cathedral Cove Macadamias

Circa Theatre
City Life Apartments
Colin Blair
Con Artists
Connells Bay Sculpture Walk
Craggy Range
Crazy Horse Steakhouse
Datastor NZ Ltd
David & Jan Paterson
David Patterson
David Wright
Delmaine Fine Foods
Diva Restaurant & Lounge
Don & Pat Scott
Downstage
Duxton Hotel
Dymocks
Elizabeth Horne
Empire Cinema Island Bay
Esteem Jewellery
EuroVintage
Farmlands Trading Society Ltd
Forbes and Co
Fullers Ferry
Gannet Safaris Overland Ltd
Gillian & Ian Silver
Glengarry, Thorndon
Gordon's Outdoor Equipment
Graham De Gruchy
Graham Wedd
Grande Gourmet Ltd
Greenfernz
Groom Barbers
Harrys Fashions, Seatoun
Hastings Pro Shop
Havelock North New World
Hawkes Bay Insurances
Hodgies Fresh Fruit Co
HOG Auckland Chapter
Hotel InterContinental
JAG Group
James & Georgie Falloon
Jane & Paul Wright
Jill Kinloch
Kapiti Extra Virgin Olive Oils
Karori Flower Shop, Karori
Kaye Maxwell
Kevin & Julie O'Connor
Krystal Foss
La Cloche
Laserforce
Le Metropolitain
Little India
Lynn & Alastair Spence
Maggie's Hair Design
Maintain Massage
Manor Park Golf Club
Mark Howard
Martin Bosley's Yacht Club Restaurant
Mary & Tim Plummer
Mataia Homestead
Matangi Cottages
Mick Ormond
Mike & Sally Blackmore
Mike Rittson-Thomas
Mitre Peak Cruises & The Totally Tourism Group
Moa Weka Beer
Moore Wilsons
Museum Hotel
National Livestock NZ Ltd
Negociants
Nicky Dallas
NOW Couriers
NZ Symphony Orchestra
Obiqo skincare
Off The Track Restaurant & Licensed Café
Offshore Rentals
Olive Tree Café
Onesource
Pak n Save Hastings
PaR nz Golfing Holidays
Paul Scott
Peak Horticulture Ltd
Peter Shirtcliffe
Petrena Miller Design
Phillipa Falloon
Prestons
Rainbow Point Lodge
Rainbow Print
Rennells Jewellers
Richard Laurenson
Rodney Callender
Rose & Shamrock Village Inn
Rosemary O'Connor
Royal New Zealand Ballet
Royston Hospital
Samson & Delilah
She is You Photography
Shed 5
Signwise Auckland
Sileni Estates
St Andrews Limes
Sue & David Steele
Tapora Golf Club
The Beach Hut
The Cut Magazine
The Diamond Shop
The Grange Golf Club
The Village Press
Thompsons Suits
Toms Cottage
Tracey Russell
Tunanui Farm Cottages
Turners and Growers
Urban Retreat of Hastings
Urban Sanctuary Beauty
Vet Ent Napier
Vet Services Hawkes Bay
VetEnt Wairoa
Veterinary Associates Hastings Ltd
Villa Del Lago
Vista Restaurant
Waiheke Shipping Ltd
Wairunga Golf Course
Walk Gisborne
Walker and Hall
Zealandia

Bequests

The following people left bequests to the Institute:

Monica Adams
Elsie Ethel Angas
BB Stoker
BEARD 42 Charitable Trust
W A Clark
Ethel Reed Hitchen
Muriel Margaret Kilner
Ian George MacLellan Longstaff
Joyce Lorraine Megget
Coral Rae Munro
Mary Rei Preston-Thomas
The Margaret Ann Tibbles Charitable Trust
Isabel Mary Tucker

In Memoriam

Donations were received in memory of the following people:

Mrs Jean Bennett
Joan Blakemore
Maurice Patrick Brown
Sarah Calver
Valda Marie Cunningham
Kathleen Davidson
Bebe Gallagher
Christina Gilchrist
Mr M J Imber
Arthur Jewell
I V Madden
Barry Albert Owen Marshall
Diana Jean Peake
Geoffrey Nicholas Burchall Peren
Dr Nick James Preston
Richard Rowell
Nicola Saunders
Mrs Margaret Spidy
Edith May Stokes
Neil James Tucker
John Alexander Waddell
Zora (Nicky) Zink

How You Can Help

You can help us discover more effective treatments and cures for cancer, asthma & allergy, arthritis, MS and infectious disease.

The Malaghan Institute is independent and receives no direct government funding. It is reliant on contestable research grants and contributions from corporate sponsors, trusts, bequests, individuals and fundraising initiatives.

We are at the forefront of international medical research, and our scientists believe that the key to fighting illness lies in the immune system. Our research programmes are focused on finding better treatments and cures for diseases affecting New Zealanders - including cancer, asthma & allergy, arthritis, MS and infectious diseases, but without funding the work will stop and the goal will be unattainable.

The Malaghan Institute is a registered charity and any support is gratefully received. You can support our vision by investing in health for the benefit of all New Zealanders. The following are some options of how you can become involved:

Corporate Sponsorship

Corporate sponsorship enables the Institute to focus financial resources on core medical research and offers an opportunity to the corporate sector to enjoy the promotional benefits of being associated with the Malaghan Institute. We have several options for sponsorship including local and national events, laboratory naming rights and the procurement of specialist pieces of scientific equipment. We will recognise your support in a way that is appropriate to your organisation.

Donations

Donations from individuals and Trusts form a large part of our funding. The income is used to support the research programmes and are acknowledged by a personal letter and receipt. All donations over $5 are tax-deductible.

Bequests

The research at the Malaghan Institute is very dependant on bequests. We have developed an endowment fund that will grow from major gifts and bequests, hence sustaining the future of the Institute.

The following is a suggested format for the wording of a bequest.

"I give a bequeath to The Malaghan Institute of Medical Research,

- A percentage (%) of my estate or
- The following property and assets or
- The residue of my estate or
- The amount of $ (in words) or

for its general purposes (or for the purpose of....) and I declare that the receipt of the chief executive or other proper officer shall be full and sufficient discharge to my trustees"

The information above is a guide only and is not intended as specific legal advice. Please consult your own legal advisor.

We would be delighted to discuss options for acknowledgement to suit your wishes.

Should you require any additional information about the above options or have any queries, please contact:

Viv Bernard,
National Development Director
Malaghan Institute
of Medical Research,
PO Box 7060
Wellington 6242
New Zealand

P: +64 4 499 6914
E: vbernard@malaghan.org.nz

Please visit www.malaghan.org.nz for further information.

The Malaghan Institute would like to thank Dave Clark Design Associates
for their generous support in designing this Annual Report, November 2011.

E: info@malaghan.org.nz
W: www.malaghan.org.nz
P: +64 4 499 6914
Charity Reg: CC10357
A: Victoria University, Gate 7, Kelburn Pde.
PO Box 7060, Wellington 6242, New Zealand