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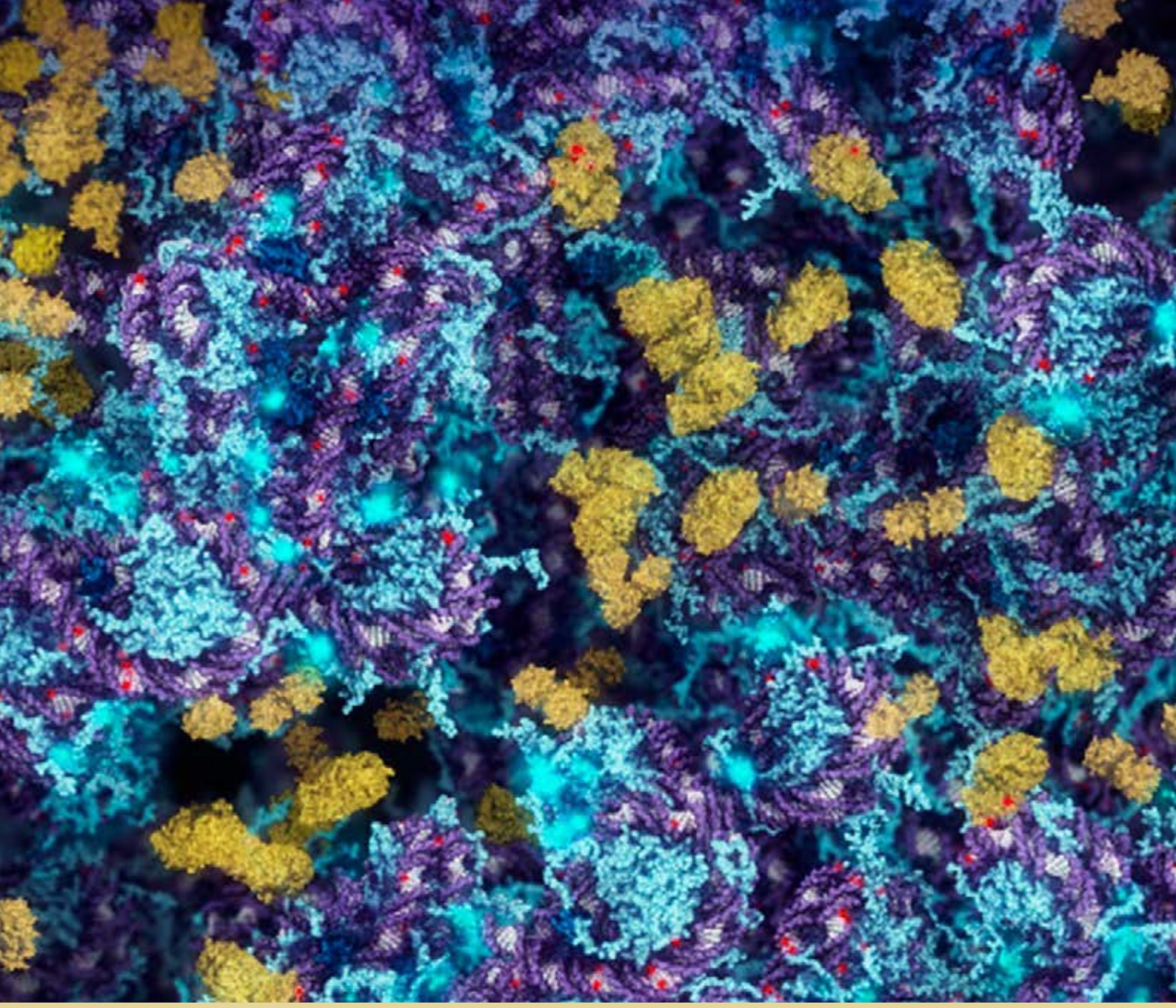

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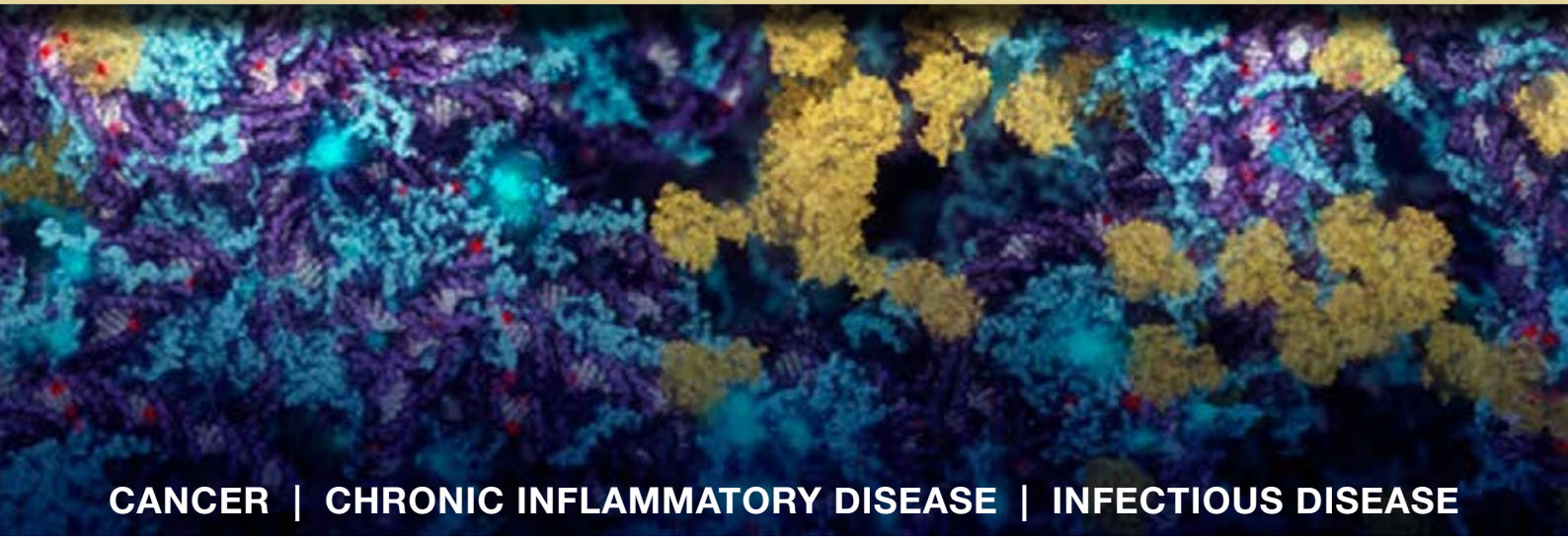
Walter+Eliza Hall
Institute of Medical Research

# Annual Report 2011-2012
## Supplementary information



CANCER | CHRONIC INFLAMMATORY DISEASE | INFECTIOUS DISEASE

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## Acknowledgements

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## Cover image

A still taken from the WEHI.TV animation
***X Inactivation and Epigenetics***
www.wehi.edu.au/x_inactivation_and_epigenetics
**Etsuko Uno and Drew Berry**, WEHI.TV

X inactivation is a vital process that occurs in all DNA-containing cells of the female body. It is also an important research model and tool for studying epigenetics. Epigenetics refers to processes that tell our cells how, and when, to read the DNA blueprint. The epigenetic regulation of DNA is critical in both normal development and disease.

# About the institute

## Our mission

Mastery of disease through discovery

## Our vision

To be an innovative medical research institute that engages and enriches society and improves health outcomes through discovery, translation and education

## Research themes

**Cancer**
**Chronic inflammatory disease**
**Infectious disease**

## Key objectives

**Discovery:** to make discoveries in medical biology that shape contemporary thinking and paradigms and enhance the understanding and treatment of disease

**Translation:** to convert our discoveries into improvements in disease diagnosis, prevention and treatment

**Education:** to develop and enrich the skills and experience of students and staff, allowing each person to realise their potential and contribute to a vibrant campus

**Engagement:** to engage with the community and develop support for medical research generally and the institute's mission specifically

**Sustainability:** to build an infrastructure, funding and research capacity that enables the institute to fulfil its mission in a sustainable manner

An exterior view of the redeveloped Parkville campus.

**The Walter and Eliza Hall Institute is home to more than 650 researchers who are working to understand, prevent and treat diseases including cancer, particularly blood, breast, lung, ovarian and colon cancers; chronic inflammatory diseases such as type 1 diabetes, rheumatoid arthritis and coeliac disease; and infectious diseases such as HIV and malaria.**

We are committed to making fundamental discoveries about the way cells, particularly cancer and blood cells, behave and communicate and seeing these discoveries translated into benefits for patients.

The institute was founded in 1915 as a benevolence of the Walter and Eliza Hall Trust to be 'the birthplace of discoveries rendering signal service to mankind in the prevention and removal of disease and the mitigation of suffering'.

We are affiliated with The University of Melbourne and The Royal Melbourne Hospital and offer postgraduate training as the Department of Medical Biology of The University of Melbourne.

## Director
**Douglas J Hilton**
BSc *Mon* BSc(Hons) PhD *Melb* FAA

## Assistant Director
**David Vaux**
MB BS BMedSc PhD *Melb* FAA

## Chief Operating Officer
**Maureen O'Keefe**
BSc(Hons) *Mon* DipEd MBA *Melb* GAICD WCLP

## Company Secretary
**Murray Jeffs**
BBus(Accounting) *RMIT* CPA FCIS SF Fin

## Honorary Governor and Patron
**Sir Gustav Nossal AC CBE**
MB BS BSc(Med) *Syd* PhD *Melb* HonLLD *Mon* HonLLD *Melb* HonMD *Mainz* HonMD *Ncl* HonMD *Leeds* HonMD *UWA* HonDSc *Syd* HonDSc *Qld* HonDSc *ANU* HonDSc *UNSW* HonDSc *LaT* HonDSc *McMaster* HonDSc *Oxon* FRCP FRACP FRCPA FRACOG(Hon) FRCPath FRACGP FRSE FTSE FAA FRS

**Clinician-scientist Dr Kylie Mason, laboratory head Professor Don Metcalf, senior postdoctoral scientist Dr Catherine Carmichael and PhD student Mr Michael White (from left to right) from the institute's Cancer and Haematology division are studying blood cells and their production, and what goes awry in the development of blood cancers such as leukaemias and lymphomas.**

# Director's and Chairman's report

**The past 12 months have been a landmark for the Walter and Eliza Hall Institute. We have completed a $185 million building project, which has seen construction of a new west wing and a complete renovation of the east wing of the institute.**

The result is a doubling of our laboratory space and an integrated, state-of-the-art biomedical research facility that will continue to be a magnet for talented scientists who will make extraordinary discoveries.

Funding a project of this scale and completing it on time and under budget is a feat that took vision, professionalism and discipline.

- The vision of the Australian and Victorian Governments, Mr Chuck Feeney and The Atlantic Philanthropies, The Ian Potter Foundation, Australian Cancer Research Foundation and Drakensburg Trust who all contributed generously to funding the capital works.
- The professionalism of all those involved in design and construction at Denton Corker Marshall, S2F/SKM, Baulderstone and Aurecon.
- The discipline of our own management team, especially Mike Fitzpatrick and Tony Murphy who provided sage leadership of our new building sub-committee that has had oversight of the project for the board, as well as Maureen O'Keefe, Steve Droste and their teams in the institute who have managed the program day-to-day.

At this time, we should remember that the new building is not a fortress or an island, rather it is a magnificent base with which to interact with our partners in the Parkville precinct, and the wider community.

The institute could not be better positioned to perform world-class medical research. We are situated within a short distance of four major hospitals: The Royal Melbourne Hospital, Royal Women's Hospital, Royal Children's Hospital and Peter MacCallum Cancer Centre (which will soon relocate to the Victorian Comprehensive Cancer Centre building being erected on the

**Institute director Professor Doug Hilton (left) with board president Mr Leon Davis**

old dental hospital site on Grattan Street). Each of these hospitals is a centre of excellence in patient care, research and education, and each is a highly valued partner as we work to translate the discoveries we make in the laboratory to improvements in disease prevention, diagnosis and treatment that benefit our community.

We are also situated opposite the world-class University of Melbourne, and have the privilege of being the Medical Biology department of the university while maintaining independent governance and management. This relationship allows intimate collaboration with colleagues in a range of departments and allows The University of Melbourne students, who are among the brightest young minds in Melbourne, to participate in the institute's research as Undergraduate Research Opportunities Program (UROP) scholars, bachelor of science honours students and PhD students. We should remember that over the past 97 years, our students have made many of our standout discoveries.

Finally, with our building near the centre of Melbourne and at the crossroads of the city's northern, eastern and western suburbs, we have been delighted to host an increasing number of discovery tours. At these tours members of the public get to know us and join the ever-growing institute family. To deliver the results that the investment in the new building merits, we need the community to be passionate advocates for medical research and to be passionate supporters of our own research effort. In our experiences, as president of the board and director of the institute, we could not ask for a more committed and engaged group of supporters. We thank you. The future is indeed rosy.

## 10 million and counting

**Nearly 30 years ago, blood hormones called CSFs (colony stimulating factors) were discovered at the Walter and Eliza Hall Institute by a research team led by Professor Don Metcalf.**

CSFs help to boost the numbers of infection-fighting white blood cells in the body, and are now commonly used to help cancer patients recover from the side-effects of chemotherapy. CSFs have also revolutionised stem cell donation and transplantation, being used in the collection of stem cells for bone marrow transplants.

In May 2012, the institute began running a series of advertisements in Melbourne and Sydney newspapers to promote awareness of this Australian research achievement. Since the early clinical trials of CSFs in Melbourne in the late 1980s, more than 10 million cancer patients worldwide have been treated with, and helped by, CSFs.

The *10 million and counting* campaign aims to make contact with people across Australia, and internationally, who have benefited from CSFs and celebrate the improvements in cancer care that have arisen from the discovery of CSFs.

In the past two decades, many people who have received CSFs have contacted the institute to acknowledge its role in the success of their cancer treatment. Each of these people has their own story of what surviving cancer has meant for them, which in many cases includes how their lives after cancer treatment have benefited others in the community.

Kris and Juanjuan von Habsburg said CSFs gave their daughter Kim the best chance of recovery after her cancer treatment. "Our daughter Kim has neuroblastoma, a type of cancer," Kris said. "The doctors said intensive chemotherapy, amongst other treatments, was her best chance of recovery, but that the treatment would destroy her bone marrow. Kim was given CSFs to collect her stem cells, which were given back to her after chemo to help her bone marrow grow back."

Despite not receiving CSFs himself, Roland Caple said they helped save his life. "My stem cell donor had CSFs so I could have a bone marrow transplant," Roland said. "I have myelodysplastic syndrome, a disease that stops my bone marrow making healthy blood cells. On three occasions, I was told to expect the worst. In 2007, I had a bone marrow transplant from a donor in Germany, which my doctor said was my best hope of survival."

These are just two of the CSF stories we hope to share during our centenary celebrations in 2015 so others can be as inspired and motivated by them as we are.


**A postcard from the institute's CSFs awareness-raising campaign featuring people who have benefited from CSFs.**


# Discovery

Dr Ashley Ng (left) and Dr Maria Kauppi from the institute's Cancer and Haematology division are studying how the cells of the blood system develop, with the hope of finding new treatments for blood cancers such as leukaemia and lymphoma.

# Discovery

**To stay at the forefront of modern medical research the Walter and Eliza Hall Institute assembles teams of outstanding researchers and provides them with access to the tools, infrastructure and support they need for scientific discovery.**

Medical research is a rapidly evolving field, and the institute has judiciously established new technologies and facilities that will help our researchers solve important, and often complex, biological questions.

In the past year, the institute's Systems Biology and Personalised Medicine division has become well established. The division incorporates proteomics and genomics facilities and supports research from across the institute that requires the integration of large biological data sets.

Investing in new technologies has delivered benefits across the institute's research divisions. The ACRF Chemical Biology division is developing new high-throughput screening systems for discovering drugs to treat disease, and researchers in the Structural Biology division have identified a new strategy to more efficiently deliver therapeutic peptides into cells.

New image analysis and statistical strategies have enabled researchers in the Immunology division to determine how antibody-producing B cells decide their fate during an immune response. The Bioinformatics division remains at the forefront of mathematical analyses of complex biological phenomena. Researchers in the division have developed new systems to aid identification of the causes of complex genetic diseases, as well as determining the genome sequence of Australian marsupials including the Tasmanian devil and the tammar wallaby. Meanwhile, the Molecular Medicine division's exploration of the field of epigenetics has revealed molecules that are important for brain and heart development.

**Dr Thomas Nebl from the institute's Systems Biology and Personalised Medicine division.**

## Understanding disease through new preclinical models

**The institute is committed to ensuring its research is relevant to human health and that promising laboratory discoveries are rapidly translated to clinical studies.**

Advancing basic research towards clinical outcomes often requires the use of preclinical models that accurately reflect the complex features of a disease. Often these models involve human tissues, or use genetically modified cells that closely mimic patient samples.

In the past year, researchers in the institute's ACRF Stem Cells and Cancer division have established new preclinical models of breast, lung and ovarian cancers. These models can be used to test promising new treatments or identify disease features that will help in refining or developing new therapies. Already they have been used by the breast cancer research team to identify a new gene required for cancer initiation (see page 11).

Researchers in the Cancer and Haematology division have developed new models of T cell leukaemia, while potential new anti-cancer agents that showed promise in preclinical testing have now entered clinical trials.

A newly developed preclinical model of malaria has enabled researchers in the Infection and Immunity division to discover a combination of medications that has the potential to improve the survival of patients with severe malaria (see page 23). Progress in developing new models for studying hepatitis B and other chronic viral infections has also been made in the Infection and Immunity division.

**Dr Rachael Rutkowski is developing preclinical models of ovarian cancer to identify genes involved in tumour development.**

## Manipulating the immune system to treat disease

**In 1957 the institute's third director, Sir Frank Macfarlane Burnet, recognised the importance of immunology research and switched much of the institute's resources to focus on studying the immune system.**

Fifty-five years later, immunology is still a major research focus at the institute. In the past year, our immunology researchers have made many contributions to explaining how the immune system functions, and how it can be manipulated to treat disease.

A new class of T cells crucial for long-term immunity were identified by researchers from the Molecular Immunology division (see page 31). Researchers in the Immunology and Structural Biology divisions have identified new ways to target antigens to important immune system sentinels called dendritic cells, potentially enhancing the initiation of immune responses (see page 19).

In the Inflammation and Cell Signalling and Cell Death divisions, researchers have made advances in understanding which molecules and cell types are important for causing inflammation. This research could be the first step towards therapeutic interventions that prevent chronic inflammatory conditions such as type 1 diabetes, rheumatoid arthritis and coeliac disease. Other research from the Inflammation division has found that preventing inflammatory cell migration into the eye can prevent or treat uveitis, an inflammatory condition that is a major cause of adult blindness.

**Professor Ian Wicks (left) and Dr Gabrielle Goldberg are studying uveitis, an inflammatory eye disease that causes blindness.**

## Combating parasitic diseases

**Malaria is a major health problem in developing countries, causing significant disease and disability. For more than 25 years, the institute has been working to prevent and develop treatments for malaria.**

This year, researchers in the Infection and Immunity division discovered a gene that is important for the malaria parasite to invade red blood cells, and have conducted preclinical and clinical testing of new combinations of medicines that could prevent or treat malaria (see page 23).

In recent years, researchers have also begun to study other significant parasitic diseases including toxoplasmosis. Researchers from the Infection and Immunity division and Systems Biology and Personalised Medicine division are collaborating on studies to determine which proteins are important for the invasion of the *Toxoplasma* and malarial parasites into host cells. This research has the potential to uncover potential targets for medications that stop infection or transmission of these parasitic diseases (see page 33).

**Professor Alan Cowman is leading research on how malaria parasites invade and remodel red blood cells in human hosts.**

# Cancer and Haematology

**The Cancer and Haematology division studies blood cells and the molecules that control their life-preserving functions.**

With colleagues in the Molecular Medicine and Inflammation divisions, and through clinical and industry links, we aim to discover the fundamental processes regulating blood cell production and function to help devise new strategies for fighting diseases of the blood, such as leukaemias and immune disorders.

Dr Jeff Babon, Professor Nick Nicola and colleagues have significantly advanced our understanding of how blood cells control their response to hormone signals. They found that specialised proteins regulate the immune response to ensure sufficient numbers of blood cells are produced while also preventing chronic inflammation and excess blood cell production that can lead to diseases such as leukaemia. Recent results have shown a new and unexpected biochemical basis for controlling these hormone responses via SOCS3 (suppressor of cytokine signalling-3), paving the way for new therapeutic strategies for fighting blood diseases.

Platelets are small blood cells responsible for blood clotting, produced in vast numbers by cells in the bone marrow called megakaryocytes. Platelet numbers are often deregulated in leukaemias and myeloproliferative diseases (blood disorders caused by excess production of blood cells in the bone marrow). Chemotherapy causes significant loss of platelets, which can lead to severe risk of haemorrhage and compromise cancer treatment.

Our longstanding interest in improving management of platelets in disease continues, with recent discoveries from the laboratories of Professor Don Metcalf, Professor Warren Alexander and Dr Samir Taoudi that better define the identity and function of platelet-producing cells. Dr Emma Josefsson and Dr Benjamin Kile have also made important new insights into platelet production, defining the important role of cell death regulators in these cells (see opposite page).

The division continues to expand its program in leukaemia research, with initiatives that apply genetic and genomics tools to discover the mutations driving disease, and how these changes accumulate and cooperate in leukaemia progression. Dr Matt McCormack has developed powerful model systems for T cell leukaemia, while Professor Andrew Roberts is leading clinical studies and making breakthroughs applying new drugs to leukaemia and lymphoma treatment (see page 39).

## Laboratory heads

**Professor Warren Alexander**
Division head

**Dr Jeff Babon**

**Dr Emma Josefsson**

**Dr Benjamin Kile**

**Dr Matthew McCormack**

**Professor Donald Metcalf**

**Professor Nick Nicola**
Division head

**Professor Andrew Roberts**

**Dr Samir Taoudi**

Dr Stefan Glaser is investigating cell proteins that are involved in the development of leukaemia.

## Scientists discover link between chemo and platelet drop

**Chemotherapy treatment can have a number of unwanted side-effects, including serious bleeding complications due to a drop in the number of platelets; tiny cells responsible for blood clotting.**

Dr Emma Josefsson, Dr Chloé James, Dr Marlyse Debrincat and Mr Michael White from the institute's Cancer and Haematology division are studying the mechanics of platelet formation, in the hope of finding new strategies to prevent chemotherapy-induced platelet deficiencies.

Dr Josefsson led a study that showed how survival of platelet-forming megakaryocytes is controlled at the molecular level, answering in the process a decade-old question about the formation of platelets.

"We wanted to find out whether the Bcl-2 family of proteins was necessary for platelet production," Dr Josefsson said. "The Bcl-2 family controls programmed cell death, and includes 'pro-death' proteins that instruct cells to die, and opposing 'pro-survival' factions that keep the cells alive.

"We not only found that pro-death proteins were not required for platelet formation, as was previously thought, but in fact pro-survival proteins were required to keep megakaryocytes alive to make platelets."

She said this discovery explained why patients have fewer platelets after chemotherapy. "Chemotherapy appears to kill platelet-forming megakaryocytes by activating pro-death proteins that instruct the cells to die," she said.

Two additional studies published this year by division scientists also supported the finding that programmed cell death is not required for platelet production.

**Collaborating organisations:** Australian Centre for Blood Diseases, Centre de Référence des Pathologies Plaquettaires, Peter MacCallum Cancer Centre, South Australian Pathology, The University of Melbourne, University of Adelaide.

**Funding partners:** Australian Cancer Research Foundation, Cancer Council Victoria, European Molecular Biology Organization, Leukaemia Foundation of Australia, Leukemia & Lymphoma Society (US), National Heart Foundation, National Health and Medical Research Council of Australia, National Institute of Health and Medical Research of France, Swedish Research Council, Sylvia and Charles Viertel Foundation, Victorian Cancer Agency and Victorian Government.

**More information:** Josefsson EC, *et al*. Megakaryocytes possess a functional intrinsic apoptosis pathway that must be restrained to survive and produce platelets. *Journal of Experimental Medicine*. 2011 Sep 26; 208(10): 2017-31.

Debrincat MA, *et al*. Mcl-1 and Bcl-xL coordinately regulate megakaryocyte survival. *Blood*. 2012 Jun 14; 119(24): 5850-58.

White MJ, *et al.* Caspase-9 mediates the apoptotic death of megakaryocytes and platelets, but is dispensable for their generation and function. *Blood*. 2012 May 3; 119(18): 4283-90.

**Dr Emma Josefsson**

## Equipping blood cancer researchers

**Leukaemia, lymphoma and myeloma are cancers that arise in blood cells. Blood cancers are responsible for more than 10 per cent of all cancers in Australia.**

For the past 40 years, researchers from the Cancer and Haematology division have been studying how blood disorders, including blood cancers, are caused, and searching for new treatments for these often fatal diseases.

Professor Nick Nicola, joint head of the Cancer and Haematology division, said a $22,000 grant from The Angior Family Foundation was helping to fit out the division's laboratories with equipment essential for the scientists to continue their work.

"Finding funding to buy laboratory equipment is often very difficult, as many grants provided through major funding sources do not allow you to purchase the equipment essential for research," Professor Nicola said. "We are very grateful for the support of philanthropic trusts such as The Angior Family Foundation, who give generously to help us achieve this goal."

The Angior Family Foundation grant supported the purchase of two new pieces of equipment that allow the researchers to grow large numbers of cells in a body-like environment and manipulate these cells under sterile conditions. "The equipment will allow seven different laboratories and more than 35 scientists within the division to further their research into the causes of, and treatments for, blood disorders," Professor Nicola said.

The Angior Family Foundation was established in perpetuity in 2001 to provide support for medical research, the arts and good works within the Anglican Church. The trust was established by Mr Leonard Angior who undertook, on behalf of his family, to form this trust upon his death.

## Major national and international meetings

**Stefan Glaser**

Apoptosis and Cancer, Cambridge, United Kingdom, 06/12, *Oral presentation*

First Australian Workshop on Cell Death: Death on the Reef, Hamilton Island, Australia, 08/11, *Oral presentation*

New Directions in Leukaemia Research, Brisbane, Australia, 03/12, *Oral presentation*

**Emma Josefsson**

XXIIIrd Congress of the International Society of Thrombosis and Haemostasis, Kyoto, Japan, 07/11, *Oral presentation*

**Benjamin Kile**

XXIIIrd Congress of the International Society on Thrombosis and Haemostasis, Kyoto, Japan, 07/11, *Invited speaker*

**Matthew McCormack**

New Directions in Leukaemia Research, Twin Waters, Australia, 03/12, *Oral presentation*

**Donald Metcalf**

Victorian Stem Cell Network inaugural meeting, Melbourne, Australia, 02/12, *Keynote speaker*

**James Murphy**

Molecular Biology Conference: Biointeractions Satellite Queenstown, Queenstown, New Zealand, 08/11, *Invited speaker*

Third Australian Course in Macromolecular Crystallisation, Melbourne, Australia, 12/11, *Invited speaker*

12th Annual Protein Expression Workshop, Melbourne, Australia, 08/11, *Invited speaker*

**Nick Nicola**

Australian Technology Network of Universities-Group of Eight Symposium – Excellence in Innovation: Measuring the innovation dividend, Canberra, Australia, 11/11, *Participant*

## Staff list

Sabine Kelly, BSc(Hons) *Monash* PhD *Monash*, scientific coordinator/alliance manager

**Nick Nicola AO,** BSc(Hons) *Melbourne* PhD *Melbourne* FAA

Stefan Glaser, PhD *Germany*
Nick Redpath, BSc *Heriot-Watt* PhD *Bristol*
Christine White, BSc(Hons) *Adelaide* PhD *Monash*
Jian-Guo Zhang, BSc *Xinjiang* PhD *Melbourne*

Phillip Morgan, BAppSc *FIT*
Priscilla Soo, BSc(Hons) *Melbourne*

**Warren Alexander,** BSc(Hons) *Melbourne* PhD *Melbourne*

Leigh Coultas, BSc(Hons) *Adelaide* PhD *Melbourne*
Maria Kauppi, PhD *Helsinki*
Rowena Lewis, BSc(Hons) *Deakin* PhD *Deakin* (to 02/12)
Ashley Ng, BMedSc *Melbourne* MBBS(Hons) *Melbourne* PhD *Melbourne* FRACP FRCPA
Sandra Pilat-Carotta, PhD *Vienna*
Bill Tang, BSc Nanjing MSc *Auckland* PhD *Auckland* (to 02/12)
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Craig Hyland, BAppSc *RMIT*
Stanley Lee, BSc(Hons) *Auckland*
Janelle Lochland, BSc *Deakin*
Dina Stockwell, BSc *LaTrobe*
Evelyn Trounson, BSc(Hons) *VUT*

Emma Watson, BSc *Melbourne*, BSc(Hons) student (from 02/12)

**Jeff Babon,** BSc(Hons) *Melbourne* PhD *Melbourne*

James Murphy, BSc(Hons) *Canterbury* PhD *ANU*

Artem Laktyushin, BSc(Hons) *LaTrobe*
Eden Whitlock, BBiotech(Hons) *LaTrobe*

Leila Varghese, BSc(Hons) *Melbourne* PostGradDipArts *Melbourne*, PhD student
Anne Tripaydonis, UROP student

**Emma Josefsson,** MSc *Gothenburg* PhD *Gothenburg*

Ping Cannon, BSc *Shanghai*
Marion Lebois, BSc *Marseille* MSc *Paris XI*
Diane Moujalled, BMedSc(Hons) *LaTrobe* PhD *LaTrobe* (from 11/11 to 03/12)

Angelika Rutgersson, overseas research trainee (from 09/11 to 12/11)

**Benjamin Kile,** BSc(Hons) *Melbourne* LLB *Monash* PhD *Melbourne*

Catherine Carmichael, BBiomedSc(Hons) *Melbourne* PhD *Melbourne*
Stephane Chappaz, MSc *Paris* PhD *Basel*
Marlyse Debrincat, BSc(Hons) *Melbourne* PhD *Melbourne*
Irina Pleines, Dipl. Biol. *Wuerzburg* PhD *Wuerzburg* (from 10/11)
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Melissa Holmes, BSc(Hons) *Melbourne* PhD *Melbourne* (from 03/12)
Libby Kruse, BSc(Hons) *Melbourne* (to 07/11)
Rachael Lane, BSc *Monash*

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**Matthew McCormack,** BSc(Hons) *Adelaide* PhD *Adelaide*

Ben Shields, BSc(Hons) *Melbourne* PhD *Melbourne* (from 07/11)

Jacob Jackson, BSc(Hons) *Melbourne* GradDipArts *Melbourne* (from 03/12)

Hesham Abdulla, BAppSc *RMIT*, BSc(Honours) student
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Kylie Mason, MBBS *Melbourne* PhD *Melbourne* FRACP FRCPA

Louise Cengia, BSc *UTAS*

Mary Ann Anderson, MBBS *Melbourne*, visiting PhD student
Simon He, MBBS *Melbourne*, visiting MD student
Sophie Lee, MB ChB *Auckland*, PhD student (from 02/12)

# ACRF Stem Cells and Cancer

**The ACRF Stem Cells and Cancer division studies the normal development of epithelial tissues and organs, and cancers arising within them.**

Epithelial organs are those that primarily consist of epithelial cells, organs such as skin, breast, ovary and lung. Epithelial cancers account for approximately 80 per cent of all cancers and are major causes of death and disease worldwide, yet improved treatments have only resulted in modest increases in cancer survival.

The division focuses on breast, ovarian and lung cancers, with the key objective of understanding the normal development of these organs and which cell types within them are predisposed to cancer.

Our breast cancer research team has isolated breast stem cells and their daughter (progenitor) cells. Both cell types are likely to give rise to breast cancer. Gaining insights into the genes that control the normal regulation of these cells and deciphering how these genes go awry during tumour development will provide important clues on how to treat or even prevent breast cancer. Key proteins expressed by normal and cancerous cells could serve as tumour biomarkers or new therapeutic targets. We have developed powerful preclinical models in which to test novel anti-cancer agents. These models have revealed that agents that target the proteins Bcl-2 or c-kit show considerable promise for the treatment of an aggressive form of breast cancer. We have also discovered that a gene called GATA-3 is a critical regulator of tumour initiation through its ability to promote differentiation (see opposite page).

Similar approaches are being applied to studying ovarian and lung cancers. Ovarian cancer usually presents at a late clinical stage and is often resistant to existing therapies. We are using preclinical models of human high-grade serous ovarian cancer, the most aggressive form of the disease, to test the efficacy of agents that bind to cellular inhibitors of DNA repair.

The lung cancer laboratory has established a series of preclinical lung cancer models representing different cancer subtypes. Over the past year, we have made inroads into identifying new progenitor populations in normal lung tissue and how these are altered in cancer development and infection.

## Laboratory heads

**Dr Marie-Liesse Asselin-Labat**

**Professor Geoff Lindeman**
Division head

**Associate Professor Clare Scott**

**Professor Jane Visvader**
Division head

**Dr Bhupinder Pal studies the development and cell of origin of breast cancers.**

## Predicting breast cancer development

**Breast cancer is the most common cancer in Australian women, affecting more than 12,000 women each year.**

Dr Marie-Liesse Asselin-Labat, Professor Jane Visvader and colleagues from the ACRF Stem Cells and Cancer division are looking for cellular 'markers' that could help in the early diagnosis of breast cancer, and help to determine cancer prognosis.

Breast cancers with high levels of a protein called GATA-3 generally have a good prognosis, with less chance that the tumour will spread to other places in the body. Dr Asselin-Labat said the research team was interested in finding out how GATA-3 affected the initiation of tumour growth and whether losing GATA-3 increased tumour growth and spread.

They found that luminal progenitor cells, the stem cell 'daughters' found to be at the origin of some hereditary breast cancers, were the cells affected by loss of GATA-3.

"In a mouse model of breast cancer, losing GATA-3 led to a marked increase in tumour development, while higher than normal levels of GATA-3 inhibited tumour growth," Dr Asselin-Labat said.

In the study, the research team also looked at GATA-3 expression in tumour tissue from women who had DCIS (ductal carcinoma in situ) – an early-stage of breast cancer in which the cancer has not yet spread.

"GATA-3 appeared to be an important predictive marker for DCIS," Dr Asselin-Labat said. "Given its value in prognosis, it may be possible to develop compounds that activate GATA-3 as potential therapies for preventing tumour development in these patients."

**Collaborating organisations:** Peter MacCallum Cancer Centre and The Royal Melbourne Hospital.

**Funding partners:** Cancer Australia, National Breast Cancer Research Foundation, National Health and Medical Research Council of Australia, Victorian Breast Cancer Consortium and the Victorian Government.

**More information:** Asselin-Labat ML, Sutherland KD, Vaillant F, Gyorki DE, Wu D, Holroyd S, Breslin K, Ward T, Shi W, Bath ML, Deb S, Fox SB, Smyth GK, Lindeman GJ, Visvader JE. Gata-3 negatively regulates the tumor-initiating capacity of mammary luminal progenitor cells and targets the putative tumor suppressor caspase-14. *Molecular and Cellular Biology*. 2011 Nov; 31(22): 4609-22.


**Dr Marie-Liesse Asselin-Labat**

## Remembering Gillian Welshe (10 November 1950 - 12 March 1999)

**A $2 million donation in perpetuity in memory of Mrs Gillian Welshe will support research into breast cancer at the institute.**

In 2012, Gillian's mother, Mrs Edith Qualtrough, set up the research fund in her daughter's honour. "Gillian was 48 when she died of breast cancer," Mrs Qualtrough said. "Her husband Greg died of cancer at 41. Both too young."

The money from the sale of Gillian's property in the UK prompted Mrs Qualtrough to think about how the funds could be used to remember her. "I started thinking about a donation towards breast cancer research," she said.

In February 2012, the family established the Qualtrough Research Fund to improve understanding, treatment and prevention of breast cancer.

The family was aware of the work done at the Walter and Eliza Hall Institute, and decided to support the institute after reading a story about the innovative breast cancer research being done by Professor Jane Visvader and Professor Geoff Lindeman. "If this helps other women with breast cancer in some way I would be very pleased, and I'm sure Gillian would be too," she said.

Born at Mooroopna, near Shepparton in Victoria, Gillian was a successful businesswoman. In the last two weeks of her life, Gillian set up an annual award for a female student at the International Institute for Management Development in Lausanne, Switzerland, where she had graduated with a Masters of Business Administration in 1984.

"Gillian advocated for recognition of women in the business world," Mrs Qualtrough said. "The career challenges facing women scientists also struck a chord with me, because Gillian had long advocated for equal opportunities in the workplace."

**The family of Mrs Gillian Welshe has set up a research fund for breast cancer in her memory.**

## Major national and international meetings

### Marie-Liesse Asselin-Labat

Australia-France Symposium, Canberra, Australia, 11/11, *Oral presentation*

Mater Medical Research Institute Stem Cell Symposium 2012, Brisbane, Australia, 05/12, *Plenary speaker*

Victorian Breast Cancer Research Centre Symposium 2011, Melbourne, Australia, 11/11, *Invited speaker*

### Geoff Lindeman

Amgen 2011 Breast Cancer scientific advisory board, San Antonio, United States, 12/10, *Keynote speaker, invited speaker and participant on advisory board*

Australia and New Zealand Breast Cancer Trials Group (ANZBCTG) annual scientific meeting, Gold Coast, Australia, 07/11, *Keynote speaker*

Australian Society of Breast Disease annual scientific meeting, Melbourne, Australia, 10/11, *Keynote speaker*

Cancer Therapy & Research Center-American Association of Cancer Research San Antonio Breast Cancer Symposium, San Antonio, United States, 12/11, *Invited session discussant and chair for oral poster session*

EuroSyStem European Summer School 'Hydra VII', Hydra, Greece, 09/11, *Keynote speaker*

15th World Congress of Gynecological Endocrinology, Florence, Italy, 03/12, *Invited speaker and session chair*

Kathleen Cunningham Foundation Consortium for Research into Familial Breast Cancer (kConFab) annual scientific meeting, Kingscliff, Australia, 08/11, *Keynote speaker*

The Copenhagen Bioscience Conference: The Stem Cell Niche - Development and Disease, Copenhagen, Denmark, 06/12, *Keynote speaker*

Victorian Breast Cancer Research Consortium: Fifteen Years of Progress in Breast Cancer Research, Melbourne, Australia, 03/12, *Keynote speaker*

### Clare Scott

Australian Sarcoma Group 2011 annual scientific meeting, Melbourne, Australia, 10/11, *Keynote speaker*

Familial Aspects of Cancer: Research and Practice, Kingscliff, Australia, 08/11, *Keynote speaker*

Fifth p63/p73 Workshop, Lyon, France, 09/11, *Keynote speaker*

Fred Hutchinson/University of Washington Cancer Consortium's Women's Cancer Research Program (WCRP) Seminar, Seattle, United States, 06/12, *Keynote speaker*

Gynaecologic Cancer Inter-Group (GCIG) Meeting: Rare Tumor subgroup, Milan, Italy, 09/11, *Keynote speaker*

Gynaecologic Cancer Intergroup (GCIG) Translational Committee, Chicago, United States, 05/12, *Invited speaker*

Haematology and Oncology Targeted therapies (HOTT) Symposium, Melbourne, Australia, 04/12, *Keynote speaker*

Pfizer Oncology Forum, Sydney, Australia, 06/12, *Keynote speaker*

Victorian Comprehensive Cancer Centre Gynaecological Oncology Research Collaborative and the European Network for Translational Research in Ovarian Cancer (EUTROC), Melbourne, Australia, 08/11, *Keynote speaker, invited speaker and session chair*

### Julie Sheridan

Victorian Breast Cancer Research Centre Symposium 2011, Melbourne, Australia, 11/11, *Keynote speaker*

### François Vaillant

Victorian Breast Cancer Research Centre Symposium 2011, Melbourne, Australia, 11/11, *Keynote speaker*

### Jane Visvader

American Association for Cancer Research annual meeting, Chicago, United States, 03/12, *Keynote speaker, invited speaker and session chair*

Australia-France Joint Symposium on Health Sciences and Biomedicine, Canberra, Australia, 11/11, *Keynote speaker*

Australian Academy of Science, Canberra, Australia, 4/12, *Keynote speaker*

Australian Academy of Science New Fellows and Medallist Symposium, Melbourne, Australia, 06/12, *Keynote speaker*

Breast Cancer Nobel Symposia, Stockholm, Sweeden, 06/12, *Keynote speaker*

Eighth International Symposium on Milk Genomics and Human Health, Melbourne, Australia, 11/11, *Keynote speaker*

EuroSyStem European Summer School 'Hydra VII', Hydra, Greece, 9/11, *Keynote speaker*

Frontiers in Cancer Science 2011, Singapore, Singapore, 11/11, *Plenary speaker*

Hinterzartener Kreis for Cancer Research meeting, Cadenabbia, Italy, 04/12, *Keynote speaker*

Human Genome Meeting 2012, Sydney, Australia, 03/12, *Invited speaker*

Ludwig Institute for Cancer Research Translational Oncology Conference, Melbourne, Australia, 10/11, *Keynote speaker*

The International Society for Stem Cell Research annual meeting, Yokohama, Japan, 06/12, *Plenary speaker*

Victorian Breast Cancer Research Consortium: Fifteen Years of Progress in Breast Cancer Research, Melbourne, Australia, 03/12, *Keynote speaker*

## Staff list

Sally Cane, BSc *Deakin*, scientific coordinator

Audrey Partanen, BSc *Washington*, project coordinator

Kylie Shackleton, BSc(Nursing) *Deakin*, project officer (from 05/12)

### Breast cancer laboratory

**Geoff Lindeman,** BSc(Med) *Sydney* MB BS(Hons) *Sydney* PhD *Melbourne* FRACP

**Jane Visvader,** BSc(Hons) *Adelaide* PhD *Adelaide*

Nai Yang Fu, BSc *Xiamen* MSc *Sun Yat-sen* PhD *Singapore*
Delphine Merino, MSc *Dijon* PhD *Dijon* (from 12/11)
Samantha Oakes, BSc(Hons) *UNSW* PhD *UNSW* (to 09/11)
Bhupinder Pal, MSc *Kurukshetra* PhD *Melbourne*
David Reynolds, BSc(Hons) *Adelaide* PhD *Adelaide*
Anne Rios, MSc *Marseille* PhD *Marseille* (from 12/11)
Julie Sheridan, BSc(Hons) *Leeds* PhD *Edinburgh*
François Vaillant, DEA *Paris* XI PhD *Monash*
Kelsey Breslin, BSc(Hons) *Alberta*
Kun Jiang, BBiomedSc(Hons) *Melbourne* (to 01/12)
Tamara McLennan, BAppSc(Hons) *QUT* BBiolSc *LaTrobe* (from 1/12)
Emma Nolan, BSc(Hons) *Otago* (from 02/12)
Catherine To, BSc(Hons) *Melbourne* (from 04/12)
Teresa Ward, BSc(Hons) *Massey* (to 04/12)

Sarah Best, BSc(Hons) *Melbourne*, PhD student
Bianca Capaldo, BSc *Monash* BSc(Hons) *Melbourne*, PhD student
Lily Lee, BSc(Hons) *Melbourne* LLB(Hons) *Melbourne*, PhD student
Kate Voronova, overseas research trainee (to 10/11)
Chris Walter, UROP student (to 12/11)

**Marie-Liesse Asselin-Labat,** DEA *Paris XI*, PharmaD PhD *Paris*

Caitlin Filby, BBiomedSc(Hons) *Monash* PhD *Monash*

Kati Viitaniemi, MSc *Jyvaskyla*

Laura Galvis Vargas, UROP student
Clare Weeden, BA(Hons) *UWA* BSc(Hons) *UWA*, PhD student (from 03/12)

**Clare Scott,** MB BS *Melbourne* PhD *Melbourne* FRACP

Esther Moss, MB ChB *Birmingham* MSc *Birmingham* PhD *Keele* (from 01/12 to 02/12)
Rachael Rutkowski, BA *Melbourne* BSc(Hons) *Melbourne* PhD *James Cook* (from 08/11)
Phillip Moss BA *Melbourne* BSc *Melbourne* BMed *Melbourne* (from 8/11 to 10/11)

Michele Cook DipAppSci (Medical Laboratory Science) *RMIT* (from 3/12)
Lina Happo BBiomedSc(Hons) *Melbourne* PhD *Melbourne* (from 2/12)
Lynne Hartley, BSc(Hons) *Melbourne* GradDipAcc Monash
Blazhe Nedanovski, BSc(Hons) *Melbourne* (to 07/11)

Elizabeth Lieschke, summer student (from 12/11 to 1/12)
Jenny Luong, UROP student
Monique Topp, visiting PhD student

# Molecular Genetics of Cancer

**Normal cells in our bodies have a limited lifespan. Those cells that are damaged, potentially dangerous or no longer needed are eliminated by a process of programmed cell death termed apoptosis.**

A cell that develops a defect in its apoptosis machinery will fail to die when it should and may multiply to give rise to a cancer. Defective apoptosis makes the cancer cells resistant to chemotherapy drugs and radiation commonly used in cancer therapies.

The Molecular Genetics of Cancer division explores how apoptosis is controlled and how disruptions in this vital cellular process lead to cancer or resistance to cancer therapies. Our increased understanding of apoptosis has galvanised the search for novel anti-cancer drugs that directly trigger the apoptotic machinery to kill tumour cells.

Cellular 'stress' produces signals that trigger Bcl-2 family proteins inside the cell. The resulting tussle between the pro-survival family members (including Bcl-2 and Bcl-$x_L$) and their pro-death relatives (Bak, Bax and the BH3-only signalling proteins) determines whether a cell lives or dies. Our researchers are helping to develop and test drugs that promote cell death by blocking pro-survival proteins. Our recent work reveals that one such promising drug is particularly effective at targeting Bcl-2 in lymphoid malignancies (see opposite page).

Cancer therapy should become more effective if we can establish which pro-survival protein is essential for the sustained survival and expansion of particular cancers, and develop treatments that target that specific protein. This year we showed that acute myeloid leukaemia cells depend on Mcl-1 for sustained survival both in tissue culture and *in vivo*. This points to Mcl-1 or its regulators as potential targets for therapeutic intervention for this incurable blood cell malignancy. Similarly, we found that the development of some lymphomas depends entirely on Bcl-$x_L$. These findings emphasise the exciting potential of developing anti-cancer agents that attack specific Bcl-2 family members for cancer treatment and perhaps, ultimately, its prevention.

## Laboratory heads

**Professor Jerry Adams**
Division head

**Dr Philippe Bouillet**

**Professor Suzanne Cory**

**Dr Ruth Kluck**

**Associate Professor Clare Scott**

**Professor Andreas Strasser**
Division head

**PhD student Mr Alex Delbridge is working with Professor Andreas Strasser to understand the molecules involved in programmed cell death.**

## Defining the specificity of a new class of anti-cancer agents

**For the past two decades, the institute has been at the forefront of research into understanding how defective cell death regulation contributes to the development of cancer, and how the cell death machinery can be harnessed by anti-cancer agents.**

Clinical trials of a new class of potential anti-cancer agents, called BH3-mimetics, are currently underway. These agents block the activities of pro-survival Bcl-2 family proteins including Bcl-2 and Bcl-$x_L$, bringing about death of cancer cells.

Dr Philippe Bouillet and Dr Delphine Mérino from the institute's Molecular Genetics of Cancer division, and Dr Seong Lin Khaw from the ACRF Chemical Biology division have identified the mode of action of two of the most widely-studied BH3-mimetics, navitoclax and ABT-737. Their findings provide a way of predicting which cancers will be most susceptible to these agents.

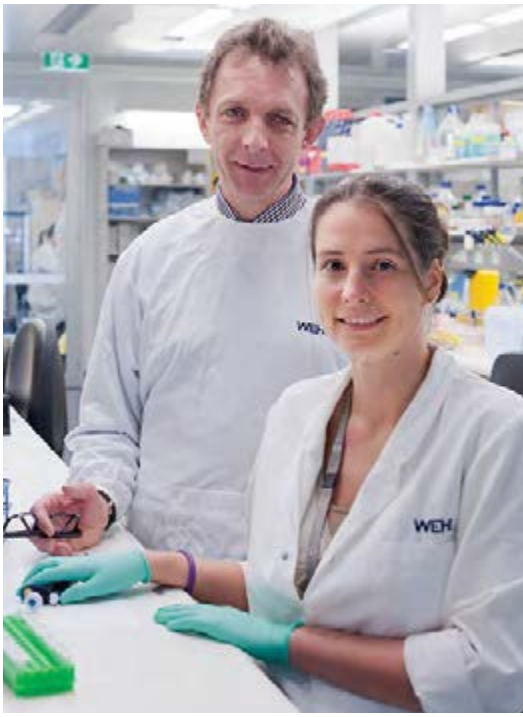
The research found that navitoclax was most effective in treating leukaemias and lymphomas with high levels of Bcl-2 gene expression, while cancers with altered expression of other Bcl-2 family proteins, such as Bcl-$x_L$ or Mcl-1, did not respond as well to the BH3-mimetics.

Dr Bouillet said the finding was an important step towards tailoring anti-cancer treatments for individual patients. "It has been known that high levels of Bcl-2 or Bcl-$x_L$ can make certain leukaemias and lymphomas resistant to conventional chemotherapy," he said. "Our findings explain how BH3-mimetics function in cells, and identify high Bcl-2 expression as a marker of susceptibility to navitoclax."

**Collaborating organisations:** Abbott, Genentech, a member of the Roche Group, Monash Medical Centre, The Royal Melbourne Hospital, The University of Melbourne.

**Funding partners:** Australian Research Council, Cancer Council Victoria, Leukaemia Foundation of Australia, Leukemia & Lymphoma Society (US), National Cancer Institute, National Health and Medical Research Council of Australia, The Lady Tata Memorial Trust and the Victorian Government.

**More information:** Mérino D, Khaw SL, Glaser SP, Anderson DJ, Belmont LD, Wong C, Yue P, Robati M, Phipson B, Fairlie WD, Lee EF, Campbell KJ, Vandenberg CJ, Cory S, Roberts AW, Ludlam MJ, Huang DC, Bouillet P. Bcl-2, Bcl-x(L), and Bcl-w are not equivalent targets of ABT-737 and navitoclax (ABT-263) in lymphoid and leukemic cells. *Blood*. 2012 Jun 14; 119(24):5807-16.



**Dr Philippe Bouillet (left) and Dr Delphine Mérino**

## Supporting outstanding Victorian science

**In November 2011, Professor Andreas Strasser was awarded the 2011 Victoria Prize for his research into the control of cell death. The Victoria Prize, which includes a cash prize of $50,000 for the recipient, is awarded annually by the Victorian Government to a scientist whose discovery has significantly advanced knowledge.**

Professor Strasser's research into the control of cell death has shown that defects in cell death can lead to the development of cancer or autoimmune disease (where the immune system mistakenly attacks and destroys healthy body tissue), and can also render cancer cells resistant to chemotherapeutics.

As part of Professor Strasser's award, the institute received an additional $100,000 through the Anne & Eric Smorgon Memorial Award. The Anne & Eric Smorgon Memorial Award is provided by the Jack & Robert Smorgon Families Foundation to the organisation supporting the work of the winner of the Victoria Prize.

The award celebrated its tenth anniversary in 2011, bringing the support it has provided to Victoria's research community to $1 million.

Institute director Professor Doug Hilton said philanthropic funding provided by families such as the Smorgons was vital to the continued work of medical research organisations.

"We are honoured to see the work of one of our outstanding researchers, Andreas Strasser, recognised with the Victoria Prize," Professor Hilton said. "Even more so, we are delighted that the Smorgon family has recognised the importance of Andreas' research, and that of other Victorian scientists, through their philanthropic support. This funding will allow Andreas and his team to continue to make discoveries that help in the treatment of diseases such as cancer and chronic inflammatory diseases, which are a significant health burden in Australia."

**Professor Andreas Strasser**

## Major national and international meetings

**Jerry Adams**

Human Genetics Society of Australasia 35th annual scientific meeting: Genetics in the Sun, Gold Coast, Australia, 08/11, *Keynote speaker*

Leukemia & Lymphoma Society SCOR progress review meeting, New York, United States, 10/11, *Keynote speaker*

European Molecular Biology Organization (EMBO) Workshop on Programmed Cell Death in Model Organisms, Ein-Gedi, Israel, 02/12, *Keynote speaker*

**Rebecca Bilardi**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**Philippe Bouillet**

ComBio 2011, Cairns, Australia, 09/11, *Invited speaker*

Cold Spring Harbour Symposium on Cell Death, Cold Spring Harbour, United States, 10/11, *Oral presentation*

Second International Symposium on Carcinogenic Spiral: Infection, Immunity, and Cancer and seminar speaker, Kyoto, Japan, 01/12, *Invited speaker*

**Suzanne Cory**

Beatson International Cancer Conference: Cancer models and novel therapies, Glasgow, Scotland, 11/12, *Keynote speaker*

European Molecular Biology Organization (EMBO) Workshop on Programmed Cell Death in Model Organisms, Ein-Gedi, Israel, 02/12, *Chairperson*

**Alexis Delbridge**

RIKEN Research Center for Allergy and Immunology international summer program, Yokohama, Japan, 06/12, *Oral presentation*

24th Lorne Cancer Conference, Lorne, Australia, 02/12, *Oral presentation*

**Stefan Glaser**

Apoptosis and Cancer Conference, Cambridge, United Kingdom, 03/12, *Oral presentation*

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

New Directions in Leukaemia Research, Sunshine Coast, Australia, 03/12, *Keynote speaker*

**Daniel Gray**

Keystone Symposium: Regulation of Lymphocyte Signalling, Keystone, United States, 03/12, *Oral presentation*

**Ana Janic**

24th Lorne Cancer Conference, Lorne, Australia, 02/12, *Oral presentation*

**Ruth Kluck**

Keystone Conference on Mitochondrial Dynamics and Function, Banff, Canada, 03/12, *Invited speaker*

Second Prato Conference on Pore Forming Proteins, Prato, Italy, 04/12, *Keynote speaker*

**Delphine Mérino**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**Lorraine O'Reilly**

Beatson Institute for Cancer Research, Glasgow, United Kingdom, 10/11, *Invited seminar*

First Bio-Rheumatology Congress, Tokyo, Japan, 11/11, *Keynote speaker*

**Clare Scott**

Australian Sarcoma Group 2011 annual scientific meeting, Melbourne, Australia, 10/11, *Keynote speaker*

Australia and New Zealand Gynaecological Oncology Group (ANZGOG) Annual Scientific Meeting 2012, Gold Coast, Australia, 02/12, *Organiser and session chair*

Haematology and Oncology Targeted therapies (HOTT) Symposium, Melbourne, Australia, 04/12, *Keynote speaker*

Gynaecologic Cancer Intergroup (GCIG) Translational Committee, Chicago, United States, 05/12, *Invited speaker*

Fred Hutchinson/University of Washington Cancer Consortium's Women's Cancer Research Program (WCRP) seminar, Seattle, United States, 06/12, *Keynote speaker*

Pfizer Oncology Forum, Sydney, Australia, 06/12, *Keynote speaker*

**Andreas Strasser**

Australian and New Zealand Association for the Advancement of Science, Melbourne, Australia, 03/12, *Invited seminar*

Cold Spring Harbour Symposium on Cell Death, Cold Spring Harbour, United States, 10/11, *Plenary speaker*

IMB Academia Sinica Performance Review and Lecture Series, Taipei, Taiwan, 01/12, *Keynote speaker*

New Directions in Leukaemia Research Meeting, Sunshine Coast, Australia, 03/12, *Keynote speaker*

19th Euroconference on Apoptosis, Stockholm, Sweden, 09/11, *Plenary speaker*

Keystone Symposium: Regulation of Lymphocyte Signalling, Keystone, United States, 03/12, *Invited speaker*

Second Ludwig Institute of Cancer Research Translational Oncology Conference, Melbourne, Australia, 10/11, *Keynote speaker*

2011 Mitochondria, Apoptosis and Cancer Conference, Singapore City, Singapore, 10/11, *Keynote speaker*

**Dana Westphal**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

## Staff list

Catherine McLean, BA *Melbourne* GradDipGenetCounsell *Charles Sturt*, scientific coordinator
Linda Scott, Executive assistant to Suzanne Cory

**Jerry Adams,** BSc *Emory* PhD *Harvard* FAA FRS

**Suzanne Cory,** BSc *Melbourne* MSc *Melbourne* PhD *Cantab* Hon DSc *Syd*, Hon DSc *Oxon* FAA, FRS

Rebecca Bilardi, BBiolSc(Hons) *LaTrobe* PhD *LaTrobe*
Max Tailler, BSc *Bordeaux 1* MSc *Bordeaux 1* PhD *Paris XI* (from 01/12)
Cassandra Vandenberg, BSc(Hons) *Otago* PhD *Otago*
Bin Wang, BSc *Beijing* PhD *Beijing*
Dana Westphal, MSc *Technical* PhD *Otago*

Leonie Gibson, BAppSc *RMIT*

Natasha Anstee, BSc(Hons) *Melbourne*, PhD student
Marie Menard, overseas research trainee (from 01/12)

**Andreas Strasser,** MSc *Basel* PhD *Basel* FAA

Silvia Alvarez-Diaz, BSc *Oviedo* MSc *Oviedo* PhD *Madrid* (from 01/12)
Stephanie Grabow, MSc *Max Planck* PhD *Melbourne*
Daniel Gray, BBiomedSc(Hons) *Monash* PhD *Monash*
Marco Herold, Dipl. Biol. *Wuerzburg* PhD *Wuerzburg*
Ana Janic, BSc *Belgrade* PhD *Barcelona* (from 10/11)
Gemma Kelly, BSc(Hons) *Durham* PhD *Birmingham*
Lorraine O'Reilly, BSc *Glasgow* PhD *London*

Ann Lin, BSc(Hons) *Melbourne*
Antonia Policheni, BBiomedSc *Monash* BSc(Hons) *Melbourne*
Lin Tai, BAppSc *Swinburne* MSc *LaTrobe*
Michele Cook, Dip AppSc *RMIT* (to 03/12)
Fiona Kupresanin, B BiomedSc *Melbourne* MDietetics *Deakin*

Adam Bonner, overseas research trainee (to 08/11)
Claire Bowtell, BSc *Melbourne*, BSc(Honours) student
Alexis Delbridge, BBiomedSc(Hons) *Melbourne*, PhD student
Reema Jain, MSc *Auckland*, PhD student (from 09/11)
Francine Ke, BSc(Hons) *Melbourne*, PhD student
Mathias Lang, BSc *Innsbruck*, overseas research trainee (from 10/11)
Jun Low, BBiomedSc *Melbourne*, BSc(Honours) student (from 02/12)
Elenora Ottina, BSc *Milan* MSc *Milan*, overseas research trainee (from 04/12)
Leona Rohrbeck, BSc *Maastricht* MSc *Maastricht*, PhD student
Liz Valente, BBiomedSc(Hons) *LaTrobe*, PhD student

**Clare Scott,** MBBS PhD *Melb* FRACP

Lina Happo BBiomedSc(Hons) *Melb*, PhD student (to 01/12)

**Philippe Bouillet,** PhD *Louis Pasteur*

Delphine Mérino MSc PhD *Dijon* (to 12/11)
Maybelline Giam, BSc *Melbourne* PhD *Melbourne* (to 06/12)

Bruno Helbert, MSc *Paris-Sorbonne*
Mikara Robati, BSc *Waikato*
Carley Young, BSc *Melbourne*

Ryan Stuchbery, BSc *Melbourne*, BSc(Honours) student (to 11/11)

**Ruth Kluck,** BSc *Qld* PhD *Qld*

Amber Alsop, BSc(Hons) *Sydney* PhD Cambridge

Khatira Anwari, BBiomedSc *Melbourne* BSc(Hons) *Melbourne* PhD *Monash* (from 07/11)

Ray Bartolo, BSc(Hons) *Deakin* PhD *Deakin* (from 01/12)
Stephanie Fennell, BBiolSc(Hons) *LaTrobe*

Colin Hockings, BA(Hons) *Cambridge*, PhD student
Sweta Iyer, BSc *India* MSc *Madurai Kamaraj*, PhD student
Vu Tran, BSc *Melbourne*, BSc(Honours) student (to 11/11)

# ACRF Chemical Biology

**The major focus of the ACRF Chemical Biology division is to discover, refine and apply state-of-the-art chemical approaches to address important biological questions and develop them into treatments for human diseases.**

To achieve these goals, researchers in the division are developing agents that can specifically modulate the action of key proteins and enzymes that cause human diseases, such as cancers and malaria. The overactivity of the protein Bcl-2 enables the survival of some cancer cells. Chemical compounds that selectively target Bcl-2 have been developed and are showing promising results in clinical trials in patients with some forms of leukaemia and lymphoma.

Our research includes efforts to target other processes and pathways that drive and sustain cancers, including mutations that cause unregulated growth, leading to tumours. We are also using complementary approaches to search for new therapeutic agents. This includes taking alternative approaches such as testing and isolating chemical compounds that are shown to kill diseased cells, then identifying the specific molecular target.

The research undertaken covers a number of therapeutic areas. Together with scientists from the Infection and Immunity division, we are investigating the possibility of targeting malaria-infected red blood cells. Such an approach may allow the development of highly efficacious treatments for the millions of people worldwide affected by this disease.

To undertake these challenging and exciting projects, the division brings together world-class expertise in chemistry, molecular biology and high-throughput chemical screening, and strong collaborations with scientists in other research divisions. We have the unique capability to rapidly screen hundreds of thousands of compounds for those with desirable properties, placing us in a strong position to discover and develop chemicals that are extremely powerful as research tools or have great potential to be transformed into medications for treating diseases that currently have poor outcomes.

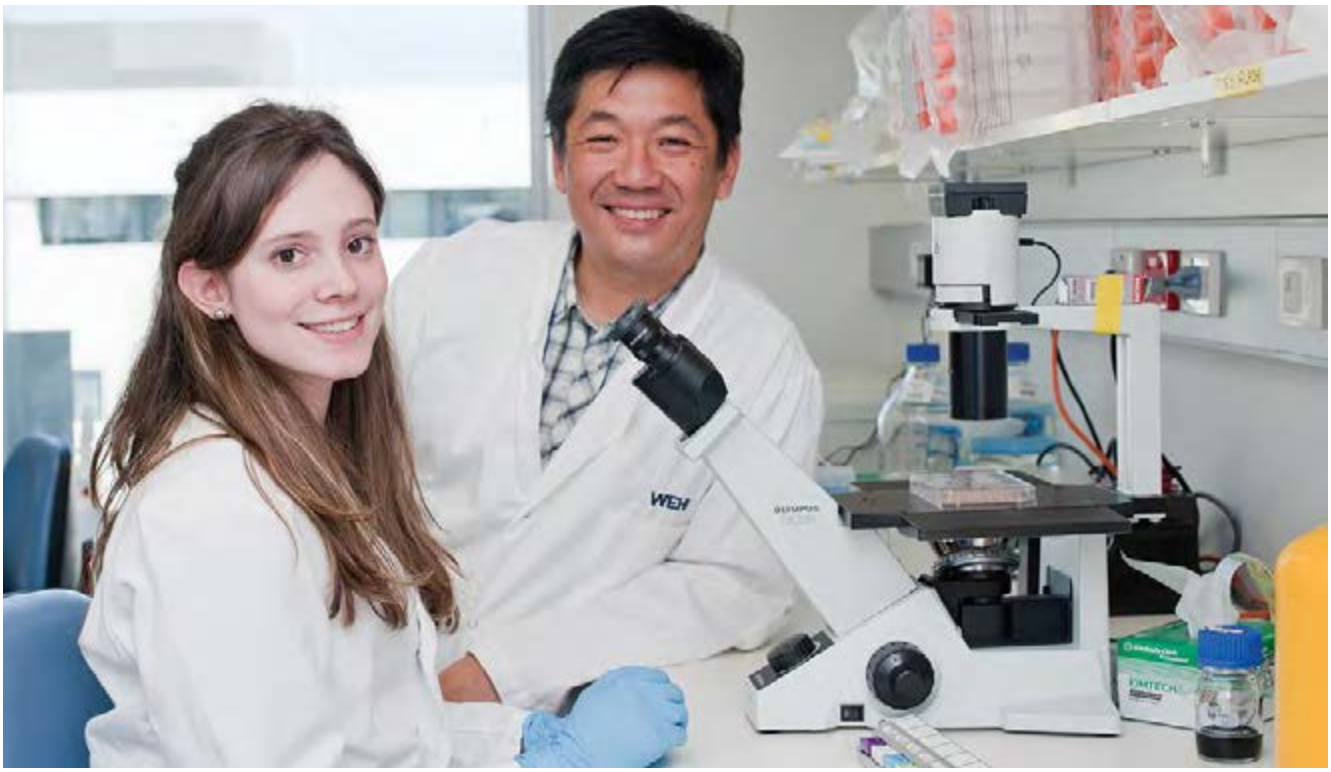
### Laboratory heads

**Dr Chris Burns**

**Professor David Huang**
Division head

**Dr Guillaume Lessene**

**Dr Ian Street**



Research assistant Ms Freya Kahn (left) and division head Professor David Huang are looking for new treatments for cancers.

## Discovering new drugs for treating leukaemias

**Acute myeloid leukaemia (AML) is the most common type of acute leukaemia (aggressive blood cancer) in Australia, with up to 850 Australians diagnosed each year.**

Dr Hendrik Falk and Dr Ian Street from the institute's ACRF Chemical Biology division and Cancer Therapeutics CRC, and Dr Tim Thomas from the Molecular Medicine division, are collaborating to identify new drugs for treating AML.

The research team is looking for drugs that target MOZ, a protein known to be involved in the development of some types of AML.

Dr Thomas said the *Moz* gene was an excellent target for treating AML. "MOZ is a key regulator of genes that tell blood cells to renew, and has been implicated in leukaemia development," Dr Thomas said. "People with AML linked to mutations in *Moz* have a very poor prognosis, with a mean survival time of less than five months. Identifying drugs that could bind to and inhibit this protein would give these people a much better treatment option."

Dr Falk said the team had developed a new drug discovery system that better identifies small molecules that inhibit MOZ activity. "With the assay, we can assess a large number of compounds quickly and robustly to identify lead-like molecules as starting points for drug development; essentially sorting the 'wheat from the chaff'," Dr Falk said. "It also overcomes a number of significant technical challenges that have led other drug discoverers down the wrong track."

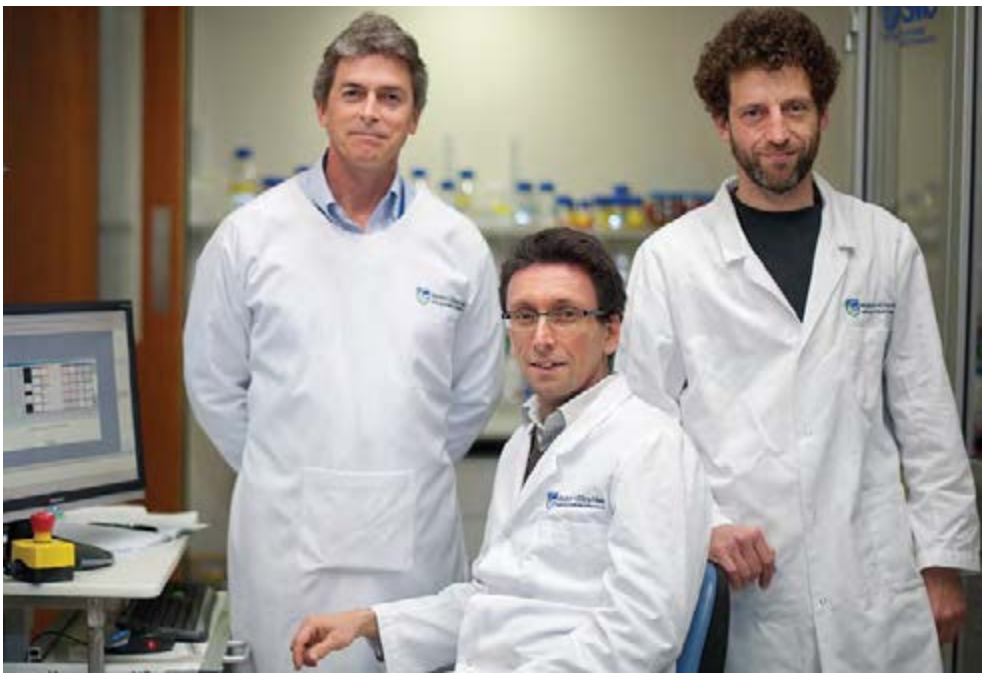
Dr Street said the research team identified a compound that reversibly binds to and inhibits MOZ activity. "It is very exciting and, to the best of our knowledge, this is the first time that it has been achieved," Dr Street said. "However drug discovery is a long and risky process and it could be more than five years before an agent that inhibits MOZ makes it into clinical trials."

**Collaborating organisations:** Cancer Therapeutics CRC and CSIRO.

**Funding partners:** Australian Research Council, Cancer Therapeutics CRC, National Health and Medical Research Council of Australia and the Victorian Government.

**More information:** Falk H, Connor T, Yang H, Loft KJ, Alcindor JL, Nikolakopoulos G, Surjadi RN, Bentley JD, Hattarki MK, Dolezal O, Murphy JM, Monahan BJ, Peat TS, Thomas T, Baell JB, Parisot JP, Street IP. An efficient high-throughput screening method for MYST family acetyltransferases, a new class of epigenetic drug targets. *Journal of Biomolecular Screening*. 2011 Dec; 16(10): 1196-205.

**Dr Ian Street (left), Dr Hendrik Falk (centre) and Dr Tim Thomas.**



## ACRF support to help find new cancer drugs

**In 2012 the Australian Cancer Research Foundation (ACRF) committed $2 million towards the fit-out of two new cancer research laboratories at the Walter and Eliza Hall Institute.**

The funding helped establish new laboratories for the institute's ACRF Chemical Biology division and ACRF Stem Cells and Cancer division, allowing for the expansion of research into the causes of, and development of new treatments for, some of the most prevalent cancers in Australia, including breast cancer, ovarian cancer, lung cancer and leukaemia.

Professor David Huang, head of the ACRF Chemical Biology division, said the facilities would enable institute researchers to develop new medications for cancers including blood cancers such as leukaemia, and epithelial cancers including breast cancers. "The institute has many scientists investigating how cancers might be better treated," Professor Huang said. "Our division will use this knowledge to develop medications that have the potential to be used as new anti-cancer agents."

ACRF chairman Mr Tom Dery said the new funding agreement would further strengthen Australian cancer research efforts. "We have been proud to support successful research projects at the Walter and Eliza Hall Institute in the past," Mr Dery said. "The ACRF's support for these new research facilities will enable institute scientists to make discoveries about cancer biology, and then see them developed through to potential new anti-cancer treatments. This will undoubtedly improve the outlook for patients with some of the most common and deadly cancers in Australia."

Australian Cancer Research Foundation

## Major national and international meetings

**David Huang**

Institute for Research in Immunology and Cancer Symposium, Montreal, Canada, 9/11, *Keynote speaker*

Ludwig Institute for Cancer Research Translational Oncology Conference, Melbourne, Australia, 10/11, *Invited speaker*

Mitochondria, Apoptosis and Cancer, Singapore, Singapore, 10/11, *Keynote speaker*

12th Hunter Meeting – Australia's Premier Cellular Biology Meeting, Pokolbin, Australia, 03/12, *Keynote speaker*

**Kurt Lackovic**

Screening Asia, Singapore, Singapore, 11/11, *Invited speaker*

**Guillaume Lessene**

Australia-France Symposium, Canberra, Australia, 11/11, *Oral presentation*

**Brad Sleebs**

Royal Australian Chemical Institute Biomolecular Division Conference, Torquay, Australia, 11/11, *Oral presentation*

## Staff list

Kylee Aumann, BSc(Hons) *Melbourne* PhD *Melbourne*, scientific coordinator

**David Huang,** MBBS *London* PhD *London* MRCP *London*

Brooke Cody, BSc *California* PhD *Wake Forest* (to 02/12)
Lisa Lindqvist, BSc *McGill* PhD *McGill* (to 05/12)
Lei Liu, MSc *China* PhD *China* (from 01/12)
Kylie Mason, MBBS *Melbourne* PhD *Melbourne*
Toru Okamoto, BSc *Osaka* MSc *Osaka* PhD *Osaka* (to 01/12)
David Segal, BSc(Hons) *UWA* PhD *ANU*
Megumi Takiguchi, BSc *Victoria* PhD *Oxford*
Mark van Delft, BSc(Hons) *McMaster* PhD *Melbourne* (from 02/12)

Angela Georgiou, ADipAppSc *RMIT*
Helen Ierino, BAppSc *RMIT*
Freya Kahn, BBiomedSc(Hons) *Melbourne* (to 12/11)
Kate McArthur, BSc(Hons) *Melbourne* (from 03/12)
Anuratha Srikumar, BSc *Madras*

Mary Ann Anderson, MBBS *Melbourne*, PhD student
Hui San Chin, BBiomedSc *Melbourne*, BSc(Hons) student (from 11/11)
Felanita Hutani, BBiomedSc *Melbourne* (to 12/11)
Douglas Tjandra, BBiomedSc *Melbourne*

**Jonathan Baell,** BSc(Hons) UTAS PhD *Melbourne* (to 04/12)

Brad Sleebs, BSc(Hons) *LaTrobe* PhD *LaTrobe* (to 04/12)
Ryan Brady, BSc(Hons) *Melbourne* PhD *Melbourne* (to 04/12)
Georgina Holloway, BAppSc(Hons) *RMIT* PhD Melbourne (to 04/12)

Kung Ban, BMedChem *LaTrobe* (to 04/12)
Dana Stachurska-Buczek, MSc *Poland* (to 04/12)

Michelle Gazdik, BMedChem(Hons) *LaTrobe*, visiting BSc(Hons) student (to 11/11)
Jelena Medan, BMedSc(Hons) *LaTrobe*, visiting PhD student (to 04/12)
Sarah Moawad, BMedChem *LaTrobe*, visiting BSc(Hons) student (to 11/11)
Silvia Teguh, BSc(Hons) *Melbourne*, PhD student (to 04/12)
Yen Vo, visiting MSc student (to 02/12)
Julie Sanchez, overseas research trainee (to 08/11)
Eliott Teston, overseas research trainee (to 08/11)

**Chris Burns,** BSc(Hons) *Melbourne* PhD Melbourne

Jo Alcindor, BSc(Hons) *Hertfordshire* PhD Cambridge
Ryan Brady, BSc(Hons) *Melbourne* PhD *Melbourne* (from 04/12)
Danny Ganame, BSc(Hons) *LaTrobe* PhD *Melbourne*
Bill Hawkins, BMedChem(Hons) *Wollongong* PhD *Wollongong* (to 06/12)
Georgina Holloway, BAppSc(Hons) *RMIT* PhD *Melbourne* (from 04/12)
Romina Lessene, BSc(Hons) *Melbourne* PhD *Melbourne*
George Nikolakopoulos, BAppSc(Hons) *QUT* PhD *Monash*
Louisa Phillipson, BSc *Surrey* PhD *Reading*
Paul Stupple, BA *Oxford* DPhil *Oxford* (from 01/12)

Kung Ban, BMedChem *LaTrobe* (from 04/12)
Wilco Kersten, BSc *Netherlands*
Thao Nguyen, BSc *VUT*
Dana Stachurska-Buczek, MSc *Poland* (from 04/12)

Manal Ali, BMedChem *LaTrobe*, visiting BSc(Hons) student (from 03/12)
Duong Nhu, BSc *LaTrobe*, PhD student
David Lee, visiting BSc student (from 03/12 to 06/12)

**Guillaume Lessene,** PhD *Bordeaux 1*

Chinh Bui, BSc(Hons) *Griffith* PhD *Melbourne*
Brad Sleebs, BSc(Hons) *LaTrobe* PhD *LaTrobe* (from 04/12)

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Amelia Vom, BMedChem(Hons) *Monash* PhD *Monash* (from 02/12)

Michelle Gazdik, BMedChem(Hons) *LaTrobe*, PhD student (from 03/12)
Jelena Medan, BMedSc(Hons) *LaTrobe*, visiting PhD student (from 04/12)
Michael Roy, BSc(Hons) *Melbourne* LLB *Melbourne*, BSc(Hons) student (to 11/11) PhD student (from 03/12)
Cyrus Tan, BA *Melbourne* BSc *Melbourne*, BSc(Hons) student (from 02/12)
Silvia Teguh, BSc(Hons) *Melbourne*, PhD student (from 04/12)

Simon Donck, overseas research trainee (to 08/11)
Sidney Louzoun, overseas research trainee (from 04/12)

**Ian Street,** BSc(Hons) *Sussex* PhD British Columbia

Tony Cardno, BSc *Otago* MSc *Otago* PhD Otago (to 03/12)
Hendrik Falk, BPharm *Halle* PhD *Berlin*
Ann Holmes, PhD *London* (from 07/11 to 08/11)
Kurt Lackovic, BAppSc(Hons) *LaTrobe* PhD *LaTrobe*
Karl Leuchowius, MSc *Uppsala* PhD *Uppsala*
Kym Lowes, BSc(Hons) *UWA* PhD *UWA*
John Parisot, BSc(Hons) *Monash* PhD *Melbourne* (to 07/11)

Elizabeth Allan, BSc(Hons) *Otago* PhD *Melbourne* (from 12/11)
Lynda Allan, BSc(Hons) *Dundee* (to 08/11)
Melanie De Silva, BSc *Melbourne* (from 09/11)
Rebecca Moss, BAppSc(Hons) *RMIT*
Patrizia Novello, BBiolSc(Hons) *LaTrobe*
Margaret Tiong, BSc(Hons) *Melbourne* (to 10/11)
Soo San Wan, BAgSc(Hons) *LaTrobe* MAgSc *LaTrobe*
Hong Yang, PhD *Norman Bethune*

**Andrew Wilks,** BSc(Hons) *Liverpool* PhD *Glasgow*

# Molecular Medicine

**The Molecular Medicine division investigates the pathways that control normal differentiation of stem cells, in particular blood stem cells, and how these pathways are perturbed in diseases including leukaemia and lymphoma, and in inflammation.**

Researchers use data from genetic, genomic, proteomic and computational analyses to place individual genes into the regulatory pathways, with the ultimate goal of working closely with clinicians and the private sector to translate our discoveries into improvements in the diagnosis and treatment of disease.

Major research themes in the division include the regulation of stem cells, blood cell production and function, and blood cancers. Researchers are also studying molecules that regulate the epigenome; chemical modifications to the chromatin (which is made up of DNA and proteins it binds to) that occur in response to environmental factors and tell genes to switch on or off.

The past 12 months have seen wonderful progress in understanding how an intriguing family of epigenetic regulators, the MYST acetyltransferases, work. Research headed by Dr Anne Voss and Dr Tim Thomas has shown that one *MYST*-family member, *MOZ*, regulates a number of genetic programs, including *Tbx* genes, needed for the proper formation of the heart and associated blood vessels. Congenital heart defects are present in approximately one per cent of live births, and this work provides a very rare insight into how an epigenetic regulator can combine both genetic and environmental cues to ensure proper formation of the heart (see opposite page).

The work of Mr Bilal Sheikh, a PhD student supervised by Dr Voss and Dr Thomas, has highlighted the importance of another *MYST*-family member, *Querkopf*, in maintaining a rare population of stem cells in the adult brain. This work highlighted the importance of *Querkopf* in maintaining stem cell features including self-renewal, and the ability to become many different cell types.

Together these studies, and other work in the division, emphasise the importance of epigenetic regulators in controlling stem cell function.

### Laboratory heads

**Dr Marnie Blewitt**

**Dr Ross Dickins**

**Professor Doug Hilton**
Division head

**Dr Samir Taoudi**

**Dr Tim Thomas**

**Dr Anne Voss**

**PhD student Ms Hannah Vanyai is looking at the role of epigenetic regulators in development and disease.**

## Gene 'switch' may explain DiGeorge syndrome severity

**The discovery of a 'switch' that modifies a gene essential for normal heart development could explain the variations in severity of birth defects in children with DiGeorge syndrome.**

DiGeorge syndrome is a common congenital disease, affecting approximately one in 4000 babies. Children with the syndrome exhibit a range of mild to severe birth defects, including heart and aorta defects.

Dr Anne Voss, Dr Tim Thomas and colleagues discovered the 'switch' while investigating foetal development in an animal model of DiGeorge syndrome.

"In DiGeorge syndrome the variation in symptoms is so prominent that even identical twins, with the exact same DNA sequence, can have remarkably different conditions," Dr Voss said. "We hypothesised that environmental factors were probably responsible for the variation, via changes to the way in which genetic material is packaged in the chromatin."

Chromatin is the genetic material that comprises DNA and associated proteins packaged together in the cell nucleus. Chemical marks that sit on the chromatin modify it to instruct when and where to switch genes on or off.

The research team found MOZ, a protein 'switch' involved in chromatin modification, was key to explaining the variation in birth defect severity in an animal model of DiGeorge syndrome. "MOZ makes marks on the chromatin that tell genes to switch on," Dr Voss said. "We showed that MOZ regulates *Tbx1*, a major gene responsible for heart and aortic arch development. MOZ is crucial for normal activity of *Tbx1*, and variations in the level of MOZ activity may contribute to determining how severe the defects are in children with DiGeorge syndrome."

The research team also showed reduced MOZ activity could conspire with excess retinoic acid (a type of vitamin A) to markedly increase the frequency and severity of DiGeorge syndrome. "In our mouse model, mice that had one normal copy of MOZ and one mutated copy looked completely normal. However if their mother's diet during pregnancy was high in vitamin A, the offspring developed DiGeorge syndrome-like defects," she said.

**Collaborating organisations:** University College London Institute of Child Health.

**Funding partners:** Australian Stem Cell Centre, British Heart Foundation, National Health and Medical Research Council of Australia and the Victorian Government.

**More information:** Presented at the Molecular Pathways in Organ Development and Disease conference, Cold Spring Harbor, New York, 17-21 April 2012.

**Dr Anne Voss (right) and Dr Tim Thomas led a research team that discovered the gene 'switch' which may explain variations in symptoms seen in children with DiGeorge syndrome.**

## Understanding why some childhood leukaemias don't respond to treatment

**Acute lymphoblastic leukaemia (ALL) is an aggressive blood cancer and the most common childhood cancer, with approximately 175 children diagnosed each year in Australia.**

Current ALL therapy begins with treatment using steroid hormones (glucocorticoids), which cause the leukaemia cells to undergo programmed cell death (apoptosis) and restore normal blood cell production. Approximately 80 per cent of patients are cured by current treatments, however the other 20 per cent often succumb to relapsed ALL that is glucocorticoid resistant.

PhD student Mr Matt Witkowski from the institute's Molecular Medicine division was awarded a Leukaemia Foundation scholarship in 2011 to study how deletions in a gene called *Ikaros* are associated with resistance to conventional therapy in children with ALL.

"Mutations in the *Ikaros* gene are strongly associated with treatment failure and poor prognosis in ALL due to a lack of treatment options," Mr Witkowski said. "Despite these breakthroughs in our understanding of the genetics of ALL, we still don't understand how *Ikaros* suppresses tumour development and how its deletion contributes to leukaemia relapse."

While Mr Witkowski was completing his honours project at the institute he was part of a team that showed Ikaros regulates the expression of an enzyme involved in activation of glucocorticoids, a class of steroid hormones that are the mainstay of ALL therapy

The Leukaemia Foundation funding has allowed Mr Witkowski to undertake a PhD project at the institute using mouse models of ALL to investigate how this enzyme is controlled by Ikaros, and how its activity influences leukaemia therapy responses.

"Understanding how *Ikaros* deletions control therapy responses in normal lymphocytes and leukaemia cells will help in the design of new treatment strategies for patients with *Ikaros*-deleted ALL, who face a dismal prognosis with current treatments," Mr Witkowski said.

**PhD student Mr Matt Witkowski**

## Major national and international meetings

**Marnie Blewitt**

Annual Meeting of New Champions 2011, World Economic Forum, Dalian, China, 09/11, *Invited speaker*

Epigenetics Australia 2012, Fourth Australian Scientific Conference, Adelaide, Australia, 05/12, *Keynote speaker*

50 years of X inactivation research, Oxford, United Kingdom, 07/11, *Oral presentation*

New Directions in Leukaemia Research, Sunshine Coast, Australia, 03/12, *Keynote speaker*

**Ross Dickins**

New Directions in Leukaemia Research, Sunshine Coast, Australia, 03/12, *Keynote speaker*

34th Lorne Cancer Conference, Lorne, Australia, 02/12, *Keynote speaker*

**Nick Seidenman**

Australian Microarray and Associated Technologies Association (AMATA) 2011 Conference, Canberra, Australia, 10/11, *Oral presentation*

**Bilal Sheikh**

Lorne Genome Conference, Lorne, Australia, 02/12, *Oral presentation*

**Samir Taoudi**

New South Wales Stem Cell Network, Sydney, Australia, 09/11, *Keynote speaker*

**Tim Thomas**

New South Wales Stem Cell Network, Sydney, Australia, 8/2011, *Invited speaker*

**Anne Voss**

Molecular Pathways in Organ Development and Disease, Cold Spring Harbor, United States, 04/12, *Oral presentation*

## Staff list

Etty Bonnici, administration officer
Fiona McGrath, BAppSc(Hons) *RMIT*, scientific coordinator/alliance manager

**Doug Hilton,** BSc(Hons) *Melbourne* BSc *Monash* PhD *Melbourne* FAA

Christine Biben, BSc(Hons) *Paris VI* PhD *Paris VI*
Rachel Burt, BSc *Melbourne* PhD *Melbourne* (to 01/12)
Marina Carpinelli, BSc(Hons) *Melbourne* PhD *Melbourne* (to 01/12)
Jarny Choi, BSc(Hons) *Melbourne* PhD *Melbourne*
Marthe D'Ombrain, BSc(Hons) *Melbourne* PhD *Melbourne*
Clare Morgan, BA Curtin BSc(Hons) *UWA* PhD *UWA*
Martin Pera, BA *USA* PhD *George Washington*
Owen Prall, BMedSc(Hons) *UTAS* MBBS(Hons) *UTAS* PhD *UNSW*
Toby Sargeant, BComp(Hons) *Monash* BSc *Monash* MComp *Monash* PhD *Melbourne*
Tracy Willson, BSc(Hons) *Monash* PhD *Monash*

Tracey Baldwin, BAppSc *RMIT*
Bette Borobokas, BBiolSc *LaTrobe*
Anne Cooray, BSc *Melbourne* (to 12/11)
Kerry Ramsay, BSc(Hons) *Murdoch*
Nick Seidenman, systems developer
Lucy Bennett, vacation scholarship student
Courtney Cameron, UROP student
Katherine Colman, vacation scholarship student
Caleb Dawson, vacation scholarship student
Anna Marneth, BBiomedSc *Groningen*, overseas research trainee (to 09/11)

**Tim Thomas,** BSc(Hons) *Melbourne* PhD *Melbourne*

**Anne Voss,** BVSc *Hannover* PD *Goettingen* PhD *Hannover*

Isobel Lawrenson, BSc (Hons) *Newcastle*, PhD *Leeds*

Rose Cobb, BBiolSc(Hons) *LaTrobe* (from 03/12)
Natalie Downer, BSc(Hons) *Melbourne*
Andrew Kueh, BSc(Hons) *Melbourne* MBBS *Melbourne*
Tamara McLennan BAppSc(Hons) *QUT* BBiolSci *LaTrobe* (to 12/11)
Lisa Sampurno, BBiomedSc(Hons) *Melbourne* (to 01/12)
Bilal Sheikh, BBiomedSc(Hons) *Melbourne*

Farrah El-Saafin, BMedSc *LaTrobe* BSc(Hons) *Melbourne*, PhD student
Hannah Vanyai, BA *Melbourne* BSc(Hons) *Melbourne*, PhD student

**Marnie Blewitt,** BSc(Hons) *Sydney* PhD *Sydney*

Sarah Kinkel, BA *Melbourne* BSc(Hons) *Melbourne* PhD *Melbourne*
Huei San Leong, BBiomedSc(Hons) *Melbourne* PhD *Melbourne* (to 06/12)

Miha Pakusch, BSc(Hons) *Melbourne*

Michael Alexanian, BA *Florence*, overseas research trainee (to 08/11)
Darcy Butts, BSc *Michigan* MSc *Oxford*, PhD student
Kelan Chen, BSc(Hons) *Melbourne*, PhD student
Jamie Gearing, BSc(Hons) *Melbourne*, PhD student
Betty Kao, BAppSc *Otago*, visiting PhD student (from 04/12)
Joy Liu, UROP student

**Ross Dickins,** BSc(Hons) *Melbourne* PhD *Melbourne*

Mutlu Kartal-Kaess, MD *Heidelberg*
Mark McKenzie, BSc(Hons) *Melbourne* PhD *Melbourne*
Megumi Takiguchi, BSc *Victoria* PhD *Oxon* (to 06/12)

Laura Tuohey BMedSci BBiotech *Charles Sturt* (to 09/11)

Tamara Huesser, BBiolSc *Zurich*, overseas research trainee (to 07/11)
Sean Ivory, UROP student
Grace Liu, BBiomedSc(Hons) *Melbourne*, PhD student
Matthew Witkowski, BSc *Melbourne*, PhD student

**Samir Taoudi,** BSc(Hons) *Westminster* PhD *Edinburgh*

Andrew Jarratt, BSc(Hons) *York* PhD *Oxford* (from 02/12)

Adrienne Hilton, BAppSc *RMIT*

Kathryn Potts, BSc *Melbourne*, PhD student

# Structural Biology

**The Structural Biology division's research contributes to the discovery of new medicines through studying the three-dimensional structures of large biological molecules that are either targets for drugs or potential therapeutic agents in their own right.**

Dr Peter Czabotar, in collaboration with colleagues from the institute's Immunology and Cancer and Haematology divisions, has described the crystal structure of Clec9A, a molecule on the surface of dendritic cells that is important in regulating immune responses. The structure informed the design of novel forms of Clec9A that were used to help identify its receptor on damaged cells (see opposite page).

We have also identified a structural anomaly in a pro-survival protein called Bcl-w that is involved in programmed cell death, or apoptosis. The Bcl-w protein changes its shape significantly, in a way not seen in other pro-survival proteins, raising interesting questions about how this protein functions to influence apoptosis. Complexes (multimers) of this protein family are especially interesting because this formation is thought to be essential for the cell-killing activity of the pro-death family members Bax and Bak, which are being investigated for their potential as anti-cancer drug targets.

Studies with our collaborator Professor Sam Gellman from the University of Wisconsin have led to the discovery of cell-killing peptides containing non-natural amino acids that are resistant to being broken down by the cell and may offer a way to use peptides as therapeutics.

In 2012 we welcomed Professor Tony Burgess as a new faculty member in the Structural Biology division. Professor Burgess has a long history of collaboration with the institute and the division. Our shared interests in turning basic discoveries into new medicines, particularly for cancer, make this appointment especially exciting.

## Laboratory heads

**Dr Jeff Babon**

**Professor Tony Burgess**

**Dr Matthew Call**

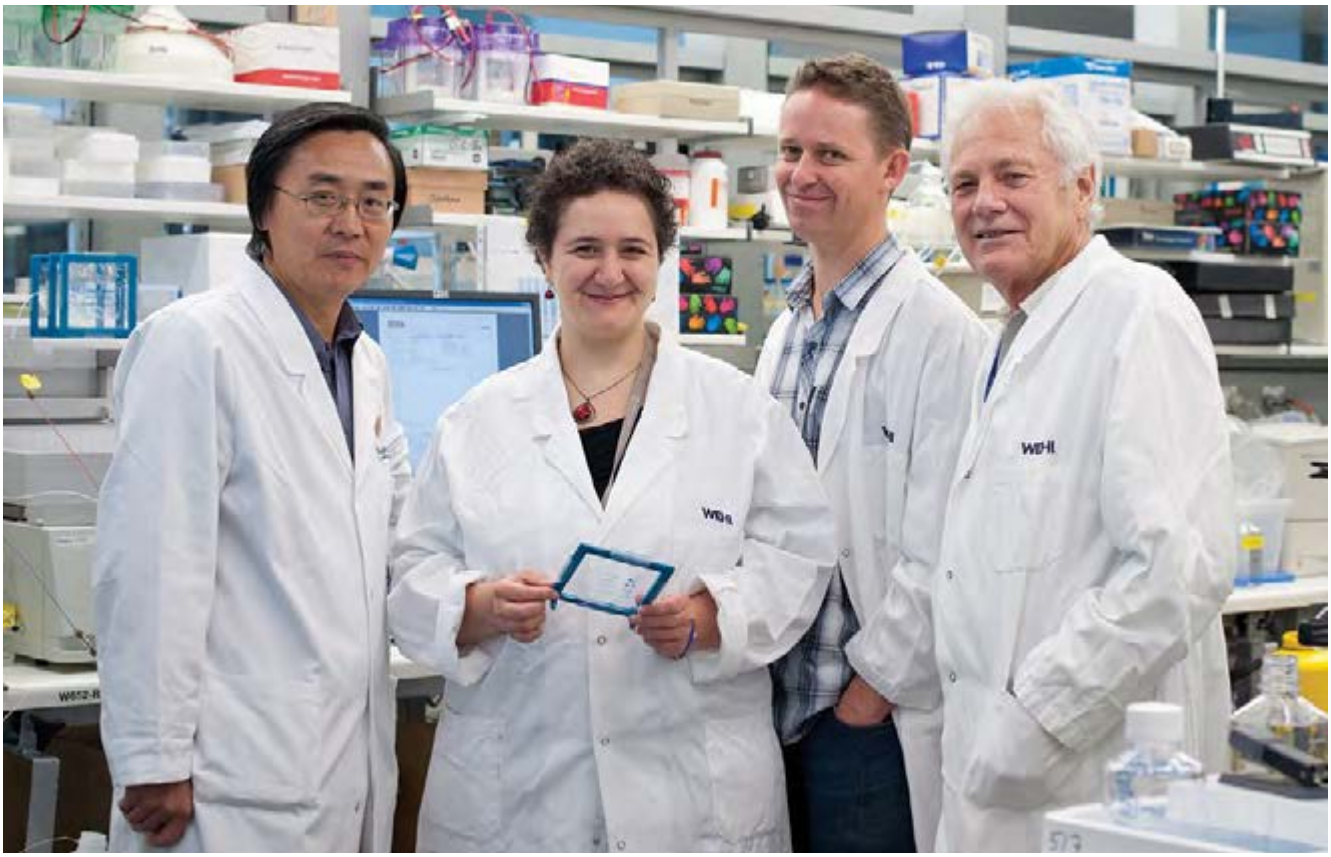
**Dr Melissa Call**

**Professor Peter Colman**
Division head

**Dr Doug Fairlie**

**Dr Jacqueline Gulbis**

**Associate Professor Mike Lawrence**



Researchers (from left) Dr Jian-Guo Zhang, Dr Mireille Lahoud, Dr Peter Czabotar and Professor Ken Shortman have discovered how a vital immune cell recognises dead and damaged body cells. The finding could modernise vaccine technology by 'tricking' cells into launching an immune response.

## Manipulating the immune system for 'next-gen' vaccines

**Dendritic cells are critical for raising the alarm about the presence of infectious invaders, as well as tumour cells and other dead or damaged cells.**

Also known as antigen-presenting cells, dendritic cells digest and present molecules from damaged cells to immune system cells to launch the immune response.

The discovery of how this vital immune cell recognises dead and damaged body cells could modernise vaccine technology by 'tricking' cells into launching an immune response, leading to next-generation vaccines that are more specific, more effective and have fewer side-effects.

Dr Peter Czabotar, Dr Jian-Guo Zhang, Dr Mireille Lahoud and Professor Ken Shortman made the discovery, through collaboration between the institute's Structural Biology, Cancer and Haematology and Immunology divisions.

Dr Czabotar said the research team showed for the first time how a protein, called Clec9A, on the surface of dendritic cells recognises dangerous damage and trauma that could signify infection.

"Solving the structure of Clec9A allowed us to identify key parts of the protein that bind to the ligand," Dr Czabotar said. "This helped us to discover that dendritic cells recognise and bind to internal cell fibres called actin via the Clec9A protein receptor."

Actin is a highly conserved protein found in all cells of the body. It is only exposed when the cell is damaged or destroyed, so is a great method for immune cells to recognise potentially dangerous changes in the body.

Professor Shortman said exploiting Clec9A could be used to generate a new, more modern class of vaccines that are more effective and have fewer side-effects. "The Clec9A protein is one of the best targets currently known for improving immune responses," he said. "By creating vaccines that bind to Clec9A, we can trick dendritic cells to think they have encountered a damaged cell and help to launch an immune response to the infectious agent of our choice."

**Collaborating organisations:** Burnet Institute, Campbell Family Institute for Cancer Research/Ontario Cancer Institute, Monash University, National University of Singapore, New York Blood Center, Toronto General Research Institute/University Health Network and The University of Melbourne.

**Funding partners:** Australian Research Council, National Health and Medical Research Council of Australia and the Victorian Government.

**More information:** Zhang JG, Czabotar PE, Policheni AN, Caminschi I, Wan SS, Kitsoulis S, Tullett KM, Robin AY, Brammananth R, van Delft MF, Lu J, O'Reilly LA, Josefsson EC, Kile BT, Chin WJ, Mintern JD, Olshina MA, Wong W, Baum J, Wright MD, Huang DC, Mohandas N, Coppel RL, Colman PM, Nicola NA, Shortman K, Lahoud MH. The dendritic cell receptor Clec9A binds damaged cells via exposed actin filaments. *Immunity.* 2012 Apr 20; 36(4): 646-57.

## CASS Foundation: supporting our early-career researchers

**Travelling to conferences overseas to hear the latest research developments and meet possible future collaborators is an important opportunity for early-career researchers.**

The CASS Foundation, a private philanthropic foundation, provides this opportunity by awarding travel grants to help early-career postdoctoral researchers attend overseas conferences, furthering their professional development and helping them to establish contact with their international peers.

Dr Geoffrey Kong from the institute's Structural Biology division was awarded a CASS travel grant during the year to fund his attendance at the *Gordon Research Conference on Three Dimensional Electron Microscopy*, held in Switzerland in May 2012.

Dr Kong is studying the structure of the insulin receptor and the related type 1 insulin-like growth factor receptor (IGF-1R). Both receptors are of interest due to their link with diabetes and cancer.

"IGF-1R is over-expressed in many cancer types and is responsible for tumour growth, transformation and metastasis, while the insulin receptor is emerging as a link between obesity, diabetes and cancer," Dr Kong said. "Unravelling the details of how these receptors function normally is an important step in understanding their functions in the disease states and, in the longer term, the development of targeted therapeutics."

Dr Kong is using cryo-electron microscopy to study the three-dimensional structures of the receptors, with and without insulin and insulin-like growth factor bound, which involves the direct imaging of protein molecules at cryogenic (liquid nitrogen) temperatures.

Dr Kong said the Gordon conference was regarded as the most important annual meeting dedicated to this field. "The use of cryo-electron microscopy for determining protein structures is an emerging field in Australia and few people are familiar with the techniques," Dr Kong said. "The conference is attended by many major research groups worldwide, including leaders in the field, and is an ideal forum for learning about the latest and the best that the electron microscopy field has to offer."

**Dr Geoffrey Kong**

## Major national and international meetings

**Jeff Babon**

37th Lorne Conference on Protein Structure and Function, Lorne, Australia, 02/12, *Keynote speaker*

**Matthew Call**

Australia and New Zealand Society for Magnetic Resonance (ANZMAG) 2011 Conference, Torquay, Australia, 11/11, *Invited speaker*

17th International Biophysics Congress (International Union of Pure and Applied Biophysics), Beijing, China, 10/11, *Invited speaker*

IgV retreat, Geelong, Australia, 09/11, *Invited speaker*

**Peter Colman**

2011 Cold Spring Harbor Asia Conference on Protein Structure Based Drug Design, Suzhou, China, 09/11, *Invited speaker*

Australia-France Symposium, Canberra, Australia, 11/11, *Invited speaker*

Max Planck Institute, Huber 75th birthday symposium, Munich, Germany, 02/12, *Invited speaker*

**Peter Czabotar**

Erice Crystallography Conference, Erice, Sicily, 06/12

First Australian Workshop on Cell Death: Death on the Reef, Lindeman Island, Australia, 08/11, *Oral presentation*

**Doug Fairlie**

Cold Spring Harbor Cell Death Conference, New York, United States, 10/11, *Invited speaker*

**Jacqui Gulbis**

Australian Course in Advanced Neuroscience, North Stradbroke Island, Australia, 04/12, *Invited speaker*

**Geoffrey Kong**

Australian Research Council Centre of Excellence for Coherent X-ray Science Workshop: Facilitating imaging and biophotonics, Melbourne, Australia, 10/11, *Invited speaker*

Bio21 Biological Electron and Advanced Microscopy (BEAM) Workshop, Melbourne, Australia, 09/11, *Invited speaker*

IGF-Oz 2011: The IGF system and related proteins in development and disease, Melbourne, Australia, 10/11, *Invited speaker*

**Mike Lawrence**

Australian Synchrotron Users Meeting 2012, Melbourne, Australia, 12/11, *Invited speaker*

XXII Congress and General Assembly International Union of Crystallography, Madrid, Spain, 08/11, *Oral presentation*

**Shenggen Yao**

Australia and New Zealand Society for Magnetic Resonance (ANZMAG) 2011 Conference and Bruker Biospin NMR Users Meeting, Torquay, Australia, 11/11, *Oral presentation*

## Staff list

Helen Barry, BA *Melbourne*, PostGradDipArts *Melbourne*, administrative officer
Pauline Drum, GradDipBus *Swinburne*, personal assistant (from 06/12)

**Peter Colman,** BSc(Hons) *Adelaide* PhD *Adelaide* HonDSc *Sydney* FAA FTSE

Peter Czabotar, BSc *Curtin* PhD *Curtin*
Mark Hinds, BSc *Auckland* MSc(Hons) *Auckland* PhD *Auckland*
Adeline Robin, MSc *Louis Pasteur* PhD *Basel*
Yibin Xu, BSc *China* MSc *China* PhD *ANU*
Shenggen Yao, MSc *China* PhD *UNSW* (to 05/12)

Geoff Thompson, BSc(Hons) *Melbourne*
Ahmad Wardak, BSc(Hons) *LaTrobe*

Jason Brouwer, BBiomedSc(Hons) Monash, PhD student (from 02/12)
Keith Khoo, BBiomedSc(Hons) Melbourne, PhD student
Michael Roy, LLB *Melbourne* BSc(Hons) *Melbourne*, BSc(Hons) student (to 11/11)

**Jeff Babon,** BSc(Hons) *Melbourne* PhD *Melbourne*

James Murphy, BSc(Hons) *Canterbury* PhD *ANU*

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Eden Whitlock, BBiotech(Hons) *LaTrobe*

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**Tony Burgess,** BSc(Hons) *Melbourne* PhD *Melbourne* AC FAA FTSE (from 06/12)

Nadia Kershaw, MChem *Oxford* PhD *Oxford* (from 06/12)
Lauren King, BSc(Hons) *Glasgow* PhD *Glasgow* (from 05/12)
Chin Wee Tan, BECompEng(Hons) *Singapore* MBiomedEng *Melbourne* PhD *Melbourne* (from 05/12)

Nicole Church, BAppSc *RMIT* (from 06/12)
Melanie Condron, BSc(Hons) *LaTrobe* (from 06/12)
Yumiko Hirokawa, MVSc *Japan* (from 06/12)

Shabnam Khatibi, BSc *Sharif*, Visiting PhD student (from 06/12)
Pheng Wong, BSc *Putra* MSc *Leicester*, PhD student (from 06/12)
Kelvin Yip, BSc *Hong Kong* M.Phil *Hong Kong*, PhD student (from 06/12)

**Matt Call,** BSc *Trinity* PhD *Harvard*

**Melissa Call,** BSc *Auckland* MSc *Auckland* PhD *Auckland*

Pooja Sharma, BPharm IIT-BHU, *India* PhD *Monash*

Mariam Lutfi, BSc *Simon Fraser* BSc(Hons) *Melbourne* (from 07/11)

Eamon Byrne, BA *Melbourne* BSc *Melbourne*, BSc(Hons) student (from 02/12)
Logesvaran Krshnan, BSc *Melbourne*, BSc(Hons) student (from 02/12)

**Doug Fairlie,** BSc(Hons) *Monash* PhD *Monash*

Erinna Lee, BSc *Melbourne* PhD *Melbourne*

Marco Evangelista, BBiotech(Hons) *Adelaide*
Anne Pettikiriarachchi, BSc(Hons) *Monash*

Nicholas Lim, BSc *Melbourne*, BSc(Hons) student (from 02/12)
Helen McRae, UROP student (from 11/11)

**Jacqui Gulbis,** BSc(Hons) *LaTrobe* PhD *LaTrobe*

Lukasz Kowalczyk, MSc *Gdansk* PhD *Gdansk* (from 08/11)
Kaavya Krishna Kumar, BSc *Madras* MSc *Madras*, PhD *Sydney* (from 05/12)
Rasmus Linser, DipChem *Goetting* PhD *Berlin* (from 06/12 to 06/12)
Conny Ludwig, BSc(Hons) *Edinburgh* PhD *Edinburgh* (to 01/12)
David Miller, BSc(Hons) *Wellington* PhD *Bristol* (from 03/12)

Pauline Crewther, BSc(Hons) *Melbourne* MSc *Melbourne*
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Agalya Periasamy, BBiomedSc(Hons) India MSc *Flinders* (from 11/11)
Katrina Black, UROP student (from 07/11)

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Colin Ward, BSc(Hons) *UNSW* PhD *UNSW* FAA

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# Bioinformatics

**New genomic technologies are revolutionising biomedical research and the Bioinformatics division continues to be at the forefront of these developments.**

The division develops new computational and statistical methods to analyse and interpret genomic data, and works collaboratively with other institute divisions to research a number of diseases including breast cancer, malaria and immune disorders.

The division has played a leading role in sequencing the genome of several iconic Australian animals. In the past year, Dr Tony Papenfuss, Professor Terry Speed and colleagues sequenced the complete genome of the tammar wallaby, drawing from it important insights into the evolution of mammalian reproduction and development. Dr Papenfuss also took part in a large collaboration to sequence the genome of the Tasmanian devil, and the devil facial tumour disease genome, with potential implications for controlling this devastating disease currently threatening Tasmanian devils' survival.

In other developments, Dr Melanie Bahlo and colleagues discovered the genetic mutation that causes the hereditary disease adult onset neuronal lipofuscinosis. This discovery paves the way for genetic testing of some families, which might avoid invasive diagnostic brain biopsies. Dr Bahlo also showed that traditional identity-by-descent analyses could be readily applied to next-generation sequencing (NGS) data, leading to improved power for the discovery of disease-causing variants in family studies.

A number of important methodological contributions were also published in the past year. Professor Speed showed how to improve the quality of both microarray and NGS datasets. Professor Gordon Smyth developed tools to analyse changes in gene activity in complex biological experiments using NGS technologies (see opposite page).

### Laboratory heads

**Dr Melanie Bahlo**

**Dr Tony Papenfuss**

**Professor Gordon Smyth**

**Professor Terry Speed**
Division head

**Dr Tony Papenfuss has used his bioinformatics expertise to help in large projects that have sequenced the Tasmanian devil facial tumour disease genome and the genome of the tammar wallaby.**

## Finding the cell changes that cause disease

**High-throughput screening and next-generation sequencing are new technologies that are revolutionising medical research.**

RNA-Seq is a recently developed high-throughput sequencing technology that is dramatically faster than standard DNA sequencing, and provides scientists with much more detail about how genes are regulated and expressed than any earlier technology.

New tools developed by Professor Gordon Smyth and colleagues from the institute's Bioinformatics division are allowing researchers to use RNA-Seq technology to more accurately determine how gene expression is altered in the development of cancers and in response to cancer treatments.

Professor Smyth said RNA-Seq allowed scientists to investigate the differences in expression of tens of thousands of genes at once in far more detail than ever before. "Next-generation sequencing is a revolutionary technology for science, however it is also enormously challenging because it generates vast amounts of data which require sophisticated mathematical and statistical algorithms to give meaning to the information," he said. "We have developed new tools that will enable scientists around the world to analyse their complex experiments and correctly identify which genes are changing with greater powers of detection and with fewer errors."

Professor Smyth said the statistical tools would be very useful in cancer research. "Using these tools, researchers will be able to more accurately determine whether gene expression is genuinely changing in response to a particular anti-cancer treatment, providing extremely valuable information about the treatment's effectiveness," he said. "They will also be able to compare normal, healthy tissues and cells that have transformed to become malignant cells to find the genes, molecular pathways and proteins that have changed to drive tumour growth."

The tools allow researchers to estimate biological variability in studies where the sample sizes are necessarily small, which was previously not possible using RNA-Seq technologies, Professor Smyth said. "We refer to it as borrowing strength between genes; using sophisticated mathematics to get some idea of the overall variability from all genes, an idea of the gene-specific variability as well, and compromising between the two," Professor Smyth said. "It allows researchers to identify genetic changes when they have only very small sample sizes, giving a reliable and complete picture about the cancer where before you may not have been able to do it at all."

**Funding partners:** National Health and Medical Research Council of Australia and the Victorian Government.

**More information:** McCarthy DJ, Chen Y and Smyth GK. Differential expression analysis of multifactor RNA-Seq experiments with respect to biological variation. *Nucleic Acids Res*. 2012 May; 40(10):4288-97.

**Professor Gordon Smyth**

## Statistics solving malaria questions

**Each year more than 250 million people worldwide contract malaria, and up to one million people die, particularly children under five and pregnant women.**

A generous donation of $10,000 supported a joint project between researchers from the Bioinformatics and Infection and Immunity divisions, with colleagues from the Swiss Tropical and Public Health Institute, Switzerland, to improve the understanding, prevention and treatment of malaria in Papua New Guinean children.

The donation from Professor Howard D'Abrere helped to fund a PhD student supervised by Bioinformatics division head Professor Terry Speed to analyse data from 264 children aged between one and three to understand how infection with different parasites affects a child's chance of developing severe malaria.

"Children with severe malaria are often infected with two, or occasionally more, parasites at once," Professor Speed said. "We wanted to answer the question: is a child more or less likely to develop severe malaria if they are infected by both the *Plasmodium falciparum* and *Plasmodium vivax* malaria parasites, in comparison with being infected by only one of the two?"

Professor Speed and PhD student Kathryn Benton are developing statistical approaches they hope will enable them to answer this question. "This is not entirely straightforward, as the child's age, exposure to mosquitoes, and other factors such as use of insecticide-impregnated bed nets must be taken into account," Professor Speed said.

Bioinformatics has become an increasingly sought-after research area to answer questions about cancer, malaria and many other diseases. "We work on a number of projects including searching for the cells at the origin of breast cancers, the genes that cause genetic and hereditary diseases and how cancers develop," Professor Speed said. "Our collaborators tell us the questions they want to address and we take their data, and try to develop mathematical, statistical or computational methods that help us tease out the answers."

## Major national and international meetings

**Melanie Bahlo**

BioInfoSummer 2011, Melbourne, Australia, 12/11, *Invited speaker*

Conference for the International Federation of Operational Research Societies 2011, Melbourne, Australia, 07/11, *Invited speaker*

Genetics Society of Australia annual meeting, Melbourne, Australia, 07/11, *Oral presentation*

International Stroke Genetics meeting, Newcastle, Australia, 04/12, *Keynote speaker*

**Anthony Papenfuss**

Australian Society of Microbiology annual meeting 2011 Tasmanian devil workshop, Hobart, Australia, 04/07, *Invited speaker*

BioInfoSummer 2011, Melbourne, Australia, 05/12, *Invited speaker*

ComBio, Cairns, Australia, 09/11, *Invited speaker*

Genetics Society of Australia Annual Meeting, Melbourne, Australia, 11/07, *Oral presentation*

Next-generation deep sequencing technologies workshop, Sydney, Australia, 07/11, *Invited speaker*

**Gordon Smyth**

Bioconductor Conference, Seattle, United States, 07/12, *Invited speaker*

**Terry Speed**

AEMC Seminar, New York, United States, 04/12, *Invited speaker*

Centre for Genomic Regulation annual symposium, Barcelona, Spain, 11/11, *Invited speaker*

Computational Biology Symposium, Los Angeles, United States, 04/12, *Keynote speaker*

Conference on New Statistical Methods for Next Generation Sequencing Data Analysis, Ames, United States, 05/12, *Plenary speaker*

Critical Assessment of Massive Data Analysis 2011, Vienna, Austria, 07/11, *Invited speaker*

European Molecular Biology Laboratory 2011, Heidelberg, Germany, 09/11, *Distinguished lecture talk*

Human Genome Meeting 2012, Sydney, Australia, 03/12, *Invited speaker*

Multiple Comparison Procedures 2011, Maryland, United States, 07/11, *Keynote speaker*

National Science Foundation Workshop for High-Dimensional Data, New Haven, United States, 06/12, *Invited speaker*

Pao-Lu Hsu Lecture on Statistical Machine Learning and Applications, Beijing, China, 05/12, *Lecture*

Stanford School of Medicine, Workshop in Biostatistics, Stanford, United States, 02/12, *Invited speaker*

## Staff list

Maria Markovic, BA *RMIT* DipEd *LaTrobe*, Administrative officer

**Terry Speed,** BSc(Hons) *Melbourne* DipEd *Monash* PhD *Monash* HonDSc UWA FAA

Kathryn Benton, BSc *Colorado* MSc *Tulane* (from 07/11 to 08/11)
Zhi-Ping Feng, BSc *Peking* MSc *Tianjin* PhD *Tianjin*
Rafael Irizarry, PhD *Berkeley* (to 08/11)
Jason Li, PhD *Melbourne*
Helen Lindsay, BSc *Newcastle* BSc(Hons) *ANU* PhD *ANU* (to 05/12)
Amsha Nahid, BSc *Punjab* MSc *Punjab* PhD *Massey* (from 07/11)
Martin O'Hely, BSc(Hons) *Monash* MA *Minnesota* PhD *Minnesota*
Moshe Olshansky, BSc *Israel* PhD *Columbia*
Mark Robinson, BSc(Hons) *Guelph* PhD *British Columbia* (to 07/11)
Matthew Wakefield, BSc(Hons) *Melbourne* PhD *LaTrobe*

Eugene Kapp, BSc(Hons) *Rhodes* MSc *Rhodes*, proteomics bioinformatics specialist

Ben Lansdell, BSc(Hons) *Melbourne* MSc *Melbourne*, visiting PhD student (to 08/11)
Joyce Lin, Visiting PhD student (to 05/12)
Alena Mysickova, BSc *Humboldt* MSc *Humboldt*, visiting PhD student (from 12/11 to 05/12)
Tom Taverner, BSc(Hons) *Melbourne* PhD *Cambridge*, visiting Masters student

**Melanie Bahlo,** BSc(Hons) *Monash* PhD *Monash*

Dimitar Azmanov (from 09/11 to 09/11)
Thomas Scerri, BSc UCL MSc *Birbeck* DPhil *Oxford*
Jim Stankovich, BA(Hons) *Melbourne* PhD *Melbourne* (from 02/12)
Natalie Thorne, BSc(Hons) *Melbourne* PhD *Melbourne*

Catherine Bromhead, BSc(Hons) *Melbourne* (to 11/11)
Luke Gandolfo, BA(Hons) *Monash* BSc(Hons) *Monash* MA *Monash*
Vesna Lukic, BEng(Hons) *Melbourne* BSc *Melbourne* MSc *Melbourne* (from 11/11)
Rick Tankard, BSc(Hons) *Melbourne*

Peter Hickey, BSc (Hons) *Melbourne*, DipArts(HPS) *Melbourne*
Dineika Chandrananda, BSc(Hons) *Auckland*, MSc *Auckland*, PhD student
Peter Diakumis, BSc *Athens*, visiting Masters student (from 06/12)
Karen Oliver, visiting Masters student (from 07/11)
Katherine Smith, BSc(Hons) *Melbourne* MBiostat *Melbourne*, PhD student

Andrew Bennett UROP student (from 12/11)
David Wakeham, UROP student (from 07/11)

**Anthony Papenfuss,** BSc(Hons) *Monash* PhD *Monash*

Vincent Corbin, BSc *Florida* MSc *Montana* PhD *Montana*
Arthur Hsu, BA *Melbourne* BE *Melbourne* PhD *Melbourne*
Jan Schroeder, MSc *Christian-Albrechts* PhD *Melbourne* (from 12/11)

Mark Kowarsky

Ehtesham Mofiz, BSc *North South*, PhD student
Xi Yao, visiting PhD student (from 02/12 to 06/12)

Lachlan McIntosh, UROP student (from 07/11)
Samuel Robinson, visiting PhD student (from 06/12)

**Gordon Smyth,** BSc(Hons) *UWA* PhD *ANU*

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Yang Liao, BCompSc *Tsinghua* MIT *Melbourne*
Cynthia Liu, BSc *Melbourne*
Keith Satterley, BSc *Melbourne* DipEd *Melbourne* DipCompSci *LaTrobe*, senior programmer

Andy Chen, BSc(Hons) *Melbourne*, PhD student
Joshy George, ME *Bangalore*, visiting PhD student
Charity Law, BSc(Hons) *Melbourne*, PhD student
Aaron Lun, BSc(Hons) *Sydney*, PhD student (from 02/12)
Davis McCarthy, BA *Melbourne* BSc(Hons) *Melbourne*, visiting PhD student (from 06/12 to 06/12)
Belinda Phipson, BSc(Hons) *KwaZulu-Natal* MSc *KwaZulu-Natal,* PhD student

# Infection and Immunity

**Infectious diseases caused by parasites, bacteria and viruses are a major health burden and can result in death, disability, and social and economic disruption for millions of people globally.**

Malaria, tuberculosis and HIV cause significant death and disease, particularly in developing countries. In the Infection and Immunity division, we aim to understand how infectious agents cause human disease and use this knowledge to develop new treatments.

A highlight in the division this year has been work identifying novel avenues for treating malaria. In a newly designed mouse model, we showed that combination treatment with antimalarial drugs and synthetic anti-inflammatory compounds based on natural host defence (innate defence regulator or IDR) peptides can increase the survival of mice with cerebral malaria (see opposite page).

In a human clinical trial based in Papua New Guinea (PNG) we showed that the use of intermittent preventive treatment with a combination of antimalarial drugs significantly improved the prevention of malaria and anaemia in infants living in a region of PNG highly endemic for *Plasmodium falciparum* and *Plasmodium vivax* malaria (see opposite page).

The malaria parasite infects humans by invading red blood cells where it can access the nutrients it requires for survival. An important aim of the division has been to understand how the parasite evades the host immune system, as this has important implications for the development of new treatments. We identified a new protein called PfSET10 in *P. falciparum* that is central to the parasite's ability to evade host immune responses by varying proteins recognised and targeted by the immune system.

Our work on chronic infectious diseases has progressed significantly with the development of preclinical models of hepatitis B that will allow us to test new therapeutics. We are also in the process of developing mouse models with human immune systems that will more accurately reflect human disease states, aiding development of new therapies for treating HIV and malaria.

## Laboratory heads

**Dr Alyssa Barry**

**Dr Jake Baum**

**Dr Justin Boddey**

**Professor Alan Cowman**
Division head

**Dr Diana Hansen**

**Professor Ivo Mueller**

**Dr Marc Pellegrini**

**Professor Louis Schofield**

**Dr Chris Tonkin**

**Professor Ivo Mueller led the team that showed malaria infections among Papua New Guinean infants could be cut by 30 per cent by giving the infants a combination of antimalarial drugs intermittently over 12 months.**

## Improving malaria survival and treatment

**Malaria kills up to one million people worldwide every year, particularly children under five and pregnant women.**

Two research teams from the institute's Infection and Immunity division are looking for ways to improve treatment for, and survival from, malaria infection and its complications.

A study led by Professor Ivo Mueller showed malaria infections could be cut by up to 30 per cent among Papua New Guinean infants given a combination of antimalarial drugs intermittently over 12 months.

The three-year clinical trial showed the most effective treatment was a combination of long-lasting antimalarials sulfadoxine/pyrimethamine and amodiaquine (SP-AQ). The treatment decreased infant infections with *Plasmodium falciparum* malaria by 35 per cent and *Plasmodium vivax* malaria by 23 per cent; the first time antimalarial drugs have been shown to prevent infections by both malaria species.

Infants were protected for at least six weeks after the end of treatment, showing that the drugs had an ongoing protective effect and did not hinder natural immunity. "This treatment is a cheap and easy way to decrease the burden of malaria in those most susceptible to clinical illness, such as young infants and pregnant women," Professor Mueller said.

In another study, researchers Dr Ariel Achtman, Dr Sandra Pilat-Carotta and Professor Louis Schofield showed that a new class of anti-inflammatory agents called IDR (innate defence regulator) peptides could help to increase survival from severe clinical malaria when used in combination with antimalarial drugs.

IDR peptides were developed at the University of British Columbia, Canada, and enhance the beneficial aspects of the initial immune response, while dampening harmful inflammation.

Dr Achtman said IDR peptide treatment, when used with standard antimalarial drugs, improved survival in mouse models of cerebral malaria infection. "Cerebral malaria, which causes brain damage, is actually the result of the immune system trying to fight infection and causing collateral damage. IDR peptides help to improve survival by preventing the immune system from causing this irrevocable brain and tissue damage," she said.

**Collaborating organisations:** Barcelona Centre for International Health Research, Burnet Institute, Case Western University, Papua New Guinea Institute of Medical Research, Simon Fraser University, Swiss Tropical and Public Health Institute, The Irish Agriculture Food Development Authority, The University of Melbourne, University of Basel and University of British Columbia.

**Funding partners:** Grand Challenges in Global Health Research program through the Foundation for the National Institutes of Health and Canadian Institutes of Health Research, National Health and Medical Research Council of Australia, The Bill & Melinda Gates Foundation and the Victorian Government.

**More information:** Senn N *et al.* Intermittent preventive treatment for malaria in Papua New Guinean infants exposed to *Plasmodium falciparum* and *P. vivax*: a randomized controlled trial. *PLoS* Medicine. 2012; 9(3):e1001195.

Achtman AH *et al.* Effective adjunctive therapy by an innate defense regulatory peptide in a preclinical model of severe malaria. *Science Translational Medicine*. 2012; May 23;4(135):135ra64.

## Gates Foundation supports world-first malaria vaccine

**Malaria is a major disease and economic burden in developing nations. More than half the world is at risk from malaria, a parasitic disease that infects more than 225 million people per year, resulting in up to one million deaths.**

The Bill & Melinda Gates Foundation, through its Grand Challenges Explorations program, is supporting malaria researcher Professor Louis Schofield in a project to develop the world's first carbohydrate-based malaria vaccine.

The vaccine targets an essential *Plasmodium* parasite carbohydrate called GPI (glycosylphosphatidylinositol). Professor Schofield said GPI was a parasite toxin that had previously been identified as a major determinant in the severity and fatality of malarial disease.

"The anti-GPI vaccine is novel in that it is the first potential antimalarial vaccine that targets a parasite carbohydrate, rather than a protein," Professor Schofield said. "Malaria parasites invest considerable effort in evading the immune system, continuously modifying their proteins to avoid detection, which is why a malaria vaccine has continued to be elusive. A vaccine that targets a highly conserved carbohydrate target could be especially effective in treating malaria."

The US$1 million funding will allow the team to advance development and preclinical trials that will test the ability of the vaccine to interrupt transmission of the parasite, and decrease the severity of the disease.

"We generated some very encouraging results from a phase I project, also supported by the Grand Challenges Explorations program, that indicated the anti-GPI vaccine could be very useful in both preventing and treating malaria," Professor Schofield said. "The use of a vaccine with anti-toxin properties could help to diminish the disease burden in countries where malaria is endemic, particularly if used in combination with other prevention and treatment strategies."

**Professor Louis Schofield (centre), Dr Sandra Pilat-Carotta (left) and Dr Ariel Achtman.**

## Major national and international meetings

**Jake Baum**

Ninth Protein Island Matsuyama Symposium, Matsuyama, Japan, 09/11, *Keynote speaker*

12th Hunter Cellular Biology Meeting, Pokolbin, Australia, 03/12, *Keynote speaker*

Creative Innovation Ci2011, Melbourne, Australia, 11/11, *Invited speaker*

Gordon Research Conference on Proteolytic Enzymes and their Inhibitors, Lucca, Italy, 06/12, *Keynote speaker*

International Young Researcher Symposium in Zoonosis Control, Sapporo, Japan, 09/11, *Invited speaker*

**Alan Cowman**

Australia-France Symposium, Canberra, Australia, 11/11, *Plenary speaker*

International Meeting of Pathogens, Sao Paulo, Brazil, 08/11, *Plenary speaker*

Molecular Approaches to Malaria, Lorne, Australia, 02/12, *Keynote speaker*

12th Hunter Cellular Biology Meeting, Pokolbin, Australia, 03/12, *Plenary speaker*

**Louis Schofield**

Australasian Vaccines and Immunotherapeutics Development Conference, Brisbane, Australia, 07/11, *Keynote speaker*

Australian College of Tropical Medicine, Cairns, Australia, 07/11, *Plenary speaker*

Culture Systems for Malaria, Tampa, United States, 03/12, *Invited speaker*

Emory Systems Biology Workshop, Atlanta, United States, 04/12, *Invited speaker*

Molecular Approaches to Malaria, Lorne, Australia, 02/12, *Keynote speaker*

## Staff list

Joan Curtis, scientific coordinator

**Alan Cowman,** BSc(Hons) *Griffith* PhD *Melbourne* FAA

Dejan Bursac, BAppSc *RMIT* BSc(Hons) *Melbourne* PhD *Melbourne*
Teresa Carvalho, PhD *Paris* (to 12/11)
Lin Chen, PhD *LaTrobe*
Sara Erickson, BSc *Iowa* MSc *Iowa* PhD *Wisconsin* (from 10/11)
Julie Healer, BSc(Hons) *Glasgow* M.Phil *London* PhD *Edinburgh*
Tony Hodder, BSc(Hons) *Monash* PhD *Monash*
Neta Regev-Rudzki, MSc *Jerusalem* PhD *Jerusalem*
Melanie Rug, PhD *Heidelberg* (to 11/11)
Xavier Sisquella Duran, BSc *Barcelona* MSc *Barcelona* PhD *Barcelona* (from 01/12)
Wai-Hong Tham, BA *California* PhD *Princeton*
Tony Triglia, BSc(Hons) *Melbourne* MSc *Melbourne*
Shiela Unkles, BSc *Glasgow* MSc *Glasgow* PhD *St Andrews* (from 10/11 to 01/12)
Danny Wilson, BSc(Hons) *NTU* PhD *Melbourne*

Sash Lopaticki, BSc(Hons) *VUT*
Jennifer Thompson, MSc *Melbourne*

Brendan Ansell, BA *Melbourne* BSc *Melbourne*, BSc(Honours) student (to 11/11)
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Hayley Bullen, BBiomedSc(Hons) *Melbourne*, PhD student (to 02/12)
Jo-Anne Chan, BBiomedSc(Hons) *Melbourne*, PhD student (to 06/12)
Wieteke Faber-Hoeijmakers, BSc *Radbound* MSc *Radbound*, visiting PhD student (from 01/12 to 02/12)
Clara Lin, BBiomedSc *Melbourne* BSc(Hons) *Melbourne*, PhD student (from 04/12)
Tana Taechalertpaisarn, BSc(Hons) *Chulalongkorn*, visiting PhD student (to 03/12)
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Hayley Stratton, UROP student (from 02/12)

**Alyssa Barry,** BSc(Hons) *UTAS* PhD *Melbourne*

Alicia Arnott, BBiomedSc(Hons) *Deakin* PhD *Monash* (from 02/12)
Mark Schultz, BSc(Hons) *Deakin* PhD *CDU* (to 03/12)

Charlie Jennison, BSc *Leeds* MSc *London* (from 08/11)
Valentine Siba (from 07/11 to 09/11)

**Jacob Baum,** BA(Hons) *Oxford* MA *Oxford* MSc *London* PhD *London*

Paisuke Ito, PhD *Ehime* (from 02/12 to 02/12)

Danushka Marapana, BBiomedSc *Melbourne*
Yan Hong Tan, BSc(Hons) *Melbourne*
*Wilson Wong,* BBiomedSc(Hons) *Monash*

Fiona Angrisano, BBiolSc(Hons) *LaTrobe*, PhD student
Maya Olshina, BSc(Hons) *Melbourne*, PhD student
Noa Pasternak-Dahan, BA *Hebrew* MSc *Hebrew*, visiting PhD student (from 02/12 to 05/12)
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Elizabeth Zuccala, BA *Melbourne* BSc(Hons) *Melbourne*, PhD student

**Justin Boddey,** BBiomedSc(Hons) *Griffith* PhD *Griffith*

Matthew O'Neill, BSc(Hons) *Melbourne*

Michelle Gazdik, BMedChem(Hons) *LaTrobe*, PhD student (from 03/12)
Pravin Rajasekaran, BSc(Hons) *Melbourne*, PhD student (from 01/12)

**Diana Hansen,** BBiolSc *Buenos Aires* PhD *Uppsala*

Lisa Ioannidis, BSc(Hons) *Melbourne* (from 04/12)

Chris Chiu, BSc(Hons) *Adelaide*, PhD student (from 07/11)
Victoria Ryg-Cornejo, BSc *Montpellier* BSc(Hons) *Melbourne*, PhD student

**Ivo Mueller,** MSc *Basel* PhD *Basel*

Celine Barnadas, MSc *Lyon* PhD *Lyon*
Cristian Koepfli, BSc *Zurich* MSc *Zurich* PhD *Basel* (from 03/12)
Suparat Phuanukoonnon, BSc *Thailand* MSc *QUT* PhD *Qld*
Holger Unger, BSc(Hons) *Edinburgh* MB ChB *Edinburgh* MSc LSHTM DTM&H LSHTM (from 12/11)

Raksmei Keo, BAppSc *RMIT* (from 01/12)
Connie Li Wai Suen, BSc(Hons) *LaTrobe* (from 04/12)

Elisheba Malau, visiting GradDip student (to 11/11)
Andreea Waltmann, BA *Monash* BSc(Hons) *Monash*, PhD student (from 11/11)

**Marc Pellegrini,** BSc *Melbourne* MB BS *Melbourne* PhD *Melbourne* FRACP

Cody Allison, BAppSc *QUT* BSc(Hons) *Monash* PhD *Monash* (from 01/12)
Kate Coles, BSc(Hons) *UWA* MB BS *Melbourne* PhD *UWA* (from 02/12 to 06/12)
Gail Cross, BSc *UNSW* MB BS *Monash* (from 02/12 to 06/12)
Gregor Ebert, Dipl. Biol. *Munich* PhD *Munich*

Hamish Scott, BSc(Hons) *UTAS*
James Cooney, BBiotech(Hons) *Flinders* (from 04/12)

Simon Preston, BBiomedSc(Hons) *Monash*, PhD student
Jesse Toe, BSc(Hons) *Melbourne*, PhD student

**Louis Schofield,** BSc *London* MSc *London* PhD Qld

Ariel Achtman, MSc *Freiburg* PhD *London*
Emily Eriksson, MSc *Malmoe* PhD *Melbourne* (from 08/11)
Krystal Evans, BMedChem(Hons) *Wollongong* PhD *Melbourne*
Ramin Mazhari, BSc(Hons) *Justus-Liebig* MSc *Philipps* PhD *Philipps*
Willie Pomat, PhD *UWA* (from 10/11 to 10/11)
Pilar Requena Mendez, BSc *Granada* MSc *Granada* PhD *Granada* (from 01/12 to 02/12)

Amandine Carmagnac, BSc *France*
Wasan Forsyth, BSc(Hons) *Auckland* (from 02/12)
Thuan Phuong, BSc(Hons) *LaTrobe*

Danika Hill, BBiomedSc(Hons) *Adelaide*, PhD student
Natalia Sampaio, BSc(Hons) *UWA*, PhD student (from 01/12)
Stephanie Tan, BBiomedSc(Hons) *Qld*, PhD student (from 02/12)

**Chris Tonkin,** BSc(Hons) *Melbourne* PhD *Melbourne*

Carolina Agop-Nersesian, PhD *Heidelberg* (to 09/11)
Alex Uboldi, BSc(Hons) *Witwatersrand* PhD *Witwatersrand*

James McCoy, BA *Melbourne* BBiomedSc(Hons) *Melbourne*, PhD student
Rebecca Stewart, BSc(Hons) *UWA*, PhD student
Melanie Williams, BBiomedSc *RMIT* BSc(Hons) *Melbourne*, PhD student (from 12/11)

# Immunology

**Our immune systems play a vital role in protecting us from infectious diseases through the coordinated activity of many cell types.**

This remarkable collection of cells detects new infections and remembers those we have seen before to provide long-term, even lifetime, protection. There is a cost, however, to having an active immune system. In some people, the immune system attacks its own tissues, leading to autoimmune diseases such as type 1 diabetes, rheumatoid arthritis and multiple sclerosis. Allergies too are an overreaction of the immune system to harmless materials found in our environment.

Every cell of the immune system must continuously make decisions that affect the health of an individual. Researchers in the Immunology division are committed to understanding how these cellular decisions are made. Understanding these processes will allow us to dampen over-reactive autoimmune and allergic responses, or enhance immunity to boost, where necessary, vaccines for infectious disease or cancers.

Three cell types – T cells, B cells and dendritic cells – are the primary focus of research in the division. Methods to remove the specific auto-reactive T cells that cause type 1 diabetes and coeliac disease have been developed and hold promise in the clinic. Other strategies to prevent tissue graft rejection by targeting molecules on T cells that inhibit their activity are yielding promising results.

This year we also gained new insights into how T and B cells communicate to regulate the antibody response and remember past infections. A novel method for enhancing vaccine efficacy by targeting foreign material directly to dendritic cells (the primary cells responsible for alerting the immune system to infection) was also identified. Catching cells in the act of deciding between fates provided a major insight into how autonomous individual cell decisions can lead to a predictable, reliable and effective immune response (see opposite page).

Together these advances greatly enhance our understanding of immune regulation and progress our goal of developing a computer-based model of immunity that can be used to optimise therapies to promote health.

## Laboratory heads

**Dr Bob Anderson**

**Professor Len Harrison**

**Professor Phil Hodgkin**
Division head

**Associate Professor Andrew Lew**

**Professor Ken Shortman**

**Associate Professor David Tarlinton**

**Professor Phil Hodgkin (far right) and colleagues (from left to right) Ms Jie Zhou, Dr Cameron Wellard, Dr John Markham and Dr Mark Dowling, have shown that cells have some control over their own destiny.**

## Research shows cells influence their own destiny

**B cells, immune cells that make antibodies, can have multiple fates. Some of the more common fates are to die, divide, become antibody-secreting cells or change the antibody they make.**

Researchers from the institute's Immunology division have shown B cells have some control over their own destiny, challenging the commonly-held view that a cell's fate is determined by external cues such as hormones or cell signalling molecules.

Professor Phil Hodgkin, Dr Mark Dowling and colleagues from the institute's Immunology division led the research, in collaboration with mathematician Dr Ken Duffy from the Hamilton Institute, National University of Ireland, Maynooth, and Dr John Markham from National Information and Communications Technology Australia.

The research team recreated the conditions required for 2500 B cells to develop into different cell types and filmed the cells, developing new technology, image analysis and mathematical methods to analyse their behaviour and decisions.

Professor Hodgkin said the cells behaved as though they had internal machines governing their fate. "Each internal machine is like a little clock or timer for each potential fate," he said.

Dr Dowling explained the different fate outcomes resembled a competition. "The cell has internal clocks that 'count down' to each potential outcome, and whichever clock goes off first is the decision the cell makes," he said.

Professor Hodgkin said the external signals did not tell the cells what to do, but did alter the probability of the cell's final fate 'decision'. "We hope to create mathematical models that accurately predict how these external signals interact with internal clocks to alter cell fate, which would help in the design of new immune therapies for autoimmune diseases and improved vaccines," he said.

**Collaborating organisations:** Hamilton Institute at the National University of Ireland, National Information and Communications Technology Australia, Peter MacCallum Cancer Centre.

**Funding partners:** National Health and Medical Research Council of Australia, Science Foundation Ireland and the Victorian Government.

**More information:** Duffy KR, Wellard CJ, Markham JF, Zhou JH, Holmberg R, Hawkins ED, Hasbold J, Dowling MR, Hodgkin PD. Activation-induced B cell fates are selected by intracellular stochastic competition. *Science*. 2012 Jan 20; 335(6066): 338-41.

## Coeliac Australia appeal to support new treatment search

**Coeliac disease, which affects more than one per cent of the population, is caused by an abnormal immune response to gluten. Treatment involves a strict, lifelong, gluten-free diet. Without treatment, patients with coeliac disease have an increased risk of other immune diseases, osteoporosis and some types of cancer.**

Coeliac Australia and the Walter and Eliza Hall Institute have formed a three-year, $570,000 partnership to support critical research required for new treatments and diagnostic tests for coeliac disease.

Funded by an ongoing Coeliac Australia appeal, the partnership aims to develop better treatments for children with coeliac disease, effective treatments following accidental gluten consumption, and a diagnostic test for people already following a gluten-free diet.

Coeliac Australia president Mr Hugh Sheardown praised the research efforts of Dr Bob Anderson and Dr Jason Tye-Din, who lead the institute's coeliac disease research team.

"The research being undertaken is critical to unlocking a greater understanding of coeliac disease, particularly in the under-researched area of children. This is the largest research funding project Coeliac Australia has ever undertaken, and we are very happy to partner with the Walter and Eliza Hall Institute to improve the understanding, diagnosis and treatment of coeliac disease," Mr Sheardown said.

Dr Anderson and Dr Tye-Din's research at the institute has already led to the development of a potential coeliac vaccine, Nexvax2®, currently in clinical trials.

Dr Tye-Din said the Coeliac Australia partnership was very exciting. "We are thrilled that Coeliac Australia is supporting the institute's research. A major focus is understanding the immune response that causes disease in young people, in the hope of developing a treatment for children similar to Nexvax2®. We are grateful for the opportunity to translate these research projects into meaningful outcomes for people with coeliac disease," Dr Tye-Din said.

**Dr Jason Tye-Din is working to understand the immune response that causes coeliac disease in young children.**

## Major national and international meetings

**Maria Esther** Bandala Sanchez

8th Congress of Autoimmunity, Granada, Spain, 05/12, *Oral presentation*

**Jamie Brady**

Transplant Society of Australia and New Zealand (TSANZ), Canberra, Australia, 06/11, *Oral presentation*

**Mark Chong**

Immunology Group of Victoria Annual Scientific Meeting, Geelong, Australia, 09/11, *Invited speaker*

International Symposium of Aging and Autoimmunity, Seoul, South Korea, 12/11, *Invited speaker*

**Len Harrison**

Australian Diabetes Society annual scientific meeting, Perth, Australia, 08/11, *Oral presentation*

41st Australasian Society of Immunology annual scientific meeting, Adelaide, Australia, 12/11, *Invited speaker*

Fourth Australasian Vaccines and Immunotherapeutics Development Meeting, Brisbane, Australia, 05/12, *Invited speaker*

Novo Nordisk Type 1 Diabetes Research and Development Center, Opening Scientific Symposium, Seattle, United States, 06/12, *Invited speaker*

12th Immunology of Diabetes Society Scientific Meeting, Victoria, Canada, 06/12, *Invited speaker*

**Phil Hodgkin**

British Society of Immunology Congress, Liverpool, United Kingdom, 12/11, *Invited speaker*

Cambridge Immunology forum: Systems Immunology: datasets and discovery in the immune system, Cambridge, United Kingdom, 09/11, *Invited speaker*

Computational Immunology Conference, Melbourne, Australia, 04/12, *Invited speaker*

41st Australasian Society of Immunology Annual Scientific Meeting, Adelaide, Australia, 12/11, *Invited speaker*

ICT for Life Sciences forum, Melbourne, Australia, 05/12, *Invited speaker*

Models and Methods for Analysis of Lymphocyte Repertoire Generation, Development, Selection and Evolution research workshop, Jerusalem, Israel, 02/12, *Invited speaker*

12th Hunter Cellular Biology Meeting, Hunter Valley, Australia, 03/12, *Invited speaker*

2011 International Nanomedicine Conference, Sydney, Australia, 07/11, *Invited speaker*

**Andrew Lew**

19th Immunology Group of Victoria annual scientific meeting, Geelong, Australia, 09/11, *Keynote speaker*

29th Transplantation Society of Australia and New Zealand annual scientific meeting, Canberra, Australia, 07/11, *Invited speaker*

**Robyn Sutherland**

Cell Transplant Society - International Xenotransplantation Association 2011 Joint International Congress, Miami, United States, 10/11, *Invited speaker*

30th Transplant Society of Australia and New Zealand (TSANZ) annual scientific meeting, Canberra, Australia, 06/12, *Oral presentation*

**David Tarlinton**

Australasian Society for Immunology NSW/ACT branch retreat, Bowral, Australia, 08/11, *Keynote speaker*

Berlin Life Science Colloquium, Max Planck Institute for Infection Biology, Berlin, Germany, 09/11, *Invited speaker*

41st Japanese Society for Immunology, Chiba, Japan, 11/11, *Plenary speaker*

Gordon Research Conference on Immunohistochemistry and Immunobiology, Les Diablerets, Switzerland, 06/12, *Plenary speaker*

Keystone Symposium: HIV Vaccines and Viral Immunity, Keystone, United States, 03/12, *Plenary speaker*

Sixth Chiba University Global Center of Excellence Symposium, Chiba, Japan, 11/11, *Plenary speaker*

17th International Conference on Lymphatic Tissues and Germinal Centres in Immune Reactions, West Midlands, United Kingdom, 09/11, *Plenary speaker*

**Jason Tye-Din**

Fifth Autoimmunity Conference Asia, Singapore, Singapore, 11/11, *Oral presentation*

## Staff list

Kim McIntosh, BSc(Hons) *Monash* MEnvSc *Monash*, scientific coordinator

**Phil Hodgkin,** BSc(Hons) *UWA* PhD *ANU*

Mark Dowling, BA *Qld* BSc(Hons) *Qld* PhD *Qld*
Melinda Hardy, BSc(Hons) *Qld* PhD *Qld*
Jhagvaral Hasbold, PhD *Budapest* (to 07/11)
Susanne Heinzel, BSc(Hons) *Tuebingen* PhD *Tuebingen*
Mike Inouye, BSc *Washington* MSc *California* PhD *Leiden* (to 03/12)
John Markham, BEng *Swinburne* BSc(Hons) *Melbourne* PhD *Melbourne*
Nadine Taubenheim, PhD *Albert-Ludwigs*
Jason Tye-Din, MB BS *Melbourne* PhD *Melbourne* FRACP
George Varigos, MB BS *Melbourne* PhD *Melbourne*
Cameron Wellard, BSc(Hons) *Melbourne* PhD *Melbourne*

Adam Girardin, BSc *British Columbia* (from 04/12)

Julia Marchingo, BBiomedSc(Hons) *Melbourne*, PhD student
Jessica Moffat, BSc(Hons) *Melbourne*, PhD student
Scott Ritchie, BCompSc *Melbourne*, visiting Masters student (from 08/11 to 03/12)
Jeigh Tiu, BBiomedSc *Melbourne*, BSc(Honours) student (from 02/12)
Jie Zhou, BBiomedSc *Melbourne*, BSc(Honours) student

**Bob Anderson,** BMedSc *Otago* MB ChB *Otago* PhD *Otago* FRACP

Noe Ontiveros-Apodaca, overseas research trainee (to 10/11)

**Len Harrison,** MB BS *UNSW* DSc *Melbourne* MD *Melbourne* FRACP FRCPA

Petra Augstein, BSc *Ernst-Moritz-Arndt* PhD *Ernst-Moritz-Arndt* (to 10/11)
Ilia Banakh, BSc(Hons) *Monash* PhD *Monash*
Esther Bandala Sanchez, BSc(Hons) *LaTrobe* MSc *LaTrobe* PhD *LaTrobe*
Mark Chong, BA *Melbourne* BSc(Hons) *Melbourne* PhD *Melbourne*
Diana Mittag, MSc *Technical* PhD *Johann Wolfgang Goethe* (to 01/12)
John Wentworth, MB BS *Qld* PhD *Cambridge*
Yuxia Zhang, PhD *IMCAS*

Fiona Bell, BA *Melbourne* BSc(Hons) *Melbourne*
Ralph Boehmer, PhD *Hamburg*, technical consultant
Jeanne Butler, BSc(Hons) *UWA*
Gaetano Naselli, BSc *Melbourne*
Alana Neale, BSc(Hons) *Melbourne*
Katrina Ngui, BSc *Melbourne*
Jarrod Skinner, BSc *Deakin* BSc(Hons) *Melbourne*
Natalie Stone, BAppSc *RMIT*
James Wettenhall, BEng(Hons) *Melbourne* BSc(Hons) *Melbourne*, computational scientist (to 04/12)

Priscilla Auyeung, MB BS *Qld*, PhD student
Julian Bosco, BSc(Hons) *UNSW* MB BS(Hons) *UNSW*, PhD student
Marek Cmero, BCom *UWA* BCompSc *UWA*, visiting Masters student (from 07/11)
Ashleigh Keown, BSc *Melbourne*, BSc(Honours) student (from 02/12)
Michelle Low, MSc *Melbourne*, visiting Masters student (from 07/11)
Cathy Qian, overseas research trainee (from 01/12 to 02/12)
Maryam Rashidi, *MD Yazt Azad*, PhD student
Janet Yeo, BSc(Hons) *Melbourne*, PhD student

**Andrew Lew,** BVSc *Melbourne* MVSc *Melbourne* PhD *London*

Emma Carrington, BSc(Hons) *Melbourne* PhD *Melbourne*
Sophie Ko, MSc *Sungkyunkywan University* PhD *Monash*
Robyn Sutherland, BSc(Hons) *Melbourne* PhD *Melbourne*
Yifan Zhan, BMedSci *Jiangxi* MMedSc *Beijing* PhD *Melbourne*
Jiao Zhijun, PhD *Shanghai* (to 10/11)

Jamie Brady, BSc(Hons) *LaTrobe* MSc *Adelaide*
Manuela Hancock, BAppSc *RMIT*

Kevin Chow, MB BS(Hons) *Melbourne*, PhD student (from 04/12)
Tim Johanson, BSc(Hons) *Melbourne*, PhD student
Shirley Seah, BSc(Hons) *Melbourne*, PhD student

**Ken Shortman,** BSc(Hons) *Sydney* PhD *Melbourne* FAA

Irene Caminschi, BSc(Hons) *Murdoch* PhD *UWA* (to 12/11)
Mireille Lahoud, BSc *Monash* BSc(Hons) *Melbourne* PhD *Monash* (to 12/11)
Hae Park, MD *Dong-A* PhD *Dong-A* (from 01/12)

Fatma Ahmet, BSc(Hons) *Melbourne* (to 12/11)
Lauren Cox, BBiomedSc *LaTrobe* (from 02/12)
Susie Kitsoulis, BSc *Monash* (to 12/11)
Priyanka Sathe, BSc *Sydney* BSc(Hons) *Melbourne* (to 08/11)
David Vremec, BAppSc *RMIT*

**David Tarlinton,** BSc(Hons) *Sydney* PhD *Stanford*

Simona Infantino, MSc *Switzerland* PhD *dell'Insubria*

Kim Jacobson, BBiomedSc(Hons) *UTS* PhD *Sydney*

Katja Luethje, PhD *Hamburg*

Victor Peperzak, MSc *Amsterdam* PhD *Netherlands*

Ken Smith, BMedSc *Melbourne* MB BS *Melbourne* PhD *Melbourne* (from 02/12 to 02/12)

Ingela Vikstrom, MSc *Ume* PhD *Ume*

Dimitra Zotos, BBiomedSc(Hons) *Deakin* PhD *Melbourne*

Catherine Chang, BBiomedSc *Melbourne* (from 03/12)
Lingli Li, BSc *Hunan* MSc *Hunan* (from 01/12)
Amanda Light, BAppSc *RMIT*
Kristy O'Donnell, BAppSc *RMIT* BSc(Hons) *Melbourne*

Ivan Fung, BSc(Hons) *Melbourne*, PhD student (from 02/12)

# Cell Signalling and Cell Death

**Some of the pathways that tell a cell whether to continue to survive or to self-destruct also control innate immune responses to viruses and other pathogens.**

Drugs that target these proteins have been designed to cause the death of cancer cells, but might also be used to reduce inflammation in autoimmune disease. The Cell Signalling and Cell Death division studies two families of proteins that inhibit cell death, the Bcl-2 family and IAP (inhibitor of apoptosis) family.

Dr Grant Dewson is studying how Bax and Bak, the two essential pro-death members of the Bcl-2 family, are activated. Dr Dewson and Dr Ruth Kluck, from the Molecular Genetics of Cancer division, have found that these proteins first bind to each other, then bind in higher numbers to form higher-order oligomers. This is the first step in the search for novel drugs that can block cell death when it occurs inappropriately, such as in heart attacks or stroke.

In healthy cells, activation of the Bcl-2 family pro-death molecules Bax and Bak is governed by other Bcl-2 family proteins, which are in turn controlled by a network of signalling pathways. Associate Professor Paul Ekert is investigating such pathways in blood cells that respond to growth factors. He has found that, rather than being simple linear pathways, there is unexpected communication between the pathways controlled by cell signalling hormones (cytokines) involved in inflammation, and those that respond to DNA damage.

Dr John Silke and Professor David Vaux are studying signalling pathways that regulate cell survival independently of the Bcl-2 family. In these pathways the key killers are RIP (receptor-interacting protein) kinases and the enzyme caspase 8. Both classes of proteins are regulated in large part by the IAPs. They have carried out genetic studies to determine the role of IAP proteins during embryo development, and to validate the effects of IAP-antagonist drugs that are undergoing clinical trials for the treatment of cancer. Drs James Vince, Ueli Nachbur and Kate Lawlor have discovered that the IAPs not only regulate cell survival, but also control the level of inflammation in immune responses.

## Laboratory heads

**Dr Grant Dewson**

**Associate Professor Paul Ekert**

**Associate Professor John Silke**

**Professor David Vaux**
Division head

**Dr James Vince is studying inhibitor of apoptosis (IAP) proteins and their role in inflammation.**

## Cancer, development and cell death

**Most of our cells contain mechanisms that enable them to self-destruct.**

This process, called programmed cell death or apoptosis, can cause disease when activated inappropriately such as in heart or brain cells during heart attack or stroke. However if cells fail to kill themselves when they should, they can lead to cancers.

Inhibitor of apoptosis proteins (IAPs) are important for cell survival and the response to certain cell signalling hormones, such as tumour necrosis factor (TNF), involved in immunity. IAP genes are also frequently amplified in cancers. Anti-cancer agents called smac-mimetics that kill cancer cells by targeting and binding the IAPs are currently in clinical trials.

Professor David Vaux and colleagues from the institute's Cell Signalling and Cell Death division are studying how IAPs keep tumour cells alive, as well as looking at the role of IAPs in healthy cells.

Professor Vaux said the research team had identified three IAPs involved in inhibiting cell death. "We don't yet understand precisely what role the IAPs play in the cells of adult organisms, or in the developing embryo," Professor Vaux said. "A better understanding of how IAPs function will help us to reveal the susceptibility of tumour cells to treatment with smac-mimetic agents, and help predict the potential side effects."

The research team looked at mouse models that had different combinations of the IAP genes missing to investigate how the genes function during embryonic development. They found that deleting the gene for one IAP did not significantly affect development. However deleting genes for two IAPs was fatal, proving that they do have some overlapping roles but are essential for normal development.

"We also found IAPs are critical regulators of TNF signalling, and they act in large part by limiting activity of associated proteins called RIP kinases that, left unchecked, cause cell death at the wrong time," Professor Vaux said. "Unravelling the overlapping roles of these proteins will give us a better understanding of how they are involved in diseases such as cancers, trauma and chronic inflammation, and lead to better, more targeted, therapies."

**Collaborating organisations:**
La Trobe University.

**Funding partners:** The Leukemia & Lymphoma Society (US), National Health and Medical Research Council of Australia and the Victorian Government.

**More information:** Moulin M, Anderton H, Voss AK, Thomas T, Wong WW, Bankovacki A, Feltham R, Chau D, Cook WD, Silke J, Vaux DL. IAPs limit activation of RIP kinases by TNF receptor 1 during development. *The EMBO Journal.* 2012 Feb 10; 31(7):1679-91.

## Finding new treatments for childhood cancers

**Neuroblastoma is a rare childhood cancer in which malignant tumour cells form in the nerve tissue of the glands above the kidneys, spinal cord, neck or chest. Approximately 40 children per year are diagnosed with neuroblastoma in Australia, mostly children under five.**

In September 2011 The Scobie and Claire MacKinnon Trust made a grant of $75,000 payable over three years to Associate Professor Paul Ekert for genetic studies into neuroblastoma. Associate Professor Ekert is a clinician-scientist from the institute's Cell Signalling and Cell Death division, who also has an appointment at Melbourne's Royal Children's Hospital.

The Trustees of The Scobie and Claire Mackinnon Trust said they had endeavoured to pursue themes to which Scobie and Claire were particularly sympathetic. "One of our main themes has been child health and welfare and, for this reason, we were particularly attracted to Professor Ekert's neuroblastoma project," they said.

Associate Professor Ekert said the advent of new genetic technologies had begun to shed light on the underlying nature of this disease and the molecular variations that influence response to treatment.

"The project will focus on understanding how different genetic profiles of neuroblastoma can be used to diagnose patients and guide treatment," Associate Professor Ekert said. "Tumours will be profiled for genetic changes that predict better or worse outcomes that may be helpful in guiding treatment for the child. This is a type of personalised medicine which helps each child to have the best possible treatment applied to their particular type of cancer."

The project is a collaboration between Associate Professor Ekert and Dr Francoise Mechinaud and Dr Elizabeth Algar from the Children's Cancer Centre at the Royal Children's Hospital. Associate Professor Ekert said it was an exciting project, bringing together expertise from the institute and the hospital to gain a better understanding of a serious childhood cancer.

"Children with neuroblastoma require multiple invasive surgeries, as well as intensive chemotherapy, and still the outcome is often very poor," Associate Professor Ekert said. "New treatments for this disease are desperately needed, and we look forward to opportunities that will permit the early and realistic trial of new drugs and a more rapid transition to treatments."

Associate Professor Paul Ekert

## Major national and international exchanges

**Gabriela Brumatti**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**Paul Ekert**

Eighth European Workshop on Cell Death (EWCD), Monetier-les-Bains, France, 06/12, *Session chair*

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Session chair*

New Directions in Leukaemia Research, Sunshine Coast, Australia, 03/12, *Oral presentation*

**Joe Evans**

Eighth European Workshop on Cell Death, Monetier-les-Bains, France, 06/12, *Oral presentation*

**Anissa Jabbour**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**Najoua Lalaoui**

Eighth European Workshop on Cell Death, Monetier-les-Bains, France, 06/12, *Oral presentation*

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**Kate Lawlor**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**Donia Moujalled**

Apoptosis and Cancer Conference, Cambridge, United Kingdom, 06/12, *Oral presentation*

Eighth European Workshop on Cell Death, Monetier-les-Bains, France, 06/12, *Oral presentation*

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**Ueli Nachbur**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**James Rickard**

Eighth European Workshop on Cell Death, Monetier-les-Bains, France, 06/12, *Oral presentation*

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**Jarrod Sandow**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

**John Silke**

Cytokine Interest Group Symposium - TNF Family Cytokine Biology and Signalling, Bethesda, United States, 04/12, *Keynote speaker*

Eighth European Workshop on Cell DeathMonetier-les-Bains, France, 06/12, *Keynote speaker and session chair*

Fifth Barossa Meeting on Cell Signalling and Molecular Medicine (Science Among the Vines), Barossa Valley, Australia, 11/11, *Keynote speaker*

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Session chair*

2011 Genes and Cancer Meeting, Warwick University, England, 12/11, *Keynote speaker*

**David Vaux**

Annual Meeting of the Committee of Freedom and Responsibility in the Conduct of Science, Paris, France, 03/12, *Invited participant*

Committee on Publication Ethics meeting, Melbourne, Australia, 10/11, *Invited speaker*

CSIRO Clayton, Melbourne, Australia, 05/12, *Invited speaker*

**James Vince**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

TLROZ 2012, Melbourne, Australia, 05/12, *Oral presentation*

**Lynn Wong**

First Australian Workshop on Cell Death: Death on the Reef, Lindemann Island, Australia, 08/11, *Oral presentation*

## Staff list

Catherine McLean, BA *Melbourne* GradDipGenetCounsell *Charles Sturt,* Scientific Coordinator

**Dave Vaux,** BMedSc *Melbourne* MBBS *Melbourne* PhD *Melbourne* FAA

Kate Lawlor, BSc(Hons) *Melbourne* PhD *Melbourne*
Lisa Lindqvist, BSc(Hons) *McGill* PhD *McGill*
Donia Moujalled, BMedSc(Hons) *LaTrobe* PhD *LaTrobe*
James Vince, BSc(Hons) *Melbourne* PhD *Melbourne*

Catherine Hall, BSc *LaTrobe*

Boon Chai, BSc *Melbourne*, BSc(Honours) student (from 02/12)

**Grant Dewson,** BSc *Nottingham* PhD *Leicester*

Stephen Ma, BBiomedSc(Hons) *Melbourne*
Robert Ninnis, BBiolSc(Hons) *LaTrobe*
Iris Tan, BSc(Hons) *Melbourne* PhD *Melbourne*
Laura Raiti BSc *Melbourne* (to 02/12)

**Paul Ekert,** MBBS *Melbourne* PhD *Melbourne*

Gabriela Brumatti, BSc(Hons) *Sao Paulo* PhD *Sao Paulo*
Anissa Jabbour, BSc(Hons) *Melbourne* PhD *Melbourne*
Jarrod Sandow, BBiotech *Adelaide* BSc(Hons) *Adelaide* PhD *Adelaide*

Carmel Daunt, BSc(Hons) *Melbourne*
Chris Riffkin, BSc(Hons) *LaTrobe*
Natasha Silke, DipLabTech *University of Zürich*

Mimi Bandopadhayay, BBiomedSc(Hons) *Monash* MB BS(Hons) *Monash* FRACP, PhD student (to 08/11)
Stephanie Conos, BA *Melbourne* BSc *Melbourne*, BSc(Honours) student (from 02/12)
Gerda de Vries, BSc *Groningen*, overseas research trainee (from 12/11 to 06/12)
Ben Green, BSc(Hons) *Melbourne*, PhD student (to 03/12)
Ashod Kherlopian, BSc *Monash*, BSc (Honours) student (from 02/12)
Dimitra Masouras, BSc(Hons) *Melbourne*, PhD student
Nisha Narayan, BBiomedSc *Melbourne* BSc(Hons) *Melbourne*, PhD student (from 03/12)
Marika Salmanidis, BSc(Hons) Melbourne, PhD Student
Jolanda Visser, BSc *Groningen*, overseas research trainee (from 12/11 to 06/12)

**John Silke,** BA(Hons) *Cantab* LLB *London* PhD *Zurich*

Joanne Hildebrand, BBiomedSc(Hons) *Melbourne* PhD *Melbourne* (from 02/12)
Najoua Lalaoui, PhD *France*
Ueli Nachbur, PhD *Berne*
Lynn Wong, BSc *Guelph* PhD *Toronto* (to 08/11)

Holly Anderton, BA *Canterbury* BSc(Hons) *Canterbury*
Aleksandra Bankovacki, BSc(Hons) *LaTrobe*
Diep Chau, BSc *Melbourne*
Sukhdeep Spall, BSc *India* MSc *LaTrobe*

Nima Etemadi, BSc *Iran* MSc *LaTrobe*, PhD student
Joseph Evans, BBiomedSc(Hons) *LaTrobe*, visiting PhD student
Timothy Liemar, BSc *Adelaide*, BSc (Hons) student (from 02/12 to 03/12)
James Rickard, BSc *LaTrobe* MSc *LaTrobe*, PhD student
Richelle Spanjers, overseas research trainee (to 07/11)

# Inflammation

**Inflammation is a rapid, protective response that forms part of the body's first line of defence against noxious stimuli.**

Although short-term inflammation is usually beneficial to the host, prolonged inflammation can be harmful and contribute to the development of disease. In the Inflammation division, we aim to understand the biological and molecular mechanisms underlying inflammatory diseases in order to improve prevention, diagnosis and treatment. We use a wide range of experimental techniques to study immune cells, molecular regulators of inflammation, and responses to cell signalling proteins (cytokines).

Neutrophils are white blood cells that play a key role in inflammation and are essential for the immune response, however too many activated neutrophils can lead to inflammatory diseases. Little is known about the control of neutrophil lifespan during infection and inflammation. We have developed software to study the survival of neutrophils and are using this to investigate how molecular regulators control inflammation.

We are interested in two families of proteins that control the inflammatory response to infection, the SOCS (suppressors of cytokine signalling) and TRIM (tripartite motif) proteins. Defining the complexes these proteins interact with will help us to understand how the immune response is regulated. We have solved the crystal structure of the TRIM25 SPRY domain and now seek to understand how it interacts with its binding partners. We have also demonstrated, using a mouse influenza model, the importance of SOCS4 and SOCS5 proteins during viral infection.

Uveitis is a major cause of adult blindness. In collaboration with CSL, we have shown that blocking G-CSF (granulocyte colony stimulating factor), an important neutrophil growth factor, decreases the incidence and severity of uveitis by markedly decreasing migration of neutrophils to the site of inflammation.

Chondrocytes are the resident cells in cartilage and are thought to play a passive role in diseases such as osteoarthritis and rheumatoid arthritis. Our research, however, has shown that they are actively involved in joint inflammation, producing cytokines and chemokines, as well as enzymes that degrade the cartilage matrix. SOCS molecules control these responses.

## Laboratory heads

**Dr Ben Croker**

**Dr Seth Masters**

**Dr Sandra Nicholson**

**Professor Ian Wicks**
Division head

**Dr Seth Masters is studying the role of micro-RNAs in inflammation and in viral infections.**

## Switching off free radicals to control inflammation

**The immune system has evolved to rapidly detect and respond to 'invasion' by infectious agents through the inflammatory response.**

A number of complex 'brakes' or control systems have also evolved in immune cells to ensure that inflammation is short-lived and prevent long-term inflammatory responses that could cause collateral damage and lead to severe or chronic inflammatory diseases.

Inflammation division researchers are studying the cellular production of nitric oxide, a 'free radical' which is a potent frontline killer of infectious agents such as bacteria and viruses. Inducible nitric oxide synthase (iNOS) is an enzyme that is crucial for the production of nitric oxide.

Dr Sandra Nicholson and colleagues have identified a protein, called SPSB1, as a key regulator of the iNOS enzyme. "Nitric oxide is a potent inflammatory molecule that can cause severe tissue damage and toxicity," Dr Nicholson said. "If unregulated, you can end up with inflammation that can be fatal, such as in acute infections which result in sepsis. So nitric oxide production is very tightly monitored and controlled by the cell."

Dr Nicholson said the research team found both iNOS and SPSB1 were rapidly upregulated early in the inflammatory response. "We found that SPSB1 acts as a switch to turn off nitric oxide production by making marks on the iNOS enzyme that label it for degradation," Dr Nicholson said. "SPSB1 and iNOS are produced at the same time by the cell, and SPSB1 acts in a negative feedback loop to modulate the level of iNOS."

The research team is now looking at how targeting this pathway could enhance the anti-infectious action of nitric oxide, while minimising the effects of damaging inflammatory responses. "By disrupting the SPSB1 interaction with iNOS, the effects should only be seen in the target cell where iNOS is produced in response to infection. This strategy would limit the toxicity associated with excessive systemic nitric oxide," Dr Nicholson said.

**Funding partners:** National Health and Medical Research Council of Australia and the Victorian Government.

**More information:** Lewis RS, Kolesnik TB, Kuang Z, D'Cruz AA, Blewitt ME, Masters SL, Low A, Willson T, Norton RS, Nicholson SE. TLR regulation of SPSB1 controls inducible nitric oxide synthase induction. *Journal of Immunology*. 2011 Oct 1; 187(7): 3798-805.


**Dr Sandra Nicholson**

## Funding better diagnostics for acute rheumatic fever

**Acute rheumatic fever is an inflammatory disease caused by an immune reaction to streptococcal bacteria that leads to damage of heart valves and rheumatic heart disease.**

Indigenous Australians have one of the highest rates of rheumatic heart disease in the world, a disease that affects more than 15 million people worldwide and kills more than 200,000 annually. More than 80 per cent of rheumatic fever cases occur in developing countries.

Researchers from the institute's Inflammation division and the Menzies School of Health Research in Darwin were awarded almost $60,000 by the H & L Hecht Trust to develop a better diagnostic test for acute rheumatic fever (ARF), the illness which follows certain streptococcal infections and eventually leads to rheumatic heart disease (RHD).

Professor Ian Wicks, head of the institute's Inflammation division, said despite the global significance of ARF, a simple and effective diagnostic test for the disease does not currently exist.

"Prevention of RHD is dependent on the timely diagnosis and treatment of ARF in high-risk groups," Professor Wicks said. "However, a simple and effective diagnostic test for ARF does not currently exist. We will use new technological platforms to find blood markers for the disease. Hopefully, the generous funding from the H & L Hecht Trust will also enable more targeted therapeutic interventions to improve outcomes for patients and help to diminish the global impact of this preventable disease."

**Professor Ian Wicks**

## Major national and international meetings

**Simon Chatfield**

European League Against Rheumatism Annual European Congress of Rheumatology, Berlin, Germany, 6/12, *Oral presentation*

**Ben Croker**

Keystone Symposia: Cell Death Pathways: Beyond Apoptosis, Banff, Canada, 03/12, *Plenary speaker*

Keystone Symposia: Innate Immunity, Keystone, United States, 03/12, *Plenary speaker*

Lorne Infection and Immunity Conference, Lorne, Australia, 02/12, *Invited speaker*

Salk Symposium on Biological Complexity: Immunity and Inflammation, San Diego, United States, 01/12, *Oral presentation*

TLROZ 2012, Melbourne, Australia, 05/12, *Invited speaker*

**Gabrielle Goldberg**

Eighth International Congress on Autoimmunity, Granada, Spain, 5/12, *Oral* presentation

**Xiao Liu**

Australian Rheumatology Association annual scientific meeting, Canberra, Australia, 5/12, *Oral presentation*

**Seth Masters**

Australian Society of Immunology (Special Interest Group), Adelaide, Australia, 12/11, *Invited speaker*

Australian Society of Immunology annual scientific meeting, Adelaide, Australia, 12/11, *Oral presentation*

French Society of Immunology, Montpellier, France, 11/11, *Invited speaker*

Lorne Infection and Immunity, Lorne, Australia, 03/12, *Oral presentation*

TLROZ 2012, Melbourne, Australia, 05/12, *Invited speaker*

**Annemarie van Nieuwenhuijze**

Australian Rheumatology Association annual scientific meeting, Canberra, Australia, 5/12, *Oral presentation*

**José Villadangos**

Congress of the Brazilian Society of Immunology, Iguaçu, Brazil, 10/12, *Invited speaker*

Fifth Barossa Meeting: Science Amongst the Vines, Barossa Valley, Australia, 11/12, *Invited speaker*

**Ian Wicks**

European Phagocyte Workshop, Budapest, Hungary, 3/12, *Keynote speaker*

## Staff list

Rhiannon Jones, BSc(Hons) *Adelaide* PhD *Adelaide*, scientific coordinator

**Ian Wicks,** MB BS *Sydney* PhD Melbourne FRACP

Gabby Goldberg, BSc(Hons) *Monash* PhD *Monash*
Rowena Lewis, BSc(Hons) *Deakin* PhD *Deakin* (from 02/12)
Willy-John Martin, BSc *Waikato* MSc *Waikato* PhD *Wellington*

Jacinta Grayden, BSc(Hons) *Monash*
Jane Murphy, BSc(Hons) *Adelaide*
Annemarie van Nieuwenhuijze, BSc *Amsterdam* MSc *Amsterdam*

Simon Chatfield, MB BS *Melbourne*, Reid Translational Scholar
Tommy Liu, BSc *Otago* MSc *VUT*, PhD student
Shereen Oon, BMedSc *Melbourne* MB BS *Melbourne*, PhD student (from 02/12)
Bart Pieters, overseas research trainee (from 11/11)

**Ben Croker,** BSc(Hons) *UNSW* PhD *Melbourne*

Motti Gerlic, BBiomedSc *Ben Gurion* PhD *Ben Gurion* (from 07/11)
Man Lyang Kim, BSc *Gyeonsang* MSc *Gyeonsang* PhD *Basel* (from 07/11)

Kate MacArthur, BSc *Melbourne*, BSc(Hons) student (to 11/11)
Jo O'Donnell, BSc(Hons) *Melbourne*, PhD student

**Seth Masters,** BSc(Hons) *Melbourne* PhD *Melbourne* (from 09/11)

Motti Gerlic, BBiomedSc *Ben Gurion* PhD *Ben Gurion*
Man Lyang Kim, BSc *Gyeonsang* MSc *Gyeonsang* PhD *Basel*

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Sarah Freeman, BSc *Melbourne*

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Eddie Linossi, BSc(Hons) *Melbourne*, PhD student

**José Villadangos,** PhD *Madrid* (to 11/11)

Wan Shoo Cheong, PhD *Monash* (to 12/11)
Nishma Gupta, MSc *Madurai* PhD *Madurai* (to 12/11)
Simone Meuter, PhD *Berne* (to 12/11)
Justine Mintern, BSc(Hons) *Melbourne* PhD *Melbourne* (to 12/11)
Sandro Prato, BSc(Hons) *Lausanne* PhD *Melbourne* (to 12/11)
Javier Vega Ramos, BSc(Hons) *Barcelona* PhD *Barcelona* (to 12/11)
Linda Wakim, BSc(Hons) *Melbourne* PhD *Melbourne* (to 12/11)
Yuekang Xu, BA *China* BM *China* PhD *Melbourne* (to 12/11)

Wei Jin Chin, BSc(Hons) *Melbourne* (to 12/11)

Elisa Crisci, overseas research trainee (to 07/11)
Natalie Patterson, BSc(Hons) *Melbourne*, PhD student (to 12/11)
Gabriela Segal, BEng *Chile* BSc *Chile*, PhD student (to 12/11)
Jaris Valencia, BBiolSc *Madrid*, overseas research trainee (from 10/11 to 01/12)
Peter Zeller, MSc *Albert-Ludwigs*, overseas research trainee (to 07/11)

# Molecular Immunology

**Our immune system has the complex task of defending us against potentially harmful microorganisms in our environment, while allowing us to live in harmony with the multitudes of beneficial microbes that occupy our bodies.**

This harmony depends on a network of immune cells whose many and diverse functions provide the checks and balances necessary to control the immune response. The goal of the Molecular Immunology division is to understand how our immune network functions normally and what goes wrong in conditions such as chronic inflammatory (autoimmune) disease and cancers such as leukaemia.

Just when we think that we know all the players in the immune system, immunologists find another. This year much of our attention has focused on a newly identified cell type, T follicular helper cells, which are specialised in promoting antibody responses. In a collaborative project involving members of the Molecular Immunology and Immunology divisions, we discovered that not all T follicular helper cells are alike and some have the ability to persist for long periods after an encounter with a virus, in this case influenza, and to provide immunological memory, the central feature of vaccination and immunity (see opposite page). A related study, led by Associate Professor Lynn Corcoran, examined how T follicular helper cells achieve their function and found that blood hormones (cytokines) IL-6 and IL-21 have an important role.

Researchers in the Molecular Immunology division are also trying to understand how immune cells from a common ancestor are programmed differently to maintain their distinct functions. Dr Gabrielle Belz and Dr Sebastian Carotta are investigating the function of inhibitory molecule Id2 in producing killer T cells and natural killer cells, which fight virus-infected and cancerous cells. Dr Axel Kallies is asking similar questions with regard to another cell programmer, Blimp1. Finally, we are actively translating our fundamental findings to improve health outcomes, highlighted by Dr Li Wu, whose research is deciphering the complexities of human dendritic cell biology.

## Laboratory heads

**Dr Gabrielle Belz**

**Dr Sebastian Carotta**

**Associate Professor Lynn Corcoran**

**Dr Axel Kallies**

**Dr Stephen Nutt**
Division head

**Dr Li Wu**

**Associate Professor Lynn Corcoran is studying the role of blood hormones in the function of specialised immune cells.**

## Rare immune cells could hold key to treating immune disorders

**T follicular helper cells represent less than half of one per cent of all immune cells, but play a critical role in antibody production and developing long-lasting immunity.**

Dr Stephen Nutt, Dr Katja Lüthje and Associate Professor David Tarlinton from the institute's Molecular Immunology and Immunology divisions have found T follicular helper cells can 'remember' infectious agents. Exploiting these cells could help to improve vaccination and lead to new treatments for immune disorders such as chronic inflammatory (autoimmune) diseases.

Dr Nutt said the study showed T follicular helper cells were essential for developing strong and specific antibody responses to infectious agents and could 'remember' being exposed to infectious agents, allowing them to rapidly react to subsequent attacks.

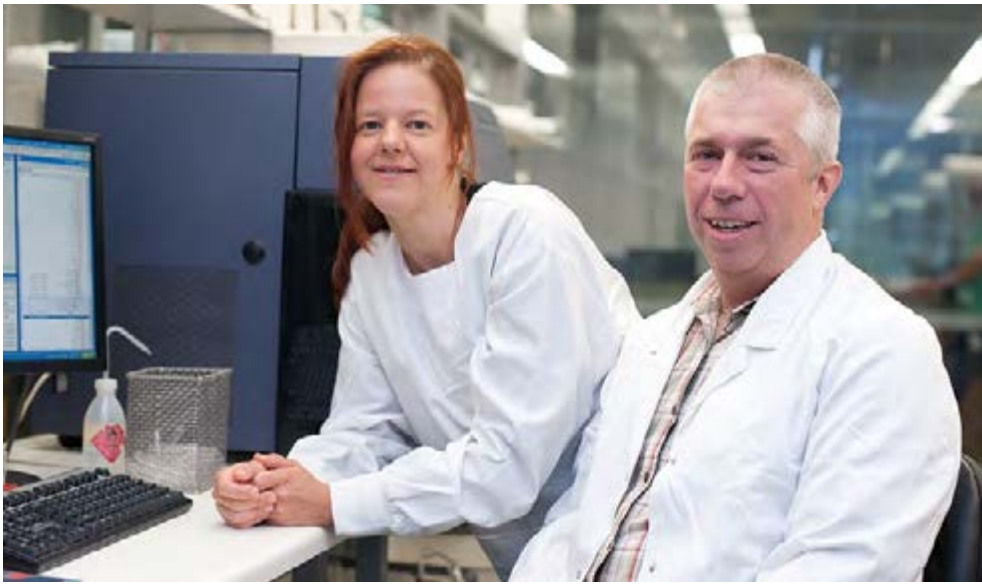
"The success of vaccines relies on antibody production and long-term immune 'memory'. It is well established that antibody-producing B cells can remember a particular infectious agent and rapidly respond when exposed again. Our study shows, for the first time, that T follicular helper cells also develop memory to rapidly respond to infection. This finding is incredibly important for the development of vaccines, which rely on immune memory to prevent subsequent infections," Dr Nutt said.

Associate Professor Tarlinton said the team discovered T follicular helper cells were tightly controlled by the immune system, which might explain why increases in their numbers are associated with chronic inflammatory diseases such as rheumatoid arthritis and lupus. "In some disease models, large numbers of T follicular helper cells are associated with the development of chronic inflammatory diseases and can actually cause autoimmune disease very much like lupus in humans. This suggests that modulating these cells could be a potential treatment for autoimmune conditions."

**Funding partners:** Australian Research Council, German Academic Exchange Service, National Health and Medical Research Council of Australia, Pfizer Australia, Sylvia and Charles Viertel Foundation and the Victorian Government.

**More information:** Lüthje K, Kallies A, Shimohakamada Y, Belz GT, Light A, Tarlinton DM, Nutt SL. The development and fate of follicular helper T cells defined by an IL-21 reporter mouse. *Nature Immunology*. 2012 May; 13(5): 491-8.

**Dr Katja Lüthje (left) and Dr Stephen Nutt discovered a rare immune cell is essential for antibody production and long-lasting immunity.**



## $200,000 support for studying genetic causes of myeloma

**Myeloma is one of the most common types of blood cancer, with more than 1000 Australians diagnosed each year. The risk of developing myeloma increases with age, with almost 80 per cent of new cases in people over 60.**

Myeloma results from mutations that cause uncontrolled growth of plasma cells, rare and highly specialised cells that produce the antibodies essential for protection against infection and immunity after vaccination.

Dr Julie Tellier and Dr Stephen Nutt have been awarded a $200,000 Multiple Myeloma Research Foundation (US) grant to study key plasma cell genes and their role in development of myeloma.

Dr Tellier said the research team would look at the function of molecules called transcription factors which control the development, differentiation and function of immune cells.

"Modern genomics technologies have revealed that altered transcription factor functions are at the heart of most blood cell cancers," Dr Tellier said. "Our research aims to understand how plasma cells are formed and what causes these cells to become cancerous," she said.

Dr Nutt said Irf4 and Blimp1, two particularly important transcription factors for the development of plasma cells, would be the first investigated. "We will use sophisticated DNA screening technologies to understand how Irf4 and Blimp1 control the activity of the plasma cell genome. There is evidence to suggest these proteins are essential for myeloma development, and we are interested in seeing whether inhibiting Irf4 or Blimp1 function impairs cancer growth," he said.

Dr Nutt said although myeloma could be treated with chemotherapy, there was at present no therapy specific for this type of cancer, and no cure. "Our studies, if successful, will highlight Irf4 and/or Blimp1 as important therapeutic targets for this difficult-to-treat blood cancer," he said.

## Major national and international meetings

**Rhys Allan**

Australian Epigenetics Conference, Adelaide, Australia, 04/12, *Oral presentation*

41st Australasian Society of Immunology annual scientific meeting, Adelaide, Australia, 12/11, *Oral presentation*

**Gabrielle Belz**

Australasian Vaccines and Immunotherapeutics Development, Brisbane, Australia, 05/12, *Session chair*

41st Australasian Society of Immunology annual scientific meeting, session chair, Adelaide, Australia, 12/11, *Invited speaker*

**Sebastian Carotta**

New Directions in Leukemia 2012, Sunshine Coast, Australia, 03/12, *Oral presentation*

45th Annual Congress Of The German Society Of Transfusion Medicine, Graz, Austria, 06/12, *Plenary speaker*

XIX Modern Trends in Human Leukaemia and Cancer, Wilsede, Germany, 06/12, *Oral presentation*

**Erika Cretney**

World Immune Regulation Meeting-VI, Davos, Switzerland, 03/12, *Oral presentation*

**Renee Gloury**

19th Annual Conference of the Immunology Group of Victoria (IgV), Geelong, Australia, 09/11, *Oral presentation*

**Nick Huntington**

The Society for Natural Immunity Meeting, Pacific Grove, United States, 04/12, *Invited speaker*

**Axel Kallies**

41st Australasian Society of Immunology annual scientific meeting, Adelaide, Australia, 12/11, *Plenary speaker*

Seventh RIKEN Research Center for Allergy and Immunology International Summer Program, Yokohama, Japan, 06/12, *Invited lecturer*

**Stephen Nutt**

Sixth Gene Expression and Signalling in the Immune System, Cold Spring Harbor, United States, 04/12, *Invited speaker*

10th German B Cell Forum, Kloster Banz, Bavaria, Germany, 03/12, *Keynote speaker*

Thomson Reuters Systems Biology Symposium, Melbourne, Australia, 07/11, *Keynote speaker*

University of Erlangen-Nuremberg Graduate program in Molecular Immunology Symposium, Erlangen-Nuremberg University, Germany, 03/12, *Keynote speaker*

**Li Wu**

22nd Nikolas Symposium on Histiocytosis, Corinth, Greece, 05/12, *Invited speaker*

## Staff list

Kim McIntosh, BSc(Hons) *Monash* MEnvSc *Monash*, scientific coordinator

**Stephen Nutt,** BSc(Hons) *Sydney* PhD *Vienna*

Rhys Allan, BSc(Hons) *Melbourne* PhD *Melbourne*
Michael Chopin, PhD *Dresden*
Erika Cretney, BSc(Hons) *Melbourne* PhD *Melbourne*
Aleksandar Dakic, BSc(Hons) *Melbourne* PhD *Melbourne*
Sheila Dias Dos Santos, BSc *Lisbon* PhD *Paris VI*
Yoko Shimohakamada, MD *Tokyo* PhD *Yamaguchi* (to 01/12)
Julie Tellier, PhD *France* (from 12/11)
Simon Willis, BSc(Hons) *Melbourne* PhD *Melbourne*

Rebecca Thong, BBiomedSc(Hons) *Melbourne*

**Gabrielle Belz,** BVBiol *Qld* BVSc *Qld* PhD *Qld*

Jo Groom, BAppSc *Charles Sturt* BSc(Hons) *Melbourne* PhD *UNSW* (from 11/11)
Frederic Masson, BSc(Hons) *France* MSc *France* PhD *Geneva*
Lisa Mielke, BSc *Melbourne* PhD *Melbourne* (from 01/12)
Adele Mount, BSc(Hons) *Melbourne* PhD *Melbourne*
Cyril Seillet, MSc *France* PhD *France* (from 12/11)

Mary Camilleri

Dane Newman, BEng(Hons) *Deakin* PhD *Deakin*

Janina Findeis, overseas research trainee (from 10/11 to 12/11)
Lucille Rankin, BA *Melbourne* BSc(Hons) *Melbourne*, PhD student

Simone Farrer, BSc(Hons) *Monash* MSc *Melbourne*, editorial assistant

**Sebastian Carotta,** PhD *Vienna*

Nick Huntington, BSc(Hons) *LaTrobe* PhD *Melbourne* (from 10/11)

Pradnya Gangatirkar, MSc *Nagpur*

Louisa Hill, BSc *Germany*, overseas research trainee (from 09/11 to 12/11)

**Lynn Corcoran,** BSc(Hons) *Melbourne* PhD *Melbourne*

Stephane Chevrier, PhD *Lausanne*
Dianne Emslie, BSc(Hons) VUT PhD VUT

Tobias Kratina, BSc(Hons) *Deakin*

**Axel Kallies,** PhD *Free*

Mia Miasari, BSc(Hons) *LaTrobe* PhD *LaTrobe* (to 12/11)
Klaas van Gisbergen, PhD *Netherlands* (from 04/12)
Ajithkumar Vasanthakumar, BSc *Madurai Kamaraj* MSc *Madurai Kamaraj* PhD *Madurai Kamaraj* (from 11/11)
Shoukat Afshar-Sterle, PhD *Adelaide*

Renee Gloury, BSc(Hons) *Melbourne* (from 12/11)

Elien Doorduijn, overseas research trainee (to 08/11)
Kevin Man, BSc *Melbourne* LLB *Melbourne*, PhD student
Anna Scherger, overseas research trainee (to 11/11)

**Li Wu,** MB *Beijing* MMedSc *Beijing* PhD *Melbourne*

Angela D'Amico
Anna Proietto, BSc(Hons) PhD *Melbourne*
Chin Nien Lee, MSc *Taiwan*

Milon Pang, BSc *Murdoch* BSc(Hons) *Melbourne*, PhD student

# Systems Biology and Personalised Medicine

**The Systems Biology and Personalised Medicine division is gaining new insights into how biological systems work by sifting through complex biological data that has been generated using high throughput technologies, and then using this data to identify the most appropriate treatment strategies for patients.**

The goal of the division is to understand how complex biological systems work. Our researchers use large-scale technologies such as genome sequencing and quantitative tandem mass spectrometry to develop this understanding. The very large datasets generated by these technologies are transforming biology into an information-based discipline and forcing us to re-examine how we think about biology.

The emergent field of personalised medicine uses high-throughput biology to drive better therapeutic outcomes for patients. We are using highly specialised equipment to identify molecular patient profiles that will predict which patients are likely to do well and which will do poorly in response to existing therapies. These profiles can then be used to design the best treatment plan for each patient. We have already embarked on a pilot-scale genomic study in which we are analysing the gene sequences of patients with colon cancer (some of whom respond well to chemotherapy and some poorly) to see if we can discover the reasons for this range of responses.

We are currently asking such questions as:

- What are the global changes in biological pathways during tumour formation, maintenance and spread?
- Can cancer patients be stratified into treatment groups based on the their genomic profiles?
- Are there genomic changes in tumours that will allow us to predict disease outcomes more accurately?

In our first year of operation, we have established quantitative proteomics through the formation of the WEHI Proteomics Laboratory and are building our capacity in genome-scale DNA sequencing through the institute's genomics laboratory, which will form the nucleus of the newly established Ian Potter Centre for Genomic and Personalised Medicine (see opposite page).

### Laboratory head

**Professor Liam O'Connor**
Division head

Dr Tom Nebl (right) from the institute's Systems Biology and Personalised Medicine division and Dr Chris Tonkin from the Infection and Immunity division are studying the cell motor in *Toxoplasma* parasites.

## Pinpointing the 'on' switch for parasite entry

**Parasitic infections such as malaria and toxoplasmosis affect hundreds of millions of people worldwide each year, killing millions and causing severe disease and debilitating illness.**

*Plasmodium* and *Toxoplasma* species, which cause malaria and toxoplasmosis respectively, are closely related parasites that must invade the host cell to reproduce and live. Dr Chris Tonkin and Dr Tom Nebl are working to understand the machinery used by the parasites to enter the cell.

Dr Tonkin said both *Plasmodium* and *Toxoplasma* parasites activate a molecular 'motor' to burrow into the host cell. "We are studying this invasion motor complex in *Toxoplasma* in the hope we will be able to identify important 'motor' proteins that could be a potential target for drug treatments for malaria," he said.

Dr Nebl said proteomics technology and techniques were enabling the research team to identify crucial proteins involved in 'flicking the switch' on the parasite motor.

"Proteomics allows us to look at the proteins in the motor complex and see the changes that are made to the proteins after cell signals stimulate the motor and 'flick the switch' to invade a host cell," Dr Nebl said. "Using state-of-the-art proteomics technologies, we were able to compare the motor complex in parasites that are stimulated via a signalling pathway to those that have not been, to see which proteins are altered when the parasite is attempting to invade the cell. It's a really powerful tool to look at how cell proteins behave in a situation that most closely resembles the real cellular environment."

Dr Tonkin said the team identified several proteins that are altered during the motor signalling process. "We've determined a number of proteins that are involved in switching on the invasion motor complex, and we are now looking at the pathways involved to identify potential therapeutic targets for treating malaria and toxoplasmosis," Dr Tonkin said.

**Collaborating organisations:** The Scripps Research Institute.

**Funding partners:** National Health and Medical Research Council of Australia and the Victorian Government.

**More information:** Nebl T, Prieto JH, Kapp E, Smith BJ, Williams MJ, Yates JR 3rd, Cowman AF, Tonkin CJ. Quantitative *in vivo* analyses reveal calcium-dependent phosphorylation sites and identifies a novel component of the *Toxoplasma* invasion motor complex. *PLoS Pathogens*. 2011 Sep; 7(9):e1002222.

## Matching disease treatments to genetic makeup

**The Ian Potter Centre for Genomics and Personalised Medicine is Australia's first research centre devoted to matching disease treatments to a person's genetic makeup. The centre is a collaboration between the Walter and Eliza Hall Institute of Medical Research and Murdoch Childrens Research Institute and is supported by a $3 million grant from The Ian Potter Foundation.**

The centre will offer new insights into childhood and adult diseases with a focus on immune disorders and cancer. In particular, projects will use genomics to examine food allergy in children, juvenile arthritis, leukaemia, neural tumours and colon cancer.

Professor Liam O'Connor, head of the institute's Systems Biology and Personalised Medicine division, said the centre would make discoveries that will allow personalised therapies to be delivered to patients, improving their clinical outcomes.

"One of the first projects at the centre will look at colorectal cancer, which is among the most commonly diagnosed cancers, with more than 1.2 million new cases and 608,700 deaths estimated worldwide per year," Professor O'Connor said. "The goal of this study is simple – to identify a molecular fingerprint by sequencing patients' own (non-cancer) DNA, DNA from tumours, and resulting RNA and proteins, that can predict which patients will do well and which patients will do poorly in response to chemotherapy."

Mrs Janet Hirst, chief executive officer of The Ian Potter Foundation, said the centre would hold a unique place in Australia, offering patients access to the large-scale technologies that have made personalised medicine possible. "We are delighted that Australians will be able to benefit from these pivotal new technologies," Mrs Hirst said. "These new methods provide a window into the micro world of our bodies and we expect they will have a profound impact on the pace of research into cancer and other major health conditions."

**Professor Doug Hilton (left) and Mrs Janet Hirst (centre) with Professor Andrew Sinclair from the Murdoch Childrens Research Institute at the centre opening.**

## Staff list

Lisa Connolly, BSc(Hons) *Melbourne*, scientific coordinator (from 07/11)

**Liam O'Connor,** BSc(Hons) *UWA* PhD *Melbourne*

Nishma Gupta, MSc *Madurai Kamaraj* PhD *Madurai Kamaraj* (to 04/12)
Sam Wormald, BSc(Hons) *Melbourne* PhD *Melbourne* (from 02/12)
Doreen Agyapomaa, BAppSc(Hons) *RMIT* (from 11/11)

Liz Milla, BSc *Deakin* BBiolSc *LaTrobe* (from 11/11)

**Proteomics laboratory**

Giuseppe Infusini, BSc *Naples* PhD *Naples* (from 07/11)

Thomas Nebl, PhD *LaTrobe*

Andrew Webb, BSc *Monash* PhD *Melbourne* (from 07/11)

# Publications

**In 2011-12, the Walter and Eliza Hall Institute again published a record number of scientific papers, with 284 papers published by our researchers.**

As in previous years, a number of institute scientists published in top-tier journals including *Cell*, *Science*, and *Nature*, and associated publications.

In 2011-12, 35 per cent of papers published were in the top 10 per cent of their field, and nine per cent in the top one per cent, according to Thomson Reuters Web of Knowledge, which ranks the impact of journal papers around the world.

A full list of publications produced by the institute in 2011-12 can be found on the accompanying CD.

Some of our highest impact papers for the year were:

**Effective adjunctive therapy by an innate defense regulatory peptide in a preclinical model of severe malaria.**

Achtman AH, Pilat S, Law CW, Lynn DJ, Janot L, Mayer ML, Ma S, Kindrachuk J, Finlay BB, Brinkman FS, Smyth GK, Hancock RE, Schofield L. *Science Translational Medicine*. 2012 4: 135ra64.

Although antimalarial drugs can be effective in killing malaria parasites, they do nothing to ameliorate the sometimes life-threatening inflammatory response to malaria infection.

In this paper the authors use a mouse model of cerebral malaria to show that a combination of antimalarial drugs and synthetic anti-inflammatory compounds based on natural host defence peptides (innate defence regulatory (IDR) peptides) increases survival by reducing host inflammation.

**PfSET10, a *Plasmodium falciparum* methyltransferase, maintains the active *var* gene in a poised state during parasite division.**

Volz JC, Bártfai R, Petter M, Langer C, Josling GA, Tsuboi T, Schwach F, Baum J, Rayner JC, Stunnenberg HG, Duffy MF, Cowman AF. *Cell Host & Microbe*. 2012 Jan 19; 11(1): 7-18.

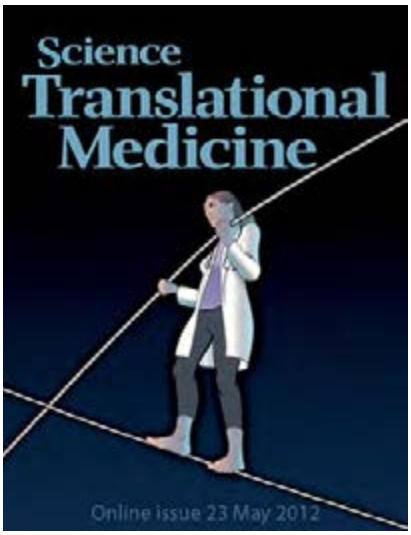
Malaria parasites express a protein, PfEMP1, on the surface of infected red blood cells that allows them to adhere to blood vessels and contributes to disease progression. The *var* genes encoding this protein come in 60 different varieties, and the parasite switches the gene used in each infected cell to enable the parasite to evade detection by the immune system.

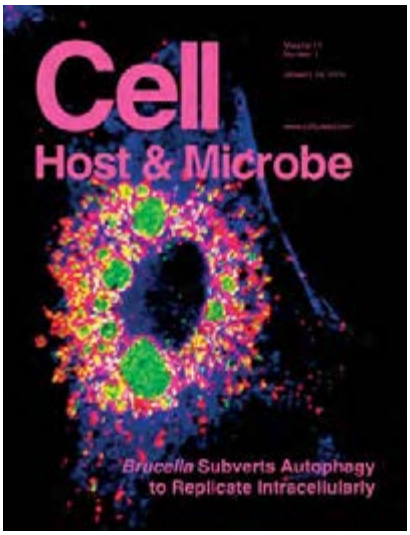
In this paper, a new protein called PfSET10 is identified that acts on these *var* genes to keep them in a state where rapid switching is possible. This protein may be a potential target for drugs that prevent this form of immune evasion.

**The dendritic cell receptor Clec9A binds damaged cells via exposed actin filaments.**

Zhang JG, Czabotar PE, Policheni AN, Caminschi I, Wan SS, Kitsoulis S, Tullett KM, Robin AY, Brammananth R, van Delft MF, Lu J, O'Reilly LA, Josefsson EC, Kile BT, Chin WJ, Mintern JD, Olshina MA, Wong W, Baum J, Wright MD, Huang DC, Mohandas N, Coppel RL, Colman PM, Nicola NA, Shortman K, Lahoud MH. *Immunity*. 2012 Apr 20; 36(4): 646-57.

Dendritic cells recognise dead or damaged cells and present antigens from them to the immune system to generate an appropriate immune response. Clec9A is a lectin-like protein expressed on dendritic cells that recognises dead cells and powerfully enhances antibody production. This paper reveals that Clec9A recognises a protein complex – filamentous actin – present in all cells but which only becomes exposed after cell death. This may pave the way to improved vaccination methods.




**Suppression of cytokine signaling by SOCS3: characterization of the mode of inhibition and the basis of its specificity.**

Babon JJ, Kershaw NJ, Murphy JM, Varghese LN, Laktyushin A, Young SN, Lucet IS, Norton RS, Nicola NA. *Immunity*. 2012 Feb 24; 36(2): 239-50.

SOCS3 (suppressor of cytokine signalling 3) is a critical natural suppressor of inflammatory responses caused by the action of a variety of cytokines. However its precise mechanism of action and the reason for its specificity for only some cytokines was unknown.

In this paper, detailed studies show that SOCS3 has distinct sites for binding different cytokine receptors. At the same time, SOCS3 binds and inhibits receptor-associated tyrosine kinases, which are required to mediate the biological actions of the cytokine.

**Inhibitor of apoptosis proteins limit RIP3 kinase-dependent interleukin-1 activation.**

Vince JE, Wong WW, Gentle I, Lawlor KE, Allam R, O'Reilly L, Mason K, Gross O, Ma S, Guarda G, Anderton H, Castillo R, Häcker G, Silke J, Tschopp J. *Immunity*. 2012 Feb 24; 36(2): 215-27.

Interleukin-1 (IL-1) is a major mediator of inflammatory diseases. Its production in response to infection is regulated by the activation of enzymes that alter (via proteolytic cleavage) the biologically inactive precursor form of IL-1 to make it active.

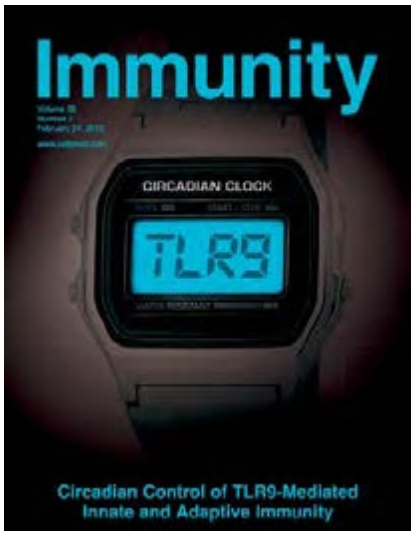
In this paper, the researchers show that cleavage of pro-IL-1 is constrained by proteins known as inhibitors of apoptosis proteins (IAPs). The study suggests that activators of IAPs could be useful in helping to treat some forms of inflammatory disease.

**Activation-induced B cell fates are selected by intracellular stochastic competition.**

Duffy KR, Wellard CJ, Markham JF, Zhou JH, Holmberg R, Hawkins ED, Hasbold J, Dowling MR, Hodgkin PD. *Science*. 2012 Jan 20; 335(6066): 338-41.

B cells are the precursors of antibody-producing cells in the immune system. Upon coming into contact with foreign antigens, B cells become 'activated' and must undergo a series of decision processes, including whether to divide or die, switching the type of antibody they produce and maturation into antibody-producing cells.

This paper studied the behaviour of thousands of individual cells to show that these decision processes are competing, essentially random processes within individual cells. This may have implications for understanding other complex cell fate decisions.






**The development and fate of follicular helper T cells defined by an IL-21 reporter mouse.**

Lüthje K, Kallies A, Shimohakamada Y, Belz GT, Light A, Tarlinton DM, Nutt SL. *Nature Immunology*. 2012 13: 491-U93.

Follicular helper T cells (TFH cells) are required for B cell maturation and proliferation. By studying mice in which the TFH cell cytokine IL-21 (interleukin-21) is linked to a fluorescent tag, this paper shows that TFH cells are not terminally differentiated but can give rise to memory T-cells and effector T-cells. This study expands the potential role TFH cells play in immune reactions.

**Genome sequencing and analysis of the Tasmanian devil and its transmissible cancer.**

Murchison EP, Schulz-Trieglaff OB, Ning Z, Alexandrov LB, Bauer MJ, Fu B, Hims M, Ding Z, Ivakhno S, Stewart C, Ng BL, Wong W, Aken B, White S, Alsop A, Becq J, Bignell GR, Cheetham RK, Cheng W, Connor TR, Cox AJ, Feng ZP, Gu Y, Grocock RJ, Harris SR, Khrebtukova I, Kingsbury Z, Kowarsky M, Kreiss A, Luo S, Marshall J, McBride DJ, Murray L, Pearse AM, Raine K, Rasolonjatovo I, Shaw R, Tedder P, Tregidgo C, Vilella AJ, Wedge DC, Woods GM, Gormley N, Humphray S, Schroth G, Smith G, Hall K, Searle SM, Carter NP, Papenfuss AT, Futreal PA, Campbell PJ, Yang F, Bentley DR, Evers DJ, Stratton MR. *Cell*. 2012 Feb 17; 148(4): 780-91.

The Tasmanian devil population is currently endangered due to an unusual facial tumour that is transmissible through biting. In this paper whole genome sequencing is used to define the mutations that occur in the tumour and to trace the evolution of the disease within the Tasmanian devil population. This work may help to define the different sub-types of the tumour and the nature of its spread.

# Publications

| | |
|---|---|
| **ART** | Advanced Research Technologies |
| **BIO** | Bioinformatics division |
| **CBD** | ACRF Chemical Biology division |
| **CHD** | Cancer and Haematology division |
| **CSCD** | Cell Signalling and Cell Death division |
| **INF** | Infection and Immunity division |
| **INFL** | Inflammation division |
| **IMM** | Immunology division |
| **MGC** | Molecular Genetics of Cancer division |
| **MIMM** | Molecular Immunology division |
| **MMD** | Molecular Medicine division |
| **SBPM** | Systems Biology and Personalised Medicine division |
| **SCC** | ACRF Stem Cells and Cancer division |
| **SBD** | Structural Biology division |

## Number of publications

Primary: 203
Reviews: 70
Edited book: 1
Book chapters: 10

**Total: 284**

## Primary


1. Achtman AH, Pilat S, Law CW, Lynn DJ, Janot L, Mayer ML, Ma S, Kindrachuk J, Finlay BB, Brinkman FS, Smyth GK, Hancock RE, Schofield L. Effective adjunctive therapy by an innate defense regulatory peptide in a preclinical model of severe malaria. *Science Translational Medicine.* 2012 4(135):135ra164. **INF BIO CHD**
2. Alari-Pahissa E, Vega-Ramos J, Zhang JG, Raul Castano A, Turley SJ, Villadangos JA, Lauzurica P. Differential effect of CD69 targeting on bystander and antigen-specific T cell proliferation. *Journal of Leukocyte Biology.* 2012 92(1):145-158. **CHD**
3. Allan RS, Zueva E, Cammas F, Schreiber HA, Masson V, Belz GT, Roche D, Maison C, Quivy J-P, Almouzni G, Amigorena S. An epigenetic silencing pathway controlling T helper 2 cell lineage commitment. *Nature.* 2012 July 4. (epub ahead of print) **MIMM**
4. Angrisano F, Delves MJ, Sturm A, Mollard V, McFadden GI, Sinden RE, Baum J. A GFP-Actin reporter line to explore microfilament dynamics across the malaria parasite lifecycle. *Molecular and Biochemical Parasitology.* 2012 182(1-2):93-96. **INF**
5. Angrisano F, Riglar DT, Sturm A, Volz JC, Delves MJ, Zuccala ES, Turnbull L, Dekiwadia C, Olshina MA, Marapana DS, Wong W, Mollard V, Bradin CH, Tonkin CJ, Gunning PW, Ralph SA, Whitchurch CB, Sinden RE, Cowman AF, McFadden GI, Baum J. Spatial localisation of actin filaments across developmental stages of the malaria parasite. *PLoS One.* 2012 7(2):e32188. **INF**
6. Arnott A, Barry AE, Reeder JC. Understanding the population genetics of *Plasmodium vivax* is essential for malaria control and elimination. *Malaria Journal.* 2012 11(1):14. **INF**
7. Arumugam TU, Takeo S, Yamasaki T, Thonkukiatkul A, Miura K, Otsuki H, Zhou H, Long CA, Sattabongkot J, Thompson J, Wilson DW, Beeson JG, Healer J, Crabb BS, Cowman AF, Torii M, Tsuboi T. Discovery of GAMA, a *Plasmodium falciparum* merozoite micronemal protein, as a novel blood-stage vaccine candidate antigen. *Infection and Immunity.* 2011 79(11):4523-4532. **INF**
8. Asselin-Labat ML, Sutherland KD, Vaillant F, Gyorki DE, Wu D, Holroyd S, Breslin K, Ward T, Shi W, Bath ML, Deb S, Fox SB, Smyth GK, Lindeman GJ, Visvader JE. Gata-3 negatively regulates the tumor-initiating capacity of mammary luminal progenitor cells and targets the putative tumor suppressor caspase-14. *Molecular and Cellular Biology.* 2011 31(22):4609-4622. **SCC BIO**
9. Babon JJ, Kershaw NJ, Murphy JM, Varghese LN, Laktyushin A, Young SN, Lucet IS, Norton RS, Nicola NA. Suppression of cytokine signaling by SOCS3: characterization of the mode of inhibition and the basis of its specificity. *Immunity.* 2012 36(2):239-250. **SBD CHD**
10. Ballouz S, Liu JY, Oti M, Gaeta B, Fatkin D, Bahlo M, Wouters MA. Analysis of genome-wide association study data using the protein knowledge base. *BMC Genetics.* 2011 12:98. **BIO**
11. Barnadas C, Kent D, Timinao L, Iga J, Gray LR, Siba P, Mueller I, Thomas PJ, Zimmerman PA. A new high-throughput method for simultaneous detection of drug resistance associated mutations in *Plasmodium vivax dhfr, dhps* and *mdr1* genes. *Malaria Journal.* 2011 10:282. **INF**
12. Barry AE, Trieu A, Fowkes FJ, Pablo J, Kalantari-Dehaghi M, Jasinskas A, Tan X, Kayala MA, Tavul L, Siba PM, Day KP, Baldi P, Felgner PL, Doolan DL. The stability and complexity of antibody responses to the major surface antigen of *Plasmodium falciparum* are associated with age in a malaria endemic area. *Molecular and Cellular Proteomics.* 2011 10(11):M111.008326. **INF**
13. Batty KT, Salman S, Moore BR, Benjamin J, Lee ST, Page-Sharp M, Pitus N, Ilett KF, Mueller I, Hombhanje FW, Siba P, Davis TM. Artemisinin-naphthoquine combination therapy for uncomplicated pediatric malaria: a pharmacokinetic study. *Antimicrobial Agents and Chemotherapy.* 2012 56(5):2472-2484. **INF**

14. Benjamin J, Moore B, Lee ST, Senn M, Griffin S, Lautu D, Salman S, Siba P, Mueller I, Davis TM. Artemisinin-naphthoquine combination therapy for uncomplicated pediatric malaria: a tolerability, safety, and preliminary efficacy study. *Antimicrobial Agents and Chemotherapy.* 2012 56(5):2465-2471. **INF**
15. Benjamini Y, Speed TP. Summarizing and correcting the GC content bias in high-throughput sequencing. *Nucleic Acids Research.* 2012 40(10):e72. **BIO**
16. Betuela I, Bassat Q, Kiniboro B, Robinson LJ, Rosanas-Urgell A, Stanisic D, Siba PM, Alonso PL, Mueller I. Tolerability and safety of primaquine in Papua New Guinean children 1 to 10 years of age. *Antimicrobial Agents and Chemotherapy.* 2012 56(4):2146-2149. **INF**
17. Betuela I, Rosanas-Urgell A, Kiniboro B, Stanisic D, Samol L, De Lazzari E, Del Portillo H, Siba P, Alonso PL, Bassat Q, Mueller I. Relapses contribute significantly to the risk of *P. vivax* infection and disease in Papua New Guinean children 1-5 years of age. *Journal of Infectious Diseases. (*in press) **INF**
18. Boersma MD, Haase HS, Peterson-Kaufman KJ, Lee EF, Clarke OB, Colman PM, Smith BJ, Horne WS, Fairlie WD, Gellman SH. Evaluation of diverse alpha/beta-backbone patterns for functional alpha-helix mimicry: analogues of the Bim BH3 domain. *Journal of the American Chemical Society.* 2012 134(1):315-323. **SBD**
19. Bohgaki T, Mozo J, Salmena L, Matysiak-Zablocki E, Bohgaki M, Sanchez O, Strasser A, Hakem A, Hakem R. Caspase-8 inactivation in T cells increases necroptosis and suppresses autoimmunity in Bim-/- mice. *Journal of Cell Biology.* 2011 195(2):277-291. **MGC**
20. Brady RM, Hatzis E, Connor T, Street IP, Baell JB, Lessene G. Synthesis of conformationally constrained benzoylureas as BH3-mimetics. *Organic & Biomolecular Chemistry.* 2012 10(27):5230-5237. **CBD**
21. Brooks MJ, Burtseva EI, Ellery PJ, Marsh GA, Lew AM, Slepushkin AN, Crowe SM, Tannock GA. Antiviral activity of arbidol, a broad-spectrum drug for use against respiratory viruses, varies according to test conditions. *Journal of Medical Virology.* 2012 84(1):170-181. **IMM**
22. Bullen HE, Charnaud SC, Kalanon M, Riglar DT, Dekiwadia C, Kangwanrangsan N, Torii M, Tsuboi T, Baum J, Ralph SA, Cowman AF, de Koning-Ward TF, Crabb BS, Gilson PR. Biosynthesis, localisation and macromolecular arrangement of the *Plasmodium falciparum* translocon of exported proteins (PTEX). *Journal of Biological Chemistry.* 2012 287(11):7871-7884. **INF**
23. Caminschi I, Vremec D, Ahmet F, Lahoud MH, Villadangos JA, Murphy KM, Heath WR, Shortman K. Antibody responses initiated by Clec9A-bearing dendritic cells in normal and Batf3(-/-) mice. *Molecular Immunology.* 2012 50(1-2):9-17. **IMM**
24. Campbell DJ, Zhang Y, Kelly DJ, Gilbert RE, McCarthy DJ, Shi W, Smyth GK. Aliskiren increases bradykinin and tissue kallikrein mRNA levels in the heart. *Clinical and Experimental Physiology.* 2011 38(9):623-631. **BIO**
25. Campbell KJ, Gray DH, Anstee N, Strasser A, Cory S. Elevated Mcl-1 inhibits thymocyte apoptosis and alters thymic selection. *Cell Death and Differentiation.* 2012 Jun 29. *(*epub ahead of print) **MGC**
26. Chang PP, Barral P, Fitch J, Pratama A, Ma CS, Kallies A, Hogan JJ, Cerundolo V, Tangye SG, Bittman R, Nutt SL, Brink R, Godfrey DI, Batista FD, Vinuesa CG. Identification of Bcl-6-dependent follicular helper NKT cells that provide cognate help for B cell responses. *Nature Immunology.* 2012 13(1):35-43. **MIMM**
27. Chee J, Angstetra E, Mariana L, Graham KL, Carrington EM, Bluethmann H, Santamaria P, Allison J, Kay TW, Krishnamurthy B, Thomas HE. TNF receptor 1 deficiency increases regulatory T cell function in nonobese diabetic mice. *Journal of Immunology.* 2011 187(4):1702-1712. **IMM**
28. Chen L, Lopaticki S, Riglar DT, Dekiwadia C, Uboldi AD, Tham WH, O'Neill MT, Richard D, Baum J, Ralph SA, Cowman AF. An EGF-like protein forms a complex with PfRh5 and is required for invasion of human erythrocytes by *Plasmodium falciparum*. *PLoS Pathogens.* 2011 7(9):e1002199. **INF**
29. Chong JJ, Chandrakanthan V, Xaymardan M, Asli NS, Li J, Ahmed I, Heffernan C, Menon MK, Scarlett CJ, Rashidianfar A, Biben C, Zoellner H, Colvin EK, Pimanda JE, Biankin AV, Zhou B, Pu WT, Prall OW, Harvey RP. Adult cardiac-resident MSC-like stem cells with a proepicardial origin. *Cell Stem Cell.* 2011 9(6):527-540. **MMD**
30. Clayton-Smith J, O'Sullivan J, Daly S, Bhaskar S, Day R, Anderson B, Voss AK, Thomas T, Biesecker LG, Smith P, Fryer A, Chandler KE, Kerr B, Tassabehji M, Lynch SA, Krajewska-Walasek M, McKee S, Smith J, Sweeney E, Mansour S, Mohammed S, Donnai D, Black G. Whole-exome-sequencing identifies mutations in histone acetyltransferase gene KAT6B in individuals with the Say-Barber-Biesecker variant of Ohdo syndrome. *American Journal of Human Genetics.* 2011 89(5):675-681. **MMD**
31. Clybouw C, Fischer S, Auffredou MT, Hugues P, Alexia C, Bouillet P, Raphael M, Leca G, Strasser A, Tarlinton DM, Vazquez A. Regulation of memory B-cell survival by the BH3-only protein Puma. *Blood.* 2011 118(15):4120-4128. **MGC IMM**
32. Clybouw C, Merino D, Nebl T, Masson F, Robati M, O'Reilly L, Hubner A, Davis RJ, Strasser A, Bouillet P. Alternative splicing of Bim and Erk-mediated Bim(EL) phosphorylation are dispensable for hematopoietic homeostasis in vivo. *Cell Death and Differentiation.* 2012 19(6):1060-1068. **MGC SCC MIMM SBPM**
33. Coughlan MT, Yap FY, Tong DC, Andrikopoulos S, Gasser A, Thallas-Bonke V, Webster DE, Miyazaki J, Kay TW, Slattery RM, Kaye DM, Drew BG, Kingwell BA, Fourlanos S, Groop PH, Harrison LC, Knip M, Forbes JM. Advanced glycation end products are direct modulators of beta-cell function. *Diabetes.* 2011 60(10):2523-2532. **IMM**
34. Croker BA, O'Donnell JA, Nowell CJ, Metcalf D, Dewson G, Campbell KJ, Rogers KL, Hu Y, Smyth GK, Zhang JG, White M, Lackovic K, Cengia LH, O'Reilly LA, Bouillet P, Cory S, Strasser A, Roberts AW. Fas-mediated neutrophil apoptosis is accelerated by Bid, Bak, and Bax and inhibited by Bcl-2 and Mcl-1. *Proceedings of the National Academy of Sciences of the United States of America.* 2011 108(32):13135-13140. **INFL CSCD MGC BIO CBD CHD ART**

35. Czesak M, Le Francois B, Millar AM, Deria M, Daigle M, Visvader JE, Anisman H, Albert PR. Increased serotonin-1A (5-HT1A) autoreceptor expression and reduced raphe serotonin levels in deformed epidermal autoregulatory factor-1 (Deaf-1) gene knock-out mice. *Journal of Biological Chemistry.* 2012 287(9):6615-6627. **SCC**

36. Damgaard RB, Nachbur U, Yabal M, Wong WW, Fiil BK, Kastirr M, Rieser E, Rickard JA, Bankovacki A, Peschel C, Ruland J, Bekker-Jensen S, Mailand N, Kaufmann T, Strasser A, Walczak H, Silke J, Jost PJ, Gyrd-Hansen M. The ubiquitin ligase XIAP recruits LUBAC for NOD2 signaling in inflammation and innate immunity. *Molecular Cell.* 2012 46(6):746-758. **CSCD MGC**

37. Darido C, Georgy SR, Wilanowski T, Dworkin S, Auden A, Zhao Q, Rank G, Srivastava S, Finlay MJ, Papenfuss AT, Pandolfi PP, Pearson RB, Jane SM. Targeting of the tumor suppressor GRHL3 by a miR-21-dependent proto-oncogenic network results in PTEN loss and tumorigenesis. *Cancer Cell.* 2011 20(5):635-648. **BIO**

38. Deakin JE, Bender HS, Pearse AM, Rens W, O'Brien PC, Ferguson-Smith MA, Cheng Y, Morris K, Taylor R, Stuart A, Belov K, Amemiya CT, Murchison EP, Papenfuss AT, Marshall Graves JA. Genomic restructuring in the Tasmanian devil facial tumour: chromosome painting and gene mapping provide clues to evolution of a transmissible tumour. *PLoS Genetics.* 2012 8(2):e1002483. **BIO**

39. Debrincat MA, Josefsson EC, James C, Henley KJ, Ellis S, Lebois M, Betterman KL, Lane RM, Rogers KL, White MJ, Roberts AW, Harvey NL, Metcalf D, Kile BT. Mcl-1 and Bcl-xL co-ordinately regulate megakaryocyte survival. *Blood.* 2012 119(24):5850-5858. **CHD ART**

40. Denton AE, Wesselingh R, Gras S, Guillonneau C, Olson MR, Mintern JD, Zeng W, Jackson DC, Rossjohn J, Hodgkin PD, Doherty PC, Turner SJ. Affinity thresholds for naive CD8+ CTL activation by peptides and engineered influenza A viruses. *Journal of Immunology.* 2011 187(11):5733-5744. **IMM**

41. Dewson G, Ma S, Frederick P, Hockings C, Tan I, Kratina T, Kluck RM. Bax dimerizes via a symmetric BH3:groove interface during apoptosis. *Cell Death and Differentiation.* 2012 19(4):661-670. **CSCD MGC**

42. Domchek SM, Mitchell G, Lindeman GJ, Tung NM, Balmana J, Isakoff SJ, Schmutzler R, Audeh MW, Loman N, Scott C, Friedlander M, Kaufman B, Garber JE, Tutt A, Robson ME. Challenges to the development of new agents for molecularly defined patient subsets: lessons from *BRCA1/2*-associated breast cancer. *Journal of Clinical Oncology.* 2011 29(32):4224-4226. **SCC**

43. Donkor ON, Ravikumar M, Proudfoot O, Day SL, Apostolopoulos V, Paukovics G, Vasiljevic T, Nutt SL, Gill H. Cytokine profile and induction of T helper type 17 and regulatory T cells by human peripheral mononuclear cells after microbial exposure. *Clinical and Experimental Immunology.* 2012 167(2):282-295. **MIMM**

44. Dow LE, Premsrirut PK, Zuber J, Fellmann C, McJunkin K, Miething C, Park Y, Dickins RA, Hannon GJ, Lowe SW. A pipeline for the generation of shRNA transgenic mice. *Nature Protocols.* 2012 7(2):374-393. **MMD**

45. Duffy KR, Wellard CJ, Markham JF, Zhou JH, Holmberg R, Hawkins ED, Hasbold J, Dowling MR, Hodgkin PD. Activation-induced B cell fates are selected by intracellular stochastic competition. *Science.* 2012 335(6066):338-341. **IMM**

46. Eirew P, Kannan N, Knapp DJ, Vaillant F, Emerman JT, Lindeman GJ, Visvader JE, Eaves CJ. Aldehyde dehydrogenase activity is a biomarker of primitive normal human mammary luminal cells. *Stem Cells.* 2012 30(2):344-348. **SCC**

47. Ellett F, Lieschke GJ. Computational quantification of fluorescent leukocyte numbers in zebrafish embryos. *Methods in Enzymology.* 2012 506:425-435. **CHD**

48. Elliott DA, Braam SR, Koutsis K, Ng ES, Jenny R, Lagerqvist EL, Biben C, Hatzistavrou T, Hirst CE, Yu QC, Skelton RJ, Ward-van Oostwaard D, Lim SM, Khammy O, Li X, Hawes SM, Davis RP, Goulburn AL, Passier R, Prall OW, Haynes JM, Pouton CW, Kaye DM, Mummery CL, Elefanty AG, Stanley EG. NKX2-5(eGFP/w) hESCs for isolation of human cardiac progenitors and cardiomyocytes. *Nature Medicine.* 2011 8(12):1037-1040. **MMD**

49. Evison BJ, Pastuovic M, Bilardi RA, Forrest RA, Pumuye PP, Sleebs BE, Watson KG, Phillips DR, Cutts SM. M2, a novel anthracenedione, elicits a potent DNA damage response that can be subverted through checkpoint kinase inhibition to generate mitotic catastrophe. *Biochemical Pharmacology.* 2011 82(11):1604-1618. **MGC CBD**

50. Falk H, Connor T, Yang H, Loft KJ, Alcindor JL, Nikolakopoulos G, Surjadi RN, Bentley JD, Hattarki MK, Dolezal O, Murphy JM, Monahan BJ, Peat TS, Thomas T, Baell JB, Parisot JP, Street IP. An efficient high-throughput screening method for MYST family acetyltransferases, a new class of epigenetic drug targets. *Journal of Biomolecular Screening.* 2011 16(10):1196-1205. **CBD MMD SBD**

51. Feng ZP, Chandrashekaran IR, Low A, Speed TP, Nicholson SE, Norton RS. The N-terminal domains of SOCS proteins: a conserved region in the disordered N-termini of SOCS4 and 5. *Proteins.* 2012 80(3):946-957. **BIO SBD INFL**

52. Ferrer PE, Frederick P, Gulbis JM, Dewson G, Kluck RM. Translocation of a Bak C-terminus mutant from cytosol to mitochondria to mediate cytochrome C release: implications for Bak and Bax apoptotic function. *PLoS One.* 2012 7(3):e31510. **SBD CSCD MGC**

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55. Gaspar M, May JS, Sukla S, Frederico B, Gill MB, Smith CM, Belz GT, Stevenson PG. Murid herpesvirus-4 exploits dendritic cells to infect B cells. *PLoS Pathogens.* 2011 7(11):e1002346. **MIMM**

56. Glaser SP, Lee EF, Trounson E, Bouillet P, Wei A, Fairlie WD, Izon DJ, Zuber J, Rappaport AR, Herold MJ, Alexander WS, Lowe SW, Robb L, Strasser A. Anti-apoptotic Mcl-1 is essential for the development and sustained growth of acute myeloid leukemia. *Genes & Development.* 2012 26(2):120-125. **CHD SBD MGC**

57. Grabow S, Waring P, Happo L, Cook M, Mason KD, Kelly PN, Strasser A. Pharmacological blockade of Bcl-2, Bcl-x(L) and Bcl-w by the BH3 mimetic ABT-737 has only minor impact on tumour development in p53-deficient mice. *Cell Death and Differentiation.* 2011 19(4):623-632. **MGC CHD CBD**

58. Gray DH, Kupresanin F, Berzins SP, Herold MJ, O'Reilly LA, Bouillet P, Strasser A. The BH3-only proteins Bim and Puma cooperate to impose deletional tolerance to organ-specific antigens. *Immunity. (*in press) **MGC**

59. Gugasyan R, Horat E, Kinkel SA, Ross F, Grigoriadis G, Gray D, O'Keeffe M, Berzins SP, Belz GT, Grumont RJ, Banerjee A, Strasser A, Godfrey DI, Tsichlis PN, Gerondakis S. The NF-kappaB1 transcription factor prevents the intrathymic development of CD8 T cells with memory properties. *EMBO Journal.* 2012 31(3):692-706. **MGC MMD MIMM**

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61. Hagn M, Belz GT, Kallies A, Sutton VR, Thia KY, Tarlinton DM, Hawkins ED, Trapani JA. Activated mouse B cells lack expression of granzyme B. *Journal of Immunology.* 2012 188(8):3886-3892. **MIMM IMM**

62. Hahn CN, Chong CE, Carmichael CL, Wilkins EJ, Brautigan PJ, Li XC, Babic M, Lin M, Carmagnac A, Lee YK, Kok CH, Gagliardi L, Friend KL, Ekert PG, Butcher CM, Brown AL, Lewis ID, To LB, Timms AE, Storek J, Moore S, Altree M, Escher R, Bardy PG, Suthers GK, D'Andrea RJ, Horwitz MS, Scott HS. Heritable GATA2 mutations associated with familial myelodysplastic syndrome and acute myeloid leukemia. *Nature Genetics.* 2011 43(10):1012-1017. **CHD MMD INF CSCD**

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# Awards

**The Victoria Prize, the Milstein Award and an Australian Academy of Science fellowship are just some of the national and international awards and fellowships received this year by institute staff and students.**

Honours and awards received by staff at the institute in the past 12 months include:

In 2012, **Professor Jane Visvader** was elected a fellow of the Australian Academy of Science. Professor Visvader's fellowship recognised her research achievements, which over the past decade have included: discovering rare 'breast stem cells', which give rise to all cell types in the breast, and identifying the breast stem cell daughters from which some types of breast cancer arise.

**Professor Andreas Strasser** was awarded the 2011 Victoria Prize for his research into the control of cell death. The $50,000 Victoria Prize is awarded annually by the Victorian Government to a scientist whose discovery has significantly advanced knowledge. Professor Strasser's research has shown that defects in cell death can lead to the development of cancer or autoimmune disease, and render cancer cells resistant to chemotherapy.

The European Molecular Biology Organization (EMBO) elected **Professor David Vaux** as a organisation member in 2012, in recognition of his contribution to cell death research. In the 1980s, Professor Vaux made the landmark discovery that the *Bcl2* gene prevented cells from dying. His findings launched the field of programmed cell death (apoptosis) research, and led to development of novel anti-cancer agents such as BH3-mimetics, which promote death of cancer cells.

In 2011, institute director **Professor Doug Hilton** became the first Australian to receive the Milstein Award, established in 1988 by US philanthropists Seymour and Vivian Milstein to recognise scientists who have made exceptional contributions to cytokine and interferon research. Professor Hilton also received the Research Australia Leadership and Innovation Award in 2011 for his achievements, including leadership in promoting the value of health and medical research to the Australian community following the 'Discoveries Need Dollars: Protect Medical Research' campaign he initiated.

**Dr Seth Masters** was awarded a $150,000 Victorian Endowment for Science, Knowledge and Innovation (VESKI) Fellowship by the Victorian Government to identify the role of tiny molecules, called micro-RNAs, in the development of cancer and chronic inflammatory disease. He is investigating whether these molecules could be a therapeutic target for treating disease.

Discovering the cellular 'link' between female hormones and breast cancer development earned **Dr Marie-Liesse Asselin-Labat** the inaugural $25,000 Lawrence Creative Prize from the Centenary Institute in 2011.

## Tackling ovarian cancer at the source

**Ovarian cancer researcher Associate Professor Clare Scott (pictured) has been awarded the Cancer Council Victoria's Edward 'Weary' Dunlop Fellowship, which will allow her to develop better experimental models of epithelial ovarian cancer with the aim of improving patient outcomes.**

Epithelial ovarian cancer is the most lethal type of ovarian cancer. Despite efforts to develop better screening tools, 80 per cent of these cancers are diagnosed after they have spread beyond the ovary and 70 per cent are generally incurable.

The funding provided by the Dunlop Fellowship – $1.5 million over five years – will enable Associate Professor Scott to develop new experimental models of ovarian cancer to explore the genetic factors driving the subtypes of this lethal disease.

Her work will build on research from the Australian Ovarian Cancer Study, which has identified several different molecular subtypes of high-grade epithelial ovarian cancer.

"At the moment, appropriate preclinical models to identify and test targeted therapies for subtypes of high-grade epithelial ovarian cancer are simply not available," Associate Professor Scott said. "These new models are essential in order to change clinical outcomes for women with ovarian cancer, from what is currently a very frightening outlook to one of targeted treatment options. Using preclinical models to test new therapies has produced some great successes in understanding related cancers, such as breast cancer. We are hopeful it will also be successful for ovarian cancer patients," she said.

Associate Professor Scott said the Cancer Council Victoria funding was crucial to the project. "This type of work would simply not be possible without the significant, long-term funding available through the Dunlop Fellowship," she said.

# Translation

Dr Jason Tye-Din (right) is a clinician-scientist at the institute and a gastroenterologist at The Royal Melbourne Hospital. He is researching the factors that lead to development of coeliac disease in the hope of developing new treatments for this immune disorder.

# Translating our research

**The institute's Clinical Translation Centre facilitates translational research being undertaken across the institute.**

The institute currently has 14 clinician-scientists and nine medically-qualified PhD students undertaking medical research into blood, breast and ovarian cancers, type 1 diabetes, coeliac disease, rheumatoid arthritis, rheumatic fever, HIV, hepatitis and malaria.

Recent developments in translational research across the institute include:

- identification of new classes of anti-inflammatory drugs for treating malaria;
- dendritic cell research to boost the effectiveness of vaccines; and
- ongoing testing of a potential vaccine for coeliac disease.

The institute's clinician-scientists are committed to linking discoveries from within their laboratory to the clinic, supported through their collaborations with Melbourne Health, Peter MacCallum Cancer Centre, St Vincent's Hospital Melbourne, The Royal Women's Hospital, Menzies School of Health Research and the Royal Children's Hospital, as well as other health facilities throughout Australia and internationally. The institute's research discoveries are associated with more than 100 current national and international clinical trials.

The Clinical Translation Centre has been fully operational since late 2011, offering clinical and laboratory services as well as human ethics advice. The coeliac disease research group, led by Dr Jason Tye-Din, is one of the first to be located within the Clinical Translation Centre. Research nurse Ms Cathy Pizzey monitors research participants and healthy volunteers in the effort to discover better treatments for coeliac disease. This is the first time in decades that the institute has had direct clinical interaction with participants of research projects and is a big step towards aligning clinical and laboratory research goals.

In collaboration with Melbourne Health, the Clinical Translation Centre recently established a Volunteer Blood Donor Registry to facilitate the availability of volunteer blood samples for ethically approved translational research projects throughout the wider Parkville precinct. The registry is a not-for-profit service for obtaining blood samples from healthy individuals as 'controls' for comparison with people who have developed disease and identify what has changed, whilst maintaining the respect and privacy of volunteer donors.

In May 2012 the Clinical Translation Centre held its biennial PhD research opportunities forum for clinicians interested in undertaking laboratory research. This event showcased the institute's translational research and career opportunities and attracted a number of Victorian and interstate clinicians.

**The institute's Clinical Translation Centre team (from left) Ms Jenni Harris, Mrs Cathy Quilici, Professor Andrew Roberts (head), Ms Naomi Sprigg and Dr Lina Laskos.**

## New anti-cancer agent shows promise for chronic leukaemias

**Chronic lymphocytic leukaemia (CLL) is the most common form of leukaemia in Australia, with approximately 1000 new cases diagnosed each year, mostly in people over 60.**

While many people with CLL either require no treatment or respond well to standard treatments, around 300 Australians die of the disease every year.

A clinical trial led by Professor Andrew Roberts from the institute's Clinical Translation Centre has found that a potential new anti-cancer agent called navitoclax may improve the symptoms and extend the survival of patients with CLL who have failed current standard therapies.

Navitoclax (ABT-263) is a so-called BH3-mimetic compound that blocks the function of the proteins Bcl-2 and Bcl-$x_L$, which are found at high levels in CLL cells. The 'pro-survival' role of Bcl-2 in allowing leukaemia cells to become long-lived was discovered at the Walter and Eliza Hall Institute.

It is now known that high levels of Bcl-2 are an important contributor to the development of several types of cancer, and resistance to anti-cancer treatments. The phase I trial was sponsored by two companies – Abbott and Genentech, a member of the Roche Group. Navitoclax was discovered by Abbott as a potential anti-cancer agent and works by rapidly neutralising the 'pro-survival' effects of Bcl-2 in CLL and other cancers, killing the cancer cells.

The 29 patients in the trial who received navitoclax had CLL that had not responded to multiple standard treatments, or their cancer had returned after treatment. Professor Roberts said although the phase I trial was designed to determine the safety and best dose of the agent, the patients had shown major reductions in leukaemic cells in their blood and substantial improvements in their symptoms.

"The trial has shown that navitoclax can be safely delivered," Professor Roberts said. "Further, in a group of patients who, without treatment, would be expected to have only six to 12 months to live, many of the trial participants have survived for more than two years. This suggests that navitoclax may be an advance in treatment of poor prognosis CLL."

Professor Roberts said it was pleasing to see the trial participants respond well to navitoclax, but there were still many years of testing ahead to determine whether it could improve the outlook for CLL patients.

"This trial was only the first step in determining whether navitoclax is a safe treatment for CLL," he said. "The results of a larger phase II clinical trial will determine more precisely whether this agent will be of real benefit for CLL patients more broadly."

The trial was a collaboration between Australian and US researchers including Professor Roberts, who is also a clinical haematologist at The Royal Melbourne Hospital, Professor David Huang from the institute's ACRF Chemical Biology division and Professor John Seymour from the Peter MacCallum Cancer Centre. The trial was conducted at The Royal Melbourne Hospital, the Peter MacCallum Cancer Centre - coordinated locally by Cancer Trials Australia - and at three and at three centres in the United States.

**Collaborating organisations:** Abbott Laboratories, ACRF Centre for Therapeutic Target Discovery, Dana-Farber Cancer Institute, MD Anderson Cancer Center, Moores University of California at San Diego Cancer Center, Peter MacCallum Cancer Centre, The Royal Melbourne Hospital and The University of Melbourne.

**Funding partners:** Supported by Abbott and Genentech, a member of the Roche Group. Additional support for correlative studies was provided by Australian Cancer Research Foundation, Leukaemia Foundation of Australia, Leukemia & Lymphoma Society (US), National Health and Medical Research Council of Australia, Victorian Cancer Agency and the Victorian Government.

**More information:** Roberts AW, Seymour JF, Brown JR, Wierda WG, Kipps TJ, Khaw SL, Carney DA, He SZ, Huang DC, Xiong H, Cui Y, Busman TA, McKeegan EM, Krivoshik AP, Enschede SH, Humerickhouse R. Substantial susceptibility of chronic lymphocytic leukemia to BCL2 inhibition: results of a phase I study of navitoclax in patients with relapsed or refractory disease. *J Clin Oncol.* 2012 Feb 10; 30(5):488-96.

**Professor Andrew Roberts**

# Developing our research

**In an increasingly difficult commercialisation environment, the business development office is engaged in a wide range of activities designed to enhance translation of the institute's research activities. These activities were underpinned by more than 320 material transfer agreements, 86 commercial and collaboration agreements, 22 invention disclosures and eight new provisional patent applications.**

Major outcomes this year included:

- commercialisation of two anti-cancer drug discoveries;
- commencement of two major stem cell initiatives;
- new collaborations targeting breast cancer and infectious disease;
- a start-up company raising significant capital in the US to progress a potential coeliac disease vaccine; and
- contributing to major changes in protecting intellectual property.

## New collaborations target breast cancer and infectious disease

A major consortium involving 14 participants was established with $5.7 million from the National Breast Cancer Foundation, with the possibility of extension after three years.

The consortium will focus on treating and preventing breast cancer recurrence through development of small molecule therapeutics targeting epithelial-mesenchymal plasticity, a newly-recognised process involved in cancer metastasis. The institute's role in the consortium specifically relates to compound screening and medicinal chemistry. The Cancer Therapeutics Cooperative Research Centre has a right to commercialise candidate compounds.

The business development office helped establish a strategic program between the institute and the University of Otago to exploit new technologies targeting, for example, HIV and fungal infections. Together with Otago Innovations at the University of Otago, a productive technology transfer relationship has been developed which sets the foundation for two drug discovery programs; one aimed at developing novel anti-HIV drugs targeting a critical viral strategy called ribosomal frameshift, the other focused on developing anti-fungal compounds.

The combined research teams bring complementary skill sets and pooled intellectual property, exemplifying the multidisciplinary approach required to achieve translation of new technologies.

**Dr Julian Clark (left) with Ms Carmela Monger.**

## Start-up company raises capital to progress coeliac disease vaccine

A major milestone was achieved by ImmusanT, a US-based biotech company created to commercialise Nexvax2®, the world's first potential therapeutic vaccine for coeliac disease. The vaccine is based on research conducted by Dr Bob Anderson at the institute, The Royal Melbourne Hospital and the University of Oxford. In 2012, Dr Anderson took up the position of chief scientific officer of ImmusanT, based in Boston.

In a tough economic environment, ImmusanT succeeded in raising more than $20 million to fund further clinical development of Nexvax2®. Research activities into the immune response to gluten, which is responsible for coeliac disease, continue at the institute under the guidance of Dr Jason Tye-Din and in collaboration with ImmusanT.

## Two major stem cell initiatives

The business development office facilitated establishment of two major stem cell initiatives, building on the institute's long history of research into blood cells. Both initiatives aim to translate basic understanding of blood cells into more effective sources for transfusion and therapy.

Based on funding secured from the CSIRO Science Industry and Endowment Fund, CSIRO, CSL and the institute, we embarked on a program to identify novel drug targets in blood stem cells using a systems biology approach. The goal is to develop agents for mobilising blood stem cells and develop methods for *in vitro* platelet production.

The institute also entered into a major consortium agreement to create Stem Cells Australia, a collaboration between nine organisations supported by $21 million from the Australian Research Council. The initiative will expand on the institute's investment in a systems biology approach to understanding blood stem cells and will complement the collaboration with CSIRO and CSL.

## Protecting intellectual property

The year witnessed strong growth in the institute's intellectual property (IP) portfolio with 35 complete patent applications being filed, and a nearly four-fold increase in patents granted. The business development office continued to engage and educate scientists in IP and translation through its training programs, focusing on IP capture. The annual institute laboratory notebook audit revealed an increased and high degree of compliance with international IP requirements. This was the third year of successive improvement across all research divisions. Through our education initiatives, the business development office continued to mentor its business development interns in IP translation, providing assistance and guidance in agreement drafting and negotiation (see page 42).

The business development office was also active in providing detailed input and evidence into a number of national intellectual property initiatives including assisting IP Australia in developing and promoting the *Intellectual Property Laws Amendment (Raising the Bar) Bill 2012,* and informing the Australian Council on Intellectual Property in its enquiry into 'Collaborations between public and private sectors: the role of intellectual property'.

## Catalyst Fund accelerates two discoveries into development

**Modest investments from the business development office's Catalyst Fund have accelerated development of two potential targeted anti-cancer therapies.**

The therapies were developed in a collaboration between Professor Tony Burgess, who recently joined the institute's Structural Biology division from the Ludwig Institute for Cancer Research, and Dr Guillaume Lessene from the institute's ACRF Chemical Biology division.

The joint research team discovered a novel family of chemical compounds targeting a protein called Src kinase, high levels of which are associated with several types of cancer and poor prognosis. An investment from the Catalyst Fund resulted in critical *in vivo* efficacy data that helped secure a National Health and Medical Research Council of Australia Development Grant and led to the development of a series of lead compounds, which will be developed further and commercialised in collaboration with an Australian biotech company.

The same team discovered that a new series of small molecules were strong mitotic inhibitors in a range of tumour cell lines. Anti-mitotic agents inhibit cell division, which is important for stopping cancer progression. An investment from the Catalyst Fund enabled further medicinal chemistry and the discovery of a novel cancer target and mechanism of action that stopped cancer cells dividing. Importantly, the compounds were active against cancer cells resistant to common chemotherapeutic agents such as the taxanes. The project was successfully partnered.

These two major translational events in the journey to develop novel targeted anti-cancer therapies illustrate the importance of collaboration between multidisciplinary teams and the significance of investments in 'killer experiments' that lead to proof-of-concept and result in further investment from public and commercial sources. Future development of both classes of compounds will focus on major types of solid tissue tumours.

**Professor Tony Burgess**

# Patents granted in 2011-12

**A method of cell isolation**
Inventors: G Lindeman, J Visvader, M Shackleton, F Vaillant
*Australia and Japan*

**A method of diagnosis and treatment and agents useful for same**
Inventors: G Lindeman, J Visvader, E Sum, L O'Reilly
*New Zealand, France, United Kingdom and Germany*

**A method of treatment and prophylaxis**
Inventors: I Wicks, I Campbell, K Lawlor, A Roberts, D Metcalf
*Israel*

**Alpha-helical mimetics**
Inventors: J Baell, G Lessene
*Australia and Japan*

**Arylsulfonamide compounds**
Inventors: J Baell, W Fairbrother, J Flygare, M Kohler, G Lessene, B Sleebs
*New Zealand*

**Compounds and methods of use**
Inventors: J Baell, C Bui, P Colman, P Czabotar, D Dudley, S Elmore, W Fairbrother, J Flygare, G Lessene, C Ndubaku, G Nikolakopoulos, A Petros, B Sleebs, C Rye, B Smith, A Souers, K Watson
*United States*

**Compounds and methods of use**
Inventors: J Baell, C Bui, P Colman, P Czabotar, D Dudley, S Elmore, W Fairbrother, J Flygare, L Hasvold, G Lessene, C Ndubaku, G Nikolakopoulos, A Petros, B Sleebs, B Smith, A Souers, K Watson, Z Tao, L Wang, X Wang
*United States*

**Immunogenic compositions**
Inventors: W Heath, G Belz
*New Zealand and Cuba*

**Immunogenic compositions and uses thereof**
Inventors: L Schofield
*United States*

**Immunogenic compositions and uses thereof**
Inventors: L Schofield
*United States and China*

**Live genetically attenuated malaria vaccine**
Inventors: A Cowman, S Kappe, K van Buskirk
*Australia and United States*

**Modified cells that co-express Blimp1 and a reporter molecule and methods of using the same**
Inventors: S Nutt, A Kallies, J Hasbold, D Tarlinton, L Corcoran, P Hodgkin
*Japan, France, United Kingdom and Germany*

**Novel aryl potassium channel blockers and uses thereof**
Inventors: A Harvey, B Flynn, D Grobelny, J Mould, G Gill, J Chaplin, J Baell, D Paul
*Australia and New Zealand*

**Novel benzofuran potassium channel blockers and uses thereof**
Inventors: J Baell, J Chaplin, B Flynn, A Harvey, J Mould, D Paul
*United States*

**Novel chromone potassium channel blockers and uses thereof**
Inventors: J Baell, J Chaplin, B Flynn, A Harvey, J Mould, D Paul
*United States*

**Novel potassium channel blockers and uses thereof**
Inventors: J Baell, A Harvey, H Wulff
*United States*

**Structure of the insulin receptor ectodomain**
Inventors: M Lawrence, C Ward, N McKern, G Lovrecz, T Adams, L Sparrow, V Streltsov, T Garrett, M Lou
*United States*

**Therapeutic and diagnostic agents**
Inventors: L Harrison, S Mannering, A Purcell, N Williamson
*Australia, United States and China*

**Therapeutic molecules and methods for generating and/or selecting same**
Inventors: P Colman, D Huang, E Lee, W Fairlie
*Australia and China*

## Business development interns deliver

**As the business development internship program designed and run by the business development office nears its third anniversary, the program continues to be a drawcard for early-career researchers.**

The program provides real-life experience of working in a technology transfer office, with the interns spending up to 20 per cent of their time as part of the business development team and contributing to projects active in the office at that time. Up to 10 interns take part in the program at any one time. As a result of its success, the program has been extended to senior postdoctoral researchers and experienced research technicians.

Twenty interns have graduated from the program since its inception, the majority having strengthened their position as a career research scientist and developing skills in five core areas of technology transfer and business development: opportunity identification and analysis, intellectual property management, technology marketing communication, agreements and technology transfer administration.

The program offers researchers the opportunity to gain skills in an area outside of, but complementary to, their research, as well as developing an understanding of the process, drivers and players involved in translation of research bench innovations to bedside applications.

During the year the interns made significant contributions towards market analysis, grant and proposal preparation, marketing communication materials, consulting and a review of the institute's high-throughput chemical screening facility.

Dr Grant Dewson, a laboratory head from the institute's Cell Signalling and Cell Death division, recently completed the business development internship.

"Since establishing my own laboratory, I have found the experience gained with the business development office extremely useful for the identification, critical assessment and management of collaborative research opportunities, strategic planning, and for understanding the process and importance of securing intellectual property," Dr Dewson said. "The program also served to reinforce my understanding of the key role for business development in establishing a clinically relevant research program."

**Dr Grant Dewson (left) with Dr Julian Clark.**


# Education

Institute director Professor Doug Hilton (left) with Undergraduate Research Opportunities Program (UROP) student Mr Doug Tjandra from the institute's Structural Biology division.

# Education

**The Education Committee is pleased to report on a productive and rewarding year.**

The institute currently has 87 PhD students and 15 honours students. In the past 12 months the institute has hosted 21 Undergraduate Research Opportunities Program (UROP) students and 13 visiting students.

Eighteen PhD students completed their postgraduate degrees during the financial year, and we congratulate them on this wonderful effort. Five PhD students were also awarded PhD scholarships in the past 12 months, including National Health and Medical Research Council of Australia (NHMRC) Medical and Dental Postgraduate Research Scholarships and NHMRC Dora Lush Biomedical Postgraduate Research Scholarships. The institute's Harold Mitchell Foundation Travel Awards were awarded to PhD student Mr David Riglar and postdoctoral scientist Dr Mike Inouye, enabling them to attend international conferences and tour prospective laboratories in the US, Canada and Germany.

We were once again privileged to host an exceptional cohort of honours students in 2011. All 14 students achieved first-class honours.

One of the Education Committee's specific aims is engagement with our partner institutions and, with respect to education in particular, with Melbourne-based universities. In the past 12 months, institute faculty members Dr Marnie Blewitt, Dr Chris Burns, Dr Matthew Call, Associate Professor Lynn Corcoran, Dr Guillaume Lessene, Professor Andreas Strasser, Associate Professor David Tarlinton and Professor David Vaux have delivered lectures and participated in the assessment of students at The University of Melbourne, La Trobe University and RMIT.

In 2011-12 we also ran a pilot mentoring program between the institute's postdoctoral scientists and undergraduate students from The University of Melbourne, organised by Professor Dick Strugnell from The University of Melbourne and Walter and Eliza Hall Institute researcher Dr Krystal Evans.

In July 2011, the institute appointed a scientific education officer, Dr Keely Bumsted-O'Brien. Dr Bumsted-O'Brien initiated and facilitated a new Advanced Honours Coursework element designed to instruct students in critical reading and discussion of scientific literature, as well as workshops to increase the skills of our students in areas such as journal article writing. Aspects of the Advanced Honours Coursework offered jointly with The University of Melbourne for the first time in 2011 were successful and this arrangement continued in 2012.

Encouraging medical professionals to participate in laboratory-based research is an important aspect of translational research, which is a key strategic pillar of the institute. Together with the institute's clinician-scientists, we have mapped potential paths for becoming a clinician-scientist, and this information is now available on the institute website.

**Prospective honours and PhD students attended the institute's Open Days in September 2011.**

## Discovering new treatments for deadly parasites

**Schistosomiasis is a deadly parasitic disease in the developing world. More than 200 million people are infected with schistosomiasis, and an estimated 200,000 people die from the disease each year.**

Honours student Mr Nicholas Lim has been studying the programmed cell death pathway that was recently discovered in parasitic worms by researchers Dr Doug Fairlie and Dr Erinna Lee from the institute's Structural Biology division.

Mr Lim said the research team was looking for proteins similar to the Bcl-2 family of cell death proteins found in humans. "The Bcl-2 protein family includes 'pro-survival' and 'pro-death' proteins that are responsible for telling the cells whether to live or die," Mr Lim said. "My honours project has been focused on characterising components of the cell death pathway in parasitic worms called schistosomes to try to identify new pro-survival or pro-death proteins that are part of this process."

Mr Lim has already potentially identified a previously unknown pro-death protein in schistosomes as part of his project. "I found a pro-death protein that binds to and interacts with a previously identified pro-survival protein, giving us another 'link' in the pathway," he said. "As researchers continue to understand the components of this pathway they will be able to determine whether targeting these proteins with drugs will be helpful in treating this devastating disease."

Mr Lim said the Walter and Eliza Hall Institute's honours program had been a great experience. "The honours program really gives you practical experience and helps you to develop a lot of skills that will be very useful in any future workplace," he said.

**Honours student Mr Nicholas Lim**

## New genetic clue to dementia puzzle

**Fronto-temporal lobar degeneration (FTLD) is the second-most common cause of dementia, a degenerative brain disease for which there is currently no treatment or cure, in people aged under 65.**

Approximately 40 per cent of people who develop FTLD have a family history of the disease. Now, institute researchers have made a genetic discovery that may lead to a deeper understanding of this inherited form of dementia.

The research is a joint project between PhD student Ms Katherine Smith and her supervisors Dr Melanie Bahlo, from the institute's Bioinformatics division, and Professor Sam Berkovic from the Epilepsy Research Centre at Austin Health.

Ms Smith said the research team made the discovery while investigating the genetic cause of a very rare, but fatal, neurodegenerative disease. "Our work is a bit like detective work. We look at the DNA of people who have particular inherited diseases and use sophisticated mathematical and statistical methods to find the genes that have mutations or changes that cause these diseases," Ms Smith said.

The researchers found that two abnormal copies of a gene called progranulin caused very different disease compared to that seen with one abnormal copy. While a single abnormal copy of progranulin causes FTLD, a condition that begins in middle to late life, two abnormal copies cause a rare and devastating disease, which causes blindness, seizures, and mental decline in young adults in their early twenties.

Ms Smith said the link between these two disorders was not previously suspected. "We had no idea that this mutation, which causes a well-known type of dementia when it affects a single gene copy, would cause this very rare neurodegenerative disease when it affects both gene copies," she said. "The discovery will help us to better understand how mutations in the progranulin gene cause severe neurological disease."

**Collaborating organisations:** Austin Health, Carlo Besta Neurological Institute, Center for Human Genetic Research, Hospital São João, Mayo Clinic, The University of Melbourne, University College London, University of Florida.

**Funding partners:** Australian Research Council, National Health and Medical Research Council of Australia, The Pratt Foundation and the Victorian Government.

**More information:** Smith KR, Damiano J, Franceschetti S, Carpenter S, Canafoglia L, Morbin M, Rossi G, Pareyson D, Mole SE, Staropoli JF, Sims KB, Lewis J, Lin WL, Dickson DW, Dahl HH, Bahlo M, Berkovic SF. Strikingly different clinicopathological phenotypes determined by progranulin-mutation dosage. *American Journal of Human Genetics*. 2012 Jun 8;90(6):1102-7.

**PhD student Ms Katherine Smith**

# 2011-12 graduates

**The following students successfully completed their studies in the past year:**

## Doctor of Philosophy, The University of Melbourne

**Dr Julia Cutts**
The innate immune response and human severe malaria.
*Professor Louis Schofield, Professor Alan Cowman*

**Dr Hayley Bullen**
Novel membrane proteins of *Plasmodium falciparum.*
*Professor Alan Cowman, Dr Brendan Crabb, Dr Paul Gilson, Dr Jacob Baum*

**Dr Oliver Clarke**
Structural investigations of the Bk potassium channel assembly.
*Dr Jacqui Gulbis, Dr Brian Smith*

**Dr Felix Ellett**
Zebrafish models for studying macrophage function and fungal infection.
*Dr Graham Lieschke, Dr Benjamin Kile*

**Dr Maybelline Giam**
Functional characterisation of Bcl-G.
*Professor Andreas Strasser, Dr Philippe Bouillet*

**Dr Alexander Gout**
*Plasmodium falciparum* transcriptional regulation of gene expression.
*Professor Terry Speed, Dr Tony Papenfuss, Dr Brendan Crabb.*

**Dr Stephanie Grabow**
Which pro-survival Bcl-2 family members are required for lymphoma development or sustained lymphoma growth?
*Professor Andreas Strasser, Dr Philippe Bouillet*

**Dr Lina Happo**
The impact of BH3-only genes on the response of murine lymphoma to anti-cancer therapy.
*Professor Andreas Strasser, Associate Professor Clare Scott*

**Dr Peter Hughes**
The pro-apoptotic protein Bim and its role in the immune system and polycystic kidney disease.
*Dr Philippe Bouillet, Professor Andreas Strasser*

**Dr Seong Khaw**
Translational and mechanistic studies with BH3-mimetics in haematological malignancies.
*Professor Andrew Roberts, Professor David Huang*

**Dr Elizabeth Kruse**
Regulation of haematopoiesis by ETS transcription factors.
*Dr Benjamin Kile, Professor Warren Alexander*

**Dr Huei Leong**
The role of Smchd1 in cancer.
*Dr Marnie Blewitt, Professor Doug Hilton*

**Dr Shu Louie**
Targeting alternative enzymes in malaria.
*Dr Keith Watson, Associate Professor Jonathan Baell*

**Dr Ashley Ng**
The role of Erg in haematopoiesis.
*Professor Warren Alexander, Dr Benjamin Kile*

**Dr Priyanka Sathe**
The development pathways of splenic dendritic cells.
*Professor Ken Shortman, Dr Li Wu*

**Dr Di Wu**
Finding hidden relationships between gene expression profiles with application to breast cancer biology.
*Professor Terry Speed, Professor Gordon Smyth*

**Dr Dimitra Zotos**
The regulation of germinal centre B cell differentiation.
*Associate Professor David Tarlinton, Professor Phil Hodgkin*

**Dr Yi Xin**
Understanding transcriptional regulation of terminal T cell differentiation: a focus on Blimp1.
*Dr Stephen Nutt, Dr Axel Kallies*

## Bachelor of Science (Honours), The University of Melbourne

**Mr Brendan Ansell**
Understanding malarial invasion from a structural perspective.
*Professor Alan Cowman, Dr Wai-Hong Tham*

**Ms Renee Gloury**
Unravelling the distinct roles of transcription factors in B cell leukaemia development.
*Dr Axel Kallies, Professor Phil Hodgkin*

**Mr Nicholas Liau**
Understanding the interplay between JAK2 and SOCS3 in myeloproliferative disease.
*Dr Jeff Babon, Professor Nick Nicola*

**Ms Clara Lin**
Function and structure of MSP-DBL2 – an MSP3-like protein peripherally associated with the merozoite surface of *P. falciparum.*
*Professor Alan Cowman, Dr Tony Hodder*

**Mr Edmond Linossi**
SOCS4 structure/function studies and detection of interacting proteins.
*Dr Sandra Nicholson, Dr Lukasz Kedzierski*

**Mr Michael Manning**
Investigation of the genetics of hearing loss.
*Dr Rachel Burt, Dr Marina Carpinelli*

**Miss Kate McArthur**
Phenotypic cell-based chemical screening.
*Dr Kurt Lackovic, Professor David Huang, Dr Ben Croker*

**Ms Antonia Policheni**
Biological characterisation of Clec9A function.
*Dr Mireille Lahoud, Dr Jian-Guo Zhang, Dr Peter Czabotar*

**Ms Kathryn Potts**
Investigating the lineage interactions that facilitate transcriptional control of haematopoietic development and stem cell formation in the embryo.
*Dr Samir Taoudi, Dr Christine Biben*

**Mr Michael Roy**
Design and structural characterisation of Bcl-2 inhibitors.
*Dr Guillaume Lessene, Dr Peter Czabotar*

**Mr Ryan Stuchbery**
Acute deletion of the pro-apoptotic protein Bim in mice.
*Dr Philippe Bouillet, Dr Delphine Merino*

**Mr Vu Tran**
Mitochondrial permeabilisation by Bak and Bax during apoptotic cell death.
*Dr Ruth Kluck, Dr Grant Dewson*

**Ms Melanie Williams**
Molecular characterisation of signal transduction pathways mediating apicomplexan parasite-host cell invasion.
*Dr Chris Tonkin, Dr Jacob Baum*

**Mr Matthew Witkowski**
Characterising essential genes in B cell leukaemia using RNAi.
*Dr Ross Dickins, Dr Mark McKenzie*

## Bachelor of Science (Honours), visiting students

**Ms Michelle Gazdik**
Design and synthesis of pyridylbenzamides as novel agents active against *Trypanosoma brucei.*
*Associate Professor Jonathan Baell, Dr Brad Sleebs, Dr Andrew Hughes*

**Ms Sarah Moawad**
Design and synthesis of acylguanidines as novel agents active against *Trypanosoma brucei.*
*Associate Professor Jonathan Baell, Dr Brad Sleebs, Dr Andrew Hughes*

**Mr Digjaya Utama**
Diversity of the major surface antigen of *Plasmodium falciparum*, PfEMP1.
*Dr Alyssa Barry*

# 2011-12 PhD in progress

**Scholarships to support training**

**APA** Australian Postgraduate Award
**BPS** National Health and Medical Research Council (NHMRC) Biomedical Postgraduate Scholarship
**CCV** Cancer Council of Victoria
**CSL** CSL Scholarship
**Dora Lush** NHMRC Dora Lush
**DSO** DSO National Labs, Scholarship, Singapore
**IPRS** International Postgraduate Research Scholarship
**LFA** Leukaemia Foundation Australia Scholarship
**MIFRS** Melbourne International Fee Remission Scholarship
**MIRS** Melbourne International Research Scholarship
**MPS** NHMRC Medical Postgraduate Scholarship
**MRS** Melbourne Research Scholarship
**NBCF** National Breast Cancer Foundation Scholarship
**Pearl** Pearl Scholarship
**Pratt** Pratt Foundation
**RCS** Reid Foundation Scholarship
**WEHI** Walter and Eliza Hall Institute Scholarship

**Raed Alserihi**
Targeting self-renewal mechanisms in T-cell acute lymphoblastic leukaemia.
*Dr Matthew McCormack, Professor Warren Alexander, Professor David Huang* **SACM**

**Fiona Angrisano**
The molecular basis for motility in the malaria parasite insect stages.
*Dr Jake Baum, Professor Alan Cowman* **WEHI**

**Natasha Anstee**
Impact of Mcl-1 on the development of acute myeloid leukaemia and its resistance to therapy.
*Professor Suzanne Cory, Dr Cassandra Vandenberg* **LFA**

**Priscilla Auyeung**
Cellular immune mechanism in chronic idiopathic urticaria.
*Professor Len Harrison, Dr Diana Mittag* **MPS**

**Sarah Best**
Identification of master regulators of the mammary hierarchy.
*Professor Jane Visvader, Professor Geoff Lindeman* **Dora Lush**

**Julian Bosco**
Mechanism and function of CD52 in immune regulation.
*Professor Len Harrison, Dr John Wentworth* **Dora Lush**

**Michelle Boyle**
*Plasmodium falciparum* merozoite invasion mechanisms and inhibitors of invasion.
*Professor James Beeson, Dr Jake Baum* **APA**

**Jason Brouwer**
Structural and biochemical analysis of the pro apoptotic protein Bak.
*Dr Peter Czabotar, Professor Peter Colman* **APA**

**Darcy Butts**
An shRNA screen for novel epigenetic regulators of neural stem cell proliferation, differentiation and survival.
*Dr Marnie Blewitt, Professor Doug Hilton, Professor Chris Parish* **IPRS**

**Bianca Capaldo**
Functional screens to identify mammary epithelial regulators.
*Professor Jane Visvader, Professor Geoff Lindeman* **APA**

**Jo-Anne Chan**
Targets of antibodies to the surface of *Plasmodium falciparum*-infected erythrocytes that mediate protective immunity to human malaria.
*Professor James Beeson, Professor Alan Cowman, Dr Freya Fowkes* **MRS**

**Dineika Chandrananda**
Impact of Mcl-1 on the development of acute myeloid leukaemia and its resistance to therapy.
*Dr Melanie Bahlo, Professor Terry Speed* **APA**

**Simon Chatfield**
Human neutrophil activation in inflammatory arthritis.
*Professor Ian Wicks, Dr Ben McKenzie* **RCS**

**Kelan Chen**
Structural and functional characterisation of a novel epigenetic regulator SmcHD1.
*Dr Marnie Blewitt, Dr James Murphy, Professor Doug Hilton* **MIFRS/MIRS**

**Andy Chen**
Statistical analysis of RNA-Seq data.
*Professor Gordon Smyth, Professor Terry Speed* **APA**

**Chris Chiu**
Defining antigenic targets of immunity to malaria.
*Dr Diana Hansen, Professor Alan Cowman* **WEHI**

**Kevin Chow**
The regulation of monocyte-derived cells during allograft rejection.
*Associate Professor Andrew Lew, Dr Yuxia Zhang* **KHA**

**Akshay D'Cruz**
Investigation of SPRY domain-containing SOCS box proteins.
*Dr Sandra Nicholson, Dr Jeff Babon, Professor Nick Nicola* **APA**

**Alexis Delbridge**
Investigating the binding specificity of the SPRY domain.
*Professor Andreas Strasser, Dr Philippe Bouillet* **APA**

**Farrah El-Saaffin**
Investigating the molecular and cellular role of TRN.
*Dr Tim Thomas, Dr Anne Voss* **APA**

**Nima Etemadi**
Regulation of lymphotoxin ß receptor signalling.
*Associate Professor John Silke, Professor David Vaux* **WEHI**

**Ivan Fung**
Regulation of early B cell differentiation in response to antigen.
*Associate Professor David Tarlinton, Professor Phil Hodgkin* **APA**

**Michelle Gazdik**
The design of small molecule inhibitors of Plasmepsin V for intervention against malaria.
*Dr Justin Boddey, Dr Brad Sleebs, Professor Alan Cowman* **APA**

**Jamie Gearing**
An RNA interference-based screen for epigenetic modifiers of X chromosome inactivation.
*Dr Marnie Blewit, Professor Doug Hilton* **APA**

**Danika Hill**
Analysis of immunological memory to malaria.
*Professor Louis Schofield, Professor Alan Cowman* **APA**

**Colin Hockings**
The Bak:Mcl-1 complex – a mechanism of resistance to apoptosis.
*Dr Ruth Kluck, Professor Jerry Adams* **APA**

**Sweta Iyer**
Membrane topology of the mitochondrial apoptosis pore.
*Dr Ruth Kluck, Dr Brian Smith, Professor Peter Colman* **MIFRS**

**Reema Jain**
Thymic epithelial cell differentiation and apoptosis.
*Dr Daniel Gray, Professor Andreas Strasser* **MIFRS**

**Timothy Johanson**
The role of micro RNAs in dendritic cells.
*Associate Professor Andrew Lew, Dr Yuxia Zhang, Dr Mark Chong* **APA**

**Eugene Kapp**
Improved bioinformatics tools for the analysis of mass spectrometry based on peptiodomics data.
*Professor Terry Speed, Professor Gordon Smyth* **N/A**

**Francine Ke**
Determining the role of Bak in development and apoptosis.
*Professor Andreas Strasser, Professor Jerry Adams* **LFA**

**Keith Khoo**
Characterisation of helical peptide toxins and their analogues.
*Professor Ray Norton, Dr Jonathan Baell* **IPRS**

**Andrew Kueh**
The role of HBO1 during embryonic development.
*Dr Tim Thomas, Dr Anne Voss* **IPRS**

**Charity Law**
Statistics for next-generation sequencing.
*Professor Gordon Smyth, Professor Terry Speed* **MRS**

**Chin-Nien Lee**
Functional studies of dendritic cells in type 1 diabetes: Non-Obese Diabetic (NOD) mouse model.
*Dr Li Wu, Professor Ken Shortman, Associate Professor Andrew Lew* **MIFRS/MIRS**

**Stanley Lee**
The role of polycomb group genes in cancer.
*Professor Warren Alexander, Dr Ian Majewski* **APA**

**Lily Lee**
Cell types in normal breast and human breast cancers: when do they express the oestrogen receptor?
*Professor Jane Visvader, Professor Geoff Lindeman* **NBCF**

**Sophie Lee**
The biological and functional characterisation of how the Erg transcription factor contributes to the development of human leukaemia.
*Professor Warren Alexander, Dr Ashley Ng* **APA**

**Clara Lin**
Functions of proteins involved in invasion of *Plasmodium falciparum* merozoites into human red blood cells.
*Professor Alan Cowman, Dr Tony Hodder* **MIRS**

**Edmond Linossi**
Characterising the suppressor of cytokine signalling 4.
*Dr Sandra Nicholson, Professor Nick Nicola* **APA**

**Grace Liu**
Investigating the interactions between critical molecular pathways in cancer using RNAi.
*Dr Ross Dickins, Dr Lorraine Robb* **LFA**

**Tommy Liu**
The role of suppressor of cytokine signalling-3 (SOCS3) in chondrocytes during development and in inflammatory arthritis.
*Professor Ian Wicks, Dr Ben Croker, Dr Kate Lawlor* **APA**

**Aaron Lun**
Systems biology for chromatin interaction using ChIA-PET.
*Professor Gordon Smyth, Dr Stephen Nutt* **APA**

**Kevin Man**
The role of IRF4 in CD8 T cell effector and memory differentiation.
*Dr Axel Kallies, Dr Stephen Nutt* **APA**

**Julia Marchingo**
Regulation of T cell activation and survival.
*Professor Phil Hodgkin, Dr Susanne Heinzel* **APA**

**Dimitra Masouras**
Establishing the role of IKK in the regulation of BH3-only pro-apoptotic proteins.
*Dr Anissa Jabbour, Associate Professor Paul Ekert* **APA**

**James McCoy**
Activation of the *Toxoplasma* invasion motor.
*Dr Chris Tonkin, Dr Jake Baum, Professor Alan Cowman* **APA**

**Jessica Moffat**
Specialising of antigen presentation in the dendritic cell network.
*Dr Jose Villadangos, Dr Justine Mintern* **APA**

**Ehtesham Mofiz**
Scabies mite genome project.
*Dr Tony Papenfuss, Professor Terry Speed* **APA**

**Nisha Narayan**
Defining how HoxB8 functions to regulate cell survival and differentiation.
*Associate Professor Paul Ekert, Dr Anissa Jabbour* **APA**

**Duong Nhu**
Rocaglamide congeners as novel anti-cancer agents.
*Dr Chris Burns, Dr Guillaume Lessene* **MIFRS/MIRS**

**Joanne O'Donnell**
Molecular regulation of inflammatory cell death.
*Dr Ben Croker, Professor Andrew Roberts, Dr Motti Gerlic* **Dora Lush**

**Maya Olshina**
*In vivo* and *in vitro* investigation of actin regulation in the malaria parasite.
*Dr Jake Baum, Dr Jacqui Gulbis, Professor A Cowman* **Dora Lush**

**Shereen Oon**
A novel approach to cytokine blockade for the treatment of systemic erythematosus.
*Professor Ian Wicks, Dr Nicholas Wilson* **MPS**

**Milon Pang**
The role of PU.1 in early lymphocyte development and leukaemogenesis.
*Dr Li Wu, Dr Stephen Nutt* **LFA**

**Kathryn Potts**
Generation of inter-lineage cross-talk model of haematopoietic stem cell development.
*Dr Samir Taoudi, Professor Doug Hilton* **APA**

**Simon Preston**
The role of signal transducer and activator of transcription (STAT)-related proteins in dendritic cells during chronic active infection.
*Dr Marc Pellegrini, Dr Gabrielle Belz* **Dora Lush**

**Pravin Rajasekaran**
Characterising *Plasmodium*–hepatocyte interactions during liver-stage malaria.
*Dr Justin Boddey, Professor Alan Cowman* **APA**

**Lucille Rankin**
Investigating the transcriptional regulation of lymphoid tissue inducer (LTi) cells by inhibitor of differentiation (Id2) and retinoid-related orphan receptor gamma T (Ror-Gamma-T).
*Dr Gabrille Belz, Dr Stephen Nutt* **Dora Lush**

**Maryam Rashidi**
Innate immunity and inflammation in diabetes.
*Professor Len Harrison, Dr John Wentworth* **MIFRS/MIRS**

**James Rickard**
Sharpin regulation of TNF signalling in chronic proliferation dermatitis.
*Associate Professor John Silke, Professor David Vaux* **APA**

**David Riglar**
Dissection of the coordinated events during *Plasmodium falciparum* infection of the human erythrocyte.
*Professor Alan Cowman, Dr Jake Baum* **APA**

**Leona Rohrbeck**
Regulation of BH3-only protein *in vivo*.
*Professor Andreas Strasser, Dr Philippe Bouillet* **MIFRS/MIRS**

**Michael Roy**
Design and characterisation of Bcl-xL and Mcl-1 inhibitors.
*Dr Guillaume Lessene, Dr Peter Czabotar, Professor Peter Colman* **APA**

**Victoria Ryg-Cornejo**
Understanding generation of high-affinity antibody responses to malaria.
*Dr Diana Hansen, Professor Louis Schofield* **APA**

**Natalia Sampaio**
Suppression of malaria by the malaria parasite antigen *Plasmodium falciparum* erythrocyte membrane protein 1 (PfEMP-1).
*Professor Louis Schofield, Dr Krystal Evans* **Dora Lush**

**Shirley Seah**
Costimulatory requirements of help-independent anti-influenza CTL.
*Associate Professor Andrew Lew, Dr Yuxia Zhang* **DSO**

**Bilal Sheikh**
The independent and overlapping roles of chromatin regulators MOZ, QKF and BMI1.
*Dr Anne Voss, Dr Tim Thomas* **Dora Lush**

**Katherine Smith**
Developing statistical analysis methods robust to heterogeneity for the discovery of disease variants.
*Dr Melanie Bahlo, Professor Terry Speed* **Pratt**

**Rebecca Stewart**
Functional characterisation of phosphorylation of the *Toxoplasma* invasion motor.
*Dr Chris Tonkin, Dr Jake Baum, Professor Alan Cowman* **APA**

**Stephanie Tan**
Glycosylphosphatidylinositol as a multi-stage, pan-species surface antigen in malaria.
*Professor Louis Schofield, Dr Diana Hansen* **MIRS/MIFRS**

**Jesse Toe**
Clearing chronic infectious diseases – enhancing host immune effector function.
*Dr Marc Pellegrini, Dr Gabrielle Belz* **Dora Lush**

**Elizabeth Valente**
Pro-apoptotic BH3-only proteins Puma, and to a lesser extent Noxa, are critical for the therapeutic effects of the p53-activating compound Nutlin-3a in normal and malignant lymphoid cells.
*Professor Andreas Strasser, Dr Philippe Bouillet* **CCV**

**Hannah Vanyai**
The role of monocytic leukaemia zinc finger protein in embryonic development.
*Dr Anne Voss, Dr Tim Thomas* **APA**

**Leila Varghese**
Janus kinase activity and regulation of haematopoiesis and disease.
*Dr James Murphy, Professor Doug Hilton, Dr Jeff Babon* **LFA**

**Andreea Waltmann**
The molecular epidemiology of malaria transmission in the South West Pacific.
*Professor Ivo Mueller, Dr Alyssa Barry* **WEHI**

**Clare Weeden**
Preclinical validation of new combination therapies in xenograft mouse models of lung cancer.
*Dr Marie-Liesse Asselin-Labat, Professor Geoff Lindeman* **APA**

**Michael White**
Functional characterisation of caspase-9 in haematopoiesis.
*Dr Ben Kile, Professor David Huang* **LFA**

**Melanie Williams**
Structural and functional analysis of host cell invasion motor in toxoplasma parasites.
*Dr Chris Tonkin, Professor Alan Cowman* **APA**

**Matthew Witkowski**
The role of transcription factor, Ikaros, in acute lymphoblastic leukaemia pathogenesis and therapy-resistance.
*Dr Ross Dickins, Dr Mark McKenzie* **APA**

**Alan Yap**
Molecular mechanisms of remodelling and invasion of malaria parasites.
*Professor Alan Cowman, Dr Jake Baum* **Pearl**

**Kelvin Yip**
Responses of normal and cancerous intestinal stem cells to regulatory signals.
*Professor Tony Burgess* **MIFRS/MIRS**

**Janet Yeo**
Alternative pathways to miRNA biogenesis.
*Dr Mark Chong, Dr Gabrielle Belz* **MIFRS/MIRS**

**Sook Pheng Wong**
Notch signalling in colorectal cancer.
*Professor Tony Burgess* **MIFRS/MIRS**

**Elizabeth Zuccala**
Molecular dissection of malaria parasite interactions with the human erythrocyte.
*Dr Jake Baum, Professor Alan Cowman* **APA**

## Visiting PhD students

**Mary Ann Anderson**
Anti-lymphoma therapy.
*Professor David Huang, Professor Andrew Roberts*

**Pratiti Bandopadhayay**
Oncogenic functions of the EWS-WT1 translocation in desmoplastic small round cell sarcoma.
*Associate Professor Paul Ekert, Dr Elizabeth Algar, Dr David Ashley*

**Joseph Evans**
TNF superfamily signalling in tumourigenesis and discovery of therapeutic applications.
*Associate Professor John Silke, Professor David Vaux*

**Benjamin Green**
The role of AKT in IL-3 receptor survival signalling.
*Associate Professor Paul Ekert, Dr Richard Pearson*

**Marika Salmanidis**
Molecular mechanisms of HoxB8 function in myeloid cells.
*Associate Professor Paul Ekert, Dr Lavinia Gordon*

**Sylvia Teguh**
Artemisinin study for mechanisms of actions and investigation of novel potential antimalarial compounds: conjugated-indole dye and triazine.
*Dr Guillaume Lessene, Dr Leann Tilley*

**Monique Topp**
Novel xenograft mouse model of human high-grade serous epithelial ovarian cancer for preclinical analysis.
*Associate Professor Clare Scott, Dr Karla Hutt*

# Bachelor of Science (Honours) in progress

**Walter and Eliza Hall Institute honours students are supported by funding from the Alan W Harris Scholarship program.**

**Hesham Abdulla**
Modelling the multi-step pathogenesis of T cell leukaemia.
*Dr Matthew McCormack, Professor Warren Alexander*

**Claire Bowtell**
Using RNA interference to uncover novel regulators of apoptosis.
*Professor Andreas Strasser, Dr Marco Herold*

**Eamon Byrne**
How do immune regulatory enzymes recognise substrates inside the lipid bilayer?
*Dr Melissa Call, Dr Matthew Call*

**Boon Kheng Chai**
Analysis of CARP1 and CARP2 knockout mice.
*Professor David Vaux, Dr Najoua Lalaoui, Dr James Vince*

**Hui San Chin**
Regulation of apoptosis in Mcl-1-dependent cells.
*Professor David Huang, Dr Seong Lin Khaw, Dr David Segal*

**Stephanie Conos**
Cytokine signalling in myeloid leukaemia.
*Associate Professor Paul Ekert, Dr Anita Jabbour*

**Ashleigh Keown**
The role of cytoskeletal regulatory proteins in T cell development.
*Dr Mark Chong, Dr Sheila Dias*

**Ashod Kherlopian**
Cytokine signalling in myeloid leukaemia.
*Dr Anissa Jabbour, Associate Professor Paul Ekert*

**Logesvaran Krshnan**
Mechanics of transmembrane signalling in the immune system.
*Dr Matthew Call, Dr Melissa Call*

**Nicholas Lim**
Targeting cell death pathways in parasites.
*Dr Doug Fairlie, Dr Erinna Lee*

**Jun Ting Low**
The role of NF-κB in the development of autoimmunity and cancer in FasL-Fas mutant mice.
*Dr Lorraine O'Reilly, Professor Andreas Strasser*

**Cyrus Tan**
Discovering new treatments for debilitating parasitic diseases using medicinal chemistry.
*Dr Jonathan Baell, Dr Brad Sleebs*

**Jeigh Tiu**
Improving drug therapies for immune diseases.
*Professor Phil Hodgkin, Dr Susanne Heinzel*

**Emma Watson**
Programmed cell death and angiogenesis.
*Dr Leigh Coultas, Professor Andreas Strasser*

**Jie Zhou**
Exploring cellular calculation with the B lymphocyte model.
*Professor Phil Hodgkin, Associate Professor David Tarlinton*

## Visiting Honours students

**Manal Ali**
Design and synthesis of selective kinase inhibitors
*Dr Chris Burns, Dr Brian Smith*

# 2011-12 vacation scholars

## UROP students and overseas research trainees

**The institute hosted eight university undergraduates as vacation scholars mainly between November 2011 and March 2012, for periods from two weeks up to four months.**

Another 21 students participated in the University Research Opportunities Program (UROP), which is administered through the Bio21 Cluster and gives university students an opportunity to participate in research.

In addition, the institute hosted 12 overseas undergraduates to undertake short-term research training placements from Austria, China, France, Germany, The Netherlands, Spain and Sweden.

**Mr Aaron Bagnato**
UROP student
*Dr Guillaume Lessene*

**Mr Andrew Bennett**
UROP student
*Dr Melanie Bahlo*

**Ms Lucy Bennett**
Vacation scholarship student
*Professor Doug Hilton*

**Ms Katrina Black**
UROP student
*Dr Jacqui Gulbis*

**Ms Courtney Cameron**
UROP student
*Professor Doug Hilton*

**Ms Hui Chin**
Vacation scholarship student
*Professor David Huang*

**Ms Bethany Clark**
UROP student
*Professor Warren Alexander*

**Ms Katherine Colman**
Vacation scholarship student
*Professor Doug Hilton*

**Mr Caleb Dawson**
Vacation scholarship student
*Professor Doug Hilton*

**Ms Gerda de Vries**
Overseas research trainee
*(The Netherlands)*
*Associate Professor Paul Ekert*

**Ms Janina Findeis**
Overseas research trainee *(Germany)*
*Dr Gabrielle Belz*

**Ms Laura Galvis Vargas**
UROP student
*Dr Marie-Liesse Asselin-Labat*

**Ms Sally Higgins**
UROP student
*Dr Alyssa Barry*

**Ms Louisa Hill**
Overseas research trainee *(Germany)*
*Dr Sebastian Carotta*

**Ms Felanita Hutani**
UROP student
*Dr Chris Burns*

**Mr Sean Ivory**
UROP student
*Dr Ross Dickins*

**Ms Ashleigh Keown**
UROP student
*Professor Len Harrison*

**Mr Logesvaran Krshnan**
UROP student
*Dr Melissa Call, Dr Matthew Call*

**Mr Mark Kowarsky**
UROP student
*Dr Tony Papenfuss*

**Mr Mathias Lang**
Overseas research trainee
*Professor Andreas Strasser*

**Ms Elizabeth Lieschke**
Vacation scholarship student
*Associate Professor Clare Scott*

**Ms Joy Liu**
UROP student
*Dr Marnie Blewitt*

**Mr Sidney Louzoun**
Overseas research trainee *(France)*
*Dr Guillaume Lessene*

**Ms Hang Luong**
UROP student
*Associate Professor Clare Scott*

**Mr Davis McCarthy**
UROP student
*Professor Gordon Smyth*

**Mr Lachlan McIntosh**
UROP student
*Dr Tony Papenfuss*

**Ms Helen McRae**
UROP student
*Dr Doug Fairlie*

**Ms Marie Menard**
Overseas research trainee *(France)*
Professor Suzanne Cory,
Professor Jerry Adams

**Ms Elenora Ottina**
Overseas research trainee *(Austria)*
*Professor Andreas Strasser*

**Mr Bartija Pieters**
*Overseas research trainee*
*(The Netherlands)*
*Professor Ian Wicks*

**Ms Junyan Qian**
Overseas research trainee *(China)*
*Professor Len Harrison*

**Mr Michael Roy**
Vacation scholarship student
*Dr Guillaume Lessene*

**Ms Angelika Rutgersson**
Overseas research trainee *(Sweden)*
*Dr Emma Josefsson*

**Mr Douglas Tjandra**
UROP student
*Professor David Huang*

**Ms Jaris Valencia**
Overseas research trainee *(Spain)*
*Professor Jose Villadangos*

**Ms Jolanda Visser**
Overseas research trainee
*(The Netherlands)*
*Associate Professor Paul Ekert*

**Ms Andrea Waltman**
Vacation scholarship student
*Professor Ivo Mueller*

**Mr David Wakeham**
UROP student
*Dr Melanie Bahlo*

**Mr Jeremy Wong**
Vacation scholarship student
*Dr Matthew McCormack*

**Mr Clarence Wong**
UROP student
*Professor Phil Hodgkin*

**Mr Nicholas Yee**
UROP student
*Associate Professor Mike Lawrence*

# Seminars

**The 2012 seminar program at the Walter and Eliza Hall Institute featured more than 100 researchers from around the world presenting the latest scientific knowledge and discoveries.**

**The Walter and Eliza Hall Institute runs two regular seminar programs, the Monday postgraduate lecture series, and Wednesday seminar series, which are both open to the public.**

The Monday postgraduate lecture series features the 'who's who' of national researchers providing insights on major questions in their field of expertise. In 2012, the postgraduate series focused on infectious diseases and the immune response to infection.

Prominent Australian and international researchers were invited to share their research and views on microbe biology, disease pathogenesis and the epidemiology of preventing transmission.

Some highlights from the series included: Professor Tania Sorell from the University of Sydney, Westmead, discussing the impact of fungal infections on human health; Dr Jake Baum from the Walter and Eliza Hall Institute on the complexity of tackling malaria; Professor Paul Young from the University of Queensland, who highlighted the threat that dengue fever virus poses in Australia; and Professor Lindsay Grayson from the Austin Hospital in Melbourne, providing an insightful study of how simple hygiene can have a massive effect on the transmission of superbugs.

The institute's Wednesday seminar series features the best, 'hot-off-the-press' research and includes presentations from across the institute's research community, including PhD students, laboratory heads and division heads.

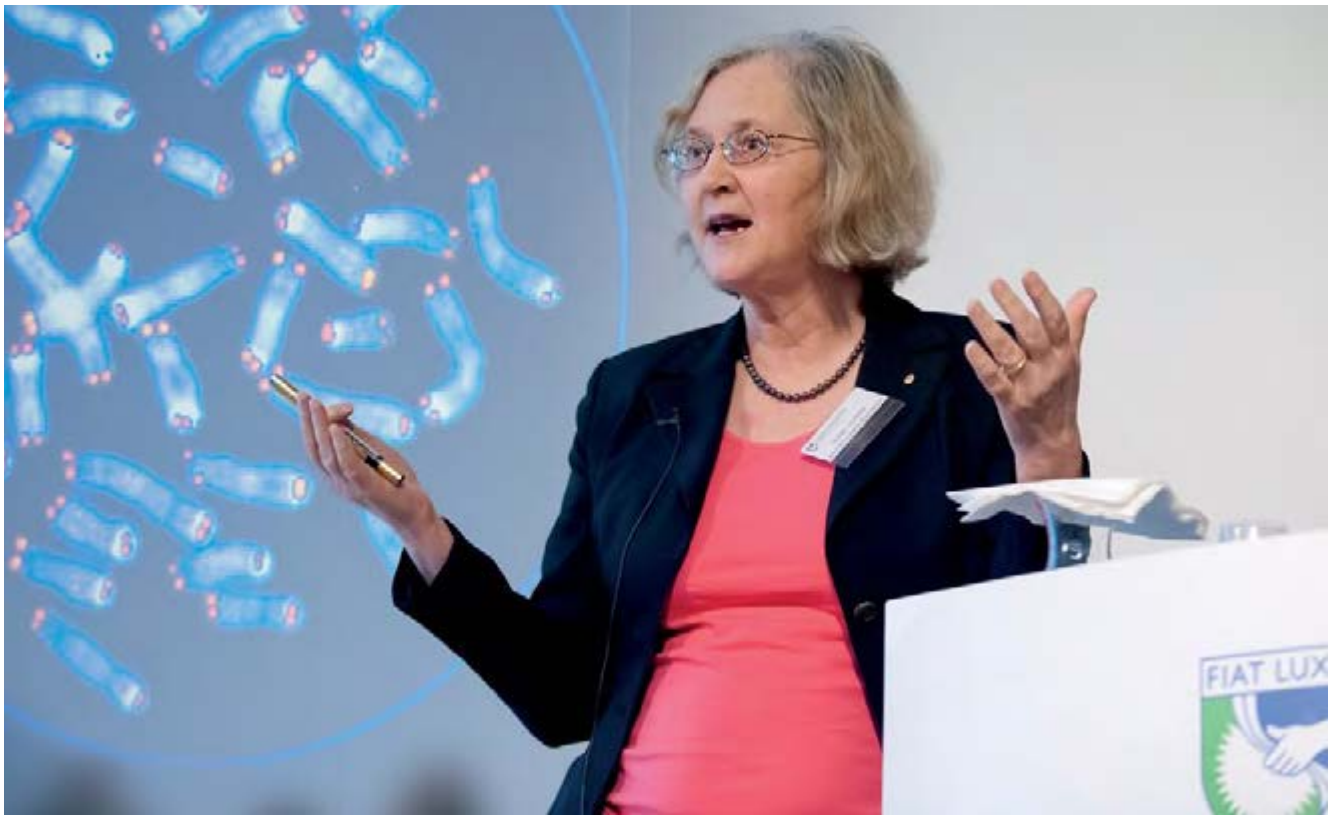
The quality of the research presented by institute scientists was underscored by the numerous high profile publications that followed. Dr Emma Josefsson discussed how cell death programs regulate platelet production, Dr Erika Cretney presented data on the biological programming of regulatory T cells, Dr Katja Lüthje showed us how the fate of certain T cells could be tracked, and Dr James Vince presented his work investigating the role of cell death regulators in inflammation.

A number of special seminars were also held at the institute. Professor Nadia Rosenthal, director of the Australian Regenerative Medicine Institute at Monash University, presented her work on how the immune system may impact on our body's regenerative capacity. Professor Rosenthal was our first 'Women in Science' guest speaker for 2012.

Our 'Clinical Translation' guest seminars match basic science researchers with hospital clinicians, demonstrating how disease-focused research is providing valuable insights in medicine. Clinician-scientist Dr John Wentworth from the institute and The Royal Melbourne Hospital partnered with Professor Paul O'Brien from Monash University to discuss obesity, its impact on biological processes and its management.

A full list of institute seminars held in 2011-12 can be found on the accompanying CD.

**Nobel Laureate Professor Elizabeth Blackburn presented *Hooked on Science*, a lecture to inspire junior and middle high school students to study science, medicine or engineering.**



# 2011-12 institute speakers

| Date | Topic | Speaker |
|---|---|---|
| 6 July 2011 | The comparative epidemiology of *P. falciparum* and *P. vivax*: lessons from population-based studies in Papua New Guinea. | Professor Ivo Mueller, Infection and Immunity division. |
| 13 July 2011 | Bim isoforms: three bullets to kill a cancer cell. | Dr Delphine Merino, Molecular Genetics of Cancer division. |
| 27 July 2011 | Weight loss surgery provides insights into immune mechanisms of metabolic disease. | Dr John Wentworth, Immunology division. |
| 3 August 2011 | The impact of BH3-only genes on the response of murine lymphoma to anti-cancer therapy. | Ms Lina Happo (PhD student), Molecular Genetics of Cancer division. |
| 8 August 2011 | Clinical translation: developing targeted therapies in haematological cancers. | Professor Andrew Roberts, Clinical Translation. |
| 10 August 2011 | The identification of an epigenetic lock that maintains Th2 lineage fidelity. | Dr Rhys Allan, Molecular Immunology division. |
| 17 August 2011 | Dissecting the molecular mechanisms behind actin filament disassembly – an essential process in malaria parasite cell movement. | Mr Wilson Wong, Infection and Immunity division. |
| 24 August 2011 | Development of the haematopoietic system during embryogenesis. | Dr Samir Taoudi, Molecular Medicine division. |
| 31 August 2011 | Living on the edge: releasing Arih2's stranglehold on immunity. | Dr Marc Pellegrini, Infection and Immunity division. |
| 7 September 2011 | Inside the plasma membrane: how lipid-embedded protein domains participate in immune regulation. | Dr Matthew Call, Structural Biology division. |
| 21 September 2011 | A modern high-throughput screening approach to a 20-year-old drug target. | Dr Tony Cardno, Chemical Biology division. |
| 28 September 2011 | Restraint of apoptotic cell death, not its activation, is essential for megakaryocytes to produce platelets. | Dr Emma Josefsson, Cancer and Haematology division. |
| 12 October 2011 | The transcription factors Blimp-1 and IRF4 jointly control the differentiation and function of effector regulatory T cells. | Dr Erika Cretney, Molecular Immunology division. |
| 26 October 2011 | Examining the requirement of endogenous pro-survival Bcl-2 family members in lymphoma development. | Ms Stephanie Grabow (PhD student), Molecular Genetics of Cancer division. |
| 28 October 2011 | Sequencing and understanding tumour genomes. | Dr Tony Papenfuss, Bioinformatics division. |
| 2 November 2011 | Identification of signalling pathways modulating *Toxoplasma* host cell invasion. | Dr Chris Tonkin, Infection and Immunity division. |
| 9 November 2011 | Smchd1 is a novel epigenetic modifier involved in X chromosome inactivation that also behaves as a tumour suppressor. | Ms Huei San Leon (PhD student), Molecular Medicine division. |
| 16 November 2011 | Autoinflammation: diseases of the innate immune system. | Dr Seth Masters, Inflammation division. |
| 23 November 2011 | The role of Polycomb Repressive Complex 2 (PRC2) in tumourigenesis. | Mr Stanley Lee (PhD student), Cancer and Haematology division. |

| Date | Topic | Speaker |
|---|---|---|
| 30 November 2011 | Sticky business: major players in the pathogenesis of malaria infections. | Dr Melanie Rug,<br>Infection and Immunity division. |
| 5 December 2011 | Deciphering the role of IRF4 in transcription and chromatin regulation during T cell differentiation using RNA and ChIP sequencing. | Dr Axel Kallies,<br>Molecular Immunology division, and<br>Dr Wei Shi,<br>Bioinformatics division. |
| 14 December 2011 | Vascular regression and the role of endothelial cell apoptosis. | Dr Leigh Coultas,<br>Cancer and Haematology division. |
| 21 December 2011 | Characterisation of novel Bcl-2 family member, Bcl-G. | Ms Maybelline Giam (PhD student),<br>Molecular Genetics of Cancer division. |
| 7 March 2012 | Bridging histone acetylation and ubiquitination during development and in stem cells. | Mr Bilal Sheikh (PhD student),<br>Molecular Medicine division. |
| 14 March 2012 | The important role of dendritic cells in autoimmune type 1 diabetes. | Mr Chin-Nien Lee (PhD student),<br>Molecular Immunology division. |
| 28 March 2012 | Transcriptional regulation of CTL differentiation: more than one way to be a killer. | Ms Annie Xin (PhD student),<br>Molecular Immunology division. |
| 2 April 2012 | Overview of malaria parasite virulence and resistance mechanisms and disease pathogenesis. | Dr Jake Baum,<br>Infection and Immunity division. |
| 11 April 2012 | Unlike CD4 T cell help, co-stimulation is necessary for effective primary CD8 T cell influenza-specific immunity. | Ms Shirley Seah (PhD student),<br>Immunology division. |
| 2 May 2012 | Following T cell fate using an interleukin-21 reporter mouse. | Dr Katja Lüthje,<br>Immunology division. |
| 9 May 2012 | Making models of systemic inflammatory disease. | Dr Ben Croker,<br>Inflammation division. |
| 16 May 2012 | SOCS box proteins: regulation of inflammation and immunity. | Dr Sandra Nicholson,<br>Inflammation division. |
| 23 May 2012 | Role of cell death signalling in inflammation. | Dr James Vince,<br>Cell Signalling and Cell Death division. |
| 30 May 2012 | The role of HoxB8 in myeloid cell immortalisation. | Ms Marika Salmanidis (PhD student),<br>Cell Signalling and Cell Death division. |
| 6 June 2012 | Soluble glycoprotein CD52 mediates suppression by antigen-activated regulatory CD4+ T cells. | Dr Esther Bandala Sanchez,<br>Immunology division. |
| 13 June 2012 | The role of HBO1 during embryonic development. | Mr Andrew Kueh (PhD student),<br>Molecular Medicine division. |
| 14 June 2012 | The Ion Torrent sequencing platform: options for WEHI researchers for high-throughput sequencing. | Ms Doreen Agyapomaa,<br>Systems Biology and Personalised Medicine division. |
| 20 June 2012 | BH3-only proteins in apoptosis. | Dr Philippe Bouillet,<br>Molecular Genetics of Cancer division. |
| 27 June 2012 | Haematopoietic transcription factors in acute leukaemia genesis and therapy. | Dr Ross Dickins,<br>Molecular Medicine division. |

# 2011-12 visiting speakers

| Date | Topic | Speaker |
|---|---|---|
| 4 July 2011 | Cancer immunoediting. | Professor Mark Smyth, Cellular Immunity, Peter MacCallum Cancer Centre, Australia. |
| 18 July 2011 | Xenograft models of pediatric acute leukaemia: insights into biology and treatment. | Associate Professor Richard Lock, Children's Cancer Institute Australia, Lowy Cancer Research Centre, University of NSW, Australia. |
| 20 July 2011 | The role of antibodies in protecting children from *Plasmodium* falciparum malaria. | Dr Jack Richards, Centre for Immunology, Burnet Institute, Australia. |
| 25 July 2011 | Virus-associated human cancer. | Professor Ian Frazer FAA, Translational Research Institute, Australia. |
| 27 July 2011 | Weight loss surgery provides insights into immune mechanisms of metabolic disease. | Professor Paul O'Brien, Centre of Obesity Research and Education, Monash University, Australia. |
| 1 August 2011 | Antigen presentation in bone marrow transplantation: where and when? | Professor Geoff Hill, Division of Immunology, Bone Marrow Transplant Lab, Queensland Institute of Medical Research, Australia. |
| 18 August 2011 | Modelling cell fate transitions and determinants of cell type. | Dr Jessica Mar, Albert Einstein College of Medicine, US. |
| 19 August 2011 | Stat3: the secret ingredient to turn lysosomes deadly? | Dr Peter Kreuzaler, Trinity College, Department of Pathology, University of Cambridge, UK. |
| 14 September 2011 | IAP antagonists induce conformational changes in cIAP1 that promote dimerisation and auto-ubiquitination. | Dr Wayne Fairbrother, Protein Engineering Department, Genentech Inc US. |
| 5 October 2011 | Minor class mRNA splicing comes into focus: Rnpc3 shapes the developing transcriptome and is deregulated in cancer. | Associate Professor Joan Heath, Colon Biology Lab, Ludwig Institute for Cancer Research, Australia. |
| 10 October 2011 | Non-invasive optical imaging: an established tool for studying disease progression, mechanism and therapy. | Dr Vivek Shinde Patel, Technical Applications, Caliper Life Sciences, Australia. |
| 18 October 2011 | Pipetting, ergonomics and you: an overview of ergonomics, pipetting risk factors, methods for reducing the risk of injury and recommended solutions. | Mr Jason Smith, Mettler Toledo Limited, Australia. |
| 19 October 2011 | Devil facial tumor disease: a cancer of ignorance. | Associate Professor Greg Woods, Menzies Research Institute, Tasmania, Australia. |
| 20 October 2011 | Genetics and evolution of clonally transmissible cancers in dogs and Tasmanian devils. | Dr Elizabeth P Murchison, Wellcome Trust Sanger Institute, UK. |
| 28 October 2011 | Sequencing and understanding tumour genomes. | Mr Dale Garsed, Peter MacCallum Cancer Centre, Australia. |
| 4 November 2011 | Making blood: *in vitro* production of human red cells for transfusion therapy. | Professor David Anstee, Bristol Institute for Transfusion Sciences, UK. |
| 7 November 2011 | The common gamma chain family of cytokines: from human disease to transcriptional regulation of critical immune pathways. | Dr Warren J Leonard, Laboratory of Molecular Immunology, National Heart Lung and Blood Institute, National Institutes of Health, US. |
| 16 November 2011 | Genome-wide and boutique RNAi and miRNA screening strategies for functional gene analysis. | Dr Kaylene Simpson, Australian Cancer Research Foundation Victorian Centre for Functional Genomics in Cancer, Peter MacCallum Cancer Centre, Australia. |
| 18 November 2011 | Immune evasion by Tasmanian devil facial tumour. | Dr Hannah Siddle, Department of Pathology, University of Cambridge, UK. |

| Date | Topic | Speaker |
|---|---|---|
| 21 November 2011 | Development of targeted therapeutics for childhood malignancy using mouse models. | Drs Louis Chesler, The Institute of Cancer Research, UK, and Toby Trahair, New South Wales Health Department South Eastern Sydney and Illawarra Area Health Service, Australia. |
| 22 November 2011 | Death receptors and ubiquitin in cancer and inflammation. | Professor Henning Walczak, Tumour Immunology, Department of Medicine, Imperial College London, UK. |
| 22 November 2011 | The modular organisation of dynamic signalling networks - why bad is good. | Professor Anthony J Pawson, Department of Medical Genetics and Microbiology, University of Toronto, Canada. |
| 22 November 2011 | Early events in adaptive immunoresponse: from single molecule to *in vivo*. | Professor Facundo Batista, Lymphocyte Interaction Laboratory, London Research Institute, UK. |
| 29 November 2011 | Targeted sequencing approaches for cancer genomics. | Dr Ian Majewski, Netherlands Cancer Institute, The Netherlands. |
| 29 November 2011 | Drug discovery and development in academia: the Sloan-Kettering experience. | Dr Hakim Djaballah, Memorial Sloan-Kettering Cancer Center, US. |
| 16 December 2011 | Inflammasomes in health and homeostasis in the intestines and beyond. | Professor Richard A Flavell FRS, Howard Hughes Medical Institute, US, and Yale School of Medicine, US. |
| 19 December 2011 | Peeking into the secret life of neutrophils. | Dr Lai Guan Ng, Singapore Immunology Network at A*Star, Singapore. |
| 7 February 2012 | Ubiquitin-mediated regulation of innate immune signaling. | Associate Professor Mads Gyrd-Hansen, Novo Nordisk Foundation Center for Protein Research, University of Copenhagen, Denmark. |
| 8 February 2012 | Functional genomics, experimental models and cancer. | Associate Professor William Hahn, Dana-Farber Cancer Institute, US. |
| 9 February 2012 | Advances in monoclonal antibody purification and protein characterisation. | Mr Oscar Yamasaki, Tosoh Bioscience, Japan. |
| 13 February 2012 | BCR-ABL-independent factors which prevent the control of chronic myelogenous leukaemia. | Associate Professor Sin Tiong Ong, Duke-National University of Singapore Graduate Medical School, Singapore. |
| 13 February 2012 | The use of p53 as a tool for cancer therapy. | Dr Jean-Christophe Marine, VIB Laboratory for Molecular Cancer Biology, KU Leuven, Belgium. |
| 13 February 2012 | Using mouse models to improve cancer therapy. | Dr Michael Hemann, The David H Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology, US. |
| 14 February 2012 | Deconstructing p53 pathways *in vivo* using mouse models. | Associate Professor Laura Attardi, Department of Radiation and Cancer Biology, Stanford University, US. |
| 15 February 2012 | Kuru: the science and the sorcery. | Professor Michael Alpers, Centre for International Health, Curtin University, Australia. |
| 20 February 2012 | Some like it hot: biomolecule analytics using microscale thermophoresis (MST). | Dr Jan Griesbach, NanoTemper Technologies GmbH, Germany. |
| 29 February 2012 | Immune modulation of vertebrate regeneration. | Professor Nadia Rosenthal, Australian Regenerative Medicine Institute and European Molecular Biology Laboratory Australia, Monash University, Australia. |

| Date | Topic | Speaker |
|---|---|---|
| 29 February 2012 | Two issues relevant to how new knowledge is generated: the process for allocating NHMRC project grants; and the strange organisation of universities. | Professor Nicholas Graves School of Public Health and Institute for Health and Biomedical Innovation, Queensland University of Technology, Australia. |
| 5 March 2012 | Breast cancer subtypes: biology, biomarkers and therapeutic targets. | Professor Rob Sutherland AO FAA, Cancer Research Program, Garvan Institute of Medical Research, Australia. |
| 19 March 2012 | Digital PCR: a breakthrough in genetic analysis. | Dr Eli Mrkusich, Field Applications Specialist - Life Science Group, BioRad Laboratories, Australia. |
| 21 March 2012 | Molecular targeted therapy for childhood cancer. | Professor Michelle Haber AM, Children's Cancer Institute, Australia. |
| 22 March 2012 | Gene regulatory control of entry into the T cell developmental pathway. | Professor Ellen Rothenberg, Division of Biology, California Institute of Technology, US. |
| 23 March 2012 | Nature News and Views. | Dr Marian Turner, Associate News and Views Editor, Nature, UK. |
| 26 March 2012 | PerkinElmer/Caliper *in vivo* roadshow. | Dr Wael Yared, Life Science and Technology, PerkinElmer, Australia, and Dr Kevin Francis |
| 29 March 2012 | The H19 lincRNA is a developmental reservoir of miR-675 which suppresses growth and Igf1r. | Dr Andrew Keniry, The Babraham Institute, UK. |
| 4 April 2012 | Dissecting the dynamics of antiviral T cell responses in the skin during herpes simplex virus infection. | Dr Scott Mueller, Microbiology and Immunology, University of Melbourne, Australia. |
| 11 April 2012 | The fattening and sweetening of haematopoietic stem cells: effects on monocyte production and atherosclerosis. | Dr Andrew Murphy, Molecular Medicine, Department of Medicine, Columbia University, US. |
| 18 April 2012 | Working towards an integrated research platform. | Associate Professor Peter Gibbs, Colorectal Cancer Biomarkers Laboratory, Ludwig Institute for Cancer Research; The Royal Melbourne Hospital and Western Health; and BioGrid Australia. |
| 27 April 2012 | Immunomodulatory effects of vitamin D during antituberculous therapy and HIV/Mycobacterium tuberculosis (MTB) co-infection. | Dr Anna Coussens, Division of Mycobacterial Research, National Institute for Medical Research, UK. |
| 30 April 2012 | Genes, mechanisms, and intervention in autoimmune diabetes. | Dr Anna Coussens, Division of Mycobacterial Research, National Institute for Medical Research, UK. |
| | Professor John Todd, Cambridge Institute for Medical Research, Cambridge University, UK. | Professor Tania Sorell, Centre for Infectious Diseases and Microbiology, The University of Sydney at Westmead Millennium Institute for Medical Research, Australia. |
| 11 May 2012 | Rejuvenating apoptosis. | Professor Atan Gross, Department of Biological Regulation, Weizman Institute of Science, Israel. |
| 18 May 2012 | Telomeres and other DNA breaks in autoimmunity. | Professor Cornelia Weyand, Stanford University, US. |
| 29 May 2012 | Transcriptional regulation of complex genetic loci during vertebrate development. | Professor Peter Rigby, The Institute of Cancer Research, UK. |
| 29 May 2012 | A global perspective on developing a non-dietary treatment for coeliac disease. | Dr Bob Anderson, Walter and Eliza Hall Institute, Australia, and ImmusanT Inc, US; Dr Evan Newnham, Angliss Hospital, Monash University, and Box Hill Hospital, Australia; Ms Leslie Williams, ImmusanT Inc, US. |
| 14 June 2012 | The Ion Torrent sequencing platform: options for researchers for high-throughput sequencing. | Dr Ken McGrath, Australian Genome Research Facility, Australia. |

# 2012 postgraduate lecture series: infection and inflammation

The institute's postgraduate lecture series provides students, postdoctoral fellows and staff with the opportunity to learn from experts from many institutions across the nation. Following the lecture, the students have the opportunity to pursue further discussions over lunch with the speaker.

| Date | Topic | Speaker |
|---|---|---|
| 19 March 2012 | Overview of *E.coli* and intracellular bacteria virulence and resistance mechanisms and disease pathogenesis. | Professor Elizabeth Hartland, Department of Microbiology and Immunology, University of Melbourne. |
| 26 March 2012 | Overview of Group A *Streptococcus* virulence and resistance mechanisms and disease pathogenesis, with implications for indigenous health. | Professor Mark Walker, Australian Infectious Disease Research Centre, University of Queensland. |
| 2 April 2012 | Overview of malaria parasite, virulence and resistance mechanisms and disease pathogenesis. | Dr Jake Baum, Infection and Immunity division, Walter and Eliza Hall Institute. |
| 16 April 2012 | Overview of *Leishmania* parasites, virulence and resistance mechanisms and human disease pathogenesis. | Professor Malcolm McConville, Bio21 Institute. |
| 23 April 2012 | Overview of helminths, virulence and resistance mechanisms and human disease pathogenesis. | Dr Aaron Jex, Faculty of Veterinary Science, University of Melbourne. |
| 30 April 2012 | Overview of fungi, virulence and resistance mechanisms and disease pathogenesis. | Professor Tania Sorell, director, Centre for Infectious Diseases and Microbiology, University of Sydney at Westmead Millennium Institute for Medical Research. |
| 7 May 2012 | Latent viral infections, mechanism of latency, pathogenesis and oncogenesis. | Dr Jamie Nourse, Clinical Immunohaematology division, Queensland Institute of Medical Research. |
| 14 May 2012 | Dengue: a case of once bitten, twice shy. | Professor Paul Young, Australian Infectious Diseases Research Centre, University of Queensland. |
| 21 May 2012 | Overview of hepatitis viruses, virulence and resistance mechanisms and disease pathogenesis. | Associate Professor Joseph Torresi, Department of Infectious Diseases, Austin Hospital. |
| 28 May 2012 | Overview of HIV, virulence and resistance mechanisms and disease pathogenesis. | Professor Steve Wesselingh, South Australian Health and Medical Research Institute. |
| 4 June 2012 | Overview of human prions and disease pathogenesis. | Associate Professor Andrew Hill, Department of Biochemistry and Molecular Biology, Bio21 Institute. |
| 18 June 2012 | Overview of epidemiology and determining modes of transmission/acquisition, e.g. multi-drug resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE) in the hospital and community. | Professor Lindsay Grayson, Department of Infectious Diseases, Austin Hospital. |
| 25 June 2012 | Science of predicting, preparing, preventing for the next potential pandemic. | Professor Raina MacIntyre, School of Public Health and Community Medicine, University of New South Wales. |
| 2 July 2012 | Overview of host sensing of pathogens and innate immunity. | Dr Antje Blumenthal, Epithelial Cancer division, University of Queensland Diamantina Institute. |

| Date | Topic | Speaker |
|---|---|---|
| 9 July 2012 | Overview of how new epidemic pathogens are recognised and identified, e.g. Nipah/Hendra virus and epidemiological surveillance and detection of emerging infectious disease threats. | Dr Peter Daniels, Australian Animal Health Laboratory, CSIRO. |
| 16 July 2012 | New vaccines for the old enemy: the challenge of tuberculosis. | Professor Warwick Britton, Discipline of Infectious Diseases Immunology and Mycobacterial Research Program at the Centenary Institute of Cancer Medicine Cell Biology, University of Sydney. |
| 23 July 2012 | Overview of host determinants of infectious diseases outcomes, e.g. HCV and IL-28. | Dr Alex Thompson, Hepatology Research, St Vincent's Hospital. |
| 30 June 2012 | Can vaccines contribute to the malaria eradication agenda? | Associate Professor Louis Schofield, Infection and Immunity division, Walter and Eliza Hall Institute. |
| 6 August 2012 | Overview of septicaemia, pathogenesis of soch/ SIRS, and the role of pathogens and host factors in pathogenesis. | Dr Christopher MacIsaac, Intensive Care Unit, The Royal Melbourne Hospital. |
| 13 August 2012 | Overview of post Group A Streptococcal immune complications. | Professor Ian Wicks, Inflammation division, Walter and Eliza Hall Institute. |
| 20 August 2012 | The gut microbiota, immunity and human disease. | Professor Charles Mackay, Immunology Department, School of Biomedical Sciences, Monash University. |
| 27 August 2012 | Global equality in infectious diseases control. | Sir Gustav Nossal, Professor Emeritus, University of Melbourne |
| 3 September 2012 | Overview of major Indigenous health infectious diseases issues and problems. | Professor Jonathan Carapetis, Telethon Institute of Child Health Research. |
| 10 September 2012 | Overview of global health initiatives in malaria – the big picture: microbe, epidemiology, host. | Professor Graham Brown, Nossal Institute for Global Health. |

# Institute awards

## The Burnet Prize

**Malaria researcher Dr Jake Baum was the 2011 recipient of the Burnet Prize, the Walter and Eliza Hall Institute's top award, for his work to understand the 'motor' that drives movement of the malaria parasite.**

The Burnet Prize is awarded annually to early-career scientists and was established in 1987 through a bequest from Sir Macfarlane Burnet (institute director 1944-65).

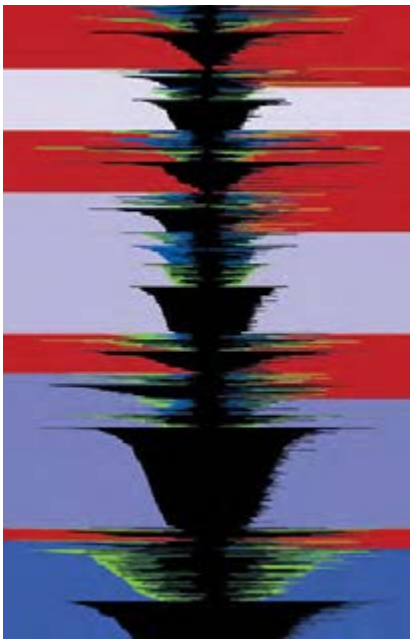
Dr Baum's research aims to identify crucial parasite proteins that are involved in infection and transmission of malaria parasites, including the most virulent strain that infects humans, *Plasmodium falciparum*. Such proteins could serve as important targets for development of new antimalarial drugs.

Dr Baum said he was honoured to receive the Burnet Prize. "The award is wonderful recognition for my research group," Dr Baum said. "It is humbling, if not a little terrifying, to look at the list of previous winners and see the impact they have had, particularly in translating their research to real human health outcomes. It is my greatest hope that we might see the same impact from our work in the future."

There is still a lot that is not understood about the processes that regulate how malaria parasites move, Dr Baum said. "The holy grail of malaria research has been to find a vaccine or drug that is effective against all stages of malaria parasite infection," he said. "Since the parasite must keep moving at all times, we are trying to take apart the motor to understand every process involved, to find a target that meets this criteria. We hope to develop a complete 'toolkit' for drug development against motility to identify new targets in the malaria parasite."

**Dr Jake Baum was the winner of the 2011 Burnet Prize.**

**Winner of the 2011 Art in Science Prize, *Siblings on Reflection* by Ms Jie Zhou.**



## The institute's other award winners were:

**Best seminar:** The 2011 Seminar Prize was awarded to **Dr Ingela Vikstrom** from the Immunology division for her presentation, 'Resolving the stage-specific contribution of the anti-apoptotic proteins to humoral immunity'.
**Best student seminar:** The Student Seminar Prize went to PhD student **Mr Oliver Clarke** from the institute's Structural Biology division for his presentation, 'Domain reorientation and rotation of an intracellular assembly controls conduction in a Kir potassium channel'.

**Art in Science Prize: Ms Jie Zhou**, an honours student from the institute's Immunology division, won the 2011 Art in Science Prize for her image, *Siblings on Reflection*, showing the symmetry of immune cell fates.

**Mr Denis Quilici** received an award for 40 years of service to the institute. Eight staff were recognised for 25 years service to the institute: **Ms Janice Coventry, Mrs Joan Curtis, Mr Alf Mele, Mrs Brigitte Mesiti, Mr Steven Mihajlovic, Mr Gaetano Naselli, Ms Julie Stanley, Mr Malcolm Williamson**.

# Engagement

Dr Erinna Lee (right) with a discovery tour participant from the Ashburton Probus Club.

# Engagement

**The institute is committed to establishing and maintaining awareness and community dialogue about health, medical research and innovation, and the value these offer all Australians.**

Our staff and students have participated in a range of activities aimed at reaching these goals, including giving presentations to community groups, hosting laboratory tours, holding positions on scientific boards, organising conferences and participating in the institute's Open Days.

The institute's community encompasses school students, donors and bequestors, politicians, colleagues, collaborators, and the public. This year, we welcomed many donors, school groups and organisational representatives to the institute. Throughout the year, these groups toured the laboratories, attended research briefings hosted by our scientific staff, and took part in fundraising activities. We also launched the Walter and Eliza Hall Society to recognise and thank those people who have indicated their intent to leave a gift to the institute in their will.

In 2012 the institute participated in an exhibition organised by the Bio21 Cluster to showcase Victoria's proud scientific achievements. The Bio21 Cluster is a collaborative network of 22 Melbourne institutions, encompassing universities, tertiary health services, medical research institutes, CSIRO and other member-based organisations. The *Innovating for Victoria's Health* exhibition, held at Parliament House in May 2012, has increased awareness of the Bio21 members' contributions to medical research and initiated discussion among Victorian parliamentarians about the value of medical research to the community.

The Discoveries Need Dollars campaign continues to foster conversations about the value of medical research to the Australian community. In 2011, the federal government commissioned a strategic review of the health and medical research sector (the McKeon Review) in response to community concerns about potential funding cuts in the health and medical research sector. Institute staff prepared three submissions: one on behalf of the institute; one on behalf of the institute's Gender Equity Committee; and a third on behalf of the Discoveries Need Dollars campaign. The outcomes of the review are due to be released in the second half of 2012.

WEHI.TV animator Ms Etsuko Uno won the Visual Science Award at New York's Imagine Science Film Festival in October 2011 for her animation *Breast stem cells*. These achievements of this award-winning team have culminated in the creation of a biomedical animation partnership between WEHI.TV, other biomedical animation studios, and Apple to create online educational resources for biology students. The head of WEHI.TV, Mr Drew Berry, was also the successful recipient of an Inspiring Australia grant, with the Garvan Institute of Medical Research and the CSIRO, to help train three new science animators.

In 2012 we initiated the *10 million and counting* campaign to celebrate the contribution of institute researchers to the discovery and development of colony stimulating factors (CSFs). CSFs have been used by more than 10 million cancer patients worldwide to boost their immune systems after chemotherapy or collect stem cells for bone marrow transplants. The initiative aims to expand awareness of our research achievements and establish a community of people who have benefited from this important Australian medical research discovery.

**The Hon Justin Madden at the launch of the *Innovating for Victoria's Health* exhibition at Parliament House.**

# Strategic partners

**The institute's management is committed to establishing and maintaining collaborative links to help us solve research questions relating to cancer, chronic inflammatory diseases and infectious diseases.**

We have a long history of collaborative research into blood cell production and function, with a major focus on stem cells. In November 2011 **Stem Cells Australia** was launched, linking Australia's premier life scientists in a seven-year $32 million initiative to position Australia as an international hub for stem cell research.

Stem Cells Australia is a collaboration between the Walter and Eliza Hall Institute, The University of Melbourne, Monash University, University of Queensland, University of New South Wales, Victor Chang Cardiac Research Institute, the Florey Institute of Neuroscience and Mental Health and the CSIRO.

Stem Cells Australia will fast-track efforts to understand how stem cells are controlled and maintained, and what properties and signals allow them to develop into any cell type in the body. The initiative brings together Australia's leading experts in bioengineering, nanotechnology, stem cell biology, advanced molecular analysis and clinical research to uncover the fundamental mechanisms involved in stem cell regulation and differentiation. We aim to translate the knowledge gained into new biotechnological and therapeutic applications.

The institute makes research collaborations a high priority and is dedicated to establishing partnerships that allow us to develop our laboratory research into new treatments and diagnostics.

We were one of the founding members of **Cancer Trials Australia**, a leading provider of early-phase cancer clinical trials. Established in 1993, Cancer Trials Australia is a Melbourne-based not-for-profit organisation that helps member investigators evaluate new medicines conceived in their laboratories, in addition to running clinical trials for investigators and research organisations.

Cancer Trials Australia was the local coordinator of a worldwide phase Ia clinical trial of the anti-cancer agent ABT-199 (GDC-0199/RG7601) in patients with chronic lymphocytic leukaemia which began in early 2011. Professor Andrew Roberts, head of the institute's Clinical Translation Centre, was one of the investigators leading the trial.

## Sector-wide collaboration showcases research to Victoria's politicians

**Collaboration has been important to the institute's successes. Over the past several decades many of our collaborators have been based at neighbouring universities, hospitals and medical research institutes.**

In 2001 some of these relationships were formalised when the institute became one of three founding members of the Bio21 Cluster. The cluster was formed to support the development of Victoria's fledgling biotechnology industry. Today it has 22 members from across Melbourne, all working collaboratively to advance health and medical research in Victoria.

A focus of the cluster, and the institute, over the past 12 months has been engaging Victoria's parliamentarians in discussion about the contribution health and medical research has, and will, make to Victoria.

One of the central pillars of this was an exhibition of health and medical research organised by the Bio21 Cluster and held in May 2012 to showcase the strength and value of the sector in Victoria. The institute was one of more than 70 organisations represented through displays that profiled the economic benefits the sector has brought to Victoria, the discoveries that have saved and improved lives and the contribution our scientists have made to Victoria's global profile.

The exhibition was held in Queens Hall, Parliament House, during a parliamentary sitting week, ensuring maximum exposure to Victoria's politicians. The exhibition is now being seen by a broader audience, with the displays featuring at venues across Victoria.

**Victorian Minister for Innovation, Services and Small Business, The Hon Louise Asher, spoke at the launch of the *Innovating for Victoria's Health* exhibition at Parliament House.**

# Scientific and medical community

**Many of the institute's researchers contribute to the scientific and medical community both nationally and internationally. One such contribution is serving on conference organising committees. Throughout the year five conferences were organised by institute staff, with a total of 783 delegates attending.**

In October 2011, the Malaria in Melbourne meeting was held to facilitate the development of collaborative links among young researchers from various institutes, strengthening the common goal to develop new ways to control malaria. Institute scientists Dr Alyssa Barry (co-chair) and Dr Melanie Rug were on the organising committee, which held a successful conference for 150 young malaria researchers. Also in October 2011, Professor Mike Lawrence chaired the organising committee for the IGF-Oz conference, which brought together Australian researchers interested in the IGF (insulin-like growth factor) system and related proteins in development and disease. Eighty delegates attended this two-day meeting.

Dr Arthur Hsu from the institute's Bioinformatics division chaired the organising committee for the BioInfoSummer Symposium. This week-long meeting was held in December 2011 and introduced 107 students and early-career researchers from mathematical and biological sciences to state-of-the-art bioinformatics research. Institute scientists were also involved in the Computational Immunology conference in April 2012. Dr Cameron Wellard (chair) and Professor Phil Hodgkin were part of the organising committee, which brought together 30 practitioners from overseas and interstate to present their latest research and apply new techniques to important problems in immunology.

Institute researchers also contribute to the scientific and medical community by serving on review panels, boards and committees, undertaking editorial work for scientific and medical journals, conference organisation and attendance, and involvement with biotechnology, clinical advisory groups and public health programs. A full list of staff service to the scientific and medical community can be found on the CD that accompanies this annual report.

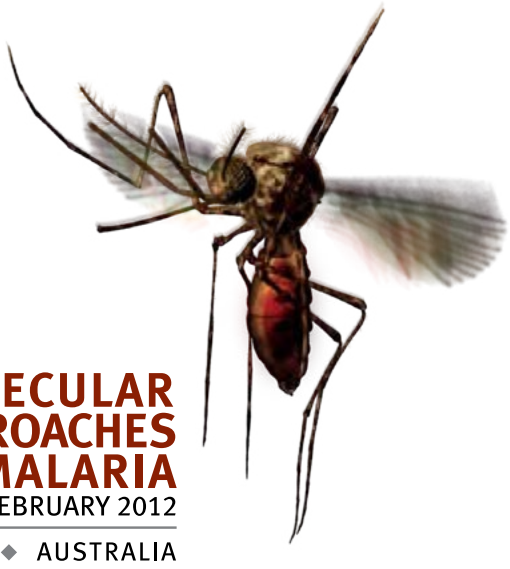

**The week-long BioInfoSummer Symposium featured the latest state-of-the-art bioinformatics research.**

## Championing malaria on the global stage

**Continuing its tradition of championing malaria research on the global stage, the Walter and Eliza Hall Institute again played principal host to the quadrennial Molecular Approaches to Malaria (MAM) international conference.**

MAM2012 took place in Lorne, Victoria, on 19-23 February 2012. The conference was chaired by Dr Jake Baum from the institute's Infection and Immunity division and Dr Kevin Saliba from the Australian National University. More than 400 delegates registered with more than half travelling from overseas, including many from regions where malaria remains a major human health problem. Conference speakers gave 62 scientific talks, and the science presented crossed all disciplines, all scales of investigation and every facet of the parasite lifecycle and malaria disease.

The conference heralded an era that places this major global disease centre-stage for biomedical science. By bringing the world's experts in malaria and parasitic disease to Australia every four years, the MAM conferences continue to take the lead in showcasing how science is tackling one of mankind's greatest diseases.




## Charting the course of Australian health and medical research into the next decade

**In 2011, the federal government commissioned a strategic review of health and medical research in Australia.**

The government announced the review in the aftermath of widespread community concern that funding of health and medical research would be cut in the May 2011 federal budget.

Institute director Professor Doug Hilton prepared a submission to the review on behalf of the Walter and Eliza Hall Institute. The submission highlighted the significant contributions Australian researchers have made to improving health and wellbeing, and outlined the challenges facing the medical research sector in the next decade. Many institute staff and students also made individual contributions to the review.

Professor Hilton said the review was necessary to ensure that Australia's health and medical research efforts were optimised in the next decade. "Australia is fortunate to have a fantastic pool of talent and significant infrastructure committed to health and medical research," Professor Hilton said. "We look forward to the McKeon Review providing a 'road map' that ensures these resources are best applied to improve the health of Australians."

The review, chaired by 2011 Australian of the Year Mr Simon McKeon AO, will recommend a 10-year plan for health and medical research in Australia, proposing how the sector can best address Australia's future health needs, and ways that government funding and policy can be used to strengthen Australian health and medical research.

Institute staff also prepared a submission to the McKeon Review from the Gender Equity Committee and another on behalf of the Discoveries Need Dollars campaign, which has been run by the institute since February 2011. The review is expected to make its recommendations to the government in late 2012.


**The institute's submissions to the federal government-commissioned McKeon Review.**

# Public engagement

**More than 1000 people visited the institute in 2011-12 as part of the institute's public engagement program.**

The institute has a strong commitment to sharing its medical research discoveries with the community. Two public lectures were held during the year, with more than 450 attendees, a 40 per cent increase in attendance from 2010-11.

In February 2012, Professor Rob Sutherland from the Garvan Institute of Medical Research gave a presentation on the latest in biology, biomarkers and therapeutic targets in breast cancer research. In May 2012, a public lecture on developing non-dietary treatments for coeliac disease was presented by Dr Bob Anderson, honorary associate of the institute and chief scientific and medical officer of ImmusanT Inc; Ms Leslie Williams, president and chief executive officer of ImmusanT Inc; and Dr Evan Newnham, director of Angliss Hospital. The lecture outlined the development and progress of Nexvax2®, a potential therapeutic vaccine for coeliac disease.

The institute's discovery tours are an opportunity for the public to visit our laboratories, meet our scientists and learn about our many discoveries. In 2011-12, 75 of our scientists volunteered their time to showcase their research at the institute, and more than 650 people attended the 26 tours which were held throughout the year. These tours consisted of both public and private groups and included school students, Probus and community groups, and partner and business organisations. Thirteen schools attended our discovery tours, including students from John Monash Science School, Nagle College, Rosehill Secondary School, Scotch College and Woodleigh School.

In June 2012, more than 380 Year 7-10 students from 44 schools attended a lecture at the institute by Nobel laureate Professor Elizabeth Blackburn. Professor Blackburn inspired the students with her story of the passion, struggles and successes along her scientific journey.

As part of the CSIRO *Scientists in Schools* program, six institute scientists partnered with schools to engage and motivate students in their learning of science. The schools included Wesley College, Our Lady of Victories and Mill Park Primary School. Our students also volunteered their time at the Gene Technology Access Centre as part of the *Insights into Medical Research* day in June. They undertook experiments with 60 Year 9 students from schools such as Norwood Secondary College, Assumption College and University High School. Our students also gave career talks, emphasising the diversity of careers in biomedical research.

**Students from Scotch College on a discovery tour of the institute.**

## Supporting talented school students

**Encouraging school students of all ages to explore and develop their passion for science is a critical part of the Walter and Eliza Hall Institute's community outreach and engagement program.**

The institute has proudly supported the Science Talent Search, run by the Science Teachers' Association of Victoria, since 2001. In 2011 our sponsorship provided more than 30 bursaries that were awarded to students across a range of categories.

The Science Talent Search is open to all primary and secondary school students in Victoria. Students prepare essays, conduct experiments, take photographs, design posters and create videos for the judges' consideration.

Among the winners of the institute's bursaries in 2011 were Jessica Jong and Nhu Quynh Quach from Santa Maria College. Jessica and Nhu won a bursary for their scientific poster titled 'Drugs As Friends & Foes'.

Mr Jules Nisperos, a Year 8 student from Caroline Chisholm Catholic College, was awarded a bursary for his experimental research report titled 'Is it safe for my teeth?'. Jules examined the effect of applying different colas to animal bone, and concluded that one cola in particular had a markedly heavier impact on bone disintegration.

Jules said he encountered many challenges working on his project and was on the verge of giving up. "My parents encouraged me to finish what I had started," he said. "I spent many hours experimenting at the school's laboratory after school, many days of the school holidays continuing my experiments at home and many nights typing up my experimental report.

"My teachers said this was the first time that a student from my school had received an award from this prestigious competition. My parents, teachers and I were extremely proud and excited once we knew that my entry had won a minor bursary."


**Jessica Jong (left) and Nhu Quynh Quach from Santa Maria College display their poster 'Drugs As Friends & Foes'.**

## WEHI.TV animation wins New York award

**In October 2011, a biomedical animation of breast stem cells and breast development was screened at New York's Imagine Science Film Festival. The animation, created by WEHI.TV's Ms Etsuko Uno and Mr Drew Berry, won the festival's Visual Science Award.**

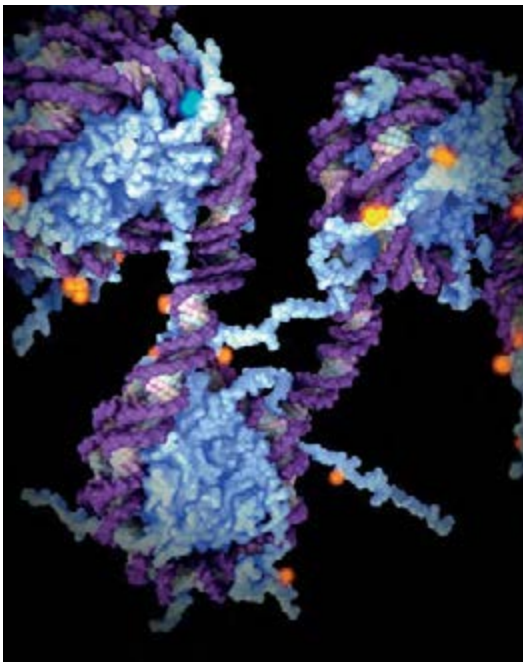
The animation depicts breast stem cells and their role in producing breast milk during pregnancy. Breast stem cells were discovered by researchers in the institute's ACRF Stem Cells and Cancer division, and have been implicated in the development of certain types of breast cancer.

Ms Uno said she was thrilled to receive the award. "It is great to see our film recognised for its ability to depict highly complex biological processes in an accurate and visually appealing way for the general public," she said.

WEHI.TV's latest animation, *X Inactivation and Epigenetics,* was launched at the Walter and Eliza Hall Institute annual general meeting in October 2011. X inactivation is a vital process that occurs in all DNA-containing cells of the female body. It is also an important research model and tool for studying epigenetics. The animation has attracted almost 7000 views on YouTube.

We continue to receive a large number of requests for the animations from media, science institutes, art galleries, schools and students. Visits to the WEHI.TV YouTube channel *WEHImovies* have risen by 150 per cent in the past year.

Also in the past year, Mr Berry and Ms Uno have joined a partnership between E. O. Wilson's Biodiversity Foundation and Apple to create scientifically accurate animations for use in a digital textbook called *Life on Earth* for students in kindergarten through to late high school. Mr Berry also created an animation for well-known singer and artist Björk for the song *Hollow*.



**A still from the WEHI.TV animation *X Inactivation and Epigenetics*.**

## GTAC: The Gene Technology Access Centre

**GTAC is a specialist science education centre with a focus on engaging students, teachers and the broader community in cell and molecular biology.**

Collaboration between the Walter and Eliza Hall Institute, The University of Melbourne, University High School and the Victorian Government's Department of Education and Early Childhood Development, enables the centre to deliver programs that immerse students and their teachers in contemporary science investigations. More than 11,000 school students participated in GTAC programs this year, supported by PhD scientists who mentor and inspire small groups of students while demystifying science.

Specialist GTAC programs in 2012 facilitated student and teacher interaction with prominent scientists such as Sir Gustav Nossal and Professor Phil Hodgkin who presented historical and contemporary perspectives on disease and immunology, Dr David Piedrafita who revealed the amazing world of parasites, and Professor Tony Bacic and Professor Bronwyn Kingwell who provided insights into carbohydrates and our health.

During the year GTAC launched a new DNA barcoding program in which students extract and amplify DNA for sequencing and analysis. GTAC staff and scientists also visited primary schools, facilitating investigations for 2500 students in the fields of forensic microscopy, genetics and the environment.

New GTAC director Ms Jacinta Duncan described the GTAC model as a state treasure. "We have a highly qualified education staff dedicated to designing programs that enhance student engagement in contemporary science working alongside our 70-plus scientist mentors," Ms Duncan said. "These mentors are engaging students in real science and opening pathways to a career in science. The ongoing support provided by the Walter and Eliza Hall Institute and other research institutes in the Bio21 precinct is invaluable to our success."

**High school students from Penola Catholic College participating in the GTAC program.**

## Australian politicians visit the institute

**The Walter and Eliza Hall Institute benefits greatly from Victorian and Australian Government support of medical research.**

We were delighted to welcome a number of state and federal politicians to the institute over the past year. They toured the facilities and met with our researchers to learn more about their work.

Our guests in 2011-12 included former speaker of the House of Representatives, Mr Harry Jenkins MP, and Mr Kelvin Thomson MP, Federal Member for Wills.

**Mr Harry Jenkins MP (left), Federal Member for Scullin and former speaker of the House of Representatives, visited the institute's Bundoora campus in 2011 to speak with Dr Kurt Lackovic and other members of the institute's Chemical Biology division. The visit was hosted by the Cancer Therapeutics CRC, of which the institute is a partner.**

# Donor and bequestor engagement

**This past year has provided a welcome opportunity for us to cement existing relationships with our supporters in the community while building new ones.**

We have been humbled by the generosity of our supporters, who have donated almost $6 million to the institute in the past year. In an uncertain financial climate, where competition is intensifying for the limited government funding available for research, this support is more valuable than ever. As we move towards our centenary celebrations in 2015, we hope to build even stronger relationships with our supporters.

The belief our donors and bequestors have shown in us through their ongoing support means a great deal to our scientists and is directly responsible for advancing the institute's research program.

This year we continued the program of research briefings that introduces our supporters to institute scientists. The feedback from our visitors is that they value the chance to see firsthand the work their donations support.

Bequests have been an important and valued support for the institute's scientists over the past 97 years, and we are indebted to past bequestors for their generous choice to support our research. In the past year we have established the Walter and Eliza Hall Society to recognise those members of the community who have indicated that they wish to leave a gift to the institute in their will, and give them the opportunity to attend briefings and events at the institute.

For those donors who are unable to visit us due to distance or other restraints we extend our thanks, and hope to be able to welcome you to the institute in the coming years.

## Official launch of the Walter and Eliza Hall Society

**Institute director Professor Doug Hilton hosted the launch of the Walter and Eliza Hall Society in April 2012, on the 97th birthday of the institute.**

The society is named in recognition of Walter and Eliza Hall. Following the death of Walter Hall in 1911, his widow Eliza set up a charitable trust to benefit the community, using part of his estate. An early grant made by the trust established the Walter and Eliza Hall Institute of Medical Research.

The Walter and Eliza Hall Society is a special events program giving bequestors unique opportunities to hear about recent research developments from our key scientists.

Professor Hilton said the society was a way for the institute community to thank those who have indicated their intention to leave a gift to the institute in their will.

"The society acknowledges the vital contribution bequestors have made to the institute's development over the past 97 years," he said. "The gift they have made in their wills to our medical research is a wonderful gesture which provides hope for the development of new and better treatments that will have a real impact on human health."

Institute director Professor Doug Hilton speaking at the launch of the Walter and Eliza Hall Society.

## Breakfast with the Cure Cancer Australia Foundation and Can Too

**In June 2012 institute director Professor Doug Hilton had the pleasure of hosting a 'meet the researchers' breakfast for the Cure Cancer Australia Foundation and its major fundraising arm, Can Too.**

Each year Cure Cancer Australia chooses one institute in each state to showcase to their supporters and donors. We were delighted to be the Victorian host in 2012.

Cure Cancer Australia provides funding for early-career medical researchers around Australia. Institute researchers Dr Ashley Ng and Dr Rachael Rutkowski have both benefited from this funding and, with Associate Professor Clare Scott, were at the breakfast to meet the supporters, talk about their research, and host tours of the laboratories.

During the tours the Cure Cancer Australia and Can Too supporters met with Professor Don Metcalf, renowned for leading the research team that discovered colony stimulating factors (CSFs). CSFs have helped more than 10 million people worldwide recover from their cancer treatments.

Cure Cancer Australia and Can Too staff and supporters, along with the eye-catching Can Too Panda and Walter and Eliza Hall Institute researcher Dr Ashley Ng.

Professor Hilton said it was a pleasure to welcome the supporters to the institute. "The support of groups such as Cure Cancer Australia and Can Too provides financial security for our early-career researchers as they pursue their research goals," he said. "This sort of support is vital if young researchers are to produce a body of work on which to firmly establish their research careers."

## Institute researchers raise money in World's Greatest Shave

**The Leukaemia Foundation has been a great supporter of medical research at the Walter and Eliza Hall Institute, providing funding for many of our research staff from students to senior researchers.**

For many years, institute staff have participated in the Leukaemia Foundation's World's Greatest Shave, an annual event in which people shave or colour their hair to raise money for people with blood cancers such as leukaemia, lymphoma and myeloma. The money is used by the Leukaemia Foundation to provide free services for people with blood cancers and to fund their multi-million dollar research investment each year.

Thirteen staff members took part in the World's Greatest Shave on Thursday 15 March 2012, including both research and support service staff. The team raised $12,500 for the Leukaemia Foundation, the 11th highest amount of money raised by a team in Tasmania and Victoria.

This year's team was led by PhD student Ms Hannah Vanyai, who said she was proud to take part in the fundraising event. "My hair was so long – more than 70 centimetres – so I thought it would be great to raise money for the World's Greatest Shave and donate my hair to make wigs for people who are undergoing chemotherapy," she said. "This fundraising venture is very personal on two levels: at work I see the amazing research that can be done with funding from events like the World's Greatest Shave, and a dear friend of mine is also a leukaemia survivor."

The institute team that participated in the 2012 World's Greatest Shave. Back row (from left): Mr Nicholas Lim, Dr Doug Fairlie, Mr Ashod Kherlopian and Mr Stanley Lee. Middle row (from left): Ms Catherine McLean, Ms Hannah Vanyai, Mr Greg Menzies, Ms Leila Varghese and Ms Alice Robinson. Front row (from left): Mr Marco Evangelista and Mr Milon Pang. Not pictured: Mr Chris Evans and Dr Martin O'Hely.

# Service to the scientific and wider community

## Service to biotechnology boards, committees and consultancies

**Warren Alexander,** MuriGen Therapeutics Scientific Advisory Board, Co-chair

**Marie-Liesse Asselin-Labat,** Victorian Comprehensive Cancer Centre Lung Research Collaborative Working Group, Member

**Jonathan Baell,** Bionomics, Consultant

**Melanie Bahlo,** MacTel consortium, Scientific consultant

**Gabrielle Belz,** Australian Government Gene Technology Technical Advisory Committee, Member

**Gabrielle Belz,** CSL Limited, Consultant

**Chris Burns,** YM BioSciences, Chief scientific advisor

**Peter Colman,** Bio21 Australia Ltd, Alternate board member to Professor Doug Hilton

**Lynn Corcoran,** CSL Limited, Collaborative research project, Project leader

**Ross Dickins,** Victorian Centre for Functional Genomics Scientific Advisory Committee, Member

**Mark Hinds,** Bio21 NMR Strategic Committee, Member

**David Huang,** Bio21 Scientific Advisory Council, Council member

**Benjamin Kile,** MuriGen Therapeutics, Chief scientific and operating officer

**Michael Lawrence,** Australian Association of Medical Research Institutes, Proposal advisor for the Australian Synchrotron

**Geoff Lindeman,** Australian Cancer Research Foundation Medical Research Advisory Committee, Committee member

**Anthony Papenfuss,** University of Melbourne e-Research Advisory Group, Member

**Marc Pellegrini,** Cytheris, Inc, Preclinical research advisor

**Louis Schofield,** Ancora Pharmaceuticals Inc, Scientific Board, Board member

**Clare Scott,** BioGrid Australia, Breast Stream, Head

**Clare Scott,** BioGrid Australia Management Committee, Institute representative

**Clare Scott,** BioGrid Australia, Rare Tumour Stream, Head

**Clare Scott,** Melbourne Health Expert Scientific Review Panel, Panel member

**Clare Scott,** Melbourne Health Research Week committee, Institute representative

**Clare Scott,** Victorian Comprehensive Cancer Centre Seminar Series Committee, Institute representative

**Clare Scott,** Walter and Eliza Hall Institute of Medical Research Victorian Comprehensive Cancer Centre Gynaecologic Oncology Research Collaborative, Member

**John Silke,** Cooperative Research Centre for Biomarker Translation, Project leader

**John Silke,** Scientific Advisory Board, TetraLogic Pharmaceuticals, Pennsylvania, Board member

**John Silke,** Victorian Comprehensive Cancer Centre Education and Training Committee, Member

**Gordon Smyth,** Australasian Genomic and Associated Technologies Association (AMATA), President

**Gordon Smyth,** Australasian Genomic and Associated Technologies Association (AMATA), Committee member

**Terry Speed,** Bionovo Scientific Advisory Board, Board member

**Terry Speed,** Pathwork Diagnostics Scientific Advisory Board, Board member

**Terry Speed,** Veracyte Inc Scientific Advisory Board, Board member

**Andreas Strasser,** Genentech, Inc., Consultant

**Andreas Strasser,** Pfizer Inc., Consultant

**Andreas Strasser,** Walter and Eliza Hall Institute/The Royal Melbourne Hospital Clinical Advisory Group, Member

**Ian Street,** Children's Cancer Institute Australian Drug Discovery Scientific Advisory Board, Board member

**Ian Street,** New South Wales Cancer Institute Research Review Committee, Committee member

**David Tarlinton,** CSL Limited, Consultant

**David Tarlinton,** Ozgene Pty Ltd, Consultant

**Jason Tye-Din,** ImmusanT, Inc., Consultant

**Jason Tye-Din,** Nexpep Pty Ltd, Consultant

**David Vaux,** Scientific Advisory Board, Mochtar Riady Institute of Nanotechnology, Indonesia, Board member

**David Vaux,** Scientific Advisory Board, TetraLogic Pharmaceuticals, Pennsylvania, Board member

**Jane Visvader,** Cancer Council Victoria Medical and Scientific Committee, Member

**Jane Visvader,** International Society for Stem Cell Research, Translational Science Advisory Committee, Member

**Jane Visvader,** National Breast Cancer Foundation Research Advisory Committee, Member

## Service on clinical working or advisory boards

**Warren Alexander,** Children's Cancer Institute Australia Scientific Advisory Board, Member

**Phil Hodgkin,** Bio21 Cluster Scientific Advisory Council, Institute representative

**Phil Hodgkin,** RMIT Biomedical Science Program Advisory Committee, Member

**Benjamin Kile,** Australian Cancer Research Foundation Translational Haematology Laboratory Management Committee, Member

**Geoff Lindeman,** Australian Cancer Research Foundation Centre for Therapeutic Target Discovery, Clinical director

**Geoff Lindeman,** Australian New Zealand Breast Cancer Trials Group, Board member

**Geoff Lindeman,** Australian New Zealand Breast Cancer Trials Group Scientific Advisory Committee, Member

**Geoff Lindeman,** Department of Health Implementation Committee for the Victorian Family Cancer Genetics Service, Member

**Geoff Lindeman,** Implementation Committee for the Royal Melbourne Hospital Familial Cancer Centre, Chair

**Geoff Lindeman,** Kathleen Cunningham Foundation Consortium for Research into Familial Breast Cancer (kConFab), Committee member

**Geoff Lindeman,** Kathleen Cunningham Foundation Consortium for Research into Familial Breast Cancer (kConFab) Executive, Member

**Geoff Lindeman,** Melbourne Health Clinical Advisory Group for Victorian Comprehensive Cancer Centre, Member

**Geoff Lindeman,** Melbourne Health Research Advisory Group for Victorian Comprehensive Cancer Centre, Member

**Geoff Lindeman,** Melbourne Health Tissue Bank Implementation Committee, Chair

**Geoff Lindeman,** New South Wales Breast Cancer Tissue Bank Scientific Advisory Panel, Member

**Geoff Lindeman,** Royal Melbourne Hospital Familial Cancer Centre, Director

**Geoff Lindeman,** Sanofi-Aventis International Steering Committee for Sanofi-Aventis PARP inhibitor (BSI-201) Study TCD11418, Member

**Geoff Lindeman,** Victorian Cancer Biobank Consortium Committee, Member

**Geoff Lindeman,** Victorian Comprehensive Cancer Centre Research Advisory Group - Tissue Bank Subcommittee, Chair

**Geoff Lindeman,** Victorian Comprehensive Cancer Centre Working Party - Research, Member

**Geoff Lindeman,** Victorian Cooperative Oncology Group, Genetics Advisory Committee, The Cancer Council Victoria, Member

**Kylie Mason,** Victorian Comprehensive Cancer Centre Emergency Admissions Committee, Member

**Ivo Mueller,** Papua New Guinea National Malaria Control program, Temporary advisor

**Ivo Mueller,** World Health Organisation Expert Group on Malaria Rapid Diagnostic Tests, Temporary advisor

**Ivo Mueller,** World Health Organisation Malaria Vaccine Advisory Committee, Temporary advisor

**Marc Pellegrini,** National Centre in HIV Epidemiology and Clinical Research, Combined Working Group in Immunotherapies, Consultant

**Clare Scott,** Australia & New Zealand Breast Cancer Trials Group Scientific Advisory Committee, Expert consultant

**Clare Scott,** BioGrid Australia Scientific Advisory Committee, Member

**Clare Scott,** Clinical Trials Australia (CTA) Breast Stream, Principal investigator

**Clare Scott,** Clinical Trials Australia (CTA) Gynaecologic Tumour Stream, Principal investigator

**Clare Scott,** Clinical Trials Australia (CTA) Phase I Trials Group, Clinical advisor

**Clare Scott,** Kathleen Cunningham Consortium Foundation for Research in Familial Breast Cancer (kConFab) Translational Research Committee, Member

**Clare Scott,** Victorian Consensus Data Sets Committee, Member

**Jason Tye-Din,** Coeliac Australia Clinical Advisory Committee, Chair

**Jane Visvader,** Kathleen Cunningham Foundation Consortium for Research into Familial Breast Cancer (kConFab) review committee, Member

## Service to editorial boards

**Jerry Adams,** Genes & Development, Member

**Jerry Adams,** Oncogene, Member

**Jerry Adams,** Proceedings of the National Academy of Sciences of the United States of America, Invited editor

**Warren Alexander,** Growth Factors, Editorial board member

**Jonathan Baell,** Future Medicinal Chemistry, Editorial board member

**Melanie Bahlo,** Faculty of 1000, Medical Genetics, Associate editor

**Melanie Bahlo,** Statistical Applications in Genetics and Molecular Biology, Associate editor

**Alyssa Barry,** The Open Parasitology Journal, Member

**Jacob Baum,** Frontiers in Microbiology, Review editor

**Jacob Baum,** Malaria Journal, Editorial board member

**Gabrielle Belz,** Frontiers in Immunology - Immunological Memory, Editorial board member and guest editor

**Gabrielle Belz,** Immunology and Cell Biology, Editor-in-Chief

**Philippe Bouillet,** Cell Death & Differentiation, Associate editor

**Philippe Boullet,** Apoptosis, Associate editor

**Mark Chong,** MicroRNAs in Diabetes and Obesity, Editorial advisory board member

**Suzanne Cory,** Proceedings of the National Academy of Sciences of the United States of America, Review editor

**Alan Cowman,** Science, Board of reviewing editors

**Paul Ekert,** BioMedCentral Cancer, Associate editor

**Paul Ekert,** Cell Death & Disease, Editorial board member

**Daniel Gray,** Frontiers in Immunology, Editorial board member

**Diana Hansen,** ISRN Parasitology, Editorial board member

**Len Harrison,** Current Diabetes Reports, Editorial board member

**Len Harrison,** Diabetes Metabolism Reviews, Editorial board member

**Len Harrison,** Diabetes nutrition and metabolism, Associate editor

**Len Harrison,** Diabetes prevention and therapy, Editorial board member

**Len Harrison,** Diabetes research and clinical practice, Editorial board member

**Len Harrison,** Human Vaccines and Immunotherapeutics, Associate editor

**Len Harrison,** International Journal of Experimental Diabetes Research, Editorial board member

**Len Harrison,** Journal of Autoimmunity, Editorial board member

**Len Harrison,** Molecular Medicine, Contributing editor

**Len Harrison,** Pediatric diabetes, Editorial board member

**Mark Hinds,** Journal of Biological Chemistry, Editor

**Phil Hodgkin,** Frontiers in B Cell Biology, Editorial board member

**Phil Hodgkin,** Immunology and Cell Biology, Editorial board member

**David Huang,** Cell Death & Differentiation, Editorial board member

**David Huang,** Cell Death & Differentiation News & Commentaries Network, Editorial board member

**David Huang,** Cell Death & Disease, Editorial board member

**David Huang,** Molecular & Cellular Pharmacology, Editorial board member

**Nick Huntington,** Clinical and Translational Immunology, Editorial board member

**Eugene Kapp,** Journal of Proteomics & Computational Biology, Member

**Eugene Kapp,** Molecular and Cellular Proteomics, Member

**Ruth Kluck,** Cell Death & Disease, Member

**Michael Lawrence,** Frontiers in Molecular and Structural Endocrinology, Associate editor

**Andrew Lew,** Frontiers in Molecular Antigen Presenting Cell Biology, Editorial board member

**Geoff Lindeman,** Growth Factors, Member

**Geoff Lindeman,** Journal of Mammary Gland Biology and Neoplasia, Member

**Geoff Lindeman,** Stem Cell Research, Member

**Seth Masters,** Dataset Papers in Cell Biology, Editorial board member

**Seth Masters,** Frontiers in Inflammation, Editorial review board

**Seth Masters,** The Open Inflammation Journal, Editorial board member

**Donald Metcalf,** Cell Cycle, Editorial board member

**Donald Metcalf,** International Journal of Hematology, Editorial board member

**Donald Metcalf,** Leukemia, Editorial board member

**Donald Metcalf,** Stem Cells, Editorial board member

**Ivo Mueller,** PLoS Medicine, Academic Editor

**Ivo Mueller,** PLoS One, Editor

**Nicos Nicola,** Growth Factors, Editorial board member

**Nicos Nicola,** Open Biotechnology, Editorial board member

**Nicos Nicola,** Principle Investigator Advisor, Editorial board member

**Nicos Nicola,** Stem Cells, Editorial board member

**Nicos Nicola,** Technology Transfer Tactics, Editorial board member

**Stephen Nutt,** F1000 Research, Editorial board member

**Stephen Nutt,** Frontiers in Immunological Memory, Editorial board member

**Stephen Nutt,** Frontiers in NK Cell Biology, Editorial board member

**Stephen Nutt,** Immunology and Cell Biology, Editorial board member

**Marc Pellegrini,** Clinical and Translational Immunology, Editorial board member

**Marc Pellegrini,** F1000 Research, Editorial board member

**Louis Schofield,** Cellular Microbiology, Editorial board member

**Ken Shortman,** Frontiers in Molecular Antigen Presentation, Review editor

**Ken Shortman,** International Immunology, Executive editor

**John Silke,** Cell Death & Differentiation, Editorial board member

**John Silke,** Open Cell Signalling Journal, Editorial board member

**Gordon Smyth,** BioMedCentral Bioinformatics, Editor (Transcriptomics)

**Terry Speed,** Australian and New Zealand Journal of Statistics, Editorial board member

**Terry Speed,** Journal of Computational Biology, Editorial board member

**Andreas Strasser,** Cell Death & Differentiation, Associate editor

**Andreas Strasser,** Current Opinion in Immunology, Associate editor

**Andreas Strasser,** Genes to Cells, Associate editor

**Andreas Strasser,** International Journal of Molecular Medicine, Associate editor

**Andreas Strasser,** Journal of Cell Biology, Associate editor

**Andreas Strasser,** Journal of Experimental Medicine, Associate editor

**Andreas Strasser,** Protein Reviews on the Web, National Institutes of Health, Reviewer

**Andreas Strasser,** University of California, San Diego Nature Signaling Gateway Molecule Pages, Member

**Robyn Sutherland,** Molecular Immunology, Invited reviewer

**David Tarlinton,** Faculty of 1000, Editorial board member

**David Tarlinton,** Frontiers in Immunology, Review editor

**David Tarlinton,** Immunology and Cell Biology, Editorial board member

**David Tarlinton,** Immunology Letters, Editorial board member

**David Tarlinton,** International Immunology, Transmitting editor

**Tim Thomas,** PLoS One, Editorial board member

**David Vaux,** Apoptosis, Editorial board member

**David Vaux,** Cancer Medicine, Editorial board member

**David Vaux,** Cell Death & Differentiation, Editorial board member

**David Vaux,** Disease Models and Mechanisms, Editorial board member

**David Vaux,** EMBO Reports, Editorial board member

**Jane Visvader,** Breast Cancer Research, Editorial board member

**Jane Visvader,** Cancer Cell, Editorial board member

**Jane Visvader,** Cancer Research, Senior editor

**Jane Visvader,** Cell Stem Cell, Editorial board member

**Jane Visvader,** Molecular Oncology, Editorial board member

**Li Wu,** Molecular and Cellular Immunology, Editorial board member

## Service to learned scientific societies

**Jerry Adams,** Australian Society of Biochemistry and Molecular Biology Awards Committee, Member

**Jerry Adams,** Australian Society of Biochemistry and Molecular Biology National Advisory Council, Member

**Mark Chong,** Immunology Group of Victoria, Institute representative

**Lynn Corcoran,** American Association of Immunologists, Member

**Lynn Corcoran,** Australasian Society for Immunology, Member

**Lynn Corcoran,** National Association of Research Fellows, Member

**Suzanne Cory,** Australian Academy of Science, President

**Alan Cowman,** Australian Academy of Science Sectional Committee, Member

**Grant Dewson,** Faculty of 1000, Associate member

**Diana Hansen,** Victorian Infection and Immunity Network Executive Committee, Member

**Susanne Heinzel,** Australasian Society of Immunology, Honorary secretary

**Julia Marchingo,** Australasian Society of Immunology, Student representative

**Ivo Mueller,** American Society of Microbiology, Member

**Ivo Mueller,** American Society of Tropical Medicine and Hygiene, Member

**David Tarlinton,** Australasian Society of Immunology, President

**David Vaux,** Australian Academy of Science, Fellow

**David Vaux,** Faculty of 1000, Cellular Death and Stress Responses, Section head

## Service on international committees, councils, boards and foundations, including grant review panels

**Gabrielle Belz,** Health Research Council of New Zealand Grant Reviews, Panel member

**Gabrielle Belz,** Howard Hughes Medical Institute International Review Panel, International Grant Reviews, Panel member

**Gabrielle Belz,** Research Foundation - Flanders (Fonds Wetenschappelijk Onderzoek - Vlaanderen, FWO) Grant Reviews, Panel member

**Gabrielle Belz,** Wellcome Trust UK Grant Reviews, Panel member

**Marnie Blewitt,** Wellbeing of Women UK Grant Reviews, Panel member

**Chris Burns,** Health Research Council of New Zealand Grant Reviews, Panel member

**Sebastian Carotta,** Medical Research Council (UK) Grant Reviews, Panel member

**Peter Colman,** Institute of Biology and Chemistry of Proteins, CNRS, France, Scientific Advisory Board, BCL-2 Family Database, Scientific advisor

**Peter Colman,** International Union of Crystallography (IUCr) Executive Committee, Vice President

**Peter Colman,** Japan Proton Accelerator Research Complex, Macromolecular Crystallography Beamline, International advisor

**Lynn Corcoran,** Swiss Cancer League Grant Review, Panel member

**Suzanne Cory,** BioMedical Science International Advisory Council, Member

**Suzanne Cory,** Cancer Research UK Council Research Strategy Committee, Member

**Suzanne Cory,** Duke-NUS Graduate Medical School, Singapore, scientific advisory board, Board member

**Suzanne Cory,** Francis Crick Institute Science Assessment Panel, Member

**Suzanne Cory,** Gairdner Foundation Medical Advisory Board, Board member

**Suzanne Cory,** Institute of Medical Biology (A*STAR BMRC) Scientific Advisory Board, Board member

**Suzanne Cory,** International Human Frontiers Science Program Organization Council of Scientists, Council member

**Suzanne Cory,** Leukaemia & Lymphoma Research grant review panel, Member

**Suzanne Cory,** Pasteur Institute, scientific advisory board, Board member

**Suzanne Cory,** University of Auckland Maurice Wilkins Centre for Molecular Biodiscovery Scientific Advisory Board, Board member

**Alan Cowman,** Howard Hughes Medical Institute Early Career Scientist Selection Committee, Member

**Alan Cowman,** World Parasite Foundation, President

**Erika Cretney,** L'Oréal Australia and New Zealand For Women in Science Fellowships, Jury member

**Jacqui Gulbis,** Biotechnology and Biological Sciences Research Council (UK) Grant Reviews, Panel member

**Jacqui Gulbis,** Israeli Science Foundation Grant Reviews, Panel member

**David Huang,** Biomedical Assessing Committee 3 (BMAC) Health Research Council of New Zealand, Panel member

**David Huang,** Cancer Research UK Grant Reviews, Panel member

**David Huang,** Health Research Council of New Zealand Grant Reviews, Panel member

**David Huang,** Health Research Council of New Zealand, Biomedical Assessing Committee, Panel Member

**Eugene Kapp,** Informatics Proteomics Research Group of the Association of Biomolecular Resource Facilities Committee, Member

**Ruth Kluck,** Faculty of 1000, Contributing member

**Geoff Lindeman,** Amgen 2011 Breast Cancer Scientific Advisory Board, Member

**Geoff Lindeman,** Australian New Zealand Breast Cancer Trials Group, Board member

**Geoff Lindeman,** Australian New Zealand Breast Cancer Trials Group, scientific advisory committee, Member

**Geoff Lindeman,** Breast Cancer Foundation - American Association for Cancer Research Grants for Translational Breast Cancer Research Scientific Review Committee, Member

**Geoff Lindeman,** Israeli Science Foundation, Member

**Geoff Lindeman,** Sanofi-Aventis International Steering Committee for Sanofi-Aventis PARP inhibitor (BSI-201) Study TCD11418, Member

**Geoff Lindeman,** Sanofi-Aventis International Steering Committee for Sanofi-Aventis PARP inhibitor (BSI-201) Study TCD11418, Member

**Ivo Mueller,** Fonds zur Forderung der wissenschaftichen Forschung (FWF - Austrian Science Fund), Panel member

**Ivo Mueller,** Medical Research Council (UK), Panel member

**James Murphy,** Marsden Fund (New Zealand) grant review panel, Member

**Nick Nicola,** Asia-Pacific International Molecular Biology Network, research advisory board, Board member

**Nick Nicola,** Leukaemia & Lymphoma Research (UK) grant review panel, Member

**Stephen Nutt,** Austrian Science Fund Grant Reviews, Panel member

**Stephen Nutt,** European Research Council Grant Reviews, Panel member

**Stephen Nutt,** Foundation for Scientific Research Belgium Grant Reviews, Panel member

**Stephen Nutt,** Institut National de la santè et de la recherche mèdicale Grant Reviews, Panel member

**Stephen Nutt,** Wellcome Trust (UK) Grant Reviews, Panel member

**Anthony Papenfuss,** The Muscular Dystrophy Campaign Grant Reviews, Panel member

**Louis Schofield,** Australasian College of Tropical Medicine, Convenor

**Clare Scott,** Australia New Zealand Gynaecological Oncology Group (ANZGOG) Annual Scientific Meeting 2012, organising committee, Member

**Clare Scott,** Australia New Zealand Gynaecological Oncology Group (ANZGOG) Annual Scientific Meeting 2013, organising committee, Member

**Clare Scott,** Gynaecologic Cancer Inter-Group, Translational Committee, Member and co-chair

**Clare Scott,** Gynaecologic Cancer Inter-Group, Translational Committee, Member and co-chair

**Clare Scott,** Health Research Council of New Zealand Grant Reviews, Member

**Clare Scott,** Mayo Clinic Rochester, Ovarian Specialized Program of Research Excellence, external advisory board, External advisor

**Clare Scott,** Mayo Clinic Rochester, Ovarian SPORE (Specialized Program of Research Excellence) External Advisory Board, External advisor

**Clare Scott,** The Gynaecological Oncology Research Collaborative of the Victorian Comprehensive Cancer Centre and the European Network for Translational Research in Ovarian Cancer (EUTROC), Symposium on Ovarian Cancer, organising committee, Member

**Wei Shi,** The MicroArray/Sequencing Quality Control Consortium (MAQC/SEQC), Investigator

**Ken Shortman,** International Society for Dendritic Cell and Vaccine Science, scientific advisory committee, Member

**Ken Shortman,** International Union of Immunological Societies Nomenclature of Monocytes and Dendritic Cells in Blood Sub-committee, Member

**Ken Shortman,** National University of Singapore Immunology Program, scientific advisory board, Board member

**John Silke,** Israeli Science Foundation Grant Reviews, Panel member

**John Silke,** Research Foundation Flanders Grant Reviews, Panel member

**Terry Speed,** Cambridge Research Institute, scientific advisory board, Board member

**Terry Speed,** Wellcome Trust Centre for Human Genetics, Oxford, scientific advisory board, Board member

**Andreas Strasser,** Academica Sinica IMB Performance Review Committee, Committee member

**Andreas Strasser,** Dr Josef Steiner Cancer Research Foundation Prize Committee, Advisor

**Andreas Strasser,** Faculty of 1000 Biology Advisory Board, Board member

**Andreas Strasser,** Faculty of 1000 Medical Research Advisory Board, Board member

**Andreas Strasser,** German Science Foundation (DFG Sonderforschungsbereich) Program Grant Assessment Committee, Member

**Andreas Strasser,** Heineken Prize Committee, Advisor

**Andreas Strasser,** Highlights Advisory Panel for Nature Reviews Immunology, Panel member

**Andreas Strasser,** Japanese Society for Promotion of Science, Large Grants Committee, Advisor

**Andreas Strasser,** Marcel Benoist Prize Committee, Advisor

**Andreas Strasser,** MIT Promotions and Recruitment Committee, Advisor

**Andreas Strasser,** The European Research Institute for Integrated Cellular Pathology, International advisory member

**Jason Tye-Din,** Australasian Society of Parenteral and Enteral Nutrition project grant reviews, Panel member

**Jason Tye-Din,** Coeliac Australia, clinical advisory committee, Chair

**David Vaux,** Committee on Freedom and Responsibility in the Conduct of Science (CFRS) of the International Council for Science (ICSU), Member

**Jane Visvader,** Human Genome Organisation Awards Selection Committee, Member

**Jane Visvader,** Stinehart-Reed Awards Selection Committee, Stanford University, Member

## Service on international conference organising committees

**Warren Alexander,** The International Society for Stem Cell Research Tenth Annual Meeting, Abstract reviewer

**Alyssa Barry,** Malaria in Melbourne, Co-chair

**Alyssa Barry,** Molecular Approaches to Malaria, Committee member

**Jacob Baum,** Molecular Approaches to Malaria, Chair

**Diana Hansen,** Molecular Approaches to Malaria, Session chair

**Diana Hansen,** Lorne Infection and Immunity Meeting Organising Committee, Member

**Phil Hodgkin,** 41st Australasian Society of Immunology Annual Scientific Meeting, Member

**Phil Hodgkin,** Quantitative Immunology: Experiments meet modelling program, Kavli Institute for Theoretical Physics, Member

**David Huang,** Cold Spring Harbor Asia: Translational Approaches to Cancer, organising committee, Member

**David Huang,** Lorne Cancer Conference Organising Committee, Member and co-convenor

**David Huang,** New Directions in Leukaemia Research Organising Committee, Member

**Kurt Lackovic,** Australian High Content Screening Group, Co-convenor

**Erinna Lee,** 37th Lorne Conference on Protein Structure and Function, Lorne Protein Conference Program and Organising Committee, Member

**Geoff Lindeman,** 5th PacRim Breast and Prostate Cancer Meeting International Advisory Committee, Member

**Matthew McCormack,** New Directions in Leukaemia Research Organising Committee, Member

**Ivo Mueller,** 4th Vivax Conference, Convener

**Clare Scott,** International Gynecologic Cancer Society (IGCS) 2014, Organising Committee, Member

**John Silke,** 13th International TNF Conferences, Advisory committee

**Andreas Strasser,** 15th International Congress of Immunology Organising Committee, Member

**Andreas Strasser,** 2012 American Association for Cancer Research Annual Symposium, Cell Death Subcommittee of the Molecular and Cellular Biology Section of the Program Committee, Member

**Andreas Strasser,** The 2013 European Molecular Biology Organization Conference on Apoptosis and the Cellular Response to DNA Damage, Co-organiser

**David Tarlinton,** 41st Australasian Society of Immunology Annual Scientific Meeting, Member

**Chris Tonkin,** Molecular Approaches to Malaria, Session facilitator

**Jane Visvader,** American Association for Cancer Research Annual Meeting 2012, Member

**Jane Visvader,** American Association for Cancer Research Breast Cancer Meeting 2013, Co-chair

**Jane Visvader,** Breast Cancer Nobel Symposium, Member

**Jane Visvader,** Lorne Cancer Conference,

**Anne Voss,** Lorne Genome Conference Organising Committee, Member

## Service on national (Australian) committees, councils, boards and foundations, including grant review panels

**Jerry Adams,** Australian Cancer Research Foundation Medical Research Advisory Committee, Member

**Jerry Adams,** John Curtin School of Medical Research, Advisory board member

**Jerry Adams,** National Health and Medical Research Council Academy, Member

**Jerry Adams,** National Health and Medical Research Council Assigner's Academy, Grant review assigner

**Jerry Adams,** National Health and Medical Research Council Project Grants Review Panel, Member

**Warren Alexander,** National Health and Medical Research Council Academy, Member

**Warren Alexander,** National Health and Medical Research Council program grant review panel, Chair and member

**Warren Alexander,** National Health and Medical Research Council Project Grants Review Panel, Chair and member

**Warren Alexander,** The University of Melbourne Cancer Research Domain, Haematological Subdomain, Coordinator

**Warren Alexander,** Victorian Cancer BioBank Consortium Committee, Independent member

**Jeff Babon,** Australian Research Council Grant Review Panel, Member

**Jeff Babon,** National Health and Medical Research Council Project Grants Review Panel, Member

**Jonathan Baell,** National Health and Medical Research Council Project Grants Review Panel, Member

**Melanie Bahlo,** Australian Research Council Grant Review Panel, Member

**Melanie Bahlo,** National Health and Medical Research Council Project Grants Review Panel, Member

**Jacob Baum,** Australian Research Council Grant Review Panel, Member

**Jacob Baum,** Australian Society for Parasitology Grant Review Panel, Member

**Jacob Baum,** Borrowman Trust, Member

**Jacob Baum,** National Health and Medical Research Council Project Grants Review Panel, Member

**Gabrielle Belz,** Australian Research Council Grant Review Panel, Reviewer

**Gabrielle Belz,** National Health and Medical Research Council Academy, Member

**Gabrielle Belz,** National Health and Medical Research Council Project Grants Review Panel, Member

**Marnie Blewitt,** National Health and Medical Research Council Project Grants Review Panel, Member

**Philippe Bouillet,** National Health and Medical Research Council Project Grants Review Panel, Member

**Chris Burns,** Monash University Bachelor of Pharmaceutical Sciences Review Committee, Member

**Chris Burns,** National Health and Medical Research Council Project Grants Review Panel, Member

**Chris Burns,** Royal Australian Chemical Institute Biomolecular Division Committee, Member

**Matthew Call,** Australian Research Council Grants Review Panel, Member

**Melissa Call,** National Health and Medical Research Council Project Grants Review Panel, Member

**Melissa Call,** The Australian Society for Medical Research Judging Panel for the Merck Millipore Award for Medical Research 2011, Member

**Sebastian Carotta,** Australian Research Council Grants Review Panel, Member

**Sebastian Carotta,** National Health and Medical Research Council Project Grants Review Panel, Member

**Peter Colman,** Australian Centre for HIV and Hepatitis Virology Research (ACH2) Scientific Advisory Committee, Member

**Peter Colman,** Australian Research Council Grant Review Panel, Member

**Peter Colman,** Australian Synchrotron Company Limited, Board of directors

**Peter Colman,** Bragg Institute, Australian Nuclear Science and Technology Organisation Advisory Committee, Member

**Peter Colman,** Burnet Institute, Board of directors

**Peter Colman,** National Health and Medical Research Council Project Grants Review Panel, Member

**Peter Colman,** Prime Minister's Prizes for Science Secretariat Scientific Prizes Committee, Member

**Lynn Corcoran,** Australian Research Council OzReader, Reviewer

**Lynn Corcoran,** National Health and Medical Research Council Project Grants Review Panel, Member

**Suzanne Cory,** Australian Synchrotron National Science Colloquium, Committee member

**Suzanne Cory,** Australian Synchrotron National Science Colloquium, Committee member

**Suzanne Cory,** Festival of Ideas 2013 Advisory Group, Member

**Suzanne Cory,** Gene Technology Access Centre Board of Management, Chair

**Suzanne Cory,** L'Oréal Australia For Women in Science Fellowships Selection Committee, Member

**Suzanne Cory,** Rotary Aboriginal and Torres Strait Islander Tertiary Scholarship Selection Committee, Member

**Suzanne Cory,** Royal College of Pathologists of Australasia Faculty of Science Foundation Committee, Member

**Suzanne Cory,** The Global Foundation Advisory Council, Member

**Alan Cowman,** Griffith University Advisory Board, Member

**Alan Cowman,** National Health and Medical Research Council Assigner's Academy, Assigner

**Alan Cowman,** National Health and Medical Research Council Project Grants Review Panel, Member

**Erika Cretney,** National Health and Medical Research Council Project Grants Review Panel, Member

**Erika Cretney,** Victorian Research Fellowships Reference Group (Victorian Government), Member

**Peter Czabotar,** National Health and Medical Research Council Project Grants Review Panel, Member

**Grant Dewson,** Australian Research Council Grants Review Panel, Member

**Grant Dewson,** Undergraduate Research Opportunities Program, Committee member and institute representative

**Sheila Dias,** National Health and Medical Research Council Project Grants Review Panel, Member

**Ross Dickins,** National Health and Medical Research Council Development Grants Review Panel, Member

**Ross Dickins,** National Health and Medical Research Council Project Grants Review Panel, Member

**Paul Ekert,** Leukaemia Foundation Australia Grants Review Panel, Panel member

**Paul Ekert,** Leukaemia Foundation Australia Medical and Scientific Advisory Committee, Committee member

**Paul Ekert,** National Health and Medical Research Council Project Grants Review Panel, Member

**Paul Ekert,** National Health and Medical Research Council Project Grants Review Panel, Member

**Daniel Gray,** National Health and Medical Research Council Project Grants Review Panel, Member

**Jacqui Gulbis,** National Health and Medical Research Council Career Development Fellowship Committee, Panel member

**Jacqui Gulbis,** National Health and Medical Research Council Project Grants Review Panel, Member

**Jacqui Gulbis,** National Health and Medical Research Council Project Grants Review Panel, Member

**Diana Hansen,** National Health and Medical Research Council Project Grants Review Panel, Member

**Diana Hansen,** National Health and Medical Research Council Project Grants Review Panel, Member

**Melinda Hardy,** Macpherson Smith Rural Foundation, Mentor for undergraduate science student

**Len Harrison,** Juvenile Diabetes Research Foundation Grant Reviews, Panel member

**Len Harrison,** National Health and Medical Research Council Academy, Member

**Len Harrison,** National Health and Medical Research Council Project Grants Review Panel, Member

**Susanne Heinzel,** National Health and Medical Research Council Project Grants Review Panel, Member

**Marco Herold,** National Health and Medical Research Council Project Grants Review Panel, Member

**Phil Hodgkin,** National Health and Medical Research Council Academy, Member

**Phil Hodgkin,** National Health and Medical Research Council Project Grants Review Panel, Member

**David Huang,** National Health and Medical Research Council Project Grants Review Panel, Member

**David Huang,** National Health and Medical Research Council Project Grants Review Panel, Member

**David Huang,** South Australian Cancer Research Collaborative Grants Review Panel, Panel member

**David Huang,** South Australian Research Collaborative Fellowship Review Panel, Member

**Kim Jacobson,** National Health and Medical Research Council Project Grants Review Panel, Member

**Emma Josefsson,** National Health and Medical Research Council Project Grants Review Panel, Member

**Benjamin Kile,** Australian Genome Research Facility, Board member

**Benjamin Kile,** Australian Phenomics Network Executive Management Committee, Chair

**Benjamin Kile,** Heart Foundation Grants Review Panel, Panel member

**Benjamin Kile,** National Health and Medical Research Council Career Development Fellowships Grants Review Panel, Chair

**Benjamin Kile,** National Health and Medical Research Council Community Observers Working Committee, Member

**Benjamin Kile,** National Health and Medical Research Council Project Grants Review Panel, Member

**Benjamin Kile,** National Health and Medical Research Council Research Grants Management System User Reference Group, Member

**Ruth Kluck,** National Health and Medical Research Council Project Grants Review Panel, Member

**Ruth Kluck,** National Health and Medical Research Council Project Grants Review Panel, Member

**Kate Lawlor,** National Health and Medical Research Council Project Grants Review Panel, Member

**Geoff Lindeman,** Australian Cancer Research Foundation Medical Research Advisory Committee, Member

**Geoff Lindeman,** Australian Cancer Research Foundation Medical Research Advisory Committee, Member

**Geoff Lindeman,** National Health and Medical Research Council Project Grants Review Panel, Member

**Geoff Lindeman,** New South Wales Cancer Institute Grants Review Panel, Member

**Matthew McCormack,** Australian Research Council Grants Review Panel, Member

**Matthew McCormack,** National Health and Medical Research Council Project Grants Review Panel, Member

**Matthew McCormack,** National Health and Medical Research Council Scholarships grant review panel, Member

**Lisa Mielke,** National Health and Medical Research Council Project Grants Review Panel, Member

**Ivo Mueller,** National Health and Medical Research Council Project Grants Review Panel, Member

**James Murphy,** Australian Research Council Discovery Grant Scheme, Reviewer

**James Murphy,** National Health and Medical Research Council Project Grants Review Panel, Member

**Thomas Nebl,** National Health and Medical Research Council Project Grants Review Panel, Member

**Nicos Nicola,** Australian Research Council Grants Review Panel, Member

**Nicos Nicola,** Institute for Molecular Biosciences Advisory Board, Member

**Nicos Nicola,** Institute for Molecular Biosciences Scientific Advisory Committee, Chair

**Nicos Nicola,** Kathleen Cunningham Consortium Foundation for Research in Familial Breast Cancer (kConFab) Appeals Committee, Member

**Nicos Nicola,** National Health and Medical Research Council Project Grants Review Panel, Member

**Nicos Nicola,** National Health and Medical Research Council Review of Development Grants Funding Scheme Outcomes Steering Committee, Member

**Nicos Nicola,** Victorian Comprehensive Cancer Centre Research Advisory Committee, Member

**Nicos Nicola,** Virtual Pharma, Member

**Stephen Nutt,** Australian Research Council Grants Review Panel, Member

**Stephen Nutt,** Diabetes Australia Research Trust Grants Review Panel, Member

**Stephen Nutt,** Multiple Myeloma Research Foundation Grants Review Panel, Panel member

**Stephen Nutt,** National Health and Medical Research Council Project Grants Review Panel, Member

**Anthony Papenfuss,** Australian Research Council Grants Review Panel, Member

**Anthony Papenfuss,** National Health and Medical Research Council Project Grants Review Panel, Member

**Thomas Scerri,** National Health and Medical Research Council Project Grants Review Panel, Member

**Louis Schofield,** National Health and Medical Research Council Project Grants Review Panel, Member

**Louis Schofield,** National Health and Medical Research Council Training Awards, Co-chair

**Louis Schofield,** Queensland Tropical Health Alliance, Director

**Clare Scott,** Cancer Australia Grants Review Committee, Member

**Clare Scott,** Cure Cancer Australia Foundation Board, Member

**Clare Scott,** Cure Cancer Australia Foundation Research Committee, Chair

**Clare Scott,** Melbourne Health Research Week Organising Committee, Member

**Clare Scott,** National Breast Cancer Foundation Postdoctoral Fellow Grants Review Panel, Member

**Clare Scott,** National Health and Medical Research Council Project Grants Review Panel, Member

**David Segal,** National Health and Medical Research Council Project Grants Review Panel, Member

**Wei Shi,** National Health and Medical Research Council Project Grants Review Panel, Member

**John Silke,** National Health and Medical Research Council Project Grants Review Panel, Member

**Brad Sleebs,** National Health and Medical Research Council Project Grants Review Panel, Member

**Gordon Smyth,** Australian Statistics Conference 2012 Programming Committee, Member

**Gordon Smyth,** National Health and Medical Research Council Assigner's Academy, Assigner

**Gordon Smyth,** National Health and Medical Research Council Project Grants Review Panel, Member

**Andreas Strasser,** National Health and Medical Research Council Academy, Member

**Andreas Strasser,** National Health and Medical Research Council Project Grants Review Panel, Member

**Andreas Strasser,** Victorian Prostate Cancer Research Consortium, Panel member

**Ian Street,** National Health and Medical Research Council Project Grants Review Panel, Member

**Robyn Sutherland,** Diabetes Australia Research Trust Grants Review Panel, Member

**David Tarlinton,** Australian Research Council OzReader, Reviewer

**Tim Thomas,** National Health and Medical Research Council Project Grants Review Panel, Member

**Tim Thomas,** National Health and Medical Research Council Project Grants Review Panel, Member

**Tim Thomas,** National Health and Medical Research Council Development grant review panel, Member

**Jason Tye-Din,** Diabetes Australia Research Trust Grants Review Panel, Member

**Jason Tye-Din,** National Health and Medical Research Council Project Grants Review Panel, Member

**Cassandra Vandenberg,** National Health and Medical Research Council Project Grants Review Panel, Member

**David Vaux,** ANZ Trustees Medical Research Grant Award Panel, Member

**David Vaux,** Australian & New Zealand Association for the Advancement of Science, Federal Council Member and Victorian committee member

**David Vaux,** Australian Academy of Science, National Committee for International Council for Science, Member

**David Vaux,** National Health and Medical Research Council Project Grants Review Panel, Member

**David Vaux,** Victorian Premier's Medical Research Award Selection Panel, Member

**Jane Visvader,** Medical and Scientific Committee of The Cancer Council Victoria Standing Research Subcommittee, Member

**Jane Visvader,** National Breast Cancer Foundation National Collaborative Breast Cancer Research Program Selection Committee, Member

**Jane Visvader,** National Breast Cancer Foundation Research Advisory Committee, Member

**Jane Visvader,** National Health and Medical Research Council Assigner's Academy, Assigner

**Jane Visvader,** National Breast Cancer Foundation Concept Awards 2011 Review Panel, Chair

**Anne Voss,** National Health and Medical Research Council Project Grants Review Panel, Member

**Anne Voss,** The University of Melbourne Research Higher Degree Committee, Member

## Service on national conference organising committees

**Jonathan Baell,** Royal Australian Chemical Institute Biomolecular Division Conference Biomolecular @ The Beach, Committee member

**Gabrielle Belz,** Australasian Vaccine and Immunotherapeutics Development Meeting, Conference chair

**Chris Burns,** Royal Australian Chemical Institute Biomolecular Division Conference Biomolecular @ The Beach, Convenor

**Stephane Chevrier,** International Day of Immunology Committee, Melbourne, Member

**Mark Chong,** International Day of Immunology Committee, Melbourne, Member

**Grant Dewson,** Australian Workshop on Cell Death, organising committee, Member

**Paul Ekert,** Australian Workshop on Cell Death, organising committee, Member

**Phil Hodgkin,** Computational Immunology Conference, Chair

**Phil Hodgkin,** Shortman 75th Birthday Celebration Symposium, Co-chair

**Ruth Kluck,** AussieMit 2012, Scientific Program Committee, Member

**Ruth Kluck,** ComBio 2012, Member

**Ruth Kluck,** First Australian Workshop on Cell Death: Death on the Reef, organising committee, Member

**Michael Lawrence,** IGF-Oz 2011, organising committee, Chair

**Michael Lawrence,** IGF-Oz 2011, program committee, Chair

**Guillaume Lessene,** Royal Australian Chemical Institute Biomolecular Division Conference Biomolecular @ The Beach, Committee member

**Andrew Lew,** Shortman 75th Birthday Celebration Symposium, Member

**Julia Marchingo,** Australian Society for Immunology Student Function Subcommittee for the 42nd Annual Scientific Meeting of the Australasian Society for Immunology, Co-chair

**Lucille Rankin,** International Day of Immunology Committee, Melbourne, Member

**Louis Schofield,** National Science Conference, scientific organising committee, Member

**John Silke,** Australian Workshop on Cell Death, organising committee, Member

**Andreas Strasser,** First Australian p53 Workshop, June 2012, Conference organiser

**Robyn Sutherland,** Immunology Group of Victoria, Member

**Robyn Sutherland,** International Day of Immunology Committee, Melbourne, Member

**Anne Voss,** Hunter Cell Biology Meeting, organising committee, Member

**Anne Voss,** Lorne Genome Conference, organising committee, Member

**Cameron Wellard,** Computational Immunology Conference, Member

# Sustainability

The eastern wing of the institute has been redeveloped to have a similar layout to the new western wing.

# The Board

**The directors of the Walter and Eliza Hall Institute of Medical Research board**

## Mr Leon A Davis AO Dip Prim Metallurgy *SAIT* Hon DSc *Curtin* Hon DSc *Qld* Hon DUniv *UniSA* FRACI FAIMM

**President**

Appointed: **February 2001**
Term expires: **May 2013**

Mr Davis became chief executive of Rio Tinto Ltd and Rio Tinto plc on 1 January 1997 and retired from the position in 2000. Previously he had been deputy chief executive and chief operating officer of RTZ-CRA.

Mr Davis joined the CRA Group in 1956 as a metallurgical cadet. In 1989 he was appointed a group executive of CRA Limited. Until joining RTZ in 1991 as mining director, his appointments included chairman of Argyle Diamond Mines, Dampier Salt, Wimmera Industrial Minerals and Kalimantan Gold.

In December 2000 Mr Davis became chairman of Westpac Banking Corporation, stepping down from the position in 2007.

## Mr Steven M Skala AO BA LLB (Hons) *Qld* BCL *Oxon*

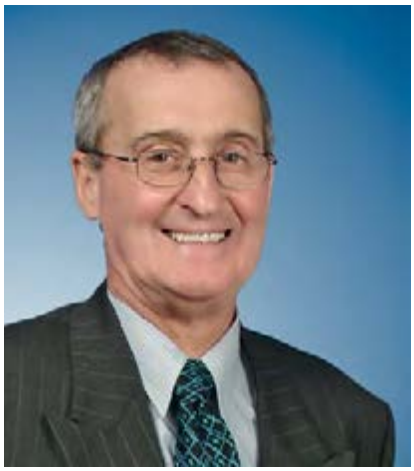
**Vice-President**

Appointed: **June 1999**
Term Expires: **June 2014**

Mr Skala is vice chairman Australia & New Zealand of Deutsche Bank AG and a former senior partner of Arnold Bloch Leibler lawyers.

He is chairman of Wilson HTM Investment Group Ltd and a director of the Australian Broadcasting Corporation and Hexima Limited. He is deputy chairman of The General Sir John Monash Foundation, a director of the Centre for Independent Studies and a member of the International Council of New York's Museum of Modern Art.

Mr Skala is a member of the advisory council of the Australian Innovation Research Centre, the Global Foundation and the Grievance Tribunal of Cricket Australia. He is the immediate past chairman of Film Australia Limited and the Australian Centre for Contemporary Art.



## Mr Roger E Male LLB *Adelaide* Dip Acctg *Swinburne*

**Honorary Treasurer**

Appointed: **June 1998**
Term Expires: **May 2013**

Mr Male was a partner of Coopers & Lybrand for more than 20 years and retired from the firm as a member of its national committee and Melbourne office managing partner in 1998.

He is a director of Goldman Sachs Australia Managed Funds Limited, and the Uniting Church Funds Management Ltd. Mr Male is also a member of the Almond Orchards Limited compliance committee and the Nillumbik Shire Council audit advisory committee.

## Professor James Angus AO BSc *Syd* PhD *Syd* FAA

Appointed: **November 2003**
Term expires: **at the discretion of The University of Melbourne**

Professor Angus is dean of the Faculty of Medicine, Dentistry and Health Sciences at The University of Melbourne. He was president of the university's academic board and has served on the university's council as well as the council of the Australian Academy of Science.

He currently serves on the boards of Melbourne Health, the Mental Health Research Institute, the Victorian Institute of Forensic Medicine, and the Victorian Comprehensive Cancer Centre. He is a past president of Medical Deans Australia and New Zealand, and is honorary secretary to the Victorian Rhodes Scholarship Committee. Professor Angus was awarded the Gottschalk Medal in 1984, the Centenary Medal in 2003 and the Australian Citation Laureate Award for Pharmacology in 2004. He was appointed Officer of the Order of Australia in June 2010.

## Mr Mike C Fitzpatrick BA (Hons) *Oxon* BEng (Hons) *UWA*

Appointed: **February 2001**
Term Expires: **February 2013**

Mr Fitzpatrick is chairman of the Australian Football League, Treasury Group Limited, Infrastructure Capital Group, and a non-executive director of Rio Tinto plc.

He is the founder and former managing director of Hastings Funds Management Limited. In that role, Mr Fitzpatrick was a director of a number of Hastings-managed investments including Pacific Hydro Limited, Global Renewables Limited, Utilities of Australia, Australian Infrastructure Fund and Airstralia Development Group Pty Ltd (Perth Airport).

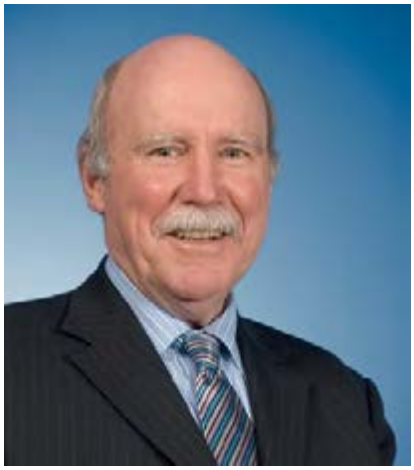
Mr Fitzpatrick was a premiership captain (1981, 1982) with the Carlton Football Club in the Australian Football League and a first-grade cricketer. He was formerly a member of the Melbourne Park Tennis Centre Trust, a director of the Carlton Football Club, chairman of the Australian Sports Commission and, in the early 1980s, vice-president of the AFL Players' Association.

## Professor Jim McCluskey BMedSc MB BS MD *UWA* FRACP FRCPA FAA

Appointed: **April 2011**
Term expires: **at the discretion of The University of Melbourne**

Professor Jim McCluskey is the deputy vice-chancellor (research) at The University of Melbourne. Prior to this he was the pro vice-chancellor (research partnerships), chair of Microbiology and Immunology and deputy head of that department. Professor McCluskey has an international reputation for his research in genetics and immunity. He has consulted for the Australian Red Cross for more than 20 years and is editor-in-chief of the international immunogenetics journal *Tissue Antigens.*

He is a member of the board of directors of The Florey Institute of Neuroscience and Mental Health, Bionics Institute, UoM Commercial and chair of the Nossal Institute for Global Health council.



## Dr Graham F Mitchell AO RDA BVSc *Syd* FACVSc PhD *Melb* FTSE FAA

Appointed: **July 2007**
Term Expires: **June 2013**

Dr Mitchell has detailed knowledge of the academia-industry interface and completed his PhD at the Walter and Eliza Hall Institute in the late 1960s. In 1973, after postdoctoral experience in the US, UK and Switzerland, Dr Mitchell returned to the institute and established a program on the immunology of parasitism.

In 1990, Dr Mitchell was appointed director of the Royal Melbourne Zoological Gardens but returned to biomedical research in 1993 as director of research in the R&D division of CSL Limited. Dr Mitchell is an adviser on innovation to the Victorian, Tasmanian, Northern Territory and Federal Governments and jointly acts as chief scientist for the Victorian Government departments of Primary Industries and Sustainability and Environment. He is a non-executive director of Antisense Therapeutics Limited, Compumedics Limited, AgVic Services Pty Ltd, Adelaide Research and Innovation Pty Ltd and Avipep Pty Ltd.

## Mrs Linda B Nicholls AO BA(Econ) *Cornell* MBA *Harvard* Hon FAICD

Appointed: **February 2001**
Term Expires: **February 2013**

Mrs Nicholls is a corporate adviser and a director of a number of leading Australian companies and organisations. She is chairman of KDR (Yarra Trams), and a director of Sigma Pharmaceutical Group, Fairfax Media, and retired as a director of the Australian Institute of Company Directors in July. Previously Mrs Nicholls was chairman of Healthscope and Australia Post, and a director of St George Bank. She is also vice-president and a member of the Harvard Business School Alumni board. She runs her own corporate advisory practice specialising in business strategy in financial services and health care. Mrs Nicholls has more than 30 years experience as a senior executive and company director in Australia, New Zealand and the United States.

## Ms Kate J Redwood BA BSW (Hons) *Monash*

Appointed: **August 2009**
Term Expires: **August 2012**

Ms Redwood has held a number of senior management positions including CEO of the Australian Physiotherapy Association, executive director of Australian Red Cross Victoria, and executive director of the Victorian Council of Social Service.

A former councillor for the City of Melbourne, Ms Redwood has chaired a number of standing committees as well as the Yarra/Melbourne Regional Library Board, the Melbourne Disability Advisory Committee and for many years was president of the Carlton Senior Citizens' Centre.

Ms Redwood is a member of the Melbourne Health board and chairs the Melbourne Health community advisory committee. In 2010, she became a director of Hepburn Wind. Ms Redwood was awarded the Centenary Medal in 2001 for services to local government and the community.

## Mr Christopher W Thomas BCom (Hons) MBA *Melb* FAICD

Appointed: **February 2001**
Term Expires: **February 2013**

Mr Thomas joined executive search firm Egon Zehnder International in 1979 and was managing partner of the Melbourne office from 1986 to 2003. He was also leader of the firm's global Board Consulting Practice Group (1998–2006) and chaired the firm's twice-yearly international partners' meetings from 1997 to 2007.

Mr Thomas is a fellow of the Australian Institute of Company Directors. He has served on the board of the Corps of Commissionaires (Victoria) and the council of the Australian Film, Television and Radio School. He was a board member of the Heide Museum of Modern Art for nine years (and its chairman for three years), chairman of the Victorian Community Foundation and president of the Melbourne Business School Alumni.

## Ms Catherine M Walter AM LLB (Hons) LLM MBA *Melb* FAICD

Appointed: **February 2001**
Term Expires: **February 2013**

Ms Walter is a non-executive director of Australian Foundation Investment Company, the Reserve Bank's Payment Systems Board, Victorian Funds Management and Victorian Opera and chairman of the Australian Synchrotron.

She practised law for 20 years as a commercial lawyer, which included a term as managing partner of Clayton Utz in Melbourne. Ms Walter is a former commissioner of the City of Melbourne.

In 2003, Ms Walter was appointed a Member of the Order of Australia for her service to business, particularly as a director of a number of public companies, to the arts, to the law, and to the community through the City of Melbourne. She was awarded a Centenary Medal in the same year.

## Professor Ingrid Winship MB ChB MD *Cape Town* FRACP FACD

Appointed: **June 2007**
Term Expires: **June 2013**

Professor Ingrid Winship is the inaugural chair of adult clinical genetics at The University of Melbourne and executive director of research for Melbourne Health.

A medical graduate of the University of Cape Town, she completed postgraduate training in genetics and dermatology. In 1994, Professor Winship took up an academic position at the University of Auckland and later became Professor of Clinical Genetics and associate dean for research in the Faculty of Medicine and Health Sciences.

Professor Winship is a member of the Victorian Cancer Action Plan implementation committee, NHMRC Human Genetics Advisory Committee, and Victorian Life Sciences Computation Initiative steering committee.

# Chief Operating Officer's report

**This year has seen the near completion of the building works that have occupied the minds and hearts of staff for close to five years. The works have meant a doubling in size of the institute, allowing for the recruitment of new research teams and the establishment of new infrastructure and advanced technologies.**

They have also provided the opportunity to create spaces dedicated to acknowledging our donors and supporters and celebrating our scientists and scientific achievements since the institute was established in 1915. Staff across all areas of the institute have made this possible, including divisional coordinators, researchers, research assistants, administration, facilities, marketing, communications and fundraising, IT, bioservices, safety, laboratory operations and scientific services. I would like to take this opportunity to thank everyone for their valuable contributions during the year.

## Financial sustainability

Ensuring the institute's financial sustainability has become part of the day-to-day operations of the institute. We are currently facing opportunities and challenges that we have not seen for more than 25 years: a significant expansion in space and people, and an increased need for funding for research, equipment, infrastructure and operating costs.

To be financially sustainable in the longer term requires the institute to meet its current needs while planning for the future. This requires income growth and diversification, efficient administration and our own income generation.

### Income growth and diversification

The institute's 2011-12 fundraising results have been encouraging, with applications to trusts and foundations resulting in philanthropic grants of $1.152 million. The results for donations and bequests have also been positive, with $5.892 million raised. Significant work has gone into attracting new donors, through an awareness-raising newspaper campaign, building relationships with existing donors and in growing our new bequest society, the Walter and Eliza Hall Society.

Strategies are currently being developed to diversify our sources of funding, including entering the newly emerging market of private ancillary funds and developing a corporate partnership program. Planning is also underway to identify fundraising opportunities leading up to our centenary in 2015.

The marketing and communications team have continued to show strong leadership over the past year, building on the success of the Discoveries Need Dollars campaign. While continuing to focus on raising the profile of the institute in the media and general community, they also played a key role in developing the institute's submission to the Strategic Review of Health and Medical Research in Australia, chaired by Simon McKeon.

**Staff from the Bioservices facility at the pilot 5S Lean System meeting. From left: Mr Gary Morgan, Ms Jian Xiao, Dr Catheryn O'Brien (obscured), Ms Angela Milligan, Mr Danny Noriel, Mr Peter Ritchie, Ms Maureen O'Keefe, Mr Paul Tracjevski, Mr Glen Monagle and the 5S consultant.**

## Efficient operations

Over the past three months we have been piloting the 5S Lean System to improve efficiency by building smarter, simpler and sustainable processes and ways of working. The pilot has been run in the Bioservices facility and has been enthusiastically embraced by the team. We plan to progressively roll out the system to other areas of the institute following the pilot. A review of our procurement function is also underway using value stream mapping to improve efficiencies and reduce costs, with collaborative purchasing and e-procurement as key elements.

Meanwhile we are continuing with reviews of scientific services. Reviews of FACS and Bioservices have been completed and review reports on Histology and Imaging are currently under consideration. The reviews are being led by institute researchers. We also participated in a National Health and Medical Research Council audit during the year.

## Risk and compliance

Risk management has evolved at the institute over recent years to include fraud prevention, internal control, corporate governance and integration of operational risk management functions.

This broadening of the risk management portfolio means it is no longer confined to staff involved in insurance, loss prevention, safety and audit, but involves IT, human resources, finance, laboratory operations, facilities, research divisions and other areas. The institute's compliance with policies, procedures and legal and regulatory obligations is regularly examined by the institute's internal auditor, who reports through to the Audit and Risk Committee, a sub-committee of the board.

To add rigor, a new management-level Risk and Compliance Committee has been established. This committee has commenced reviewing and updating the institute's risk policy, risk profile, risk register, business continuity plan, critical incident plan, and emergency procedures. It is also developing a 'risk champions' program, which will assist with integrating and sustaining risk management in operational areas.

**The chief operating officer's leadership team. Front row (from left): Mr Steve Droste and Dr Helene Martin. Second row (from left): Dr Catheryn O'Brien, Dr Julie Mercer, Ms Maureen O'Keefe and Dr John Wastell. Third row (from left): Mr Stan Balbata, Ms Penny Fannin, Ms Jo Marshall and Mr Michael Rubira. Fourth row (from left): Mr Paul Fraser, Mr Todd Jasper and Mr Murray Jeffs.**

## Ludwig Institute for Cancer Research, Parkville

Early in 2012 the Ludwig Institute for Cancer Research announced it was closing its Parkville node. This presented an opportunity for us to recruit more than 60 outstanding staff and students to the institute.

Researchers, divisional coordinators, management, and staff from human resources, finance, business development, grants, facilities, IT, laboratory operations, safety and bioservices from the Ludwig Institute and the Walter and Eliza Hall Institute have worked closely to develop a funding agreement, negotiate leases, employment contracts, terms for technology and materials transfer, intellectual property assignment, transfer of research grants, relocation of equipment, animal and human ethics committee approvals, while also integrating Ludwig facilities into our operations and setting up laboratories and IT for the new laboratory groups.

## Staff changes

At the end of 2012 Murray Jeffs, the institute's chief financial officer and company secretary, will retire after 16 years. Murray has made an outstanding contribution to the institute. His role in managing the endowment fund, and assisting donors and bequestors, leaves the institute in a strong financial position. We are fortunate that the incoming chief financial officer, Kim Tsai, who commences at the institute on 1 November 2012, comes to the institute with extensive experience in the medical research sector.

## Building redevelopment

Over the past year the institute's focus has been on settling into the new west wing of the building while refurbishing the existing east wing to create an integrated research facility. It has been a long but exciting process and in November 2012 we will be celebrating the formal opening of our new building.

The success of the project, which was achieved on time and on budget, was made possible by the strong partnerships between the institute and the architects (Denton Corker Marshall and S2F/SKM), the builders (Baulderstone BPL) and the consultant team (Aurecon, Donald Cant Watts Corke and others). The support of the institute's internal project team, user planning teams, divisional coordinators and researchers was invaluable during the building and refurbishment periods.

The project couldn't have occurred without the generous support of the Australian Government ($50 million), the Victorian Government ($50 million), and The Atlantic Philanthropies ($30 million) who made this $185 million expansion and redevelopment possible. We are extremely grateful for their generous grants and for the strong support of other granting bodies including The Ian Potter Foundation, the Australian Cancer Research Foundation and the Drakensburg Trust who all generously provided funding for fit-out of the new facilities.

We were very pleased to be advised that the land lease for the institute's expanded site had been fully executed by the Victorian Minister for Environment and Climate Change on 23 November 2011, for a period of 99 years less one day. This marked a major milestone in the life of the project and was achieved through strong collaboration between two state government departments (Health and Innovation), Melbourne Health and the institute.

**The northern facade of the newly renovated institute building in Parkville.**

## Supporting women in science

**In 2010 the institute established a Gender Equity Committee, seeking to address the lack of female researchers progressing to become independent research scientists.**

The committee is developing and implementing initiatives that promote equity, social inclusion and awareness of the obstacles encountered by women in their career development.

One of the programs developed by the Gender Equity Committee is a 'Women in Science' lecture series, which showcases the careers and challenges of outstanding female scientists.

During the year the lecture series featured two highly regarded and prominent women scientists: Professor Nadia Rosenthal, director of the Australian Regenerative Medicine Institute at Monash University who is acclaimed for her research on the genetics of muscle and cardiac development; and Professor Michelle Haber, director of the Children's Cancer Institute Australia who is known for her research into the treatment of neuroblastoma and acute lymphoblastic leukaemia in children.

Each lecture was followed by a lunch, providing an opportunity for female scientists at postdoctoral, PhD and junior laboratory head levels to meet the speakers, hear about their experiences as female scientists and discuss their advice for a successful career in science.

"I walked out of the lunches pumped up and full of ambition and motivation," said postdoctoral fellow Dr Erika Cretney from the institute's Molecular Immunology division. The Gender Equity Committee will continue to host this successful series, with four seminars scheduled for 2012–13.

**Professor Nadia Rosenthal speaking with women scientists at the institute.**

# Supporters and donors

**The support the institute receives from government, private donors, trusts, foundations and industry is vital to helping our researchers make the discoveries necessary to advance the understanding, prevention and treatment of cancers, chronic inflammatory diseases and infectious diseases.**

We are grateful for the trust our supporters have awarded us and are committed to honouring that trust.

## Government support

**The institute is thankful for the support of the Victorian and Australian Governments.**

This year we received $34 million in grants and $9.5 million in fellowships through the National Health and Medical Research Council. A further $412,000 in grants and $2.5 million in fellowships was received from the Australian Research Council. The institute also received $1.7 million in support from the Australian Phenomics Network, Australian Stem Cell Centre, Australia-Europe Malaria Research Cooperation (OzEMalaR), CRC for Cancer Therapeutics, CSIRO, and HEARing CRC.

The Victorian Government provided $7.1 million in funding to the institute through the Operational Infrastructure Support scheme, Victorian Breast Cancer Research Consortium, Victorian Cancer Agency, Victorian Comprehensive Cancer Centre, Victorian Endowment for Science, Knowledge and Innovation, Victorian Neurotrauma Initiative and Victorian Life Sciences Computation Initiative.

We are also grateful for the support provided through the following international government agencies: Canadian Institutes of Health Research (Canada), National Cancer Institute (US), National Institutes of Health (US) and Swiss National Science Foundation (Switzerland).

## Trusts and foundations

**Philanthropic grants provide crucial support for our research by contributing funding to purchase equipment, to fund salaries and projects and to provide the dollars to build laboratories and buildings.**

These grants provide a much-needed subsidy for projects that may not qualify for federal or state funding and provide investment in, and support to, our researchers.

This year we welcomed new trusts and foundations to our supporter list and also continue to appreciate long-standing relationships with existing supporters. It is through this sustained support we can initiate new methods of tackling research problems, build stronger collaborative partnerships and continue to produce high-impact research.

We thank the following trusts and foundations that have provided support to the institute through successful competitive and non-competitive grants over the past 12 months:

American Australian Association (US), Arthritis Foundation of Australia, Association for International Cancer Research (UK), Australian Friends of The Hebrew University Jerusalem Limited, Australian Kidney Foundation, Cancer Council Victoria, Centenary Institute, Coeliac Australia Project, Cure Cancer Australia Foundation, Diabetes Australia Research Trust, Diabetes Vaccine Development Centre, Save the Tasmanian Devil Program (Dr Eric Guiler Research Grant), Thomas William Francis and Violet Coles Trust, H & L Hecht Trust, Human Frontier Science Program (France), Japan College of Rheumatology (Japan), Juvenile Diabetes Research Foundation (US), Kay Kendall Leukaemia Fund (UK), Leukaemia Foundation of Australia, Leukaemia Foundation of Queensland, Ludwig Institute for Cancer Research, Harold Mitchell Foundation, Multiple Myeloma Research Foundation (US), National Breast Cancer Foundation, National Heart Foundation, Ophthalmic Research Institute of Australia, Papua New Guinea Institute of Medical Research (PNG), PATH Malaria Vaccine Initiative (US), Prostate Cancer Foundation of Australia, Ramaciotti Foundations, Royal College of Pathologists of Australasia, The Angior Family Foundation, The William Angliss (Victoria) Charitable Fund, The Pierce Armstrong Foundation, The Bill & Melinda Gates Foundation (US), The William Buckland Foundation, The CASS Foundation, The Rebecca L. Cooper Medical Research Foundation, The Dyson Bequest, The Scobie and Claire MacKinnon Trust, The J.H.A. Munro Foundation, The Publishing Group (US), The Royal Australasian College of Physicians, The Royal Melbourne Hospital Department of Diabetes and Endocrinology, The Harry Secomb Foundation, The Jack & Robert Smorgon Families Foundation, The Lady Tata Memorial Trust (UK), The University of Alabama at Birmingham (US), The Wellcome Trust (UK), The Hugh Williamson Foundation and The Trust Company (The Woodend Foundation).

## Private donors

The institute is fortunate to receive support from individuals, companies and community organisations. Support includes donations from golf clubs Australia-wide, community-based organisations, family trusts and workplace giving and matched giving programs. One particular highlight was the establishment of a three-year partnership with Coeliac Australia which will provide more than $500,000 for the institute's coeliac disease research (see page 25).

## Recognising the support of The J.H.A. Munro Foundation

**The J.H.A. Munro Foundation has been a generous supporter of the Walter and Eliza Hall Institute since 2009.**

Funding from the foundation has supported various areas of research at the institute, particularly type 1 diabetes and coeliac disease research.

In 2012 the institute was advised that The J.H.A. Munro Foundation Ltd had decided to go into voluntary deregistration and that the directors had chosen to donate more than $580,000 in residual funds to support our medical research.

Institute director Professor Doug Hilton met with Professor Terry Nolan, Mr Andrew J. Crozier-Durham, Mr Simon Stuart and Mr Bob Munro to discuss how the generous donation from the foundation could be best used to support institute researchers.

"Bob was adamant that the funds be used at the discretion of the director," Professor Hilton said. "Untied philanthropic funding is crucial to the success of our institute as it allows us to take risks on smart young researchers.

In discussion with Bob, we decided that the funds would be kept invested in perpetuity, with the interest funding a fellowship for researchers. Given Bob's interest in diabetes and coeliac disease we thought it made sense for the funding to initially support Dr Jason Tye-Din, one of our star clinician researchers who is spear-heading our coeliac disease research program."

Dr Tye-Din will become the inaugural J.H.A. Munro Fellow, in honour of Mr Bob Munro's uncle Mr James Harry Alexander Munro (Alex). "It is a pleasure to name the fellowship in recognition of Mr Munro's uncle, who was renowned as a person of high principles and morals and donated generously to charity," Professor Hilton said. "The J.H.A. Munro Fellowship will allow us to attract, retain and support the brightest researchers of each generation and will be a wonderful testament to the generosity and foresight of Bob and Alex Munro."

**Mr Bob Munro has been a generous supporter of the institute's research.**

## Remembering Bev Gray

**Mrs Bev Gray was a passionate supporter of ovarian cancer research.**

Bev was diagnosed with ovarian cancer in 2003. When she was diagnosed, Bev's tests revealed that the cancer had spread beyond her ovaries. As with many women who have ovarian cancer, Bev had some symptoms, but they were not recognised as early signs of ovarian cancer.

Bev passed away in February 2012, after nine years living with ovarian cancer. She is survived by her husband Tony, and daughters Katya and Miranda.

Katya said Bev's greatest hope was to see better early-warning markers identified to screen for ovarian cancer and help in detecting the disease before it spreads and is harder to treat. "In the weeks before she passed away, mum wanted to know what she could do to help make this happen," Katya said. "Rather than sending flowers, mum asked her friends and family to donate money to ovarian cancer research in the hopes that one day, better early markers, treatments and perhaps a cure, could be found."

Katya works at the Walter and Eliza Hall Institute, and – in accordance with Bev's wishes – the Gray family chose to give the donations to the institute's ovarian cancer research program, led by Associate Professor Clare Scott. The money was used to set up the Bev Gray Scholarship, which will help to support a student training with Associate Professor Scott.

Bev's daughter Miranda gave birth to a son four months before Bev passed away. "She was overjoyed to be able to spend time with her first grandchild, even though that time was so short," Bev's husband Tony said.

He said Bev was extremely touched to think she was able to contribute to future ovarian cancer research. "Bev was always thinking of others and gave a lot to other people," Tony said. "Until the very end she was a giver of herself and still thinking of how she could help people, particularly other women with ovarian cancer."

**The late Mrs Bev Gray with her grandson Ryan J Bailey.**

## Golf clubs tee off for medical research

**For several decades golf clubs around Australia have organised charity days to support the Walter and Eliza Hall Institute's research, raising more than $1.6 million. Women in golf clubs have contributed significantly to this achievement.**

In 1976 women golfers at Victoria Golf Club in Cheltenham, Melbourne, decided to change the way they made donations to charities. Instead of giving a little to many good charities, the women's committee of the day decided they would fundraise for one piece of equipment for the Walter and Eliza Hall Institute.

Mrs Norma Wilkinson, president of the Women's Committee from 1992 to 1994, said that each year the institute's scientists were invited to select what equipment was a priority for the next year. "Many women members then worked tirelessly towards its purchase, and great friendships were made," she said.

Over 36 years, 400 women members at Victoria Golf Club have raised more than $136,000 to purchase equipment for the institute's medical research.

The most recent acquisition was a dissecting microscope for Dr Marie-Liesse Asselin-Labat's laboratory in the institute's ACRF Stem Cells and Cancer division. Dr Asselin-Labat has worked to understand how breast cancer starts. She was part of the institute team that identified breast stem cells, a discovery that caused a major shift in the way scientists thought breast cancer developed. Dr Asselin-Labat is now focusing on lung cancer, looking at how lung stem cells are regulated and what drives tumour initiation in the lungs.

Mrs Jan Tootell, Lady President of Victoria Golf Club, said that members continue their commitment to supporting community projects. "We are not just a golf club, we are part of the community and we like to contribute when we can," she said.

**Mrs Norma Wilkinson (left) and Mrs Jan Tootell**

## Supporting the next generation of scientists

**A generous donation by Mr Michael and Mrs Kelli Harris will help support the next generation of scientists training at the Walter and Eliza Hall Institute.**

Mr Harris is the son of former institute researcher and cell biologist Dr Alan Harris, who passed away in 2006. The Alan W Harris Honours Scholarship was established in honour of his contribution to the institute and is awarded to students who are accepted into the institute's honours program. The award provides $5000 to each honours student.

Mr Harris said his father had demonstrated a lifelong commitment to encouraging students and young scientists in the early phase of their research careers. "Dad gave a lot of his time to his students," Mr Harris said. "Having been honours students ourselves, my wife Kelli and I know how difficult it can be financially. To honour dad, we decided to donate to a scholarship that supports talented students who are making their own contribution to science."

During his 36-year research career at the institute Dr Harris made contributions to the fields of genetics, immunology, cancer biology and histopathology. Mr Harris and his wife Kelli work in the health sector and have a particular interest in research that benefits developing countries.

Mr Harris visited the institute in 2012 to meet two Alan W Harris Honours Scholarship recipients, current Honours student Ms Jie Zhou and former Honours student Mr Simon Preston, who is now undertaking a PhD at the institute. "I enjoyed meeting them and learning about their research," Mr Harris said. "It was satisfying to know that this is what dad would appreciate."

Ms Zhou said the scholarship made her life much easier. "Having moved out of home, every cent counts. It helps me worry less and focus more on my studies," she said.

Mr Preston agreed. "The scholarship lightens the financial burden placed on honours students, and allows us to focus on what is most important, our research," he said.

**Ms Jie Zhou (left), Mr Simon Preston (centre) and Mr Michael Harris.**

## Celebrating a remarkable gift

**A hundred years ago the most significant donor in the institute's history, the Walter and Eliza Hall Trust, was established.**

Both Walter Hall and his wife Eliza were active philanthropists during their life together. In 1912, the year following Walter's death, Eliza set up a charitable trust, calling it the Walter and Eliza Hall Trust, as a means of assisting those in need. Her gift of £1,000,000 to establish the trust was the largest charitable gift in Australian history up to that time, the equivalent of approximately $107.5 million today.

In the first years of the Walter and Eliza Hall Institute it was financed solely by an annual donation of £2500 (about $220,000) from the trust. That support has continued until the present day, with the trust's total donations to the institute amounting to approximately $10.1 million in today's terms.

Mr John Chatterton, chairman of The Walter and Eliza Hall Trust, said the tenacity and vision of the men who were its first trustees were crucial to the establishment of the institute.

"The trust's Melbourne-based trustee, Richard Gardiner Casey, was instrumental in highlighting to trustees the need for research into cancer in 1914," Mr Chatterton said. "Following several meetings with medical professors from The University of Melbourne and the then new Melbourne Hospital an agreement was struck to establish the Walter and Eliza Hall Institute of Research in Pathology and Medicine."

Mr Chatterton said it was in 1924, under the second director Dr Charles Kellaway, that the institute began to take off in the way Richard Gardiner Casey had envisioned.

"Casey would be very pleased with what his idea has become. The institute has gone from strength to strength and we are delighted to have been there from the beginning."

Fraser, Kay. (2012). *A Remarkable Gift, 100 Years of the Walter & Eliza Hall Trust*. Queensland, Australia: The University of Queensland Press.

**Eliza Hall at the time of the formation of the Walter and Eliza Hall Trust in 1912. *Provided by the Walter and Eliza Hall Trust.***

## The institute acknowledges the support of the following organisations

## Donations of $1000 and over

Anonymous – NSW
Anonymous – NSW
Anonymous – TAS
Anonymous – VIC
Anonymous – VIC
Anonymous – VIC
Anonymous – VIC
Anonymous – VIC
Anonymous – VIC
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Coeliac Australia
George Collie Trust
Coolah Lady Golfers
Corcoran Parker Pty Ltd
Dr Andrew Cuthbertson
Professor Howard D'Abrera
Mrs June Danks
Mr Gordon Darling AC CMG
Mr and Mrs Patrick N Devlin
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Drakensberg Trust
Dr Janice D Dudley
Estate of Eleanor Margrethe Albiston (The Stang Bequest)
Estate of Charles David Badham
Estate of Gladys Amy Batiste
Estate of Arthur William Byrne
Estate of Isabel Louise Deravin
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Estate of Ethel Mary Drummond
Estate of Margaret Mary Dwyer
Estate of Keith Goldsbury
Estate of Bertha Frances Harris
Estate of Margot Lynne Hindson
Estate of Joan Louise McMahen
Estate of Audrey Evelyn McNeill
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Mr John B Prescott AC and Mrs Jennifer Prescott
Mrs Edith Qualtrough
Ramaciotti Award
John T Reid Charitable Trusts
Agnes Maude Reilly Charitable Trust
Margaret Lewis Reilly Charitable Trust
Mr Dieter and Mrs Maxine Rinke
RobMeree Foundation
Mrs Margaret S Ross AM
Rotary Club of Point Gellibrand Williamstown
S.T.A.F - Rupert, Ethel & Ronald Fraser & Ruby Thomas
Mrs Sam Sharman
Ms Pauline Speedy
Strathmore Community Services Ltd
Ms Jenny Tatchell
Tathra Beach Country Club Ladies Golf
The Angior Family Foundation
The William Angliss (Victoria) Charitable Fund
The Baldy Trust Fund
The C.H. Boden Memorial Trust
The Frank Broadhurst Memorial Charitable Fund
The Decor Corporation Pty Ltd
The Dyson Bequest
The Thomas William Francis & Violet Coles Trust
The Goldschlager Family Charitable Foundation
The Isabel & John Gilbertson Charitable Trust
The Walter and Eliza Hall Trust
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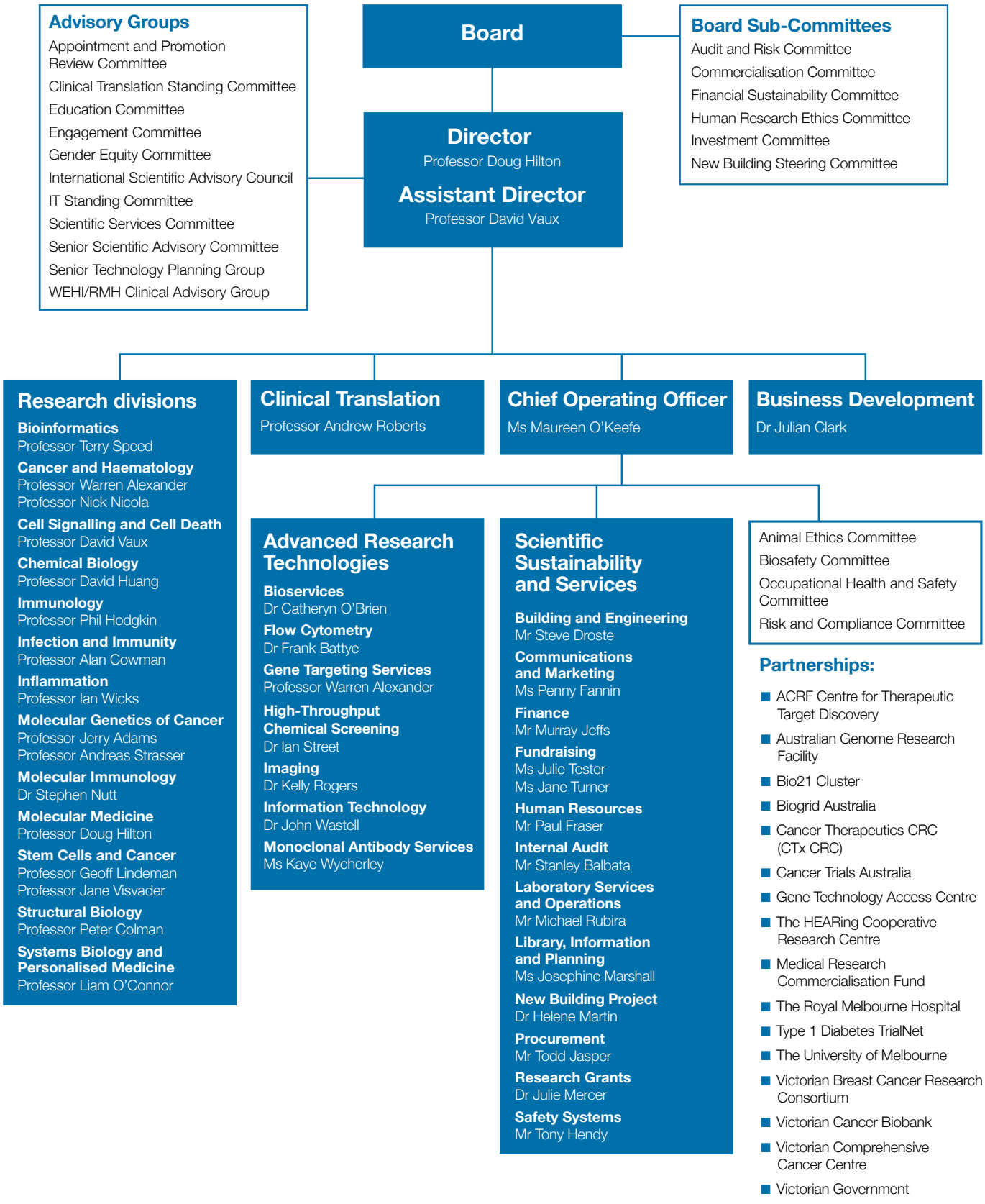
Vincentia Golf Club Lady Members
Mr John C Warburton
Ms Marjorie E J Wilks
Mr David A Williamson
Yarra Yarra Golf Club

## New donations of capital received in the 2011–12 financial year

Anonymous seminar award
Tim Bates Memorial Diabetes Research Fund
DA Craven Memorial Fund
JE Craven & MA Shearer Estates
Alan Harris Scholarship Fund
David Mann Memorial Research Fund
Nossal Family Trust
Paddy Pearl Fund
Qualtrough Research Fund
Sidwell OB Estate

The full list of the institute's permanent named capital funds is on the accompanying CD.

# Institute organisation
## 30 June 2012



# Members of the institute
## during the financial year to 30 June 2012

The University of Melbourne
The Royal Melbourne Hospital
Dr Susan M Alberti AO
Professor Emeritus Robin Anders
Professor James A Angus AO
Mr Donald Argus AC
Sir James Balderstone AC
Mrs Ann D Bates
Mr Robert Bates
Mr Lance H J Bauer
Professor Claude C A Bernard
Mr Marc Besen AO
Dr Gytha W Betheras
Dr Peter Brennan
Mrs Beverley A Brownstein
Mr Edward G Brownstein
Dr Margaret N Brumby AM
Professor Tony Burgess AC
Professor Christopher J Burrell AO
Professor Robert C Burton
Dr David G Campbell
Mr Terrence A Campbell AO
Mr Alan J Chatterton AM
Trustee, the Walter and Eliza Hall Trust
Lady Susannah Clarke
Professor Gordon J Clunie
Mr Glenn Corke
The Rt Hon Sir Zelman Cowen
Deceased, 8 December 2011
Mr John F Cowper
Trustee, the Walter and Eliza Hall Trust
Dr Andrew Cuthbertson
Mr John C Dahlsen
Mr Stephen Daley
Mrs Annette Davis
Mr Leon A Davis AO
Dr Simon de Burgh
Professor David M de Kretser AC
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Mrs Helen M Diamond
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Ms Melda Donnelly
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Mrs Julie Gearing
Mrs Janet Gilbertson
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Ms Rose Gilder
Professor James W Goding
Associate Professor Nicholas M Gough
Mrs Andrea Gowers
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Mr Harry M Hearn AM
Professor David Hill
Dr Margaret C Holmes
Dr Margo C Honeyman
Dr Thomas H Hurley AO OBE
Mr Darvell M Hutchinson AM
Ms Helen Kennan
Mr Warwick G Kent AO
Trustee, the Walter and Eliza Hall Trust
Professor Emeritus Priscilla Kincaid-Smith AC OBE
Professor Frank Larkins AM
Professor Richard G Larkins AO
Mr Gary W Liddell
Mr Sean Lusk
Professor Emeritus Athol W J Lykke
Deceased 4 February 2012
Professor Emeritus Ian R Mackay AM
Mrs Avis L Macphee AM
Ms Eve Mahlab AO
Mrs Robyn G Male
Mr Roger E Male
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Professor Emeritus Thomas J Martin AO
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Professor John A McKenzie AM
Professor Frederick Mendelsohn AO
Professor Jacques Miller AC
Professor John Mills
Mr Robert C Minter
Trustee, the Walter and Eliza Hall Trust
Professor Christina Mitchell
Dr Graham F Mitchell AO
Dr Judith A Mitchell
Mr Barry Moore
Mrs Barbara R Morgan
Mr Hugh M Morgan AC
Dr George Morstyn
Mr Bob I Munro
Dame Elisabeth Murdoch AC DBE
Mr Anthony P Murphy
Ms Linda B Nicholls AO
Lady Lyn Nossal
Mr Tom J R O'Brien AM
Mr David Owens
Mrs Helen Owens
Sir Arvi Parbo AC
Professor David G Penington AC
Professor Roger Pepperell
Mr David R Percival
Professor Emeritus Jim Pittard AM
Lady Primrose Potter AC
Mr John B Prescott AC
Mrs Edith Qualtrough
Ms Lesley Qualtrough
Professor Peter Rathjen
Ms Kate J Redwood
Mr John B Reid AO
Mr Dieter O Rinke
Associate Professor Ken Roberts AM
Mr Michael B Robinson AO
Ms Linda Rodger
Mrs Mary Rodger
Mrs Margaret S Ross AM
Mr Fergus D Ryan
Professor Graeme B Ryan AC
Professor Nick Samaras
Mrs Pam J Sargood
Professor Carl B Schedvin
Ms Carol J Schwartz AM
Dr Roland Scollay
Mr Andrew Scott
Professor John F Scott AO
Dr Paul W Scown
Mrs Sam M Sharman
Mrs Lousje Skala
Mr Steven M Skala AO
Mr Jack Smorgon AO
Mr Robert Smorgon AM
Ms Linda Sorrell
Ms Pauline Speedy
Miss Ann A Sprague
Mr Geoffrey J Stewardson
Dr John Stocker AO
Mr John W Stratton
Ms Helen Sykes
Ms Jenny Tatchell
Mr Bruce B Teele
Mrs Cheryl F Thomas
Mr Christopher Thomas
Mr John C Walker QC
Mr Stanley Wallis AC
Ms Catherine Walter AM
Mr John M Walter
Mr John C Warburton
Mr Robert Warren
Ms Marion J Webster OAM
Mr Kevin J Weight
Professor Richard E H Wettenhall
Dr Senga Whittingham
Mr David A Williamson
Professor Robert Williamson AO
Professor Ingrid Winship
Mr Peter A Worcester

# Staff list

## Director

**Doug Hilton,** BSc *Monash* BSc(Hons) *Melbourne* PhD *Melbourne* FAA

### Assistant director

**Dave Vaux,** BMedSc *Melbourne* MB BS *Melbourne* PhD *Melbourne* FAA

### Director's office

Keely Bumsted O'Brien, BSc *Simmons College* PhD *Washington*, scientific education officer (from 07/11)
Pamela Dewhurst, personal assistant
Sue Hardy, student administration assistant (from 02/12)
Kelly Rodger, executive assistant (administrative)
Linda Scott, personal assistant to president of the Australian Academy of Science
Fenny Wiradjaja, BSc *Monash* PhD *Monash*, executive assistant (scientific)

## Chief operating officer

**Maureen O'Keefe,** BSc(Hons) *Monash* DipEd *Melbourne* MBA *Melbourne* GAICD WCLP

### Chief operating officer's office

Sue Cameron-Codognotto, administrative officer
Jenna Kelley, administrative assistant

### Internal audit

**Stanley Balbata,** CPA, internal auditor

### Research Grants

**Julie Mercer,** BSc *Melbourne* DipEd *Monash* PhD *Monash*, grants manager

Annette Wilson, BA(Hons) *Monash* MA *Monash* GradDipSocSci *Swinburne*, grants administrative assistant

## Bioservices

**Catherine O'Brien,** BVSc *Melbourne*, veterinarian

Gavina Bailey, animal ethics committee and regulatory compliance officer

**Angela Milligan,** head, Bioservices – Parkville

Sophie Allan
Kim Birchall
Amanda Bradfield (to 02/12)
Rebecca Cole
Dannielle Cooper
Jessica Coughlin
Faye Dabrowski
Merle Dayton
Kris Dennemoser (to 09/11)
Heather Donatucci
Emma Dunstan (from 02/12)
Michelle Fornito
Carmen Gatt
Jaclyn Gilbert
Katya Gray
Megan Haillay (from 08/11 to 11/11)
Melissa Hobbs, BSc *Monash*
Krystal Hughes
Nadia Iannarella
Meagan James (to 02/12)
Elizabeth Kyran
Emma Lanera
Jamie Leahy
Silvana Liburdi
Nicole Lynch
Liana Mackiewicz
Kate McKenzie
Julie Merryfull
Glen Monagle
Andrea Morcom
Gary Morgan
Danny Noriel
Stephanie O'Connor
Melissa Pritchard
Lisa Reid
Alice Renkema (to 04/12)
Kristen Scicluna (from 07/11)
Giovanni Siciliano
Catherine Smith
Chrystal Smith
Keti Stoev
Emily Sutherland (to 09/11)
Paul Trajcevski
Kelly Trueman
Kristy Vella
Kelly Walker (from 08/11)
Lauren Wilkins
Jian Xiao
Catherine Yates

**Gillian Carter,** head, Bioservices – Kew

Andrea Baldwin
Fiona Berryman
Kerry Betts
Peter Coffman
Rhiannan Crawley (from 01/12)
Carmen Epifanio (from 01/12)
Jackie Fisher
Sharen Hennessy
Wendy Intrepido
Jess Janssen
Terese Johns, education and training manager
Melissa Keeble
Con Koureskas
Kelly Lane, BSc *Melbourne*
Teisha Mason
Cameron McKenzie
Lyciah Mounsey (from 08/11)
Sohrab Partow
Bec Poppleton
Liz Reddie
Leanne Scott
Bianca Smaranda
Silvia Stoev (from 11/11)
Cheryl Thorp, administrative assistant
Collette Turfrey
Sarah Vivian
Melinda Watts (from 10/11)
Kelly Wilson

**Elaine Major,** head, Bioservices – Biotechnology Centre

Loretta Allen (to 01/12)
Kathy Barber
Denise Barker
Rebecca Bowyer (to 07/11)
Sheree Brown
Tara Carle
Cassandra D'Alessandro (from 02/12)
Christopher Evans
Katie Franks
Theresa Gibbs
Stephanie Green
Aida Herrera
Melanie Howell
Priscilla Kennedy
Lyn Lowe
Vicki Marshall, BSc *LaTrobe*
Dang Nguyen (to 03/12)
Shauna Ross
Mathew Salzone (to 04/12)
Emilia Simankowicz (from 11/11)
Julie Stanley
Christina Tsatsoulis
Jayne Vella (from 11/11)
Fiona Waters, BSc *LaTrobe*
Magda Wilk

**Eren Loza,** Head, Bioservices – LaTrobe

Louise Inglis
Jose Jimenez
Tracey Kemp
Tony Trajcevski, animal attendant coordinator

## Business Development Office

**Julian Clark,** BSc(Hons) *Flinders* PhD *Glasgow*, head, business development

Patricia Diggle, BSc(Hons) *Monash* PhD *Bristol*, business development officer
James Dromey, BSc(Hons) *London* PhD *London*, business development associate
Gabrielle Hirsch, BSc(Hons) *Monash* LLB *Monash*, IP/legal officer (from 12/11)
Carmela Monger, BSc *LaTrobe* MSc *Melbourne*, intellectual property and contracts manager
Sheena Segbedzi, BE(Hons) *Melbourne* MEng *Melbourne* GradDipIP *Melbourne*, patents administrator

## Building and Engineering Services

**Steve Droste,** BEng *Melbourne*, facilities manager

Geoff Cravino, engineering supervisor
Nick Basalaj, essential safety measures technician
Mahbub Bhuiyan, MPICT *Macquarie*, security and compliance supervisor
Peter Brown, maintenance technician
Marek Grostal, BEng(Technology) *Warsaw*, electronics technician
Cipriano Maligsay, BEng *Manila*, electrical/mechanical technician
Alf Mele, trades assistant
Greg Menzies, engineering purchasing officer
Onker Singh, maintenance technician
Derek Wates, refrigeration technician

**Graham Pratt,** engineering supervisor, Bundoora

Darren Goodwin, workshop technician
Jeffrey Langley, maintenance technician
Patrick Makiatea, trades assistant
Robert Mitrevski, workshop technician
Graham Thornbury, maintenance technician

## Clinical Translation Centre

**Andrew Roberts,** MB BS *Qld* PhD *Melbourne* FRACP FRCPA, head, clinical translation centre

Jenni Harris, BSc(Nursing) *Ballarat* GradDipCC(ICU) *Monash* GradDipSc(Nursing) *VUT*, clinical project officer
Cathy Quilici (from 09/11), research assistant
Naomi Sprigg, visiting tissue coordinator
Lina Laskos, BSc(Hons) *Monash* PhD *Monash*, clinical project officer

## Community Relations

**Deb Cutts,** BSc *Monash*, fundraising manager (to 12/11)

**Penny Fannin,** BSc(Hons) *Melbourne* GradDipJourn *Murdoch*, strategic communications and marketing manager

Drew Berry, BSc(Hons) *Melbourne* MSc *Melbourne*, biomedical animations manager
Elizabeth Bravo, catering supervisor
Rachel Bucknall, BVC(Hons) *Monash*, graphics officer (from 02/12)
Richard Burleigh, database officer (from 05/12)
Lee Byrne, BA *South Australia* MA *Deakin*, web communications manager (from 04/12)
Jacqui Church, community relations coordinator (to 03/12)
Madhu Dass, catering assistant
Rosie Falcone, reception coordinator
Maureen Grant, BA *UTS* CEM, conference and events manager
Renee Jowett, receptionist
Lauren McCluskey, BA *RMIT*, development officer (from 08/11)
Peter Maltezos, graphics officer
Dany Maneely, BBiomedSc *Durham* MSc *Imperial College*, web content manager (to 04/12)
Czesia Markiewicz, photographer
Brigitte Mesiti, graphics officer
Alice Robinson, BA *Flinders* LLB *Flinders*, communications officer (from 08/11)
Vanessa Solomon, BSc(Hons) *UTAS* PhD *Melbourne*, communications advisor
Simon Taplin, production manager
Julie Tester, BA *Melbourne* BSW *Melbourne*, donor development manager
Jane Turner, BA *LaTrobe*, trusts and foundations manager (from 07/11)
Etsuko Uno, BSc(Hons) *UWA* MA *Rockefeller*, biomedical animator
Cameron Wells, graphics officer
Elizabeth Williams, BSc(Hons) *UWA* GradDipSciComm *UWA*, media and publications manager

## Finance

**Murray Jeffs,** BBus(Accounting) *RMIT* CPA FCIS SF Fin, financial controller

Malcolm Williamson, BBus(Accounting) *Swinburne*, financial operations manager
Yesar Al-Hashimi, BBus(Administration) *Yarmouk*, accounts officer
Gordana Barkovic, accounts officer
Kaye Bates, accounts officer
Michelle Birrell, BBus(Administration) *Monash*, accounts/grants officer
Peter Chen, BCom *Deakin*, accounts payable officer
Barbara Groves, accounts officer
Justine Koutsoupias, BCom *RMIT*, accountant (from 08/11)
Adrian Turvey, assistant accountant

### Procurement and Logistics

**Todd Jasper,** procurement and logistics coordinator

Luke Baltrunas, storeperson
Oscar Canedo, storeperson
Mario Florides, stores and inventory clerk
Brigitte Jordanidis, receptionist/ administration assistant
Claudia Kerstovitch, administration coordinator
Stella Kyvetos, shipping officer
Jim McDonagh, shipping officer
Dorothy Pilarinos, purchasing officer
Richard Reeve, stores supervisor
John Sapazovski, storeperson
Boris Trajcevski, purchasing officer

## Human Resources

**Paul Fraser,** BSc(Hons) *Melbourne* DipEd *Melbourne* MEdAdmin *New England*, human resources manager

Catherine Axiaq, BBus *Swinburne*, human resources administrator)
Frank Draffen, academic administration officer
Mabel Kiang, BBus *Swinburne*, payroll/ HR administrator
Vanessa Linde, BHealthSc *Deakin*, human resources officer
Yvonne Sirinotis, BBus *LaTrobe*, human resources officer
Rita Tiziani, senior human resources officer

## Information Technology Services

**John Wastell,** BSc(Hons) *Melbourne* PhD *Melbourne*, head, Information Technology Services

Adrian Colomitchi, BSc *Bacharest*, software engineer (from 10/11)
Janice Coventry, BSc *Melbourne* DipEd *Melbourne*, VMS systems manager
Jason Cutler, BInfTech *Monash*, helpdesk engineer
Miffy Edwards, BA *Monash*, DBA/senior applications programmer
Chris Fitzgerald, helpdesk engineer
David Hardy, BA(Hons) *De Montfort*, Macintosh systems manager
Edy Huynh, computer technician
Norm King, computer technician
Khoi Le, software engineer
Tri Le, BSc(Hons) *Monash*, PC systems manager
John McFarlane, GradDipAppInfSys *RMIT*, IT services manager
Andrew McInneny, helpdesk team leader
Austin McLaughlin, BSc(Hons) *LaTrobe*, application services manager (from 07/11)
John Nguyen, BECompEng *Melbourne*, desktop systems support engineer
Jakub Szarlat, BESoftEng(Hons) *Melbourne*, Unix/Linux systems manager
Phi Tang, BComp(Hons) *Adelaide*, software engineer (from 10/11)
Dung Tran, BEComp *Monash*, networks manager
Qui Tran, BAppSc *Chisholm*, Microsoft server applications support engineer
Rodney Van Cooten, BSc(Hons) *Melbourne*, CTx computer systems engineer

## Laboratory Services and Operations

**Helene Martin,** BSc(Hons) *Melbourne* MBB *RMIT* PhD *Melbourne*, laboratory operations manager

**Michael Rubira,** BAppSc *RMIT*, laboratory operations manager
Wendy Carter, ARMIT *RMIT*

### Flow Cytometry Laboratory

**Frank Battye,** BSc(Hons) *LaTrobe* PhD *LaTrobe*, head, flow cytometry

David Baloyan, BSc(Hons) *Javakhishvili Tbilisi State* MSc(Hons) *Javakhishvili Tbilisi State*
Adrian Binek, BSc *Swinburne* (from 02/12)
Sandy Fung, BSc *Melbourne* (to 01/12)
Angela Hind (to 03/12)
Dora Kaminaris, BSc *Monash*
Padmini Nanda, BSc *Bangalore* MSc *Bangalore*
Chayanica Nasa, BSc *Delhi* MSc *Delhi*
Rumbi Tichawangana, BSc *Deakin* BSc(Hons) *Melbourne*
Lankesha Yapa, BSc *Auckland* MSc *Auckland*

### Gene Targeting Service

Jacob Sarkis, BSc *RMIT*
Elizabeth Viney, BAppSc *RMIT*

### Histology

**Ellen Tsui,** head of Histology

Vera Babo
Salam Hasanein
Yuyin Hoang
Steven Mihajlovic, BSc *Sydney* MSLA *Zagreb*
Kevin Weston

### Imaging Facility

**Kelly Rogers,** BSc(Hons) *Deakin* PhD *Griffith*, head, imaging facility

Lachlan Whitehead, BA *Melbourne* BSc(Hons) *Melbourne* PhD *Melbourne* (from 04/12)

### Media

**Wendy Dietrich,** BAppSc *Monash* BAppSc(Hons) *RMIT*, head, Central Services

Kelly Arnott
Goran Arsovski
Balwinder Kaur, BA *Bunjab*
Linda Minter (to 01/12)
Carolyn Sperrer
Dora Vasiliadis, media supervisor

### Monoclonal Antibody laboratory

**Kaye Wycherley,** head, Monoclonal Antibody services

Ridouan Bouhbouh
Monica Brown
Myha Huynh
Karen Mackwell, BAppSc *RMIT*
Paul Masendycz, BAppSc *RMIT*, laboratory coordinator

### Preparation Services

Leny Juatan
Dianne Mathews
Heather Orange
Josephine Pink
Wendy Ross
Anna Rymer
Denise Stephen

### Radiation and Instrument Services

Denis Quilici, ARMIT *RMIT*, radiation safety
Thomas Nikolaou

## Library and Information Management

**Josephine Marshall,** head, library and information management

Richard Burt, BA *LaTrobe* MIMS *Swinburne* GradDipEd *Monash*, records officer
Wendy Hertan, BA *VUT* GradDipLib *Melbourne*, assistant librarian

## Safety

**Tony Hendy,** BAgSc(Hons) *Melbourne* GCertIndHygSc *Deakin*, safety systems manager

Grant Thomas, BAppSc *RMIT*, chemical safety officer

# Board Committees

## Audit and Risk Committee

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Professor Doug Hilton
Mr Murray Jeffs
Mr Roger Male
Ms Maureen O'Keefe
Mr Steven Skala AO
Mr Malcolm Williamson
Mr Stan Balbata (Minutes)

## Commercialisation Committee

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Professor Doug Hilton
Dr George Morstyn
Professor Nick Nicola AO
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Dr John Raff
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Ms Jane Hemstritch
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Mr Rowan Kennedy
Ms Maureen O'Keefe
Mr Steven Skala
Mr Robert Wylie
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## Human Research Ethics Committee

Associate Professor Rufus Black, Chair
Dr Bob Anderson (to 12/11)
Dr John Bonacci
Associate Professor Paul Ekert (from 01/2)
Reverend Father Michael Elligate, Deputy Chair
Mr David Freeman
Observer: Dr Lina Laskos
Professor Geoff Lindeman
Mrs Netta McArthur
Mr Paul McCaffrey
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Professor Louis Schofield
Professor Ingrid Winship
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Professor Doug Hilton
Mr Murray Jeffs
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Mr Stephen Milburn-Pyle
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Mr John Stratton
Ms Fiona Trafford-Walker
Ms Catherine Walter AM
Mr Peter Worcester
Mr Andrew Scott (Minutes)

## New Building Sub-Committee

Mr Michael Fitzpatrick, Chair
Mr Leon Davis AO
Professor Doug Hilton
Mr Tony Murphy
Ms Maureen O'Keefe
Professor Nick Nicola AO
Professor David Vaux
State Government Observers:
Mr Simon Rabl, DPI
Mr Steven Skala AO
Ms Sue Cameron (Minutes)

# Advisory Committees

## Appointment and Promotion Review Committee

Professor James Angus,
The University of Melbourne, Chair
Professor Jerry Adams
Professor Warren Alexander
Professor Peter Colman
Professor Alan Cowman
Professor Len Harrison
Professor Doug Hilton
Professor Phil Hodgkin
Professor David Huang
Professor Geoff Lindeman
Professor Nick Nicola
Dr Stephen Nutt
Professor Liam O'Connor
Professor Andrew Roberts
Professor Terry Speed
Professor Andreas Strasser
Professor David Vaux
Professor Jane Visvader
Professor Ian Wicks
Mr Paul Fraser,
Human Resources Manager (Minutes)

## International Scientific Advisory Council

Dr David Baltimore,
California Institute of Technology
Professor Christophe Benoist,
Joslin Diabetes Center
Professor Anton Berns,
Netherlands Cancer Institute
Dr Alan Bernstein,
Global HIV Vaccine Enterprise
Professor Elizabeth Blackburn,
University of California San Francisco
Professor Dr Meinrad Busslinger,
Research Institute of Molecular Pathology
Professor Peter Doherty,
The University of Melbourne
Professor Richard Flavell,
Yale University
Professor Christopher Goodnow,
John Curtin School of Medical Research,
Australian National University
Dr Diane Mathis,
Joslin Diabetes Center
Professor Philippe Sansonetti,
Institut Pasteur
Professor Tom Steitz,
Howard Hughes Medical Institute,
Yale University
Professor Bruce Stillman,
Cold Spring Harbor Laboratory
Professor James Wells,
Small Molecule Discovery Center,
University of California San Francisco
Director's Office,
Walter and Eliza Hall Institute (Minutes)

## Senior Scientific Advisory Committee

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Professor Jerry Adams
Professor Warren Alexander
Dr Chris Burns
Professor Peter Colman
Professor Alan Cowman
Professor Len Harrison
Professor Phil Hodgkin
Professor David Huang
Professor Geoff Lindeman
Professor Nick Nicola
Dr Stephen Nutt
Professor Liam O'Connor
Professor Andrew Roberts
Professor Ken Shortman
Professor Gordon Smyth
Professor Terry Speed
Professor Andreas Strasser
Professor David Vaux
Professor Jane Visvader
Professor Ian Wicks
Ms Kelly Rodger (Minutes)

# Standing Committees and Sub-Committees

## Animal Ethics Committee

Professor Colin Chapman, Chair
Dr Marnie Blewitt (Scientist)
Dr Alan Bolton (The Lost Dogs Home)
Mr Terence Flanagan (Representing the public interest)
Dr Daniel Gray (Scientist)
Dr Carlotta Kellaway (Representing the public interest)
Associate Professor Andrew Lew (Veterinarian/Scientist)
Ms Julie Merryful (Senior Animal Technician)
Dr Matthew McCormack (Scientist)
Ms Angela Milligan (Senior Animal Technician)
Dr Catheryn O'Brien (Veterinarian)
Mr Tony Pyman (Representing the public interest)
Mrs Gavina Bailey (Minutes)

## Biosafety Committee

Dr Ross Dickins, Chair (from 01/12)
Dr Stephen Nutt, Chair (to 12/11)
Ms Wendy Carter
Mr Tony Hendy (to 02/12)
Associate Professor Andrew Lew
Dr Helene Martin
Professor Marjory Martin (to 02/12)
Dr Catheryn O'Brien
Ms Maureen O'Keefe
Dr Marc Pellegrini, Deputy Chair (from 01/12)
Professor Andrew Roberts
Mr Michael Rubira
Dr Odilia Wijburg
Ms Marian Cravino (Minutes)

## Clinical Translation Standing Committee

Professor Andrew Roberts, Chair
Dr Bob Anderson
Dr Chris Burns
Dr Julian Clark
Dr Ross Dickins
Associate Professor Paul Ekert
Professor Len Harrison
Dr Susanne Heinzel
Dr Lina Laskos
Professor Geoffrey Lindeman
Associate Professor Clare Scott
Ms Monique Topp
Dr Jason Tye-Din
Professor Paul Waring, University of Melbourne
Professor Ian Wicks
Ms Jenni Harris (Minutes)

## Education Committee

Dr Anne Voss, Chair
Dr Keely Bumsted-O'Brien
Dr Matthew Call
Dr Peter Czabotar
Dr Grant Dewson
Mr Frank Draffen
Associate Professor Paul Ekert
Ms Penny Fannin
Mr Paul Fraser
Dr Nick Huntington
Dr Ruth Kluck
Mr James McCoy
Dr Sandra Nicholson, Deputy Chair
Dr Marc Pellegrini
Associate Professor John Silke
Dr Brad Sleebs
Professor Terry Speed
Associate Professor David Tarlinton
Dr Chris Tonkin
Ms Jenni Harris (Minutes)

## Engagement Committee

Ms Penny Fannin, co-Chair
Professor David Vaux, co-Chair
Dr Keely Bumsted-OBrien
Miss Lee Byrne
Ms Gillian Carter
Mr Jason Corbin
Dr Leigh Coultas
Professor Alan Cowman
Dr Marlyse Debrincat
Dr James Dromey
Dr Krystal Evans
Ms Angela Georgiou
Mrs Maureen Grant
Mr Colin Hockings
Dr Kurt Lackovic
Dr Erinna Lee
Ms Jo Marshall
Dr Ashley Ng
Ms Mikara Robati
Dr Christine White
Ms Alice Robinson (Minutes)

## Gender Equity Committee

Associate Professor Lynn Corcoran, co-Chair
Professor Terry Speed, co-Chair
Dr Marie-Liese Asselin-Labat
Dr Alyssa Barry
Professor Sharon Bell
Keely Bumsted-O'Brien
Dr Chris Burns
Dr Kim Jacobson
Dr Ben Kile
Carmela Monger
Associate Professor Clare Scott
Ms Rita Tiziani
Ms Hannah Vanyai
Ms Kelly Rodger (Minutes)

## Health, Safety and Environment Committee

Mr Paul Fraser, Chair
Ms Tracey Baldwin
Ms Wendy Carter
Mr Steve Droste
Ms Jessica Janssen
Dr Guillaume Lessene
Dr Kym Lowes
Mr Greg Menzies
Ms Andrea Morcom
Ms Maureen O'Keefe
Mr Denis Quilici
Ms Lucille Rankin
Mr Michael Rubira
Mr Keith Satterley
Ms Rita Tiziani
Ms Ellen Tsui
Mr Tony Hendy (Minutes)

## IT Standing Committee

Professor Peter Colman, co-Chair
Dr John Wastell, co-Chair
Ms Lee Byrne
Dr Hendrik Falk
Professor Phil Hodgkin
Professor David Huang
Professor Liam O'Connor
Ms Maureen O'Keefe
Dr Tony Papenfuss
Dr Kelly Rogers
Ms Jie Zhou
Ms Helen Barry (Minutes)

## Mouse Management Committee

Associate Professor Andrew Lew, Chair
Professor Warren Alexander
Dr Ben Croker
Mr Paul Fraser
Dr Diana Hansen
Dr Axel Kallies
Dr Kylie Mason
Ms Angela Milligan
Dr Sandra Nicholson
Dr Catheryn O'Brien
Professor Andreas Strasser
Associate Professor David Tarlinton
Professor Jane Visvader
Dr Anne Voss
Mrs Gavina Bailey (Minutes)

## Senior Technology Planning Group

Professor Nick Nicola AO, Chair
Professor Warren Alexander
Dr Jake Baum
Professor Peter Colman
Dr Leigh Coultas
Professor David Huang
Dr Ben Kile
Professor Liam O'Connor
Ms Maureen O'Keefe
Professor Andrew Roberts
Associate Professor David Tarlinton
Ms Jane Turner (from 03/12)
Professor Jane Visvader
Dr Sabine Kelly (Minutes)

## Scientific Services

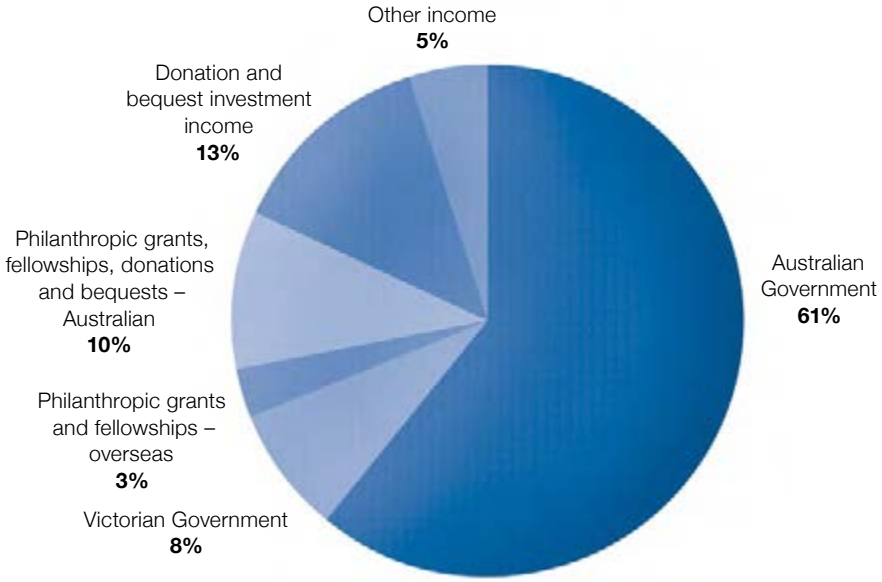
Professor Warren Alexander, co-Chair
Ms Maureen O'Keefe, co-Chair
Dr Gabrielle Belz
Professor David Huang
Mr Michael Rubira
Dr Chris Tonkin
Mr Malcolm Williamson
Dr Sabine Kelly (Minutes)

## Marketing Committee

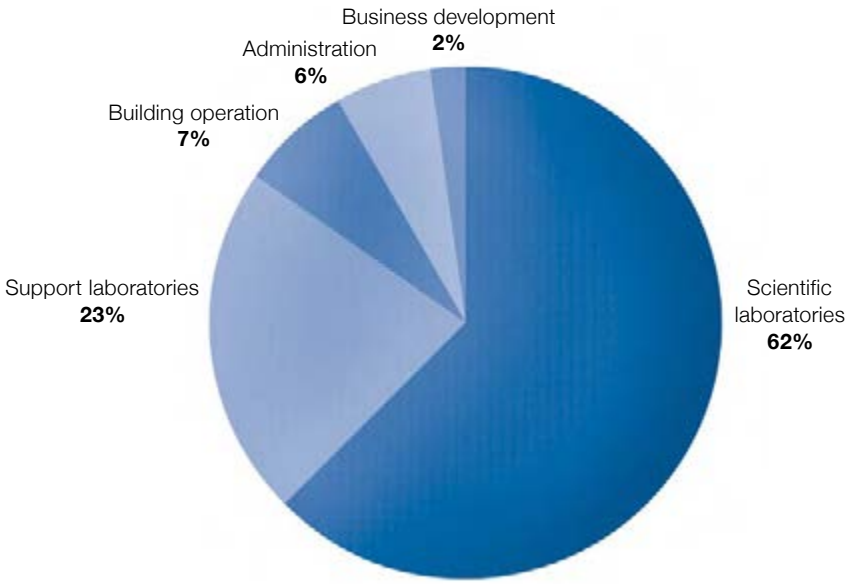
Dr Marthe D'Ombrain, Chair (Minutes)
Dr Julian Clark
Dr James Dromey
Ms Penny Fannin
Dr Stephanie Grabow
Professor Doug Hilton
Dr Kurt Lackovic
Ms Maureen O'Keefe
Ms Liz Williams

# The year at a glance

## Income




## Expenditure




| The year in brief | 2012 | 2011 |
|---|---|---|
| Income for research ($000) (excluding investment income) | **72,881** | **70,748** |
| Donation and bequest investment income ($000) | **11,280** | **11,486** |
| Expenditure on research ($000) | **89,109** | **79,124** |
| Net surplus (deficit) from research ($000) | **(4,948)** | **3,110** |
| Number of staff and visiting scientists | **608** | **585** |
| Number of postgraduate students | **137** | **135** |
| Total staff and students (EFTs) | **745** | **720** |

## Statement of comprehensive income for the year ended 30 June 2012

| Revenue for research activities | Note | 2012 $'000 | 2011 $'000 |
|---|---|---|---|
| **Government revenue** | | | |
| National Health and Medical Research Council | 4(a) | 43,528 | 39,595 |
| Cooperative Research Centres | 4(b) | 2,199 | 2,185 |
| Other federal government grants | 4(c) | 1,706 | 2,615 |
| Other federal government fellowships | 4(d) | 2,529 | 1,578 |
| Victorian Government grants | 4(e) | 7,074 | 6,842 |
| Foreign government grants and fellowships | 4(f) | 359 | 557 |
| | | **57,395** | **53,372** |
| **Other grant revenue** | | | |
| Industrial grants and contracts | 4(g) | 1,114 | 1,846 |
| Philanthropic grants and fellowships – Australia | 4(h) | 5,285 | 3,830 |
| Philanthropic grants and fellowships – International | 4(i) | 2,180 | 3,235 |
| | | **8,579** | **8,911** |
| **Other revenue** | | | |
| Investment income | 4(j) | 11,280 | 16,236 |
| Royalty income | | 810 | 2,513 |
| General income | | 3,054 | 2,647 |
| Donations and bequests | | 3,043 | 3,305 |
| | | **18,187** | **24,701** |
| **Total revenues for research activities** | | **84,161** | **86,984** |

The financial statements are to be read in conjunction with the notes to, and forming part of, the financial statements.

| Expenditure on research activities | Note | 2012 $'000 | 2011 $'000 |
|---|---|---|---|
| **Scientific laboratories** | | | |
| Staff costs | | 41,421 | 36,793 |
| Apparatus and equipment | | 2,044 | 2,000 |
| Consumable supplies | | 9,664 | 8,671 |
| Other expenses | | 2,223 | 2,539 |
| | | **55,352** | **50,003** |
| **Support laboratories** | | | |
| Staff costs | | 13,287 | 11,988 |
| Apparatus and equipment | | 2,075 | 862 |
| Consumable supplies | | 2,477 | 2,556 |
| Other expenses | | 2,088 | 1,658 |
| | | **19,927** | **17,064** |
| **Building operation** | | | |
| Staff costs | | 1,434 | 1,328 |
| Operating costs and repairs | | 4,877 | 4,353 |
| | | **6,311** | **5,681** |
| **Administration** | | | |
| Staff costs | | 4,540 | 3,890 |
| Equipment | | 75 | 73 |
| Fundraising and marketing expenditure | | 192 | 139 |
| Other expenses | | 936 | 790 |
| | | **5,743** | **4,892** |
| **Business development** | | | |
| Staff costs | | 877 | 800 |
| Patents | | 572 | 360 |
| Other expenses | | 327 | 324 |
| | | **1,776** | **1,484** |
| **Total expenditure on research activities** | | **89,109** | **79,124** |
| **Surplus (deficit) from research activities** | | **(4,948)** | **7,860** |
| Other income | 2 | 25,369 | 3,098 |
| Impairment write-down of available-for-sale financial assets | 12(f) | (2,333) | (2,945) |
| Write back of prior years' implementation costs | | | 744 |
| Depreciation and amortisation | 21 | (5,681) | (6,375) |
| **Net surplus before capitalised bequests and grants for capital works** | | **12,407** | **2,382** |
| Capitalised bequests and grants for capital works | 3 | 16,757 | 52,765 |
| **Net surplus for the year** | 12(a) | **29,164** | **55,147** |
| **Other comprehensive income** | | | |
| Gain/(loss) on available-for-sale investments taken to equity | 12(f) | (10,905) | 4,850 |
| Transfers to (gain) or loss on sale of financial assets | 12(f) | (1,154) | (6,944) |
| Transfer impairment write-down of available-for-sale financial assets | 12(f) | 2,333 | 2,945 |
| **Total comprehensive income for the year** | | **19,438** | **55,998** |

The financial statements are to be read in conjunction with the notes to, and forming part of, the financial statements.

## Statement of financial position as at 30 June 2012

| Assets | Note | 2012 $'000 | 2011 $'000 |
|---|---|---|---|
| **Current assets** | | | |
| Cash | 17(a) | 14,994 | 23,876 |
| Current tax assets | 7(a) | 2,117 | 3,580 |
| Receivables | 7(b) | 11,804 | 11,554 |
| Other financial assets | 7(c) | 17,000 | 26,000 |
| Prepaid operating lease | 11 | 32 | 32 |
| **Total current assets** | | **45,947** | **65,042** |
| **Non-current assets** | | | |
| Other financial assets | 8 | 157,716 | 155,122 |
| Property, plant and equipment – at deemed cost | 21 | 193,398 | 155,675 |
| Prepaid operating lease | 11 | 2,752 | 2,784 |
| **Total non-current assets** | | **353,866** | **313,581** |
| **Total assets** | | **399,813** | **378,623** |
| **Liabilities** | | | |
| **Current liabilities** | | | |
| Trade payables | | 6,322 | 7,591 |
| Employee benefits | 9 | 8,222 | 7,756 |
| Unearned grants and fellowships | 10 | 13,164 | 11,798 |
| **Total current liabilities** | | **27,708** | **27,145** |
| **Non-current liabilities** | | | |
| Employee benefits | 9 | 7,676 | 6,487 |
| **Total non-current liabilities** | | **7,676** | **6,487** |
| **Total liabilities** | | **35,384** | **33,632** |
| **Net assets** | | **364,429** | **344,991** |
| **Funds** | | | |
| Permanent invested funds | 12(b) | 139,073 | 134,457 |
| General funds | 12(c) | 162,909 | 138,752 |
| Royalty fund | 12(d) | 17,079 | 16,788 |
| Leadership fund | 12(e) | 16,282 | 16,182 |
| Investment revaluation reserve | 12(f) | 29,086 | 38,812 |
| **Total funds** | | **364,429** | **344,991** |

The financial statements are to be read in conjunction with the notes to, and forming part of, the financial statements.

## Statement of cash flows for the year ended 30 June 2012

| | Notes | 2012 | 2011 |
|---|---|---|---|
| **Cash flows from operating activities** | | **$'000** | **$'000** |
| Donations and bequests | | 3,043 | 3,305 |
| General income | | 3,054 | 2,646 |
| Receipts from granting bodies | | 65,605 | 60,012 |
| Payments to suppliers and employees | | (88,562) | (84,353) |
| Royalty receipts | | 810 | 2,513 |
| Dividends received | | 7,363 | 8,695 |
| Interest and bill discounts received | | 5,460 | 6,205 |
| **Net cash provided by/(used in) operating activities** | 17(b) | **(3,228)** | **(977)** |
| **Cash flows from investing activities** | | | |
| Payment for other financial assets | | (26,522) | (16,150) |
| Proceeds on sale of other financial assets | | 14,252 | 32,319 |
| Sale(Purchase) of bills of exchange | | 9,000 | 11,853 |
| Grants and Donations for Property, Plant and Equipment | | 25,006 | 37,719 |
| Payment for property, plant and equipment | | (30,753) | (53,523) |
| **Net cash provided by/(used in) investing activities** | | **(9,017)** | **12,218** |
| **Cash flows from financing activities** | | | |
| Donations and bequests to permanent invested funds | | **3,363** | **1,566** |
| **Net cash provided by financing activities** | | **3,363** | **1,566** |
| **Net (decrease) increase in cash held** | | **(8,882)** | **12,807** |
| **Cash and cash equivalents at the beginning of the financial year** | | **23,876** | **11,069** |
| **Cash and cash equivalents at the end of the financial year** | 17(a) | **14,994** | **23,876** |

The financial statements are to be read in conjunction with the notes to and forming part of the financial statements.

## Statement of changes in equity

| | Permanent funds | General funds | Royalty funds | Leadership funds | Investment revaluation reserve | Total funds |
|---|---|---|---|---|---|---|
| **Balance at 1 July 2011** | 129,802 | 90,534 | 14,823 | 15,873 | 37,961 | 288,993 |
| Surplus for the year | 4,655 | 48,218 | 1,965 | 309 | - | 55,147 |
| Other comprehensive income for the year | - | - | - | - | 851 | 851 |
| **Total comprehensive income for the year** | **4,655** | **48,218** | **1,965** | **309** | **851** | **55,998** |
| **Balance at 30 June 2011** | **134,457** | **138,752** | **16,788** | **16,182** | **38,812** | **344,991** |
| Surplus for the year | 4,616 | 24,157 | 291 | 100 | - | 29,164 |
| Other comprehensive income for the year | - | - | - | - | (9,726) | (9,726) |
| **Total comprehensive income for the year** | **4,616** | **24,157** | **291** | **100** | **(9,726)** | **19,438** |
| **Balance at 30 June 2012** | **139,073** | **162,909** | **17,079** | **16,282** | **29,086** | **364,429** |

The financial statements are to be read in conjunction with the notes to and forming part of the financial statements.

## Notes to the annual accounts 2011-2012

### 1. Statement of significant accounting policies

The Walter and Eliza Hall Institute of Medical Research ('the institute') is incorporated in Victoria as a company limited by guarantee. The institute has 170 members and the guarantee is limited to two dollars per member. The financial report is a general purpose financial report prepared in accordance with the *Corporations Act 2001*, Accounting Standards and complies with other requirements of the law. Accounting Standards include Australian equivalents to International Financial Reporting Standards (A-IFRS). The institute is exempt from taxation. The institute is a not-for-profit entity.

The financial statements were authorised for issue by the directors on 13 September 2012.

The financial report has been prepared on the basis of historical cost except for the revaluation of certain non-current assets and financial instruments. Cost is based on the fair values of the consideration given in exchange for assets.

The institute is a company of the kind referred to in ASIC Class Order 98/0100, dated 10 July 1998, and in accordance with that Class Order amounts in the financial report are rounded off the nearest thousand dollars, unless otherwise indicated.

Accounting policies are selected and applied in a manner which ensures that the resulting financial information satisfies the concepts of relevance and reliability, thereby ensuring that the substance of the underlying transactions or other events is reported.

The following significant accounting policies have been adopted in the preparation and presentation of the financial report:

**(a) Property, plant and equipment**

Property, plant and equipment held for use in research, or for administrative purposes, are stated in the statement of financial position at cost, less any subsequent accumulated depreciation.

Depreciation is provided on property, plant and equipment including freehold buildings. Depreciation is calculated on a straight-line basis so as to write off the net cost of each asset over its expected useful life. Leasehold improvements are depreciated over the period of the lease or the estimated useful life, whichever is shorter, using the straight-line method.

A regular review of useful lives, depreciation rates and residual values is conducted at each year end, with the effect of any changes in estimate accounted for on a prospective basis.

The following estimated useful lives are used in the calculation of depreciation: buildings (20 to 40 years); plant and equipment (5 to 20 years); and furniture and fittings (5 to 15 years).

Land leased at Parkville is recognised as part of Property, Plant and Equipment at fair value. Subsequent measurement will be under the cost method, whereby the asset will not be revalued.

**(b) Acquisition of assets**

Assets acquired are recorded at the cost of acquisition, being the purchase consideration determined as at the date of acquisition plus costs incidental to the acquisition. Items of property, plant and equipment are recorded at cost less accumulated depreciation, with the exception of land which is not depreciated.

**(c) Source of capital funds**

(i) The institute is a company limited by guarantee and as such has no issued capital. General Funds consist of the net accumulation of surpluses and deficits of prior years.

(ii) Permanent Invested Funds originate from gifts and bequests, the income from which is applied as stipulated by the donor, or to general research where there is no specific stipulation. These gifts and bequests are appropriated to Funds in the statement of financial position.

(iii) The Royalty Fund consists of the balance of royalties received in respect of patented inventions and not expended.

(iv) The Leadership Fund consists of donations and income earned thereon. The Leadership Fund was established in honour of Professors Gustav Nossal, Donald Metcalf and Jacques Miller to provide named fellowships to nurture the development of outstanding young scientists with the potential to be future leaders of biomedical research.

(v) The Investment Revaluation Reserve consists of gains and losses recognised through movement in the fair value of Investments and other financial assets.

**(d) Income recognition**

**Grants**

Revenue from grants is recognised when the company is entitled to receive the grant. However, reciprocal grants received or receivable for specific projects during the year but unspent at the end of the financial year, are carried forward to the next financial year.

**Sale of goods and disposal of assets**

Revenue from the sale of goods and disposal of assets is recognised when goods are delivered and legal title has passed.

**Rendering of services**

Revenue from a contract to provide services is recognised by reference to the stage of completion of the contract.

**Royalties**

Royalty income is recognised when received.

**Contributions of assets**

Revenue arising from the contribution of assets is recognised when the company gains control of the contribution.

**Donations and Bequests**

Donation and bequest income is disclosed as part of revenue for research activities, except for, where stipulated by the donor or bequestor, certain amounts are treated as capitalised donations and bequests and appropriated to Permanent Funds.

**(e) Investments and other financial assets**

All investments are initially recognised at fair value plus transaction costs. After initial recognition, investments are measured at fair value. Gains or losses on investments held are recognised in the Investment Revaluation Reserve. For assets that are actively traded in organised financial markets, fair value is determined by reference to the Stock Exchange quoted market bid prices at the close of business on balance date.

(i) Available-for-sale financial assets

Shares and other investments held by the company are classified as being available-for-sale and are stated at fair value. Fair value is determined in the manner described in note 20. Gains and losses arising from changes in fair value are recognised directly in the investment revaluation reserve with the exception of impairment losses which are recognised directly in profit or loss. Where the investment is disposed of or is determined to be impaired, the cumulative gain or loss previously recognised in investments revaluation reserve is included in profit or loss for the period.

(ii) Impairment of financial assets

Financial assets, other than those at fair value through profit or loss, are assessed for indicators of impairment at each balance sheet date. Financial assets are impaired where there is objective evidence that as a result of one or more events that occurred after initial recognition of the financial asset the estimated future cash flows of the investment have been impacted. Financial assets held below cost, by 20% or more, or for greater than 12 months are considered impaired and adjusted through profit and loss.

(iii) Bills of exchange are recorded at amortised cost, with revenue recognised on an accruals basis.

(iv) Dividend revenue is recognised on a receivable basis. Interest revenue is recognised on a time proportionate basis that takes into account the effective yield on the financial asset.

**(f) Cash and cash equivalents**

Cash comprises cash on hand and demand deposits. Cash equivalents are short-term, highly liquid investments that are readily convertible to known amounts of cash, which are subject to an insignificant risk of changes in value and have a maturity of six months or less at the date of acquisition.

**(g) Accounts payable**

Trade payables and other accounts payable are recognised when the company becomes obliged to make future payments resulting from the purchase of goods and services.

**(h) Research costs**

Research costs are recognised as an expense when incurred, except to the extent that such costs, together with unamortised deferred costs in relation to that project, are expected, beyond any reasonable doubt, to be recoverable.

Grants received or receivable in relation to research costs, which are recognised as an expense during the current or previous periods, are recognised as revenue in net surplus or deficit.

(i) Goods and Services Tax (GST)

Revenues, expenses and assets are recognised net of the amount of GST except:

(i) where the amount of GST incurred is not recoverable from the taxation authority, it is recognised as part of the cost of acquisition of an asset or as part of an item of expense; or

(ii) for receivables and payables which are recognised inclusive of GST.

The net amount of GST recoverable from, or payable to, the taxation authority is included as part of receivables or payables. Cash flows are included in the statement of cash flows on a gross basis. The GST component of cash flows arising from investing and financing activities which is recoverable from, or payable to, the taxation authority is classified as operating cash flows.

(j) Employee benefits

Provision is made for benefits accruing to employees in respect of annual leave and long service leave, when it is probable that settlement will be required and they are capable of being measured reliably.

Provisions made in respect to annual leave and long service leave expected to be settled within 12 months, are measured at their nominal values, using the remuneration rate expected to apply at the time of settlement.

Provisions made in respect to long service leave which are not expected to be settled within 12 months are measured as the present value of the estimated future cash outflows to be made by the company in respect of services provided by employees up to the reporting date.

**(k) Foreign currency**

All foreign currency transactions during the financial year are brought to account using the exchange rate in effect at the date of the transaction. Foreign currency monetary items at reporting date are translated at the exchange rate existing at that date. Exchange differences are recognised in the net surplus or deficit in the period in which they arise, except that exchange differences which relate to assets under construction for future productive use are included in the cost of those assets.

**(l) Leased assets**

Operating lease payments are recognised as an expense on a straight-line basis which reflects the pattern in which economic benefits from the leased asset are consumed.

**(m) Impairment of non-financial assets**

All non-financial assets are assessed annually for indications of impairment. If there is an indication of impairment, the assets concerned are tested as to whether their carrying value exceeds their possible recoverable amount. Where an asset's carrying value exceeds its recoverable amount, the difference is written-off as an expense. The recoverable amount for most assets is measured at the higher of value in use and fair value less costs to sell. Depreciated replacement cost is used to determine value in use. Depreciated replacement cost is the current replacement cost of an item of plant and equipment less, where applicable, accumulated depreciation to date, calculated on the basis of such cost.

**(n) Critical accounting judgements and key sources of estimation uncertainty**

In the application of the institute's accounting policies, which are described above, management may from time to time make judgements, estimates and assumptions about carrying values of assets and liabilities that may not be readily apparent from other sources. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances, the result of which form the basis of making the judgement.

**(o) Impact of revised standards**

In the current year, the institute has adopted all of the new and revised standards and interpretations issued by the Australian Accounting Standards Board (the AASB) that are relevant to its operations and effective for the current annual reporting period.

- AASB 2010-4 'Further Amendments to Australian Accounting Standards arising from the Annual Improvements Project'
- AASB 2010-5 'Amendments to Australian Accounting Standards'
- AASB 1054 'Australian Additional Disclosures'
- AASB 124 'Related Part Disclosures'

**(p) Standards and interpretations issued not yet effective**

At the date of authorisation of the financial report, the standards and interpretations that are relevant to the institute, listed below, were on issue but not yet effective.

Initial application of the following standard will not affect any of the amounts recognised in the financial report, but will change the disclosures presently made in relation to the company's financial report:

| Standard | Effective for annual reporting periods beginning on or after | Expected to be initially applied in the financial year ending |
|---|---|---|
| AASB 9 Financial Instruments, AASB 2009-11 Amendments to Australian Accounting Standards arising from AASB 9 | 1-Jan-13 | 30-Jun-14 |
| AASB 13 Fair Value Measurement | 1-Jan-13 | 30-Jun-14 |
| AASB 119 Employee Benefits | 1-Jan-13 | 30-Jun-14 |
| AASB 2011-9 Presentation of items of Other Comprehensive Income | 1-Jul-12 | 30-Jun-13 |
| AASB 2012-5 Amendments to Australian Accounting Standards arising from Annual Improvements 2009-2011 Cycle | 1-Jan-13 | 30-Jun-14 |

**(q) Comparative amounts**

Certain comparatives have been reclassified where appropriate.

| | 2012 $'000 | 2011 $'000 |
|---|---|---|
| **2. Other income** | | |
| Interest income attributable to building funds refer note 4(j) | 11,710 | 136 |
| Gain on sale of available-for-sale investments | 877 | 2,962 |
| Contribution Income for recognition of Land Lease | 12,782 | - |
| **Total other income** | **25,369** | **3,098** |
| **3. Capitalised donations, bequests and grants for capital works** | | |
| Capitalised bequests (invested to provide income for future research operations) | 3,461 | 1,566 |
| Australian Cancer Research Foundation | 2,000 | - |
| The Atlantic Philanthropies - western extension | - | 11,172 |
| Victorian Government Department of Business and Innovation - western extension | 9,090 | 39,910 |
| Australian Government Department of Health and Ageing - National Health and Medical Research Council | 817 | 77 |
| The Ian Potter Foundation | 1,000 | - |
| Harold and Cora Brennen Benevolent Trust | 40 | - |
| Drakensburg Trust | 300 | - |
| Joe White Bequest | 49 | 40 |
| **Total capitalised donations, bequests and grants for capital works** | **16,757** | **52,765** |

| | 2012 $'000 | 2011 $'000 |
|---|---|---|
| **4. Income analysis** | | |
| The following has been prepared in support of the items of income shown in the statement of comprehensive income. The institute ensures all grants are expended as stipulated. | | |
| **(a) Australian Government grants** | | |
| Department of Health and Ageing | | |
| National Health and Medical Research Council | | |
| – Research grants | 26,718 | 25,065 |
| – Research fellowships | 7,177 | 5,881 |
| – Infrastructure grant | 7,283 | 6,518 |
| – Postdoctoral fellowships and scholarships | 2,350 | 2,131 |
| **Total as per statement of comprehensive income** | **43,528** | **39,595** |
| **(b) Cooperative Research Centres** | | |
| CRC for Cancer Therapeutics | 1,593 | 1,440 |
| HEARing CRC | 606 | 745 |
| **Total as per statement of comprehensive income** | **2,199** | **2,185** |
| **(c) Other Australian Government grants** | | |
| Australia and New Zealand Breast Cancer Trials Group | - | 11 |
| Australian Phenomics Network | 796 | 1,180 |
| Australian Research Council | 412 | 293 |
| Australian Stem Cell Centre | 23 | 941 |
| Cancer Australia | - | 140 |
| CSIRO | 450 | - |
| Department of Innovation, Industry, Science and Research | - | 50 |
| OzEMalaR | 25 | - |
| **Total as per statement of comprehensive income** | **1,706** | **2,615** |
| **(d) Other Australian Government fellowships** | | |
| Australian Research Council | 2,529 | 1,578 |
| **Total as per statement of comprehensive income** | **2,529** | **1,578** |
| **(e) Victorian Government grants** | | |
| Department of Business and Innovation | | |
| – Operational Infrastructure Support program | 5,340 | 5,666 |
| Victorian Breast Cancer Research Consortium | 875 | 659 |
| Victorian Cancer Agency | 637 | 380 |
| Victorian Comprehensive Cancer Centre | 6 | - |
| Victorian Endowment for Science, Knowledge and Innovation fellowship | 111 | 62 |
| Victorian Life Sciences Computation Initiative | 17 | - |
| Victorian Neurotrauma Initiative | 88 | 75 |
| **Total as per statement of comprehensive income** | **7,074** | **6,842** |
| **(f) Foreign government grants and fellowships** | | |
| Canadian Institutes of Health Research postdoctoral fellowship | 41 | - |
| National Cancer Institute, US | 112 | 319 |
| National Institutes of Health, US | 210 | 181 |
| Swiss National Science Foundation fellowship, Switzerland | (3) | 57 |
| **Total as per statement of comprehensive income** | **359** | **557** |

| | 2012 $'000 | 2011 $'000 |
|---|---|---|
| **(g) Industrial grants and contracts** | | |
| Ancora Pharmaceuticals | - | 2 |
| BACE Therapeutics | - | 11 |
| Bayhill Therapeutics | 15 | 36 |
| Bionomics Ltd | 5 | 2 |
| CSL Ltd | 973 | 1,068 |
| Drugs for Neglected Diseases Initiative | 4 | 16 |
| GlaxoSmithKline | 28 | - |
| Merck Sharp & Dohme | 35 | 12 |
| NexPep Pty Ltd | - | 100 |
| Pfizer Global Pharmaceuticals | - | 154 |
| Miscellaneous | 54 | 445 |
| **Total as per statement of comprehensive income** | **1,114** | **1,846** |
| **(h) Philanthropic grants and fellowships – Australia** | | |
| Brought forward from previous year | 1,667 | 1,614 |
| Received and owing (net) | | |
| Anonymous grant | 25 | - |
| Hazel & Pip Appel Fund | 80 | 81 |
| Arthritis Foundation of Australia | 45 | 43 |
| Arthritis Foundation of Australia Allan and Beryl Stephens Fund | - | 20 |
| Australian Academy of Science (Ron Rickards Fellowship) | - | 12 |
| Australian Friends of The Hebrew University, Jerusalem Limited | 2 | - |
| Australian Kidney Foundation | 17 | - |
| Cancer Council Victoria | 513 | 324 |
| Centenary Institute | 12 | - |
| Coeliac Australia Project | 110 | - |
| Cure Cancer Australia | 133 | 90 |
| Diabetes Australia Research Trust | 88 | 30 |
| Diabetes Vaccine Development Centre | 56 | 101 |
| Thomas William Francis and Violet Coles Trust | 13 | 26 |
| Dr Eric Guiler Tasmanian Devil Research Grant | 27 | - |
| H & L Hecht Trust | 59 | - |
| Leukaemia Foundation of Australia | 619 | 529 |
| Leukaemia Foundation of Queensland | 40 | 40 |
| Lions Sponsored Cancer Research Fund | - | 10 |
| Ludwig Institute for Cancer Research | 1,154 | - |
| R. G. Menzies Fellowship | - | 5 |
| Harold Mitchell Foundation Fellowship | 10 | 10 |
| National Breast Cancer Foundation | 257 | 227 |
| National Heart Foundation Fellowship | 174 | 109 |
| Ophthalmic Research Institute of Australia Research Grant | 50 | - |
| Prostate Cancer Foundation of Australia | 31 | 31 |
| Ramaciotti Award | 32 | - |
| The Angior Family Foundation | 22 | - |
| The Jack Brockhoff Foundation | - | 25 |
| The William Buckland Foundation | 30 | 30 |
| The CASS Foundation | 32 | 105 |
| The Rebecca L. Cooper Medical Research Foundation | 61 | 11 |
| The Dyson Fellowship | 100 | 100 |

| | 2012 $'000 | 2011 $'000 |
|---|---|---|
| The Scobie & Claire MacKinnon Trust | 25 | - |
| The Royal Australasian College of Physicians Fellowship | 15 | - |
| The Royal College of Pathologists of Australasia | 10 | - |
| The Royal Melbourne Hospital - Department of Diabetes and Endocrinology | 10 | - |
| The Royal Melbourne Hospital Home Lottery Grant | - | 10 |
| The Harry Secombe Foundation | 100 | - |
| The Trust Company (The Woodend Foundation) | 50 | - |
| The Sylvia and Charles Viertel Charitable Foundation | 820 | 536 |
| Thomas Family Fund (Melbourne Community Foundation) | - | 10 |
| Fellowships and scholarships internal | 1,540 | 1,364 |
| Institutional allowances and miscellaneous adjustments | 57 | (26) |
| | **8,086** | **5,497** |
| Less: carried forward to next financial year | (2,801) | (1,667) |
| **Total as per statement of comprehensive income** | **5,285** | **3,830** |
| **(i) Philanthropic grants and fellowships – international** | | |
| Brought forward from previous year | 391 | 1,061 |
| American Australian Association (Keith Murdoch Fellowship) | 6 | 10 |
| Association for International Cancer Research | 80 | 87 |
| CONRAD, US | - | 70 |
| Human Frontier Science Program Organisation, France | 250 | - |
| Japan College of Rheumatology | 4 | - |
| Juvenile Diabetes Research Foundation, US | 194 | 467 |
| Kay Kendall Leukaemia Fund Fellowship, UK | 34 | - |
| Susan G. Komen for the Cure, US | - | 18 |
| Multiple Myeloma Research Foundation, US | 131 | 36 |
| PATH Malaria Vaccine Initiative, US | 485 | 286 |
| Papua New Guinea Institute of Medical Research, PNG | 265 | - |
| The Bill & Melinda Gates Foundation, US | 1,223 | 417 |
| The Leukemia & Lymphoma Society of America, US | - | 1,032 |
| The Publishing Group, US | 43 | - |
| The Lady Tata Memorial Trust, UK | 9 | 41 |
| The University of Alabama at Birmingham, US | 69 | - |
| The Wellcome Trust, UK | 95 | 53 |
| Institutional allowances and miscellaneous adjustments | (2) | 48 |
| | **3,277** | **3,626** |
| Less carried forward to next financial year | (1,097) | (391) |
| **Total as per statement of comprehensive income** | **2,180** | **3,235** |
| **(j) Investment income from investments received during the year, prior to adjustments for amounts carried forward:** | | |
| Recognised in surplus or deficit | | |
| Dividends and distributions income on available-for-sale financial assets | 7,510 | 12,405 |
| Interest income on available-for-sale financial assets | 5,460 | 5,367 |
| Amortisation of investment premiums | (150) | (172) |
| | **12,820** | **17,600** |
| Less transfer to grants and fellowships | (1,540) | (1,364) |
| **Total as per statement of comprehensive income** | **11,280** | **16,236** |
| Interest income from financial assets held at amortised cost attributable to Building funds | **11,710** | **136** |

| | 2012 $'000 | 2011 $'000 |
|---|---|---|
| **(k) Fellowships and scholarships** | | |
| Investment income was received during the year for specific fellowships and scholarships. The following fellowships and scholarships. include those supported by Permanent Invested Funds. This income is brought to account in the year of receipt and is shown below net of sums unexpended and carried forward. | | |
| The income concerned was: | | |
| From investment income: | | |
| Tim Bates Memorial Diabetes Research Fund | 5 | 4 |
| E M Carty Fund | 14 | 13 |
| Gideon Goldstein Lectureship | 45 | 43 |
| Dr Ian Mackay Fellowship Fund | 17 | 15 |
| Gordon Clunes Mathison Fund | 7 | 6 |
| Paddy Pearl Fund | 7 | 5 |
| John T Reid Charitable Trusts | 414 | 385 |
| Lyndal & Jean Skea Leukaemia Fund | 36 | 32 |
| The Alcoa of Australia Fellowship | 27 | 20 |
| The Macfarlane Burnet Award | 6 | 6 |
| The Leadership Fund | 1,003 | 969 |
| The Edith Moffatt Scholarship Fund | 132 | 122 |
| The Colin Syme Fellowship Fund | 113 | 101 |
| The Edward Wilson Memorial Fellowship | 89 | 80 |
| | **1,915** | **1,801** |
| Less Included in appropriation to permanent funds | (375) | (437) |
| **Total expended during year** | **1,540** | **1,364** |

## 5. Operating expenses

The following items of expense are included in the net surplus.

| | | |
|---|---|---|
| **Remuneration of auditors** | | |
| Auditing the financial report: $56,000 (2011: $56,000) | 56 | 56 |
| Other regulatory audit services: $8,990 (2011: $6,006) | 6 | 6 |
| **Employee entitlement expense** | | |
| Long service leave | 1,682 | 1,355 |
| Annual leave | 752 | 1,062 |
| **Depreciation** | | |
| Depreciation of non-current property, plant and equipment | 5,681 | 6,375 |
| **Operating lease** | | |
| Operating lease expense | 32 | 199 |

## 6. Directors' remuneration

The directors of the Walter and Eliza Hall Institute of Medical Research during the year were:

| | | | |
|---|---|---|---|
| LA Davis | J Angus | J McCluskey | CW Thomas |
| SM Skala | MC Fitzpatrick | LB Nicholls | CM Walter |
| RE Male | GF Mitchell | CJ Redwood | IM Winship |

The aggregate income paid or payable, or otherwise made available, in respect of the financial year, to all directors of the company, directly or indirectly, by the company or by any related party was nil (2011: nil).

Aggregate retirement benefits paid to all directors of the company, by the company or by any related party was nil (2011: nil).

| | 2012 $'000 | 2011 $'000 |
|---|---|---|
| **7. Current assets** | | |
| **(a) Current tax assets** | | |
| Franking credits receivable | 1,936 | 3,580 |
| GST Refundable | 181 | - |
| | **2,117** | **3,580** |
| **(b) Current receivables at amortised cost** | | |
| Sundry debtors and prepayments* | 3,829 | 2,535 |
| Grants receivable | 7,066 | 8,103 |
| Accrued income | 909 | 916 |
| *Terms of payment are 30 days | **11,804** | **11,554** |
| **(c) Other current financial assets at amortised cost** | | |
| Bills of exchange | **17,000** | **26,000** |
| **8. Other non-current financial assets** | | |
| Non-quoted available-for-sale Investments at fair value | | |
| Fixed interest securities | 27,882 | 35,020 |
| Shares | 213 | 264 |
| Quoted available-for-sale investments at fair value | | |
| Shares | 113,879 | 113,610 |
| Unit trusts | 862 | 955 |
| Perpetual floating rate securities | 14,879 | 5,273 |
| | **157,716** | **155,122** |

**(a) Fair value measurements recognised in the statement of financial position**

The following table provides an analysis of financial instruments that are measured subsequent to initial recognition at fair value, grouped into levels 1 to 3 based on

- Level 1 fair value measurements are those derived from quoted prices (unadjusted) in active markets for identical assets or liabilities.

- Level 2 fair value measurements are those derived from inputs other than those quoted prices included within level 1 that are observable for the asset, either directly (i.e. as prices) or indirectly (i.e. derived from prices)

- Level 3 fair value measurements are those derived from valuation techniques that include inputs for the asset that are not based on observable market data

| | Level 1 | Level 2 | Level 3 | 30/06/12 Total |
|---|---|---|---|---|
| Available for sale financial assets | $'000 | $'000 | $'000 | $'000 |
| Quoted shares | 113,880 | - | - | 113,880 |
| Fixed interest securities | - | 27,882 | - | 27,882 |
| Perpetual floating rate securities | - | 14,879 | - | 14,879 |
| Unit trusts | - | 862 | - | 862 |
| Unquoted shares | - | - | 213 | 213 |
| **Total** | **113,880** | **43,623** | **213** | **157,716** |

| | 2012 $'000 | 2011 $'000 |
|---|---|---|

**(b) Reconciliation of level 3 fair value measurements of financial assets**

| | Available-for -sale unquoted equities | Total |
|---|---|---|
| | **2012** | **2011** |
| | $'000 | $'000 |
| Opening balance | 264 | 239 |
| Purchases | - | 25 |
| Transfers out of level 3 | (14) | - |
| Revaluation | (37) | - |
| **Closing balance** | **213** | **264** |

## 9. Employee benefits

The aggregate employee benefit liability recognised and included in the financial statements is as follows:

| | | |
|---|---|---|
| Current | 8,222 | 7,756 |
| Non-current | 7,676 | 6,487 |
| | **15,898** | **14,243** |

Prepaid wages and salaries are included in the current receivables balance.

Number of employees at end of financial year (full time equivalents)

| | 2012 | 2011 |
|---|---|---|
| Staff | 597 | 569 |
| Visiting scientists | 10 | 16 |
| | **607** | **585** |

## 10. Unearned grants and fellowships

Grants and fellowships already committed and applicable to future periods:

| | | |
|---|---|---|
| Grants | 9,742 | 8,356 |
| Fellowships | 3,422 | 3,442 |
| | **13,164** | **11,798** |

## 11. Operating leases

Operating leases relate to research facilities with lease terms of between 5 to 99 years, with an option to extend. All operating lease contracts contain market review clauses in the event that the company exercises its option to renew. The company does not have an option to purchase the leased asset at the expiry of the lease period. The operating leases are prepaid.

Non-cancellable operating leases

| | | |
|---|---|---|
| Not longer than 1 year | 32 | 32 |
| Longer than 1 year and not longer than 5 years | 128 | 128 |
| Longer than 5 years | 2,624 | 2,656 |
| | **2,784** | **2,816** |

## 12. Capital movements

**(a) The net surplus for the financial year is $29,164 (2011 - $55,147)**

| This has been appropriated as follows: | NOTES | | |
|---|---|---|---|
| Transfer to Permanent Invested Funds | 12(b) | 4,616 | 4,655 |
| Transfer to General Funds | 12(c) | 24,157 | 48,218 |
| Transfer to Royalty Fund | 12(d) | 291 | 1,965 |
| Transfer to Leadership Fund | 12(e) | 100 | 309 |
| **Total appropriations to funds** | | **29,164** | **55,147** |

| | 2012 $'000 | 2011 $'000 |
|---|---|---|
| **(b) Permanent Invested Funds** | | |
| Balance at beginning of year | 134,457 | 129,802 |
| Surplus for year transferred from statement of comprehensive income | 4,616 | 4,655 |
| **Total Permanent Invested Funds** | **139,073** | **134,457** |
| **(c) General Funds** | | |
| Balance at beginning of year | 138,752 | 90,534 |
| Surplus for year transferred from statement of comprehensive income | 24,157 | 48,218 |
| **Total General Funds** | **162,909** | **138,752** |
| **(d) Royalty Fund** | | |
| Balance at beginning of year | 16,788 | 14,823 |
| Surplus for year transferred from statement of comprehensive income | 291 | 1,965 |
| **Total Royalty Fund** | **17,079** | **16,788** |
| **(e) Leadership Fund** | | |
| Balance at beginning of year | 16,182 | 15,873 |
| Surplus for year transferred from statement of comprehensive income | 100 | 309 |
| **Total Leadership Fund** | **16,282** | **16,182** |
| **(f) Investment revaluation reserve** | | |
| Balance at beginning of year | 38,812 | 37,961 |
| Valuation gain/(loss) recognised for the year | (10,905) | 4,850 |
| Transfers to gain or loss on sale of investment | (1,154) | (6,944) |
| Transfers due to loss on impairment | 2,333 | 2,945 |
| **Total investment revaluation reserve** | **29,086** | **38,812** |
| **Total funds** | **364,429** | **344,991** |

## 13. Joint projects

At 30 June 2012, the institute was no longer committed to a project with the Ludwig Institute for Cancer Research for the joint operation of the Joint Protein Structure Laboratory. This ceased at 30 June 2011.

| | | |
|---|---|---|
| Expenditure for the year ended 30 June | | |
| Salaries | - | 139 |
| Equipment | - | 232 |
| Consumables and other | - | 81 |
| | **-** | **452** |

These amounts are included in provision of scientific services and represent the institute's half share in this project. Total liability on this project amounted to zero at 30 June 2012 (2011 – $12,346) which is included in Trade Payables. There are no contingent liabilities associated with this project.

## 14. Economic dependency

The company is reliant upon grants from the Australian Government National Health and Medical Research Council for 48.9% of operating expenditure (2011 - 49.9%) and the Victorian Government Department of Business and Innovation for 6% of operating expenditure (2011 - 7.2%) for support of its basic research activities.

## 15. Segment information

The company operates predominantly in medical research in Australia.

## 16. Capital expenditure commitments

| | | |
|---|---|---|
| Not longer than 1 year | 6,933 | 42,097 |
| After 1 year but not more than 5 years | - | 8,911 |
| **Total commitments** | **6,933** | **51,008** |

refer note 22 building project

| | 2012 $'000 | 2011 $'000 |
|---|---|---|
| **17. Notes to statement of cash flows** | | |
| **(a) Reconciliation of cash** | | |
| For the purposes of the statement of cash flows, cash includes cash on hand, cash at bank and investments in money market instruments, net of outstanding bank overdrafts. | | |
| Cash at the end of the financial year as shown in the statement of cash flows is reconciled to the related items in the statement of financial position as follows: | | |
| Cash | 441 | 238 |
| Deposits at call | 14,553 | 23,638 |
| | **14,994** | **23,876** |
| **(b) Reconciliation of net surplus to net cash flows from operating activities** | | |
| Net surplus | 29,164 | 55,147 |
| Depreciation | 5,681 | 6,375 |
| Contribution Income | (12,782) | - |
| Loss on Disposal of Property Plant and Equipment | 131 | - |
| Donations and bequests | (3,363) | (1,566) |
| Gain on sale of available-for-sale financial assets | (877) | (2,962) |
| Write down of available-for-sale investments | 2,333 | 2,945 |
| Increase in Investments – dividend reinvestment plans | (1,557) | (1,737) |
| Grants and donations for capital works | (25,006) | (37,719) |
| Amortisation of investment premiums | 149 | 545 |
| Donated Financial Assets | (98) | |
| **Changes in net assets and liabilities:** | | |
| **(Increase)/decrease in assets:** | | |
| Tax assets | 1,463 | (1,973) |
| Sundry debtors and prepayments | (197) | (1,243) |
| Income receivable | (53) | 327 |
| Other – prepaid operating lease | 32 | 199 |
| **Increase/(decrease) in liabilities:** | | |
| Trade payables | (1,270) | (7,749) |
| Current provisions | 466 | 765 |
| Other current liabilities(Grants) | 1,367 | (13,169) |
| Non-current provisions | 1,189 | 838 |
| **Net cash from operating activities** | **(3,228)** | **(977)** |
| **(c) Non-cash financing and investing activities** | | |
| During the financial year: | | |
| Dividends of $1,567,000 (2011-$1,737,000) were reinvested as part of dividend and distribution reinvestment plans. | | |
| Shares of $98,000 (2011-nil) were donated to the institute during the year | | |
| **18. Key management personnel compensation** | | |
| The aggregate compensation of the key management personnel of the institute is set out below: | | |
| Short-term employee benefits | 1,141,675 | 1,076,609 |
| Post-employment benefits | 201,345 | 174,887 |
| | **1,343,020** | **1,251,496** |

| | 2012 $'000 | 2011 $'000 |
|---|---|---|

## 19. Superannuation commitments

**(a) Institute employees are members of a range of superannuation funds, which are divided into the following categories:**

Those operative and open to membership by new employees:

UniSuper – Accumulation Super (1)

Other superannuation funds chosen by employees.

Those closed to future membership by institute employees:

UniSuper – Defined Benefit Division

UniSuper – Accumulation Super (2)

**(b) UniSuper plans**

UniSuper is a multi employer superannuation fund operated by UniSuper Limited as the corporate trustee and administrated by UniSuper Management Pty Ltd, a wholly owned subsidiary of UniSuper Limited. The operations of UniSuper are regulated by the *Superannuation Industry (Supervision) Act 1993*.

(i) The UniSuper schemes known as the Defined Benefit Division or Accumulation Super (2) were only available to contributing members of the Walter and Eliza Hall Institute of Medical Research Superannuation Fund (1979) which closed in 2003.

(ii) The maximum contribution rate to the schemes is 21% of member's salary of which the member contributes 7% and the institute 14%.

(iii) UniSuper has advised that the Accumulation Super (2) and Defined Benefit Division plans are defined as multi-employer defined contribution schemes in accordance with AASB 119 Employee Benefits. AASB 119 Employee Benefits states that this is appropriate for a defined benefit plan where the employer does not have access to the information required and there is no reliable basis for allocating the benefits, liabilities, assets and costs between employers.

(iv) The number of members of the Walter and Eliza Hall Institute of Medical Research Superannuation Fund (1979) who became members of the UniSuper – Defined Benefit Division when the fund closed in 2003 was 204. The number of institute employees who are members of the Defined Benefit Division as at 30 June 2012 was 121 (2011 – 126).

(v) New employees who commenced after 1 July 2003 have a minimum contribution 9% of their annual salary contributed by the institute to accumulation super (1) or to a fund of their choice prescribed under the *Superannuation Guarantee Charge Act (1992)*.

**(c) The total superannuation contributions by the institute during the year in respect to the above plans were:**

| | | |
|---|---|---|
| UniSuper – Defined Benefit Division | 1,856 | 1,831 |
| UniSuper – Accumulation Super (2) | 400 | 392 |
| UniSuper – Accumulation Super (1) | 3,890 | 3,485 |
| Other superannuation funds | 122 | 97 |
| **Total** | **6,268** | **5,805** |

## 20. Financial instruments

**(a) Significant accounting policies**

Details of the significant accounting policies and methods adopted, including the criteria for recognition, the basis of measurement and the basis on which revenues and expenses are recognised, in respect of each class of financial asset, financial liability and equity instruments are disclosed in note 1 to the financial statements.

**(b) Significant terms, conditions and objectives of derivative financial instruments**

The company does not enter into or trade derivative financial instruments.

**(c) Capital risk management**

The company manages its capital to ensure it will be able to continue as a going concern whilst maximising its return on investment within the risk profile maintained by the company. The capital structure consists of permanent funds, retained earnings and reserves.

**(d) Financial risk management**

The company minimises financial risk through the charter given to the investment committee. In line with this charter, the company invests short term funds in a appropriate combination of fixed and floating instruments.

**(e) Interest rate risk management**

The company is exposed to interest rate risk as it invests funds at both fixed and floating interest rates. The majority of financial assets in this class are bank accounts, bank bills and fixed interest securities with varying interest rates.

**(f) Interest rate sensitivity analysis**

The sensitivity analysis below has been determined based on the exposure to interest rates at the reporting date and the stipulated change taking place at the beginning of the financial year and held constant throughout the reporting period. A 25 basis point decrease was used as the minimum point and 100 basis point decrease as the maximum point. This consistent with the management's view of interest rate sensitivity. A net decrease in interest rates translates into a fall in net surplus as investment income is reduced. The investment revaluation reserve would increase mainly as a result the changes in the fair value of available-for-sale fixed rate instruments.

| **Interest rate risk** | **Minimum 25bp** | | **Maximum 100bp** | |
|---|---|---|---|---|
| | **2012** | **2011** | **2012** | **2011** |
| | **$000's** | **$000's** | **$000's** | **$000's** |
| Effect on surplus | 106 | 138 | 422 | 551 |
| Effect on reserve | 64 | 81 | 255 | 320 |

**(g) Equity price sensitivity analysis**

The sensitivity analysis below has been determined based on the exposure to equity price risks at the reporting date.

At reporting date, if the equity prices had been 5% higher or lower:

- net surplus for the year ended 30 June 2012 would have been unaffected as the equity investments are classified as available-for-sale; and

- investment revaluation reserve would decrease/increase by $5.7 million (2011: $5.7 million) mainly as a result of the changes in fair value of available-for-sale shares.

The company's sensitivity to equity prices has not changed significantly from the prior year.

**(h) Credit risk management**

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in a financial loss to the company. The company has adopted a policy of only dealing with creditworthy counter parties as a means of mitigating the risk of financial loss from defaults. The company's exposure is continuously monitored and reviewed. Trade receivables consist of a large number of customers including granting bodies. The company does not have a significant credit exposure to any single party or any group of counter parties having similar characteristics. The carrying amount of financial assets recorded in the financial statements represents the company's maximum exposure to credit risk.

**(i) Liquidity risk management**

Ultimate responsibility for liquidity risk management rests with the board of directors, who have built an appropriate risk management framework for the management of the company's short, medium and long-term funding and liquidity management. The company manages the liquidity risk by maintaining adequate cash reserves, and by continuously monitoring forecast and actual cash flows while matching the maturity profiles of financial assets. Given the current surplus cash assets, liquidity risk is minimal. The company does not have any interest bearing liabilities. The remaining contractual maturity for its non-interest-bearing financial liabilities is $6,322 thousand payable within 3 months of 30 June 2012 (2011: $7,592 thousand).

**(j) Fair value**

The carrying amount of the institute's financial assets and financial liabilities recorded in the financial statements approximates their fair values. The fair value of financial assets and financial liabilities with standard terms and conditions and traded on active liquid markets are determined with reference to quoted market prices.

**(k) Interest rate risk**

The following table details the Institute's exposure to interest rate risk as at 30 June 2011 and 30 June 2012.

| | Average interest rate | Variable interest rate | Less than 1 year | 1 to 5 years | More than 5 years | Non-Interest Bearing | TOTAL |
|---|---|---|---|---|---|---|---|
| 30-Jun-12 | | $'000 | $'000 | $'000 | $'000 | $'000 | $'000 |
| **Financial assets** | | | | | | | |
| Cash | 3.22% | 14,553 | - | - | - | | 14,553 |
| Tax assets | | - | - | - | - | 2,117 | 2,117 |
| Sundry debtors and prepayments | | - | - | - | - | 3,829 | 3,829 |
| Accrued income | | - | - | - | - | 909 | 909 |
| Bills of exchange | 4.77% | - | 17,000 | - | - | - | 17,000 |
| Fixed interest securities | 8.21% | - | 1,887 | 140 | 262 | - | 2,289 |
| Shares | | - | - | - | - | 113,879 | 113,879 |
| Unit trusts | | - | - | - | - | 862 | 862 |
| Perpetual floating rate securities | 6.86% | - | - | 10,261 | - | - | 10,261 |
| | | **14,553** | **18,887** | **10,401** | **262** | **121,596** | **165,699** |
| **Financial liabilities** | | | | | | | |
| Trade payables* | | - | - | - | - | 6,322 | 6,322 |
| Grants carried forward | | - | - | - | - | 13,164 | 13,164 |
| | | **-** | **-** | **-** | **-** | **19,486** | **19,486** |
| **30-Jun-11** | | $'000 | $'000 | $'000 | $'000 | $'000 | $'000 |
| **Financial assets** | | | | | | | |
| Cash | 3.54% | 23,876 | - | - | - | | 23,876 |
| Tax assets | | - | - | - | - | 4,887 | 4,887 |
| Sundry debtors and prepayments | | - | - | - | - | 2,535 | 2,535 |
| Accrued income | | - | - | - | - | 916 | 916 |
| Bills of exchange | 5.86% | - | 26,000 | - | - | - | 26,000 |
| Fixed interest securities | 8.40% | - | 2,930 | 32,090 | - | - | 35,020 |
| Shares | | - | - | - | - | 113,610 | 113,610 |
| Unit trusts | | - | - | - | - | 955 | 955 |
| Perpetual floating rate securities | 7.23% | - | - | 5,273 | - | - | 5,273 |
| | | **23,876** | **28,930** | **37,363** | **-** | **122,903** | **213,072** |
| **Financial liabilities** | | | | | | | |
| Trade payables* | | - | - | - | - | 7,592 | 7,592 |
| Grants carried forward | | - | - | - | - | 11,798 | 11,798 |
| | | **-** | **-** | **-** | **-** | **19,390** | **19,390** |

*payment terms 30 days

## 21. Property, plant and equipment

| | Buildings | Work in progress | Plant and equipment | Furniture and fittings | Land Lease | Total |
|---|---|---|---|---|---|---|
| | $'000 | $'000 | $'000 | $'000 | $'000 | $'000 |
| **Gross carrying amount** | | | | | | |
| Balance at 30 June 2010 | 20,238 | 86,114 | 31,005 | 1,418 | - | 138,775 |
| Additions at cost | - | 49,354 | 4,033 | 192 | - | 53,579 |
| Transfers | 115,595 | (115,595) | - | - | - | - |
| Disposals | - | - | (1,494) | - | - | (1,494) |
| **Balance at 30 June 2011** | **135,833** | **19,873** | **33,544** | **1,610** | **-** | **190,860** |
| Additions at cost | - | 30,566 | - | - | 12,782 | 43,348 |
| Transfers | 41,016 | (47,348) | 2,914 | - | 3,418 | - |
| Disposals | (152) | - | (1,145) | - | - | (1,297) |
| **Balance at 30 June 2012** | **176,697** | **3,091** | **35,313** | **1,610** | **16,200** | **232,911** |
| **Accumulated depreciation** | | | | | | |
| Balance at 30 June 2010 | (8,239) | - | (20,826) | (1,183) | - | (30,248) |
| Disposals | - | - | 1,438 | - | - | 1,438 |
| Depreciation expense | (3,767) | - | (2,527) | (81) | - | (6,375) |
| **Balance at 30 June 2011** | **(12,006)** | **-** | **(21,915)** | **(1,264)** | **-** | **(35,185)** |
| Disposals | 55 | - | 1,114 | 184 | - | 1,353 |
| Depreciation expense | (2,910) | - | (2,661) | (110) | - | (5,681) |
| **Balance at 30 June 2012** | **(14,861)** | **-** | **(23,462)** | **(1,190)** | **-** | **(39,513)** |
| **Carrying amounts** | | | | | | |
| **As at 30 June 2011** | **123,827** | **19,873** | **11,629** | **346** | **-** | **155,675** |
| **As at 30 June 2012** | **161,836** | **3,091** | **11,851** | **420** | **16,200** | **193,398** |

*$133.3M of building project works was funded from building grants and the balance from interest earned thereon and institute funds – refer note 22.

An independent valuation of the land leased at Parkville was completed in May 2012. Land leased was valued by Mr Peter Volakos AAPI of the firm Colliers International. The valuation was based on an adopted market value.

Aggregate depreciation allocated, whether recognised as an expense or capitalised as part of the carrying amount of other assets during the year:

| | 2012 | 2011 |
|---|---|---|
| | $'000 | $'000 |
| Buildings | 2,910 | 3,767 |
| Plant and equipment | 2,661 | 2,527 |
| Furniture and fittings | 110 | 81 |
| **Total depreciation** | **5,681** | **6,375** |

## 22. Building project

The institute was committed to expansion of its Parkville facilities and funding totalling $130 million was secured from three parties, the Australian Government, the Victorian Government and The Atlantic Philanthropies. A further three grants were obtained to substantially complete the project this financial year. Amounts expended to date are shown in note 21 as Property, Plant & Equipment. The following table indicates amounts that have been received and expended up to the financial years ended on 30 June.

| | 2012 | 2011 |
|---|---|---|
| | $000's | $000's |
| Australian Government | 50,000 | 50,000 |
| The Atlantic Philanthropies | 30,000 | 30,000 |
| Victorian Government | 50,000 | 50,000 |
| Australian Cancer Research Foundation | 2,000 | - |
| The Ian Potter Foundation | 1,000 | - |
| Drakensburg Trust | 300 | - |
| **TOTAL** | **133,300** | **130,000** |
| | | |
| Expended on building project | (133,300) | (120,910) |
| Transferred to Walter and Eliza Hall Institute project facility trust | (49,000) | (49,000) |
| Transferred from Walter and Eliza Hall Institute project facility trust | 49,000 | 39,910 |
| **Funds held on deposit** | **-** | **-** |

(included in deposits at call note 17(a))

The financial impacts of the transactions on the institute have been disclosed in the statement of cash flows and in note 10 grants committed to future periods.

During 2006 the 'Walter and Eliza Hall Institute project facility trust' was established to hold funds granted from the Victorian Government for the expansion of Parkville facilities. $49 million has been transferred to this trust from amounts received to date. At 30 June 2012 $49 million has been returned for expenditure on the building project (30 June 2011 $37.7 milliion).

Interest earned on building funds refer note 4(j)

## Governance statement:

The Walter and Eliza Hall Institute of Medical Research is a public company limited by guarantee. Ultimate responsibility for the governance of the company rests with the board of directors. This governance statement outlines how the board meets that responsibility.

**Achieving the mission:**

The board's primary role is to ensure that the institute's activities are directed towards achieving its mission of 'Mastery of Disease through Discovery'. The board must ensure that this mission is achieved in the most efficient and effective way.

Specific responsibilities of the board:

The board fulfils its primary role by:

- selecting, appointing, guiding and monitoring the performance of the chief executive;
- formulating the institute's strategic plan in conjunction with the chief executive and senior management;
- approving operating and capital budgets formulated by the chief executive and management;
- monitoring management's progress in achieving the strategic plan;
- monitoring management's adherence to operating and capital budgets;
- ensuring the integrity of internal control, risk management and management information systems;
- ensuring stakeholders receive regular reports, including financial reports;
- ensuring the company complies with relevant legislation and regulations; and
- acting as an advocate for the institute whenever and wherever possible.

**Management's responsibility:**

The Board has formally delegated responsibility for the institute's day-to-day operations and administration to the chief executive and executive management.

Board oversight:

The board oversees and monitors management's performance by:

- meeting at least four times during the year;
- receiving detailed financial and other reports from management at these meetings;
- receiving additional information and input from management when necessary; and
- assigning to the Audit and Risk, Commercialisation, Investment and Remuneration committees of the board responsibility to oversee particular aspects of the institute's operations and administration.

Each board committee operates under a charter approved by the board. These charters are reviewed annually and updated as necessary.

**Board members:**

All board members are non-executive directors and receive no remuneration for their services. The company's constitution specifies:

- there must be no less than 12 and no more than 18 directors;
- directors (except those appointed by The University of Melbourne) are appointed for a maximum of four terms of three years each, after which directors may be reappointed annually with the unanimous agreement of all other board members; and
- the president or vice president may hold office for an additional period or periods not exceeding six years.

Appointments to the board are made to ensure the board has the right mix of skills, experience and expertise. Board members are appointed by the company's founding members, The University of Melbourne and The Royal Melbourne Hospital (Melbourne Health) – two each and up to a further 14 by the board.

Board and committee members receive written advice of the terms and conditions of their appointment. Board and committee members' knowledge of the business is maintained by visits to the institute's operations and management presentations.

The performance of individual board and committee members and the board and board committees is assessed annually.

**Risk management:**

The board oversees the institute's risk management system, which is designed to protect the organisation's reputation and manage those risks that might preclude it from achieving its goals.

Management is responsible for establishing and implementing the risk management system, which assesses, monitors and manages operational, financial reporting and compliance risks. The Audit and Risk Committee is responsible for monitoring the effectiveness of the risk management system between annual reviews.

**Ethical standards and code of conduct:**

Board members, senior executives and staff are expected to comply with relevant laws and the codes of conduct of relevant professional bodies, and to act with integrity, compassion, fairness and honesty at all times when dealing with colleagues, and others who are stakeholders in our mission.

**Involving stakeholders:**

The institute has many stakeholders, including our donors and benefactors, our staff, and students, the broader community, the government agencies who provide us funds and regulate our operations, and our suppliers.

We adopt a consultative approach in dealing with our stakeholders. We get involved in industry forums to ensure governments at all levels are aware of our concerns and our achievements and to remain abreast of industry developments.

**Indemnification and insurance:**

The institute insures directors (and the company secretary and executives) against liabilities for costs and expenses incurred by them in defending any legal proceedings arising out of their conduct while acting in the capacity of director (or company secretary or executive) of the company, other than conduct involving a wilful breach of duty in relation to the company.

## Directors' report

The directors of the Walter and Eliza Hall Institute of Medical Research submit herewith the annual financial report of the company for the year ended 30 June 2012. In order to comply with the provisions of the *Corporations Act 2001*, the directors report as follows:

Directors and board meetings

The names and particulars of the directors of the company during or since the end of the financial year and attendance at board meetings in the year to 30 June 2012 are:

| | | Joined Board | Age | Meetings held while a Director | Meetings Attended |
|---|---|---|---|---|---|
| **Leonard A Davis**<br>*Chairman and President of the Institute* | AO Dip Prim Metallurgy *SAIT* Hon DSc *Curtin* Hons DSc *Qld* Hon DUniv *UniSA* FRACI FAIMM | 2001 | 72 | 5 | 4 |
| **Steven M Skala**<br>*Vice President of the Institute* | AO BA LLB(Hons) *Qld* BCL *Oxon* | 1999 | 56 | 5 | 3 |
| **Roger E Male**<br>*Honorary Treasurer* | LLB Adelaide DipAcctg *Swinburne* | 1998 | 69 | 5 | 5 |
| **James A Angus** | AO BSc PhD *Syd* FAA | 2003 | 63 | 5 | 3 |
| **Michael C Fitzpatrick** | BA(Hons) *Oxon* BEng(Hons) *UWA* | 2001 | 59 | 5 | 4 |
| **Gareth J Goodier*** | MB ChB MHA DHSc FRACMA FAFPHM | 2012 | 61 | 0 | 0 |
| **James McCluskey** | BMedSci MBBS MD *UWA* FRACP FRCPA | 2011 | 61 | 5 | 5 |
| **Graham F Mitchell** | AO RDA BVSc *Syd* FACVSc PhD *Melb* FTSE FAA | 2007 | 71 | 5 | 5 |
| **Linda B Nicholls** | AO BA(Econ) *Cornell* MBA *Harvard* FAICD | 2001 | 64 | 5 | 3 |
| **Catherine J Redwood** † | BA BSW(Hons) *Monash* | 2009 | 63 | 5 | 3 |
| **Christopher W Thomas** | BCom(Hons) MBA *Melb* FAICD | 2001 | 66 | 5 | 5 |
| **Catherine M Walter** | AM LLB(Hons) LLM MBA *Melb* FAICD | 2001 | 60 | 5 | 5 |
| **Ingrid M Winship** | MB ChB MD *Cape Town* FRACP | 2007 | 54 | 5 | 4 |

*Appointed 21 August 2012 †Resigned 30 June 2012

### The Audit and Risk Committee

The role of the Audit and Risk Committee is to assist the board in fulfilling its statutory and fiduciary responsibilities with regard to accounting and financial reporting practices and internal control systems of the company. The committee met three times during the year.

### Appreciation

The board wishes to extend its appreciation to the members of the various committees (Appointments and Promotions Committee, Ethics Committee, Investment Committee, Commercialisation Advisory Committee, Financial Sustainability Committee, and the New Building Steering Committee) as well as the many other people including the director, staff, students, overseas visitors and honorary workers, who work so tirelessly to advance the company's world-wide reputation for excellence in medical research.

### Principal activities

The company's principal activity in the course of the financial year was medical research and there has been no significant change in that activity during the financial year.

### Financial results

The financial result from research activities was a net deficit of $4,948,000 (2011 surplus of $7,860,000). After allowing for the surplus arising from, contribution income, gains from the sale of investments and other grants, donations and bequests, depreciation and amortisation the overall result for the year was a surplus of $29,164,000 (2011 – $55,147,000). Tax is not applicable. The company is limited by guarantee, has no share capital and declares no dividends.

### Operations

A review of operations of the company is included in the detailed scientific reports.

### Environmental regulations

The institute aims to achieve a high standard in environmental matters. The institute complies with the Environmental Protection Act in respect of its operations. Discharges to air and water are below specified levels of contaminants and solid waste is disposed of in an appropriate manner. Biomedical waste and sharps are disposed of through appropriately licensed contractors. The directors have not received notification nor are they aware of any breaches of environmental laws by the institute.

**Auditors' independence declaration**

The Auditors' independence declaration is included on page 165 of the financial report.

**Other Matters**

(a) During the financial year there was no significant change in the company's state of affairs other than that referred to in the accounts or the notes thereto.

(b) There has not been any other matter or circumstance that has arisen since the end of the financial year, that has significantly affected, or may significantly affect the operations of the company, the results of those operations, or the state of affairs of the company in future financial years.

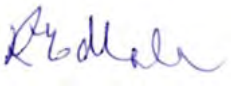
(c) The company is in the process of expansion and redevelopment of the Parkville premises which will significantly increase its capacity and operations in the coming years. Disclosure of information regarding likely developments in the operations of the company in future years and the expected results of those operations is likely to result in unreasonable prejudice to the company. Accordingly, this information has not been disclosed in this report.

(d) During the financial year the company paid a premium in respect of a contract insuring the directors and officers of the company against liability incurred as such a director or officer to the extent permitted by the *Corporations Act 2001*. The contract of insurance prohibits disclosure of the nature of the liability and the amount of the premium. The company has not otherwise, during or since the financial year, indemnified or agreed to indemnify an officer or auditor of the company or any related body corporate against a liability incurred as such an officer or auditor.

(e) The company is a company of the kind referred to in ASIC Class Order 98/100, dated 10 July 1998, and in accordance with that Class Order amounts in the directors' report and the financial report are rounded off to the nearest thousand dollars.

Signed in accordance with a resolution of the directors made pursuant to s.298(2) of the *Corporations Act 2001*.

On behalf of the directors



Leon Davis
President
Melbourne, 13 September 2012

Roger Male
Treasurer

## Directors' declaration

The directors declare that:

(a) The attached financial statements and notes thereto comply with accounting standards;

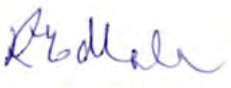
(b) The attached financial statements and notes thereto give a true and fair view of the financial position and performance of the company;

(c) In the directors' opinion, the attached financial statements and notes thereto are in accordance with the *Corporations Act 2001*; and

(d) In the directors' opinion, there are reasonable grounds to believe that the company will be able to pay its debts as and when they become due and payable.

Signed in accordance with a resolution of the directors made pursuant to s.295(5) of the *Corporations Act 2001*.

On behalf of the directors



Leon Davis
President
Melbourne, 13 September 2012

Roger Male
Treasurer

Deloitte.

Deloitte Touche Tohmatsu
ABN 74 490 121 060

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The Board of Directors
The Walter and Eliza Hall Institute of Medical Research
IG Royal Parade
Parkville VIC 3052

13 September 2012

Dear Board Members

**The Walter and Eliza Hall Institute of Medical Research**

In accordance with section 307C of the Corporations Act 2001, I am pleased to provide the following declaration of independence to the directors of The Walter and Eliza Hall Institute of Medical Research.

As lead audit partner for the audit of the financial statements of The Walter and Eliza Hall Institute of Medical Research for the financial year ended 30 June 2012, I declare that to the best of my knowledge and belief, there have been no contraventions of:

(i) the auditor independence requirements of the Corporations Act 2001 in relation to the audit; and

(ii) any applicable code of professional conduct in relation to the audit.

Yours sincerely

DELOITTE TOUCHE TOHMATSU

Peter Caldwell
Partner
Chartered Accountants

Deloitte.

Deloitte Touche Tohmatsu
A.B.N. 74 490 121 060

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# Independent Auditor's Report to the Members of The Walter and Eliza Hall Institute of Medical Research

We have audited the accompanying financial report of The Walter and Eliza Hall Institute of Medical Research, which comprises the statement of financial position as at 30 June 2012, the statement of comprehensive income, the statement of cash flows and the statement of changes in equity for the year ended on that date, notes comprising a statement of significant accounting policies and other explanatory information, and the directors' declaration as set out on pages 141 to 161 and 163 to 164.

*Directors' Responsibility for the Financial Report*

The directors of the company are responsible for the preparation of the financial report that gives a true and fair view in accordance with Australian Accounting Standards and the *Corporations Act 2001* and for such internal control as the directors determine is necessary to enable the preparation of the financial report that gives a true and fair view and is free from material misstatement, whether due to fraud or error.

*Auditor's Responsibility*

Our responsibility is to express an opinion on the financial report based on our audit. We conducted our audit in accordance with Australian Auditing Standards. Those standards require that we comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial report is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial report. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial report, whether due to fraud or error. In making those risk assessments, the auditor considers internal control, relevant to the entity's preparation of the financial report that gives a true and fair view, in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Deloitte.

*Auditor's Independence Declaration*

In conducting our audit, we have complied with the independence requirements of the *Corporations Act 2001*. We confirm that the independence declaration required by the *Corporations Act 2001*, which has been given to the directors of the Walter and Eliza Hall Institute of Medical Research, would be in the same terms if given to the directors as at the time of this auditor's report.

*Opinion*

In our opinion, the financial report of The Walter and Eliza Hall Institute of Medical Research is in accordance with the *Corporations Act 2001*, including:

(a) giving a true and fair view of the company's financial position as at 30 June 2012 and of its performance for the year ended on that date; and

(b) complying with Australian Accounting Standards and the *Corporations Regulations 2001*.

DELOITTE TOUCHE TOHMATSU

Peter Caldwell
Partner
Chartered Accountants
Melbourne, 13 September 2012

## Statistical summary for the year ended 30 June

| | 2012 $,000s | 2011 $,000s | 2010 $,000s | 2009 $,000s | 2008 $,000s |
|---|---|---|---|---|---|
| **Research revenue** | | | | | |
| Australian Government | 49,962 | 45,973 | 39,291 | 37,409 | 33,446 |
| Victorian Government | 7,074 | 6,842 | 7,638 | 7,355 | 8,229 |
| Foreign governments | 359 | 557 | 953 | 543 | 443 |
| **Government revenue** | **57,395** | **53,372** | **47,882** | **45,307** | **42,118** |
| Industrial grants and contracts | 1,114 | 1,846 | 3,518 | 3,722 | 3,847 |
| Philanthropic grants and fellowships – Australia | 5,285 | 3,830 | 3,644 | 3,440 | 2,370 |
| Philanthropic grants and fellowships – international | 2,180 | 3,235 | 4,399 | 6,551 | 6,208 |
| Investment income [1,2] | 11,280 | 11,486 | 9,278 | 10,007 | 8,561 |
| Royalty income | 810 | 2,513 | 1,071 | 1,356 | 1,943 |
| General revenue | 3,054 | 2,647 | 2,761 | 3,140 | 2,238 |
| Donations and bequests | 3,043 | 3,305 | 958 | 1,178 | 977 |
| **Non-government revenue** | **26,766** | **28,862** | **25,629** | **29,394** | **26,144** |
| **Total revenue for research** | **84,161** | **82,234** | **73,511** | **74,701** | **68,262** |
| **Research expenditure and financial results** | | | | | |
| Staff costs | 61,559 | 54,799 | 48,938 | 45,419 | 42,903 |
| Laboratory operating costs | 16,452 | 15,424 | 16,310 | 15,817 | 15,068 |
| Laboratory equipment | 4,119 | 2,862 | 2,474 | 2,591 | 2,271 |
| Building operations | 4,877 | 4,353 | 4,356 | 4,551 | 4,152 |
| Administration | 1,203 | 1,002 | 1,225 | 1,485 | 1,375 |
| Business development | 899 | 684 | 879 | 1,410 | 1,109 |
| **Total research expenditure** | **89,109** | **79,124** | **74,182** | **71,273** | **66,878** |
| **Results from research activities** | **-4,948** | **3,110** | **-671** | **3,428** | **1,384** |
| **Other income** | | | | | |
| Profit on sale of long-term investments [3] | 877 | 7,712 | 1,151 | 1,372 | 5,260 |
| Contribution Income for recognition of land lease | 12,782 | - | - | - | - |
| Donations and bequests | 3,461 | 1,566 | 2,120 | 9,879 | 34,738 |
| Grants and donations for capital works [1] | 906 | 117 | 428 | 492 | 2,547 |
| **Total other income** | **18,026** | **9,395** | **3,699** | **11,743** | **42,545** |
| **Other expenses** | | | | | |
| Loss on impairment write down of long-term investments | -2,333 | -2,945 | -203 | -8,417 | -9,336 |
| Depreciation and amortisation | -5,681 | -6,375 | -3,877 | -3,025 | -2,834 |
| **Total other expenses** | **-8,014** | **-9,320** | **-4,080** | **-11,442** | **-12,170** |
| **Net operating surplus** | **5,064** | **3,185** | **-1,052** | **3,729** | **31,759** |

1. Excluding funds for Walter and Eliza Hall Institute redevelopment project
2. Income excludes share buy back dividends in 2011 ($4.75M)
3. Income includes share buy back dividends in 2011 ($4.75M)

| | | | | | |
|---|---|---|---|---|---|
| **Capital funds** | | | | | |
| Permanent invested capital funds | 139,073 | 134,457 | 129,802 | 126,475 | 115,072 |
| General funds | 162,909 | 138,752 | 90,534 | 35,998 | 25,814 |
| Royalty fund | 17,079 | 16,788 | 14,823 | 14,294 | 14,142 |
| Leadership fund | 16,282 | 16,182 | 15,873 | 15,672 | 15,226 |
| Asset revaluation reserve | 29,086 | 38,812 | 37,961 | 25,952 | 42,297 |
| **Total funds** | **364,429** | **344,991** | **288,993** | **218,391** | **212,551** |
| **Capital expenditure** | | | | | |
| **Property, plant and equipment** | **43,348** | **53,579** | **64,516** | **17,286** | **10,712** |
| **Staff numbers: (equivalent full-time) at 30 June** | **2012** | **2011** | **2010** | **2009** | **2008** |
| **Scientific research staff:** | | | | | |
| – Senior faculty | 64 | 64 | 52 | 52 | 50 |
| – Other | 160 | 147 | 143 | 156 | 130 |
| – Visiting scientists | 10 | 16 | 14 | 28 | 24 |
| **Supporting staff:** | | | | | |
| – Laboratories and all services | 374 | 358 | 349 | 323 | 315 |
| **Total staff and visiting scientists** | **608** | **585** | **558** | **559** | **519** |
| **Students** | **137** | **135** | **103** | **68** | **67** |
| **Papers published** | **284** | **250** | **249** | **246** | **224** |

# Capital Funds

## Permanent Named Capital Funds

**The following is a complete listing of all permanent funds held and invested by the institute at 30 June, 2012. In 2011-12 the aggregate profit/loss on sale of investments was apportioned to individual fund accounts.**

*New donations of capital received in current financial year.

| | 2012 $ |
|---|---|
| Adair John Bequest (ex DW) | 311,202 |
| Adair John Bequest (ex MF) | 59,086 |
| Alexander R Estate | 124,088 |
| Allison-Levick J & H | 69,650 |
| Amey AM Estate | 29,964 |
| Anderson KA Estate | 222,735 |
| Anderson NM Estate | 13,498 |
| Angus Dorothy Irene Estate | 219,187 |
| Anonymous – Tasmania | 47,925 |
| Anonymous – Victoria | 155,328 |
| Anonymous – Victoria | 5,771 |
| Arnel Florence Janet Maude Estate | 45,328 |
| Arter Myra G Estate | 69,690 |
| Ashford Ivy A Estate | 27,587 |
| Attwell Samuel E Estate | 53,975 |
| Atyeo George & Isobel Fund | 39,650 |
| Baker Alice Lillian Estate | 65,702 |
| Ballantyne JW Estate | 628,301 |
| Barfield WG Estate | 42,650 |
| Bartlett Mary V Estate | 30,223 |
| *Bates Tim Memorial Diabetes Research Fund | 99,022 |
| Charles L Bartholomew Estate | 125,410 |
| Bauer Dr Franz Estate | 51,620 |
| Bell Valerie Amy | 73,122 |
| Benjamin EG Estate | 48,374 |
| Bennett LM Estate | 30,595 |
| Berry Ruby C Estate | 129,084 |
| Biderman Cyla Estate | 61,610 |
| Blain BE Estate | 98,654 |
| Bland RT Estate | 296,685 |
| Bock Lindsay William Estate | 26,117 |
| Boothman Alva Estate | 606,369 |
| Borrett M A Estate | 471,286 |
| Bran EG Estate | 171,540 |
| Brennan EM Estate | 53,547 |
| The Ruby Bryan Memorial Fund | 585,034 |
| Brittain W & Vl Mem Fund | 63,102 |
| Brockhoff Nyon Trust | 198,165 |
| Brough AV Estate | 68,169 |
| Brown Isabelle A Estate | 71,002 |
| Bruce RH Estate | 31,140 |
| Buckland W Foundation Fund | 182,683 |
| Buckman Olive Estate | 21,642 |
| Bult C G Estate | 394,588 |
| Brumloop LAA Estate | 67,969 |
| Burley Stanley Estate | 55,354 |
| Burnet Sir Macfarlane Estate | 86,387 |
| Burns JC Estate | 146,049 |
| Cahill JL Estate | 20,233 |
| Callaway LJ Estate | 38,725 |
| Cambridge Beresford Estate | 160,401 |
| Carlin Freda Evelyn Estate | 79,342 |
| Carling DM Estate | 141,749 |
| Carlson Catherine Estate | 71,168 |
| Carlson Elizabeth F Estate | 80,435 |
| Carty LEW Charitable Fund | 34,209 |
| Cato EA Estate | 701,831 |
| Cato MC Estate | 570,448 |
| Chatfield SL Estate | 96,285 |
| Claridge John PG Estate | 28,699 |
| Clark Lindesay Fund | 778,776 |
| Cockburn Clarice BP Estate | 21,580 |
| Cole DE Estate | 618,668 |
| Coles GO Estate | 30,091 |
| Collie Barbara Estate | 119,812 |
| Collie Betty Rae | 168,000 |
| Collie George Estate | 1,879,968 |
| Colliver Len Estate | 44,283 |
| Connolly Grace C Estate | 101,972 |
| Cormack Margaret Mary | 76,074 |
| Cory Joy & Desmond Cancer Research Fund | 103,022 |
| Coultass Hylda M Estate | 102,221 |
| Courtney Gwendoline Vera Estate | 218,809 |
| Coutts Dr ELA Estate | 102,631 |
| Coutts IBM Estate | 21,763 |
| *Craven DA Memorial Fund | 883,940 |
| *JE Craven & MA Shearer Estates | 38,806,418 |
| Crawford Duncan Estate | 13,385 |
| Criswick R M Estate | 408,173 |
| Critchlow Ronald P Estate | 238,842 |
| Crowley MM Estate | 166,896 |
| Cubbins SG Estate | 71,057 |
| Cummings ED Estate | 126,512 |
| Cutter BE Estate | 13,149 |
| Darbyshire EJ (Ted) Estate | 275,175 |
| Davey Dorothy Estate | 243,476 |
| Davidson Bl Estate | 20,662 |
| Davidson EE Estate | 23,450 |
| Davis FLG Estate | 46,885 |
| Dawson Anne Marie Estate | 6,268 |
| Del Cott RAM Estate | 206,683 |
| Deryk SD Estate | 55,900 |
| Sir Harold Dew and Family Estate | 655,859 |
| Dick MRK (Ray) Estate | 173,443 |
| Dickie Phoebe Estate | 35,542 |
| Dimsey WE Estate | 178,878 |
| Dobbie Myrtle M Estate | 32,647 |
| Dodgshun GM Estate | 129,759 |
| Dossetor Catherine L Estate | 28,229 |
| Dowie S Estate | 18,327 |
| Drakensberg Trust | 1,970,345 |
| Duncan PH Estate | 77,449 |
| East James Douglas Estate | 147,414 |
| Edwards Allen Richard Estate | 155,041 |
| Edwards HHW Estate | 197,549 |
| Eisner KR | 76,286 |
| Ellis GM Estate | 2,995,228 |
| Emery Harriet Anne Estate | 17,005 |
| Eva Michael Ross Estate | 3,565,880 |
| Facey Mary Bethune Estate | 13,028 |
| Fagg Maude V Estate | 81,055 |
| Farrant John Estate | 151,302 |
| Fields Ernest Estate | 227,868 |
| Findlay Winifred Gertrude Estate | 113,825 |
| Fitzgerald Sheila Mary Estate | 34,854 |
| Ford Ada Joyce Estate | 15,974 |
| Fraser K Estate | 1,650,971 |
| Galbraith DA & DV Estate | 90,015 |
| Gerdts Sheila Lesley G Estate | 54,050 |
| Gibb Geo & Bennett Wm A | 333,927 |
| Gilbert Augusta Estate | 301,743 |
| Gilder CH Estate | 13,307 |
| Gillon AM Estate | 2,516,795 |
| Girdwood J Estate | 198,333 |
| Goldman Sachs JB Were Foundation | 612,146 |
| Gordon H & T Estate | 88,855 |
| Graves GC Estate | 22,014 |
| Gray Bessie Mavis Fund | 20,912 |
| Gray Clara Estate | 60,063 |
| Greig Harry Douglas Estate | 419,583 |

| | |
|---|---|
| Grubb Walter Joseph Estate | 31,048 |
| Guest Doris Rose Estate | 13,059 |
| Hackett Dorothy Estate | 5,376 |
| Hadfield RCS Estate | 94,721 |
| Hadley AN Estate | 945,011 |
| Hamilton M Estate | 37,814 |
| Harrap FM Estate | 111,912 |
| Harrap LM Estate | 24,132 |
| *Harris Alan Scholarship Fund | 38,894 |
| Harris John D & Lyla Foundation | 709,948 |
| Hartlett K Estate | 815,853 |
| Haydon Michael JM Memorial Fund | 49,917 |
| Hearse JD | 992,693 |
| Hemphill Olive May Estate | 54,974 |
| Henderson AN Estate | 20,962 |
| Henderson Joan Estate | 107,139 |
| Henry MA Estate | 526,816 |
| Heron Thelma Hope Estate | 78,197 |
| Highton GAN Estate | 449,424 |
| Hill Ramon Bruce Estate | 126,543 |
| Hind Ruby F Estate | 27,298 |
| Hocking Helen Estate | 298,695 |
| Holmes EM Estate | 66,797 |
| Hope Irene Estate | 351,571 |
| Hooper Nancy Hilda | 92,834 |
| Hosier MM Estate | 125,319 |
| Hurry M Estate | 25,358 |
| Inglis Dulcie M Estate | 93,834 |
| Ironside WH Estate | 55,354 |
| Jackson Catherine M Estate | 159,850 |
| Johnson Daphne Adele Estate | 6,517 |
| Johnson Ethel Grace Estate | 37,907 |
| Johnson Sydney Robert Estate | 43,247 |
| Johnstone Reginald Ben Estate | 11,542 |
| Judd Anita Estate | 49,891 |
| Kayler-Thomson Marion Estate | 43,201 |
| Keating L Estate | 1,125,422 |
| Keats LCA Estate | 1,064,186 |
| Kellock TH Estate | 1,499,737 |
| Kendall Nanyce Douglas | 39,131 |
| Kerr HM Estate | 90,071 |
| King DM Estate | 34,343 |
| Knight FF Estate | 25,074 |
| Lang John Murray Estate | 616,415 |
| Lanteri Gwen Estate | 1,281,044 |
| Larard DV Estate | 10,659 |
| Leckie Winifred Estate | 178,917 |
| Lilford VM Estate | 394,565 |
| Lins RD Estate | 22,142 |
| Little Mabel B Estate | 54,012 |
| Lyddon Pauline M Estate | 993,084 |
| Lyell Alexia Bequest | 359,590 |
| MacAskill WG & I | 22,142 |
| Mace Nina May Estate | 239,425 |
| MacDonald Elsie May Estate | 149,383 |
| Macindoe Jock & Diana Fund | 33,213 |
| MacIntosh Elizabeth H Estate | 19,946 |
| Mackie-Smith CM Estate | 303,399 |
| Macleay The Lillian & Kenneth Bequest | 347,690 |
| Mahoney Florence Cancer Fund | 139,917 |
| Malcolm Phyllis Elizabeth Estate | 224,212 |
| Maloney Kathleen Margaret Estate | 18,454 |
| *Mann David Memorial Research Fund | 20,000 |
| Mansfield Trevor Geoffrey Estate | 8,242 |
| Marguccio R Estate | 11,071 |
| Mariner Barry Leonard Estate | 51,154 |
| McArthur Nellie M Estate | 88,061 |
| McCooke Miss MH Estate | 278,115 |
| McDonald Charles Thomas | 15,093 |
| McDougall Phyllis Mable Estate | 104,646 |
| McGhee ME Estate | 60,282 |
| McGregor Amy VK Estate | 101,940 |
| McGregor Elvira Ruth Estate | 18,784 |
| McGregor KB Estate | 147,384 |
| McKinnon Sheila May Estate | 37,166 |
| McLean Ada Myee Dutton Estate | 438,395 |
| McLennan B Estate | 79,173 |
| McNab M Estate | 20,001 |
| McNeill Sir James Fund | 17,220 |
| McRorie Ruby A Estate | 64,744 |
| Menagh Thelma Marie Estate | 15,065 |
| Miller Lorna May Estate | 722,527 |
| Miller MA Estate | 51,817 |
| Miller Violet Isabella Estate | 60,301 |
| Minney DW & NR Fund | 11,071 |
| Mitchell, Bettye Victoria Fund | 3,633,135 |
| Mitchell Doris Georgina Mildred | 55,354 |
| Mitchell G Fund | 42,907 |
| Moden FHW Estate | 106,705 |
| Moody E Vaughan Estate | 1,057,635 |
| Moon Ida Alice Estate | 41,802 |
| Mooney Carmel Mary, Estate of | 139,135 |
| Moore Phyllis Estate | 11,071 |
| Morgan DM Estate | 326,472 |
| Morris Foundation of Medical Research | 139,931 |
| Moss EE Estate | 213,568 |
| Muller FG Estate | 15,807 |
| Murray Alan Ambrose Estate | 28,459 |
| Murray Gwendoline Mary Fund | 987,209 |
| Must Mary Kathleen Bequest | 865,189 |
| Myer Dame Merlyn Estate | 11,926 |
| Myer Pam Sallmann Foundation | 24,143 |
| Nevill Melanie Joy | 66,551 |
| Newton Evelyn | 15,470 |
| Newton EM Estate | 15,038 |
| Nicholas Harold George Estate | 264,006 |
| Norins Leslie Fund | 225,505 |
| Norton M Estate | 700,381 |
| *Nossal Sir Gustav Fund | 241,563 |
| Nottingham SG Estate | 28,633 |
| Palmer DE Estate | 21,609 |
| Palmer Ethel Fund | 260,206 |
| Parker Barbara Memorial Fund | 59,310 |
| Parker Mabel V Estate | 66,815 |
| Parsons Kathleen FB Estate | 33,827 |
| Patten Ralph & Etty Bequest | 251,688 |
| Patterson Gerard A Estate | 15,817 |
| Paulin Leukaemia Fund | 182,506 |
| Paulin SC Estate | 22,921 |
| Payne Henry and Charlotte Fund | 788,802 |
| Peterson Vera Estate | 472,808 |
| Petley Francis Estate | 125,599 |
| Pierce John Lindsay Estate | 1,008,690 |
| Pietsch Dr CH Fund | 168,310 |
| Porter Florence JA Estate | 108,154 |
| Prater Mabel Edward | 11,479 |
| Pritchard DG Estate | 28,415 |
| Pyke MA Estate | 13,285 |
| *Qualtrough Research Fund | 2,000,000 |
| Rae Olive Estate | 924,480 |
| Reeves Jessie Estate | 51,911 |
| Reid Charitable Trusts | 5,256,194 |
| Reiser Erwin Estate | 22,142 |
| Richardson DLK Estate | 70,797 |
| Ricker EM Fund | 63,700 |
| Roberts JI Charitable Fund | 6,753 |
| Robertson AT Estate | 11,071 |
| Rose Norma J Estate | 11,192 |
| Ruppel FE Estate | 128,332 |
| Salemann CW Estate | 11,071 |
| Sallmann L & E Memorial Fund | 21,609 |
| Santos TS Estate | 716,970 |
| Schack Elsie Edith Estate | 104,766 |
| Scott Annie May Estate | 136,551 |
| Sharp II Estate | 17,403 |
| Shaw Eileen Coryn Estate | 19,386 |
| Shelton Edgar Estate | 679,526 |
| *Sidwell OB Estate | 1,596,984 |
| Skinner Phyllis Maye Estate | 70,180 |

| | |
|---|---|
| Smith Elsie Violet Estate | 14,143 |
| Smorgon Robert & Jack Family Foundation | 311,643 |
| Snow Freda Estate | 50,349 |
| Spence Frank Meldrum | 28,699 |
| Spencer Stanley L Estate | 15,307 |
| Stanbrough AE Estate | 88,253 |
| Stephens L Estate | 91,829 |
| Stevens SA Estate | 104,606 |
| Stevenson Dame Hilda Estate | 74,912 |
| Stewardson Family Trust | 75,412 |
| Stewart Jean Elma | 70,535 |
| Swingler Maxwell & Mary Bequests | 2,118,719 |
| Sydserff Charles SB Estate | 13,927 |
| Syme David Farnell Estate | 809,063 |
| Talbot P Estate | 345,637 |
| Taws M Estate | 110,708 |
| Taws GE Arthritis Fund | 20,912 |
| Taylor Sarah McQuillan Estate | 51,529 |
| Thomas JC Estate | 254,857 |
| Thompson O Estate | 24,522 |
| Thorpe Doris EB | 75,601 |
| Tink RM Estate | 257,040 |
| Tinkler VF Estate | 49,638 |
| Tomasetti John T Estate | 351,818 |
| Thompsom LW Estate | 1,830,649 |
| Tressider Edith Kathleen Estate | 454,148 |
| Trezise KW Estate | 15,954 |
| Tropical Diseases Fund | 77,714 |
| Turnbull JG Estate | 65,071 |
| Van Leeuwen GH Estate | 393,321 |
| Vincent-Smith IG Fund | 158,747 |
| Vogel Herta & FB Estate | 11,192 |
| Walker CM Estate | 182,413 |
| Walker Dorothy Hope Estate | 1,949,566 |
| Wallace Nancy Jeanie Estate | 172,824 |
| Walsh Dr William Butler Memorial Fund | 713,313 |
| Walter Ailsa Amy Mary Estate | 135,010 |
| Warnock EMC nee Riddle Estate | 1,413,821 |
| Watson MR Estate | 12,669 |
| Waxman Elizabeth H Estate | 61,014 |
| Wedge Erica Estate | 279,849 |
| Webb NJ Estate | 224,724 |
| Weeks Thelma Estate | 11,479 |
| Wekwerth Hilda Frances Estate | 27,441 |
| West John James Estate | 84,887 |
| Westcott Ita E Estate | 17,822 |
| White Morris G Estate | 35,593 |
| Wicks LR Estate | 11,071 |
| Williams AM Estate | 73,324 |
| Williams Irene E Estate | 266,255 |
| Wilson DE Estate | 69,276 |
| Wilson MML Estate | 77,956 |
| Wilson NF Estate | 11,071 |
| Wilson V M (Sunny) Estate | 114,187 |
| Wolstonecroft WW Estate | 31,613 |
| Wright Lynette Oreti Estate | 160,337 |
| Zillman Dudley V Estate | 44,498 |

## Fellowship and Scholarship Funds

| | |
|---|---|
| Alcoa Australia Fellowship | 446,954 |
| Carty EM | 274,400 |
| Mackay Dr Ian Fellowship Fund | 219,709 |
| Mathison G C Research Scholarship | 137,018 |
| Moffatt Edith Scholarship Fund | 1,615,909 |
| *JHA Munro Foundation | 586,806 |
| *Paddy Pearl Fund | 919,956 |
| Skea Lyndal and Jean Leukaemia Fund | 769,909 |
| Syme Colin Fellowship Fund | 1,626,028 |
| Wilson Ed Memorial Fellowship | 1,434,817 |

## Other Funds

| | |
|---|---|
| *Anonymous Seminar Award | 12,890 |
| Gideon Goldstein Fund | 891,212 |
| Mckay C N Fund | 218,269 |

The following Estates in which the institute had an interest, were managed during the year by Trustees. (Income received by the institute in the financial year is treated similarly to donations and bequests):

The Baldy Trust Fund

CH Boden Memorial Trust

John Frederick Bransden Memorial Fund

Frank Broadhurst Estate

Thomas, Annie & Doris Burgess Charity Trust

George Collie Estate

Miss EM Drummond Estate

Frederick and Winifred Grassick Memorial Fund

The Helpman Family Foundation

The Mackie Bequest

Irene and Ronald MacDonald Foundation

Albert H Maggs Charitable Trust

Mrs AM Reilly

Miss ML Reilly

The Stang Bequest

Emily Vera Winder Estate

Florence Mary Young Charitable Trust

## Leadership Fund

The Leadership Fund was established in honour of Professors Gustav Nossal, Donald Metcalf and Jacques Miller to provide named Fellowships to nurture the development of outstanding young scientists with the potential to be future leaders of biomedical research.

The Leadership Fund at 30 June 2012 included the following permanent funds ($10,000 and over):

| | |
|---|---|
| Sir Harold Dew and Family Estate | 3,855,317 |
| Chugai Pharmaceutical Co Ltd | 802,473 |
| The Ian Potter Foundation | 802,473 |
| L M Archibald Estate | 534,982 |
| Albert H Maggs Charitable Trust | 523,296 |
| Helen Macpherson Smith Trust | 320,989 |
| Anonymous | 267,491 |
| Anonymous | 267,491 |
| E Vaughan Moody Estate | 267,491 |
| The Broken Hill Proprietary Company Limited | 267,491 |
| J B Were & Son Charitable Fund | 267,491 |
| Eunice L Lambert Estate | 263,134 |
| Betty Eunice Stephens Estate | 180,154 |
| National Australia Bank | 160,495 |
| Victor Smorgon Charitable Fund | 117,696 |
| The Sidney Myer Fund | 96,297 |
| Leslie D W Stewart Estate | 78,730 |
| Joe White Bequest | 72,758 |
| Krongold Foundation Pty Limited | 53,498 |
| Professor Sir Gustav Nossal | 53,498 |
| The Scobie and Claire MacKinnon Trust | 53,498 |
| The R & J Law-Smith Gift | 32,099 |
| National Mutual Holdings Limited | 32,099 |
| Pacific Dunlop Ltd | 32,099 |
| Sheila R White Estate | 31,650 |
| Coles Myer Ltd | 26,749 |
| James Kirby Foundation | 26,749 |
| Arthur Andersen & Co Foundation | 21,399 |
| Arthur Robinson & Hedderwicks | 21,399 |
| H B Kay Estate | 10,700 |
| Stephelle Pty Ltd | 10,700 |
| C M Walter | 10,700 |

# A gift in your will to medical research

Medical research is vital to improving healthcare and quality of life.

Researchers at the Walter and Eliza Hall Institute of Medical Research have made many discoveries that have improved health outcomes for millions of people.

A gift in your will to the Walter and Eliza Hall Institute is a lasting gift that will support our research efforts to improve human health with better prevention, detection and treatment of disease.

For a confidential discussion, please contact our Community Relations department by emailing donationenquiries@wehi.edu.au or calling 03 9345 2555.

Walter+Eliza Hall
Institute of Medical Research

1G Royal Parade Parkville VIC 3052
Tel: (03) 9345 2555
Fax: (03) 9347 0852
www.wehi.edu.au

# Do you want to help the fight against disease?

## Volunteers needed to donate blood for research

The Volunteer Blood Donor Registry collects a small amount of blood from healthy volunteers for use in research into diseases such as cancer, inflammatory and blood diseases, infectious diseases, heart and vascular disease, and brain diseases.

If you are aged between 18 and 80 you can contribute to research to help us better understand these diseases.

All information will be treated with strict confidentiality.

**Please contact the Volunteer Blood Donor Registry for more information:**

Dr Lina Laskos or Ms Naomi Sprigg
**P:** (03) 9345 2304 or (03) 9342 3174
**E:** info@blooddonorregistry.org
**A:** Walter and Eliza Hall Institute, 1G Royal Parade, Parkville VIC 3052
**W: blooddonorregistry.org**

volunteer blood donor registry