The Walter and Eliza Hall Institute of Medical Research

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Cover image
Still from the Life on Earth iBooks textbook. Microtubule assembly inside a living cell. (Magnification x 5,000,000)
Image created by Mr Drew Berry, WEHI.TV.

We acknowledge the traditional owners and custodians of the land on which our campuses are located, the Wurundjeri people of the Kulin nation, and pay our respects to their elders past and present.
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.

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
ABOUT THE INSTITUTE

The Walter and Eliza Hall Institute is Australia’s oldest medical research institute, and will celebrate its centenary in 2015. For almost 100 years we have been making discoveries for humanity, improving the health of people in Australia and around the world.

The institute has more than 750 researchers who are working to understand, prevent and treat diseases, with a focus on cancers, immune disorders and infectious disease.

Our past discoveries include identifying colony stimulating factors (CSFs), which have helped more than 20 million cancer patients recover from chemotherapy; treating immune disorders with drugs that suppress abnormal immune responses; and developing techniques for growing flu viruses at sufficient quantities for flu vaccines.

The institute offers postgraduate training as the Department of Medical Biology of The University of Melbourne, and is affiliated with The University of Melbourne and The Royal Melbourne Hospital.

Staff and students: 931
Diseases impacted by institute research: 40+
Publications: 381
National and international trials based on institute discoveries: 100
Institute and visiting speakers: 130
People came to an event at the institute: 5516
Health impact

The institute is committed to making fundamental scientific discoveries that can be translated to better treatments, bringing real benefits to the community on a global scale. Clinical trials based on discoveries made at the institute include trials of vaccines for rheumatoid arthritis, coeliac disease, diabetes and malaria; and trials of a new class of anti-cancer drugs, called BH3-mimetics, for treating people with leukaemia and other cancers.
It is a pleasure to report to our stakeholders that your institute is in excellent shape.

As the largest recipient of National Health and Medical Research Council funding outside the universities, we will enter our centenary year in 2015 with confidence and a refreshed strategic vision for the future.

Preparing for the future

The past 12 months have particularly focused on ensuring that the marvellous facilities we gained at our extended and redeveloped Parkville campus, which was opened in late 2012, are fully utilised. We have also ensured that the services supporting our scientists have been refreshed and are truly up to the task.

The environment in which medical research institutes operate all around the world is one with many challenges. The industry is under considerable pressure as the pharmaceutical industry changes its priorities; demographic profiles and morbidities change rapidly; translation barriers persist; the need for prevention grows ahead of intervention; technology advances accelerate; and funding sources face increasing pressure.

The announcement by the federal government earlier this year of the proposed Medical Research Future Fund offers great hope to the Australian institutes if the legislation can finally be passed in parliament.

Changes to the institute board

As noted, the organisation is in good health as is its governance. All at the institute are very conscious of our responsibility to governments, trusts and foundations, and to individuals who provide funding in various forms. This is not only appropriately understood by the institute’s management, but also by the board.

The institute and its board continue to evolve and there have been a number of changes to the board’s composition since the last annual report. Mr Roger Male, our honorary treasurer, retired in June 2014 after 16 years of exemplary service, most recently being responsible for the Investment Committee managing the institute’s endowment. Ms Linda Nicholls, who joined the board in 2001, will retire prior to the annual general meeting. She has led the Audit and Risk Committee for several years, working closely with our auditors Deloitte to ensure financial controls are at listed company standards. The other director leaving the board this year was Professor James Angus, former Dean of the Faculty of Medicine, Dentistry and Health Sciences at The University of Melbourne. In his 11 years Professor Angus acted as a most effective bridge between the university and the institute. To all of them our most sincere thanks.

Welcoming new board directors

As the board transitions, its size has increased and we are delighted to welcome some outstanding new board members. These include Professor Stephen Smith, who replaced Professor Angus in his role at The University of Melbourne, and who has already been a positive contributor. His background details, and those of other new directors, are included in the Sustainability section of the annual report. Others joining the board are (in order of their appointment) – Associate Professor Rufus Black, Master of Ormond College; Mrs Jane Hemstritch, director of several major listed companies; Mr Terry Moran, former secretary of the Department of Prime Minister and Cabinet in Canberra; Mr Rob Wylie, a former senior partner of Deloitte in Australia and the US; and, since the end of the financial year, Mr Malcolm Broomhead, also a member of several listed company boards.

These diverse appointments ensure a continuing deep understanding of the institute’s activities by the board, and the highest standards of governance.

Mr Christopher Thomas
President
Walter and Eliza Hall Institute
“The past 12 months have particularly focused on ensuring that the marvellous facilities we gained at our extended and redeveloped Parkville campus, which was opened in late 2012, are fully utilised.”
DIRECTOR’S REPORT

It has been an exciting year for the institute.

In May the federal government announced its plans to establish a Medical Research Future Fund. The fund represents a strategic and long-term investment in Australia’s future health. For a number of years we have been making the case to government for this investment, and to have the Australian Government acknowledge medical research as a priority in the budget was welcome.

The Medical Research Future Fund is nation-defining. There is no doubt that Australia needs a perpetual fund to support medical research.

We will be encouraging the federal government and all political parties to think broadly about how to implement and fund this ambitious idea.

Scientific and community recognition

We were proud to be the highest-ranked medical research institute in Australia in the 2013 Nature Publishing Index Asia-Pacific report.

The institute also won the Committee for Melbourne’s 2014 Melbourne Achiever Award for our contributions to the city’s global reputation in health and medical research. The Committee for Melbourne cited the institute as a ‘cornerstone of Melbourne’s internationally renowned medical research sector’, playing a ‘vital role in Melbourne’s future positioning as a centre for research and bio-medicine’.

Our scientists have been making waves nationally and internationally. Professor Terry Speed was awarded the 2013 Prime Minister’s Prize for Science for his influential work using mathematics and statistics to help biologists understand human health and disease. Terry introduced the discipline of bioinformatics to the institute more than 20 years ago, and we now have a staff of more than 40 bioinformaticians helping to unlock the mysteries of the genome.

Malaria researcher Professor Alan Cowman received the Victoria Prize for Science and Innovation, Professor Peter Colman was elected a fellow of the Royal Society UK for his work in structural biology, and Professor Jerry Adams was elected to the Academy of the American Association for Cancer Research.

Dr Marnie Blewitt, Associate Professor Lynn Corcoran and Associate Professor Clare Scott were winners in the Australian Financial Review 100 Women of Influence in 2013. Professor Andrew Roberts was elected the Metcalf Chair of Leukaemia Research, a joint appointment between the institute, The Royal Melbourne Hospital and The University of Melbourne. Past PhD student Dr David Riglar won a Chancellor’s Prize for Excellence in a PhD Thesis from The University of Melbourne. Dr Riglar is now undertaking postdoctoral training at Harvard Medical School.

The future of health care

The institute and its researchers are making significant efforts to realise the potential of personalised medicine and genomics for future health care. Personalised medicine, which uses a person’s genome to predict disease or guide individual treatment, is becoming a reality and we want to ensure Australians have access to these new treatment opportunities.

The institute is a founding partner in the Melbourne Genomics Health Alliance, a collaboration between seven of Victoria’s major research organisations and health care providers to advance personalised medicine in Victoria.

The Walter and Eliza Hall Institute is also a member of the Victorian Comprehensive Cancer Centre (VCCC), which aims to deliver better outcomes for cancer patients. The institute brings unique expertise to the VCCC as our research has led to improved cancer treatments for millions of people.

Thanking our donors

Continued philanthropic investment in medical research remains vital to ensure Australia reaches its full potential and continues to make discoveries that improve health outcomes for all of humanity.

I would particularly like to acknowledge and thank the institute’s many generous donors. We think of our donors as a vital part of our research teams. Without our supporters we would not be able to pursue innovative blue-sky research, fund the challenging initial phase of drug discovery, or support the early work of our most promising young scientists.

In 2014 our donors funded fellowships, allowed us to purchase equipment, provided support and encouragement to our young researchers, and helped us to plan for the future. Thank you to the individuals, community groups and trustees who contributed so generously to our success. It is a pleasure to be sharing this challenging, exciting, demanding, inspiring journey with you.

Some of my best days as director are spent with our supporters, talking about the progress of our research. You will find some of our supporter stories featured throughout this report as part of the divisional updates.

I would also take the opportunity to salute our beloved institute friend and supporter Mr Eddie Brownstein, who passed away in May. Eddie was part of the institute for almost 50 years. He was a true gentleman and, whatever he did, he did with integrity, compassion and good humour. We will miss him dearly.

In 2015, the institute will celebrate 100 years of discoveries for humanity. I am honoured and excited to be hosting a series of events in celebration of the Walter and Eliza Hall Institute’s centenary in 2015, and look forward to seeing many of you help us reflect on our past 100 years, and look to our next 100 years.

Professor Douglas Hilton
Director
Walter and Eliza Hall Institute
“Without our supporters we would not be able to pursue innovative blue-sky research, fund the challenging initial phase of drug discovery, or support the early work of our most promising young scientists.”
Working towards reconciliation

Aboriginal and Torres Strait Islander peoples have a life expectancy that is 10 years lower than other Australians.

As Australia’s leading medical research institute, the Walter and Eliza Hall Institute is in a unique position to contribute to improved health outcomes for Aboriginal and Torres Strait Islander peoples.

The institute’s goal is to support reconciliation through activities that work towards ‘closing the gap’ in life expectancy and disease incidence and mortality between Aboriginal and Torres Strait Islander peoples and Australians of other descent.

Reconciliation is a national movement dedicated to bringing together Aboriginal and Torres Strait Islander peoples and other Australians, and addressing the barriers and inequality faced by Aboriginal and Torres Strait Islander peoples.

In 2014 the institute published its first Reconciliation Action Plan, which has been endorsed by Reconciliation Australia. The institute’s plan focuses on three key areas: relationships, respect and opportunities. It will build the foundations necessary for the institute to implement effective and mutually beneficial initiatives.

The Walter and Eliza Hall Institute is in a unique position to contribute to improved health outcomes for Aboriginal and Torres Strait Islander peoples.

One important relationship we have recently developed is with the Lowitja Institute, Australia’s National Institute for Aboriginal and Torres Strait Islander Health Research. Through the partnership we have collaborated on issues related to genetic research and best practice for involving Aboriginal and Torres Strait Islander peoples in medical research.

We are currently undertaking two projects that are addressing health issues affecting Aboriginal and Torres Strait Islander peoples.

Dr Tony Papenfuss is undertaking a project to sequence the genome of the scabies mite. Scabies infections can lead to severe health problems and the genome map for this parasitic mite could accelerate the search for a vaccine (read more on page 32).

Dr Willy-John Martin is developing improved diagnostic tests for acute rheumatic fever, a consequence of bacterial infection, to decrease the long-term, severe health problems that result from this disease (read more on page 62).

We will continue to develop our plan to identify ways in which the institute can contribute to reducing health inequality for Aboriginal and Torres Strait Islander peoples.
DISCOVERY

The Walter and Eliza Hall Institute has more than 750 researchers and students who are working to solve basic science questions through curiosity-driven research.

Our researchers are committed to innovative science that expands and improves our understanding of basic human biology and the systems that go awry to cause disease. Our scientists also undertake blue-sky research that creates and explores new paths in human biology.

Our research programs include:
Bioinformatics  
Cancer biology  
Cell death  
Cell signalling  
Clinical translation  
Epigenetics  
Genomics  
Haematology  
Infection  
Inflammation  
Immunology and immunity  
Medicinal chemistry  
Personalised medicine  
Proteomics  
Structural biology  
Stem cells  
Systems biology  
Vaccine development

750+ researchers working on cancer, immune disorders and infectious disease

84 research programs

106 publications included researchers from more than one institute division

34%  
14%

1 in 3 of publications were in the top 10% of their field

14% of publications had an impact factor of 10 or greater
The medical researchers and clinician-scientists at the Walter and Eliza Hall Institute are working to understand, prevent and treat diseases including cancers, immune disorders and infectious diseases.
The Cancer and Haematology division is working to understand the production and function of the billions of blood cells used each day to fight infections and repair tissues, and how they are regulated at the molecular level. Our aim is to understand how this process is disrupted in disease, in order to develop new therapies for immune disorders, inflammatory diseases, blood clotting disorders and cancers.

Understanding blood disorders
Problems in producing platelets, tiny blood cells essential for clotting, can cause blood disorders to develop.

Dr Ashley Ng and colleagues showed the receptor for the potent hormone thrombopoietin could both stimulate platelet production and regulate platelet numbers by ‘mopping up’ excess thrombopoietin. This prevented excessive stimulation of blood stem cells and their ‘daughter’ progenitor cells.

Understanding this mechanism of platelet regulation will help us to learn more about essential thrombocythemia and other disorders where there are too many platelets, which can clog blood vessels causing heart attacks and stroke.

Defects in blood cell production
Platelets are generated from ‘parent’ cells called megakaryocytes. Until recently, it was believed megakaryocytes underwent a form of programmed cell death, apoptosis, to produce platelets.

Dr Emma Josefsson and colleagues have shown that megakaryocytes do not activate this pathway to produce platelets. Rather, megakaryocytes must actively restrain apoptosis to survive and produce platelets.

The researchers showed that viral infections impair platelet production by triggering the death of platelet-producing cells. This discovery has important implications for our understanding of human diseases and pinpointing the pathways cytotoxic drugs might trigger in megakaryocytes and their precursors that cause them to die.

Understanding leukaemia development
Acute lymphoblastic leukaemia is a cancer of the blood that is most common in children.

Dr Matthew McCormack and colleagues discovered how a gene involved in childhood leukaemias contributed to cancer development.

The team previously demonstrated the role of a gene called Lmo2 in T-cell acute lymphoblastic leukaemia (T-ALL). With colleagues at Monash University and in the UK, Dr McCormack showed a second gene, Lyl1, interacted with Lmo2, acting as an essential catalyst driving leukaemia development in T-ALL. The discovery will help in developing new diagnostics and treatments.

Health impact
Cancers: leukaemia, lymphoma, myeloproliferative disease
Immune disorders: asthma, Crohn’s disease, rheumatoid arthritis
Other areas: blood clotting diseases, heart attack and stroke, personalised medicine

Faculty
Division heads
Professor Warren Alexander
Professor Nick Nicola

Lab heads
Dr Jeff Babon
Dr Stefan Glaser
Professor David Huang
Dr Emma Josefsson

Dr Matthew McCormack
Professor Don Metcalf
Professor Andrew Roberts
Dr Samir Taoudi
Finding new targets to treat chronic diseases

Chronic inflammatory diseases such as rheumatoid arthritis and Crohn’s disease are increasing in incidence in the Australian community.

Researchers from the institute have revealed the structure of a protein that is essential for triggering a recently discovered form of programmed cell death called necroptosis.

A team led by Dr James Murphy from the Cancer and Haematology division and Associate Professor John Silke showed a protein called MLKL plays a crucial role in the signalling pathways that trigger necroptosis.

“This could directly lead to treatments that will help patients who have chronic inflammatory diseases.”

Cells that are infected by a virus or bacteria, or have other irreparable damage, use the necroptosis pathway to send an ‘SOS’ to the immune system to tell it something has gone wrong. However the pathway can also be inappropriately activated, leading to disease.

Dr Murphy said the team had provided the first genetic proof that MLKL was required for necroptosis. “These discoveries are really exciting because they give us a new target to look at for developing treatments for people who suffer from an inflammatory disease,” he said.

The three-dimensional images of MLKL, which were obtained using the Australian Synchrotron, revealed an interesting detail about the protein, Dr Murphy said. “MLKL needs to be ‘switched on’ before it can activate necroptosis,” he said. “It could be a perfect target because it is different from almost every other cell-signalling protein, making it easier to develop highly specific drugs and limiting potential side-effects.”

Associate Professor Silke said the team was now trying to determine the ‘on’ and ‘off’ states of MLKL and how it could be modified to treat disease. “This could directly lead to treatments that will help patients who have chronic inflammatory diseases including rheumatoid arthritis, inflammatory bowel syndrome, Crohn’s disease and psoriasis,” he said.

Collaborating organisations:
Monash University and University of Canterbury (NZ).

Funding partners: Australian National Health and Medical Research Council, Australian Research Council and Victorian Government.


Dr Ashley Ng (left) and Dr Maria Kauppi are studying blood clotting cells called platelets. They recently discovered a mechanism used by the body to regulate platelet numbers, which will help to better understand blood disorders linked with excessive platelet numbers.

Number of students

12

Number of publications

48
Dr Ian Majewski is using genomics to study how cancer cells become resistant to therapy. He is supported by the Dorothy Hill Memorial Fellowship from The Cancer Research Trusts, as managed by Equity Trustees.

The Dorothy Hill Memorial Fellowship is funded through the estate of Athol Joseph Anderson, which forms part of the Cancer Research Trusts under Equity Trustees’ Medical Grants Program. This program is assessed by an external advisory committee who judged Dr Majewski’s application to be outstanding and commended him for his innovative and collaborative work.

Ms Tabitha Lovett, General Manager of Philanthropic Services at Equity Trustees, said the Medical Advisory Panel was impressed with Dr Majewski’s track record. “We were seeking to support an emerging scientist and are proud to award the Dorothy Hill Memorial Fellowship to such an accomplished recipient,” Ms Lovett said.
Major national and international meetings

**Professor Warren Alexander**
6th Barossa Meeting; Cell Signalling in the Omics Era, keynote speaker, Barossa Valley, Australia, 11/13
25th Lorne Cancer Conference, keynote speaker, Lorne, Australia, 02/14
International Society for Stem Cell Research 12th Annual Meeting, oral presentation, Vancouver, Canada, 06/14

**Dr Jeff Babon**
Centre for Cancer Biology Seminar Series, invited speaker, Adelaide, Australia, 07/13
Interleukin 6 Biology-Pathophysiology-Therapy, keynote speaker, Kiel, Germany, 05/14

**Dr Emma Josefsson**
The 2013 Joint meeting of the Australian Vascular Biology Society & the Australia New Zealand Microcirculation Society, oral presentation, Adelaide, Australia, 09/13
24th Congress of the International Society of Thrombosis and Haemostasis, oral presentation, Amsterdam, Netherlands, 10/13
60th annual meeting of the SSC of the International society of thrombosis and Haemostasis, invited speaker, Milwaukee, US, 06/14

**Dr Stanley Lee**
ComBio 2013, oral presentation, Perth, Australia, 09/13

**Dr James Murphy**
Queenstown Molecular Biology Meeting, invited speaker, Queenstown, New Zealand, 08/13
ComBio 2013, oral presentation, Perth, Australia, 09/13
6th Barossa Meeting ‘Cell Signalling in the Omics Era’, oral presentation, Barossa Valley, Australia, 11/13
39th Lorne Conference in Protein Structure and Function, oral presentation, Lorne, Australia, 02/14
10th Banff Conference on Signalling in Normal and Cancer Cells, oral presentation, Banff, Canada, 03/14

**Professor Andrew Roberts**
4th Australia-China Biomedical Research Conference, invited speaker, Hangzhou, China, 09/13
Society of Hematological Oncology Scientific Meeting, invited speaker, Houston, US, 09/13
19th Congress of European Hematology Association, invited speaker, Viale Eginardo, Italy, 06/14

**Dr Benjamin Shields**
New Directions in Leukaemia Research 2014, oral presentation, Noosa, Australia, 03/14
Staff list

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

**Warren Alexander**, BSc(Hons) Melbourne PhD Melbourne
Maria Kauppi, PhD Helsinki
Stanley Lee, BSc(Hons) Auckland PhD Melbourne (to 12/13)
Ian Majewski, BSc(Hons) UWA PhD Melbourne
Ashley Ng, BMedSc Melbourne MB HS(Hons) Melbourne PhD Melbourne FRACP FRCPA
Sandra Pilat-Carotta, PhD Vienna (to 11/13)
Takashi Ushiki, MD Niigata PhD Niigata (from 02/14)
Amandine Carmagnac, BSc France
Jason Corbin, BAppSc Swinburne Christoffer Flensburg, PhD Lund, computational scientist (from 02/14)
Pradnya Gangatirkar, MSc Nagpur
Adrienne Hilton, BAppSc RMIT
Helen Ierino, BAppSc RMIT
Janelle Lochland, BSc Deakin
Sarah Miller, BSc(Hons) Toronto MSc Melbourne (from 09/13)
Dina Stockwell, BSc LaTrobe

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

**Stefan Glaser**, PhD Germany
Alexandra Ang, BSc(Hons) Malaya MMedSc Malaya, PhD student

**David Huang**, MB BS London PhD London MRCP London
Jianan Gong, BSc(Hons) PhD Tsinghua (from 11/13)
Lei Liu, MSc China PhD China
David Segal, BSc(Hons) UWA PhD ANU
Mark van Delft, BSc(Hons) McMaster PhD Melbourne
Andrew Wilks, BSc(Hons) Liverpool PhD Glasgow
Zhen Xu, BSc Nanjing PhD Nanjing
Chris Riffkin, BSc(Hons) LaTrobe
Hui Chin, BMedSc Melbourne, PhD student
Clea Grace, BSc(Hons) Sydney, PhD student
Sean Hewetson, BSc(Hons) student (from 02/14)

**Emma Joseffsson**, MSc Gothenburg PhD Gothenburg
Marion Lebois, BSc Marseille MSc Paris XI
Starling Sim, BAppMedSc Melbourne, BSc(Hons) student (to 11/13)

**Matthew McCormack**, BSc(Hons) Adelaide PhD Adelaide
Ben Shields, BSc(Hons) Melbourne PhD Melbourne
Jacob Jackson, BSc(Hons) Melbourne GradDipArts Melbourne
Hesham Abdulla, BAppSc RMIT BSc(Hons), PhD student
Raed Aserihi, BSc King Abdulaziz MSc RMIT, PhD student

**Don Metcalf**, AC BSc(Med) Sydney
MD Sydney FRACP HonDSc Sydney HonMD Oslo HonFRCPA London FRCPA FAA FRS, Carden Fellow
Ladina Di Rago
Sandra Mifsud, BAppSc RMIT

**Andrew Roberts**, MB BS Qld PhD Melbourne FRACP FRCPA
Seong Khaw, MB BS(Hons) Adelaide PhD Melbourne
Louise Cengia, BSc UTAS
Angela Georgiou
Mary Ann Anderson, MB BS Melbourne, visiting PhD student
Edward Chew, BMedSc Melbourne MB BS Melbourne FRACP FRCPA, PhD student (from 05/14)
Greg Corby, BBiology Auckland MB BS Auckland, visiting PhD student (from 02/14)
Simon He, MB BS Melbourne, visiting MD student
Sophie Lee, MB ChB Auckland, PhD student
Eric Si, BSc Cornell MS Uni at Buffalo MD SUNY Upstate, PhD student (from 05/14)
ACRF STEM CELLS AND CANCER

The ACRF Stem Cells and Cancer division is focused on breast, ovarian and lung cancers. Our aim is to understand the normal development of these organs, which cell types are predisposed to cancer, and find new diagnostic and therapeutic targets for these cancers.

Tumour ‘bank’ to test new drugs

Human tumours from patients can provide a wealth of information about how cancers behave.

Each human cancer is different, and tumour tissue can be analysed to understand the key changes that drive cancer development and, importantly, how the cancers respond to treatment.

Over the past three years, our research teams have developed an extensive bank of tumour models based on different subtypes of breast, lung and ovarian cancers. The tumour models, based on samples from real patient tumours, are being used for critical preclinical testing of new and existing drugs (read more on page 59).

Identifying ‘markers’ of breast cancer

Understanding how breast cancer develops requires us to investigate the molecular changes that drive cancer.

Our breast cancer research team has used the latest technologies to analyse single cells from the human breast, measuring the activity of thousands of genes at once. This analysis, called a gene expression profile, will help to identify breast cancer ‘biomarkers’ – proteins that are produced by breast cancers that can be used in blood tests and other diagnostic tests for early detection of breast cancer.

Personalised medicine in ovarian cancer

High-grade serous ovarian cancer is the most aggressive type of ovarian cancer.

Associate Professor Clare Scott and the ovarian cancer team are identifying the key genetic mutations found in high-grade serous ovarian tumours. This research will help to understand how ovarian cancer develops, how genetic changes impact on the tumours’ response to treatment and identify potential targets for new anti-cancer drugs.

The program is also driving personalised medicine for people with ovarian cancer, using identified genetic mutations to search for the best treatment for the individual patient and their tumour.

Health impact

Cancers: breast cancer, lung cancer, ovarian cancer

Other areas: personalised medicine

Faculty

Division heads
Professor Geoff Lindeman
Professor Jane Visvader

Lab heads
Dr Marie-Liesse Asselin-Labat
Associate Professor Clare Scott
Dr Kate Sutherland
Do breast stem cells retain cancer legacy?

Breast cancer affects one in eight Australian women. Despite improvements in survival, many types of breast cancer are still hard to treat, and have a poor prognosis. Institute researchers have discovered breast stem cells and their ‘daughters’ have a much longer lifespan than previously thought, remaining active in puberty and throughout life. This longevity means the cells could harbour genetic defects or damage that doesn’t progress to cancer until decades later, potentially shifting back the timeline of breast cancer development.

“Given stem cells – and their daughter progenitor cells – can live for such a long time ... damage to their genetic code could lead to breast cancer 10 or 20 years later.”

Professor Jane Visvader, Professor Geoff Lindeman and colleagues first isolated breast stem cells in 2006. In a paper published this year in *Nature*, the research team, with Dr Anne Rios and Dr Nai Yang Fu, showed breast stem cells actively maintain breast tissue for most of the life of the individual.

Professor Lindeman said the discovery would have implications for identifying the cells of origin of breast cancers. “Given stem cells – and their daughter progenitor cells – can live for such a long time and are capable of self-renewing, damage to their genetic code could lead to breast cancer 10 or 20 years later,” Professor Lindeman said.

The finding is also integral to identifying the cells of origin of breast tumours and the ongoing quest to develop new treatments and diagnostics for breast cancer.

Professor Visvader said understanding normal breast cell development was critical to understanding breast cancer. “Without knowing the precise cell types in which breast cancer originates, we will continue to struggle to develop new treatments and preventions,” she said. “These findings will hopefully have future applications for breast cancer.”

**Funding partners:** Australian National Health and Medical Research Council, Australian Cancer Research Foundation, Cure Cancer Australia, National Breast Cancer Foundation, Qualltrough Research Fund and Victorian Government.


**Watch the video ▶**
Sustained support aids breast cancer research

Breast cancer is the most common cancer in Australian women.

The institute’s breast cancer laboratory team is evaluating new models and targeted therapies for breast cancer patients, thanks to the generous and dedicated support of the Joan Marshall Breast Cancer Research Fund.

The Joan Marshall Breast Cancer Research Fund has committed to support this research for five years to ensure the research team has the opportunity to carry out early-phase clinical trials of potential anti-breast cancer drugs.

In the first year, Professor Jane Visvader, Professor Geoff Lindeman and their team have generated eight breast cancer models that will form the basis of the genetic studies for the rest of the project.

Professor Visvader said the next step was to determine the ‘gene profiles’ of breast tumours from patients before and after therapy. “This will assist in identifying biological markers that indicate how well a patient will respond to different cancer treatments, and whether their tumour DNA encodes chemotherapy resistance,” she said.

One of the major impediments to improving breast cancer outcomes is the ‘one-size-fits-all’ approach that is often applied to treatment. Professor Lindeman said many patients who received breast cancer drugs after their surgery were not given treatments that were specific to their cancer type.

“To derive maximal benefit from the new therapies that medical research is delivering, we must become more adroit at personalising therapy, by identifying specific genetic changes in the tumour that we can selectively target,” he said.

The research team has identified potential new therapies and secured approval to investigate potential anti-breast cancer drugs in the laboratory and clinic. The early-phase clinical trials will be conducted in partnership with Clinical Trials Australia and The Royal Melbourne Hospital.

“This promising research is made possible because of generous philanthropic support,” Professor Visvader said.

Late detection and resistance to existing therapies have made lung cancer the leading cause of cancer-related deaths worldwide.

Dr Kate Sutherland is developing preclinical models of human lung cancers to better understand how the disease develops, progresses and spreads.
Major national and international meetings

**Dr Marie-Liesse Asselin-Labat**
ComBio 2013, *invited speaker*, Perth, Australia, 09/13
Australasian Society for Stem Cell Research Conference, *invited speaker*, Brisbane, Australia, 10/13

**Professor Geoffrey Lindeman**
35th Australia and New Zealand Breast Cancer Trials Group Annual Scientific Meeting, *invited speaker*, Brisbane, Australia, 07/13
2013 Translational Cancer Research Conference, *invited speaker*, Newcastle, Australia, 10/13
6th IMPAKT Breast Cancer Conference, *invited speaker*, Brussels, Belgium, 05/14

**Associate Professor Clare Scott**
The Gynaecological Oncology Research Collaborative of the Victorian Comprehensive Cancer Centre, Symposium on Ovarian Cancer, *conference convenor*, Melbourne, Australia, 08/13
Australia New Zealand Gynaecological Oncology Group ASGO Combined Annual Scientific Meeting, *plenary speaker*, Canberra, Australia, 03/14
Gynecologic Cancer InterGroup (GCIG), *invited speaker*, Chicago, US, 05/14
American Society of Clinical Oncology, *invited speaker*, Chicago, US, 05/14

**Professor Jane Visvader**
2013 Shanghai International Symposium on Cancer Stem Cells, *invited speaker*, Shanghai, China, 10/13
Epigenetics 2013, *invited speaker*, Shoal Bay Resort, Australia, 12/13
25th Lorne Cancer Conference, *invited speaker*, Lorne, Australia, 02/14
Genomics and Stem Cell Based Therapies: Shaping the future of personalized medicine, *plenary speaker*, Guangzhou, China, 05/14

**Ms Clare Weeden**
15th World Lung Cancer Conference, *invited speaker*, Sydney, Australia, 10/13
Staff list

Rebecca Cook, BSc(Hons) South Australia, scientific coordinator (from 02/14)
Audrey Partanen, BSc Washington, project coordinator (to 07/13)
Kylie Shackleton, BSc(Nursing) Deakin, project officer

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
Ewa Michalak, BSc(Hons) UWA PhD Melbourne
Michal Milgrom Hoffman, PhD Israel (from 03/14)
Bhupinder Pal, MSc Kurukshetra PhD Melbourne
Anne Rios, PhD Marseille
Julie Taoudi, BSc(Hons) Leeds PhD Edinburgh
Francois Vaillant, PhD Monash
Julius Graesel, BSc Germany
Felicity Jackling, BSc(Hons) Melbourne
Paul Jamieson, BSc(Hons) (from 03/14)
Kevin Liu, BMed Beihua PhD Melbourne

Tamara McLennan, BAppSc(Hons) QUT BBiolSc LaTrobe
Catherine To, BSc(Hons) Melbourne (to 04/14)
Sarah Best, BSc(Hons) Melbourne, PhD student
Bianca Capaldo, BSc Monash BSc(Hons) Melbourne, PhD student
Jeffrey Kam, visiting Honours student (to 12/13)
Lily Lee, BSc(Hons) Melbourne LLB(Hons) Melbourne, PhD student
Emma Nolan, BSc(Hons) Otago, PhD student

Marie-Liesse Asselin-Labat, PhD Paris

Aliaksei Holik, BSc(Hons) Edinburgh PhD Cardiff
Laura Galvis Vargas, BSc(Hons) Melbourne
Julie Pasquet, BSc(Hons) Lyon MBiology Toulouse
Gaelle Tachon, overseas research trainee (to 03/13)
Clare Weeden, BA(Hons) UWA BSc(Hons) UWA, PhD student
Sebastian Zijl, BSc, overseas research trainee (from 03/14)

Clare Scott, MB BS Melbourne PhD Melbourne FRACP
Michele Cook
Emma Boehm, BSc Melbourne, visiting MD student
Alison Hadley, MB BS(Hons) Sydney MMedSc Sydney FRACP, PhD student (from 03/14)
Valerie Heong, MB BS Adelaide, PhD student
Veneta Khambatta, BBiomedSc(Hons), visiting MD student (from 01/14)
Elizabeth Lieschke, BSc(Honours) student (from 01/14)
Monique Topp, visiting PhD student
Louie Ye, BAppSc(Hons) RMIT PhD Monash, visiting MD student (from 04/14)

Kate Sutherland, BSc(Hons) Melbourne PhD Melbourne

Ariena Kersbergen, BAppSc Rotterdam (from 08/13)
MOLECULAR GENETICS OF CANCER

The Molecular Genetics of Cancer division is investigating how our cells normally die and how defects in this process cause disease, particularly cancer. Better understanding of cell death will help us to develop improved treatments for both cancers and immune disorders.

Genome editing accelerates research

An Australian-first genome engineering technology being established at the institute will fast-track research into cancers such as leukaemia and lymphoma.

The technology, called CRISPR/Cas9 genome editing, makes it possible to modify or delete specific genes of mammalian cells or mice in a quarter of the time previously possible.

Dr Marco Herold is heading the institute’s genome editing facility. He has focused on adapting the technology for blood cancers to assess the impact of removing tumour-suppressing or tumour-promoting genes. The technology will help to clarify how specific genes contribute to cancer and drug resistance, and to trial drugs to ensure they do not have unexpected side-effects.

Advancing cancer treatment

Over the past 25 years, our division has significantly advanced understanding of how cell death is controlled and the key proteins governing it. This includes the Bcl-2 family of pro-survival proteins, which contribute to the survival and chemotherapy resistance of many cancers.

The division is proud of its contributions to the preclinical research involved in developing drugs that target these pro-survival proteins, which are now in clinical trials for blood cancers such as leukaemia and under study for treating other blood and solid tumours. We are continuing to investigate the function of other proteins in cell death pathways and the potential for targeting them to treat cancer and other diseases.

Professor Jerry Adams honoured

In 2014, Professor Jerry Adams received two significant honours. He was the only Australian elected a fellow of the American Association for Cancer Research Academy, and received the Australian Academy of Science’s Macfarlane Burnet Medal, its premier award for biological science.

Professor Adams was recognised for his research achievements into cancer genetics and cell death. In the 1980s, he and his colleagues showed Burkitt’s lymphoma was often caused by genetic damage to the ‘switch’ that controlled the Myc gene, driving the cells to become cancerous. Professor Adams and institute colleagues have also made seminal contributions to discovering the proteins governing normal cell survival and cell death, and their roles in cancer development.

Health impact

Cancers: leukaemia, lymphoma, myeloma, myeloproliferative disorders, stomach cancer

Immune disorders: lupus, rheumatoid arthritis, type 1 diabetes

Other areas: personalised medicine

Faculty

Division heads
Professor Jerry Adams
Professor Andreas Strasser

Lab heads
Dr Philippe Bouillet
Professor Suzanne Cory (honorary distinguished research fellow)
Dr Daniel Gray
Dr Marco Herold
Dr Ruth Kluck
Targeting cell survival to kill lymphoma

Up to 70 per cent of human cancers, including many leukaemias and lymphomas, have unusually high levels of MYC. MYC is a protein that causes cancerous changes in cells by forcing them into abnormally rapid growth. Dr Gemma Kelly, Dr Marco Herold and Professor Andreas Strasser led a research team investigating how cells with high levels of MYC stay alive and grow. The discoveries offer hope for treating the many types of cancer that are driven to grow and spread through the actions of MYC.

“This suggests drugs that block MCL-1 function would be an effective strategy for treating lymphomas with limited side-effects on the body’s normal cells.”

Dr Kelly said the team showed that lymphoma cells with high levels of MYC could be rapidly killed by disabling MCL-1, a cell survival protein that sustains the expansion of these cancer cells.

“When compared with healthy normal cells, the lymphoma cells were considerably more sensitive to being deprived of MCL-1,” she said. “This suggests drugs that block MCL-1 function would be an effective strategy for treating lymphomas with limited side-effects on the body’s normal cells.”

Professor Strasser said the finding was exciting as there was hope that MCL-1 inhibitors may soon become available for clinical testing.

“Anti-cancer agents that target the protein Bcl-2, which is closely related to MCL-1, are already showing promise in clinical trials, including in Melbourne,” Professor Strasser said. “We are hopeful that inhibitors of MCL-1 will soon become available for clinical testing, and we will be very interested in determining whether these compounds could be used to treat MYC-driven cancers.”

Collaborating organisations: Cancer Centre Karolinska (Sweden) and The University of Birmingham (UK).

Funding partners: Australian National Health and Medical Research Council, Cancer Research UK (UK), EMBO, German Research Council (Germany), Kay Kendall Leukemia Fund (UK), Leukaemia Foundation, Leukaemia & Lymphoma Society (US) and Victorian Government.


Watch the video ▶

Dr Philippe Bouillet is studying the role of cell death and inflammation in diseases including chronic inflammatory arthritis, inflammatory bowel disease, cancer and epilepsy.
Funding cancer discoveries

While travelling in the US, Ms Jeanette Haviland heard a news report about an exciting cancer discovery made at the Walter and Eliza Hall Institute.

Professor Andreas Strasser, Dr Gemma Kelly and Dr Marco Herold had discovered a promising strategy for treating lymphomas and other cancers driven to grow and spread through the actions of a cancer-causing protein called MYC (read more on page 19).

The team had discovered that the protein MCL-1 was essential for survival of cancers with high levels of MYC, which includes many leukaemias and lymphomas. Professor Strasser said the researchers had shown blocking MCL-1 could rapidly kill lymphoma cells. “The cancers just melted away – it was astounding,” he said.

Ms Haviland, a trustee of the estate of Mr Anthony (Toni) Redstone OBE, contacted the institute on her return to Australia. “Toni had requested that his estate support further research into our understanding of and treatments for lymphoma, particularly non-Hodgkin lymphoma,” Ms Haviland said.

Mr Redstone, or Toni to those who knew him, was a pioneer in the wool industry. He had a long association with Norfolk Island, travelling back and forth for 53 years, from age 17, before settling there in 1999. Mr Redstone made significant donations and contributions to the Norfolk community and other causes, and is fondly remembered by the community for his generosity and courage.

Co-trustee Ms Helen Price travelled from her home on Norfolk Island to visit the institute, meet with researchers and confirm a $1 million gift from the estate to support Professor Strasser, Dr Kelly, Dr Herold and their team. “It is thrilling to be able to make a contribution that will enable this inspiring team to drive their work forward and hopefully help patients sooner,” Ms Price said. “We were delighted to be able to honour Toni’s wishes and support such promising and exciting research.”
**Major national and international meetings**

**Professor Jerry Adams**  
Australian Academy of Science, Science at the Shine Dome, *plenary speaker*, Canberra, Australia, 05/14  

**Ms Natasha Anstee**  

**Professor Suzanne Cory**  
2nd Annual NHMRC Research Translation Faculty Symposium, *plenary speaker*, Sydney, Australia, 11/13  
10th China Australia Symposium on Science and Technology Astronomy and Astrophysics, *keynote speaker*, Nanjing, China, 11/13  
1st International Kloster Seeon Meeting on Mouse Models of Human Cancer, *invited speaker*, Kloster Seeon, Germany, 03/14  

**Mr Alex Delbridge**  
Melbourne Cell and Developmental Biology 6th Annual Meeting, *oral presentation*, Parkville, Australia, 10/13  

**Dr Daniel Gray**  
ThymOz: international workshop on T Lymphocytes, *oral presentation*, Heron Island, Australia, 04/14  

**Dr Marco Herold**  
Cancer Biology: BRIC 10-year anniversary symposium, *oral presentation*, Copenhagen, Denmark, 08/13  
ComBio 2013, *invited speaker*, Perth, Australia, 10/13  

**Mr Colin Hockings**  
39th Lorne Conference on Protein Structure and Function, *oral presentation*, Lorne, Australia, 02/14  

**Ms Reema Jain**  
ThymOz: international workshop on T Lymphocytes, *oral presentation*, Heron Island, Australia, 04/14  

**Dr Lorraine O’Reilly**  
EMBO Conference - Cellular Signalling and Cancer Therapy, *oral presentation*, Cavtat, Croatia, 05/14  

**Professor Andreas Strasser**  
International Society for Hematology and Stem Cells - 42nd Annual Scientific Meeting, *plenary speaker*, Vienna, Austria, 08/13  

Minisymposium: Cell Death and Immunity, *invited speaker*, Cologne, Germany, 12/13  
Gordon Research Conference on Cell Death Mechanisms at the interface of Health and Disease, *invited speaker*, West Dover, US, 06/14  
16th International p53 Workshop, *invited speaker*, Stockholm, Sweden, 06/14  

**Dr Dana Westphal**  
Staff list

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

Jerry Adams, BSc Emory PhD
Harvard FAA FRS

Rebecca Bilardi, BBiolSc(Hons) LaTrobe PhD LaTrobe

Michael Dengler, MSc Stuttgart PhD Stuttgart (from 02/14)

Max Tailler, BSc Bordeaux 1 MSc Bordeaux 1 PhD Paris XI

Cassandra Vandenberg, BSc(Hons) Otago PhD Otago

Bin Wang, BSc Beijing PhD Beijing

Dana Westphal, MSc Technical PhD Otago (to 01/14)

Leonie Gibson, BAppSc RMIT

Mikara Robati, BSc Waikato

Natasha Anstee, BSc(Hons) Melbourne, PhD student

Andreas Strasser, MSc Basel PhD Basel FAA

Silvia Alvarez-Diaz, BSc Oviedo MSc Oviedo PhD Madrid
Alexis Delbridge, BBIomedSc(Hons) Melbourne PhD Melbourne

Stephanie Grabow, MSc Max Planck PhD Melbourne

Ana Janic, BSc Belgrade PhD Barcelona

Francine Ke, BSc(Hons) Melbourne PhD Melbourne

Gemma Kelly, BSc(Hons) Durham PhD Birmingham
Lorraine O’Reilly, BSc Glasgow PhD London

Ann Lin, BSc(Hons) Melbourne

Liz Valente, BBIomedSc(Hons) LaTrobe
Brandon Aubrey, BA Pennsylvania MB BS Sydney, PhD student

Jun Low, BBIomedSc Melbourne, PhD student

Philippe Bouillet, PhD Louis Pasteur
Derek Lacey, BSc(Hons) Monash PhD Monash (from 01/14)

Bruno Helbert, MSc Paris-Sorbonne
Carley Young, BSc Melbourne

Daniel Gray, BBIomedSc(Hons) Monash PhD Monash

Charis Teh, BSc(Hons) ANU PhD ANU
Reema Jain, MSc Auckland, PhD student

Antonia Policheni, BBIomedSc Monash BSc(Hons) Melbourne, PhD student

Marco Herold, Dipl. Biol. Wuerzburg PhD Wuerzburg

Lin Tai, BAppSc Swinburne MSc LaTrobe

Margs Cockburn, BSc(Honours) student (from 07/13)

Leona Rohrbeck, BSc Maastricht MSc Maastricht, PhD student

Robyn Schenck, BSc(Hons) Canterbury, PhD student (from 05/14)

Ruth Kluck, BSc Qld PhD Qld
Amber Alsop, BSc(Hons) Sydney PhD Cambridge
Khatira Anwari, BBIomedSc Melbourne BSc(Hons) Melbourne PhD Monash
Rachel Uren, BSc(Hons) Melbourne PhD Melbourne
Ray Bartolo, BSc(Hons) Deakin PhD Deakin (to 03/14)

Colin Hockings, BA(Hons) Cambridge, PhD student
Sweta Iyer, BSc India MSc Madurai Kamraj, PhD student
**ACRF CHEMICAL BIOLOGY**

The ACRF Chemical Biology division investigates key biological processes and pathways critical in disease development to discover potential drug targets important for human disease. Our researchers use chemical, biochemical, structural and biological approaches to establish how dysregulation of critical cell signalling pathways contributes to disease, and use this to guide novel therapeutic development.

**Discovering new drugs for inflammatory diseases**

Catalyst Therapeutics – a joint venture between the institute and SYNthesis Med Chem – is funding a program to discover drugs that will treat immune disorders.

The research program aims to develop lead compounds against the protein MLKL in order to treat inflammatory conditions.

MLKL is a key protein in necroptosis, a process that orders the cell to self-destruct while sending signals to the immune system to mount a response to potential invaders. Drugs that target MLKL could help patients who have inflammatory immune disorders including rheumatoid arthritis, inflammatory bowel syndrome, Crohn’s disease and psoriasis.

**Developing novel cancer drugs**

Medicinal chemist Associate Professor Guillaume Lessene is working to identify and develop drug-like molecules targeting cancer cells.

Associate Professor Lessene was jointly awarded the institute’s 2013 Burnet Prize, awarded annually to early-career scientists, with Dr Peter Czabotar from the Structural Biology division. Associate Professor Lessene played a key role in developing a tailor-made chemical compound, WEHI-539, which blocks a protein linked to poor responses to treatment in cancer patients. The compound is an important step towards the design of a potential new anti-cancer agent.

**Searching for new cancer and infection treatments**

Dr Ethan Goddard-Borger joined the institute with a $150,000 veski fellowship to discover potential medicines for cancers, genetic disorders and fungal infections.

Dr Goddard-Borger is developing new ways to block production of glycosphingolipids. Changes in glycosphingolipid production can contribute to cancer, cryptococcosis (a form of meningitis) and fatal genetic conditions known as lysosomal storage disorders. He is working to discovery new agents that block glycosphingolipid function to treat these diseases.

He is also the recipient of a Ramaciotti Establishment grant from the Ramaciotti Foundations, managed by Perpetual.

**Health impact**

**Cancers:** blood cancers, breast cancers, myeloproliferative disorders, stomach cancers

**Immune disorders:** Crohn’s disease, inflammatory bowel disease, psoriasis, rheumatic fever and heart disease

**Infectious disease:** HIV, malaria, toxoplasmosis

**Other areas:** heart disease and stroke, neurodegenerative disease

**Faculty**

**Division heads**

Professor Benjamin Kile
Associate Professor Guillaume Lessene

**Lab heads**

Dr Chris Burns
Dr Ethan Goddard-Borger
Dr Isabelle Lucet
Professor Keith Watson (Honorary)
Homing in on a new treatment for malaria

Malaria kills more than 700,000 people each year, many of them children under the age of five.

As malaria develops resistance to current antimalarial drugs, the search for new targets that kill all malaria species is becoming critical.

Institute researchers have developed a compound that blocks a key ‘gatekeeper’ enzyme called Plasmepsin V, which is essential for malaria parasite survival. The compound, WEHI-916, is the first step towards a new class of antimalarial drugs that could cure and prevent infections by all malaria species, including those resistant to existing drugs.

**WEHI-916 is the first step towards a new class of antimalarial drugs that could cure and prevent infections by all malaria species, including those resistant to existing drugs.**

A team led by Dr Justin Boddey, a parasitologist from the Infection and Immunity division, and Dr Brad Sleebs, a medicinal chemist from the ACRF Chemical Biology division, collaborated to develop WEHI-916. Dr Sleebs said WEHI-916 blocked Plasmepsin V, an enzyme that institute researchers had previously shown controlled transport of essential proteins in and out of the malaria parasite.

“Plasmepsin V is an ideal drug target because its inhibition effectively halts the transport of hundreds of malaria proteins that are essential for the parasite’s survival,” he said.

WEHI-916 could lead to drugs that cure malaria caused by all five species of *Plasmodium* parasite. “Our study has shown that Plasmepsin V is important in the most virulent species that causes malaria and WEHI-916 can kill this parasite,” Dr Sleebs said.

“It is a starting point for a research program that could lead to a new class of antimalarial drugs.”

**Collaborating organisations:** La Trobe University, National Center for Genetic Engineering and Biotechnology (Thailand) and University of Copenhagen (Denmark).

**Funding partners:** Australian National Health and Medical Research Council, Australian Research Council, CASS Foundation, Howard Hughes Medical Institute (US), Human Frontier Science Program, Ramaciotti Foundations and Victorian Government.


**Watch the video ▶**
Supporting innovative research

‘Apoptosis’ is a specialised form of cell death, tightly regulated by a complex web of proteins inside the cell. Millions of cells undergo apoptosis every minute, ensuring new cells replace old ones to keep tissues healthy. Proper control of apoptosis is critical to human health – too little can lead to a dangerous accumulation of cells, such as in cancer and autoimmune diseases, while excessive apoptosis can cause the unwanted loss of healthy tissues.

The DHB Foundation is enabling some of the institute’s most innovative research into cell death; supporting an ambitious early drug discovery project investigating new drugs to prevent apoptosis.

The research program – led by Professor Benjamin Kile, Associate Professor Guillaume Lessene and Professor David Huang – aims to identify new therapies that prevent the damage caused by stroke, traumatic brain injury, and retinal degeneration.

Associate Professor Lessene said the team would investigate whether blocking apoptosis might be an effective way to intervene in conditions where unwanted cell death contributes to disease.

“Our understanding of apoptosis, and the molecules that regulate it, has grown enormously over the past 20 years,” Associate Professor Lessene said. “This project builds on the wealth of cell death expertise that has accumulated at the institute and opens up a world of possibilities regarding the therapeutic manipulation of cell death. It will allow us to definitively establish the potential therapeutic utility of targeting apoptosis in diseases such as stroke.”

Institute director Professor Doug Hilton said it was often philanthropists who were willing to support the riskiest and most ambitious research projects.

“Increasingly the government makes conservative choices when it comes to supporting research,” Professor Hilton said. “It is wonderful to have donors who understand the value of blue-sky thinking and adventurous, exploratory research.”

The DHB Foundation is managed by Equity Trustees, which manages more than 450 charitable trusts and foundations that will distribute nearly $100 million to charitable organisations in 2014-15.

Glycans cover the surface of every healthy human cell, cancer cell and bacterium, playing a central role in how cells sense their environment and communicate. Dr Ethan Goddard-Borger is investigating glycans in disease, and developing novel drug-like molecules to interfere with glycans to treat diseases such as malaria, cancer and arthritis.
Major national and international meetings

Professor Benjamin Kile
International Society for Hematology and Stem Cells 42nd Annual Scientific Meeting, *invited speaker*, Vienna, Austria, 08/13

Associate Professor Guillaume Lessene
RACI Biomolecular Conference 2013, *oral presentation*, Blue Mountains, Australia, 07/13
International Chemical Biology Society 2013, *invited speaker*, Kyoto, Japan, 10/13

Dr Brad Sleebs
RACI Biomolecular Conference 2013, *oral presentation*, Blue Mountains, Australia, 07/13
Malaria in Melbourne 2013, *oral presentation*, Melbourne, Australia, 10/13
**Staff list**

Kylee Aumann, BSc(Hons) *Melbourne* PhD *Melbourne*, scientific coordinator  
Cathy Drinkwater, BSc(Hons) ANU PhD *Melbourne*, project officer (to 05/14)

**Benjamin Kile**, BSc(Hons) *Melbourne* LLB Monash PhD *Melbourne*  
Catherine Carmichael, BBiomedSci(Hons) *Melbourne* PhD *Melbourne* (to 02/14)  
Stephane Chappaz, MSc Paris PhD Basel  
Maryse Debrincat, BSc(Hons) *Melbourne* PhD *Melbourne* (to 05/14)  
Irina Pleines, Dipl. Biol. Wuerzburg PhD Wuerzburg (to 05/14)  
Michael White, BBus Swinburne BSc Swinburne BSc(Hons) *Melbourne* PhD *Melbourne*  
Rachael Lane

**Guillaume Lessene**, PhD *Bordeaux 1*  
Chinh Bui, BSc(Hons) *Griffith* PhD *Melbourne* (to 12/13)  
Anderly Chueh, BBiomedSci(Hons) *Melbourne* PhD *Melbourne* (from 02/14)  
Christoph Grohmann, MSc Muenster PhD *Muenster* (from 06/14)  
Brad Sleebs, BSc(Hons) *LaTrobe* PhD *LaTrobe*  
Amelia Vom, PhD *Monash*  
Vivien Yin, BSc(Hons) *Tsinghua* PhD *Melbourne* (from 09/13 to 11/13)  
Yelena Khakham, BSc(Hons) *Monash*  
Diane Becart, overseas research trainee (to 08/13)  
Sabrina Bernard, overseas research trainee (from 03/14)  
Michelle Gazdik, BMedChem(Hons) *LaTrobe*, PhD student  
Kate McArthur, BSc *Melbourne*, PhD student  
Michael Roy, BSc(Hons) *Melbourne* LLB *Melbourne*, PhD student

**Chris Burns**, BSc(Hons) *Melbourne* PhD *Melbourne*  
Danny Ganame, BSc(Hons) *LaTrobe* PhD *Melbourne* (to 06/14)  
Jean-Marc Garnier, PhD *Paris XI*  
Tamas Hatcaludi, MSc Vienna PhD *Monash* (from 07/13)  
Georgina Holloway, BAppSc(Hons) *RMIT* PhD *Melbourne*  
Romi Lessene, BSc(Hons) *Melbourne* PhD *Melbourne*  
George Nikolakopoulos, BAppSc(Hons) *QUT* PhD *Monash*  
Louisa Phillipson, BSc Surrey PhD *Reading*  
Pat Sharp, BSc(Hons) ANU PhD *ANU*  
Paul Stupple, BCh Oxford PhD *Oxford*  
Wilco Kersten, BSc *Netherlands*  
Thao Nguyen, BSc VUT (to 02/14)  
Dana Stachurska-Buczak, MSc Poland  
Wendy Gabelle, overseas research trainee (from 03/14)  
Adeline Grandclement, overseas research trainee (to 08/13)  
Duong Thuy Nhu, BSc *LaTrobe*, PhD student

**Ethan Goddard-Borger**, BSc(Hons) UWA PhD UWA (from 07/13)  
Valentin Champain, overseas research trainee (from 03/14)  
Alan John, BSc *Melbourne*, visiting masters student (from 02/14)  
Gaetano Speciale, MSc *Milan*, visiting PhD student (from 06/14)  
**Isabelle Lucet**, PhD *France* (from 02/14)  
Onisha Patel, BSc *India* PhD *RMIT* (from 02/14)  
Weiwon Dai, BSc *Shanghai* MS *Shanghai* (from 02/14)
MOLECULAR MEDICINE

Researchers in the Molecular Medicine division are investigating how biological systems function and are controlled in normal and disease states. With programs focused on blood cell production and function, epigenetics and cancer, our goal is to pinpoint molecular targets for disease diagnosis and treatment.

Drug discovery partnership

Building on a well-established, long-term collaborative partnership in drug target discovery, CSL and researchers from the Molecular Medicine division extended their collaboration in 2014 to form the WEHI-CSL Bioinformatics Alliance. Bioinformatics is used to develop analytical tools and methods for the meaningful interpretation of large and complex biological datasets. This wide-ranging collaboration will see the institute’s extensive bioinformatics capabilities combine with CSL’s translational science expertise to address various biological questions relating to drug target discovery and the development of novel therapeutics for human disease.

Dampening immune attacks

Regulatory T cells (T-regs) are immune cells that dampen the immune response. T-regs prevent the emergence of autoimmune diseases, in which the body’s immune system attacks its own tissues. Dr Yuxia Zhang, Professor Len Harrison and colleagues are studying the ‘epigenetic’ regulators that control which genes are switched on and off in T-regs.

In a recent study published in Blood, they identified specific regions of the DNA that were ‘tagged’ with epigenetic marks in T-regs, compared to other types of T cells. The T-regs’ ‘genetic signatures’ provide insights into previously unknown molecular regulators and will help us discover more about these important cells.

Medal rewards blood research

Division head and director Professor Douglas Hilton was awarded the 2013 Ramaciotti Medal for Excellence in Biomedical Research. Awarded by the Clive and Vera Ramaciotti Foundations, and managed by Perpetual, the Ramaciotti Medal and accompanying $50,000 grant recognises outstanding contributions to clinical or biomedical research, or the way in which healthcare is delivered.

Professor Hilton is a renowned leader in cell signalling and blood research. Professor Hilton and his research team’s achievements include identifying a molecule that controls leukaemia cell development and a new family of proteins (suppressors of cytokine signalling) that regulate blood cell signalling. He is a passionate advocate for translating the benefits of biological discoveries to treatments for patients.

Health impact

Cancers: blood cancers, leukaemia

Immune disorders: allergy, asthma, chronic idiopathic urticaria, multiple sclerosis, rheumatoid arthritis, type 1 diabetes, type 2 diabetes

Other areas: epigenetics, personalised medicine, regenerative medicine

Faculty

Division head
Professor Douglas Hilton

Lab heads
Dr Marnie Blewitt
Dr Ross Dickins
Professor Len Harrison

Dr Shalin Naik
Dr Matthew Ritchie
Dr Samir Taoudi
Reversing cancer in childhood leukaemias

In leukaemia, immature white blood cells replicate abnormally and build up in the bone marrow, interfering with normal blood cell production.

B-cell acute lymphoblastic leukaemia (B-ALL) is the most common cancer affecting children. Institute researchers have shown B-ALL can be successfully ‘reversed’ by coaxing leukaemia cells back into normal development.

Dr Ross Dickins and Ms Grace Liu found switching off a gene called Pax5 could cause cancer in a model of B-ALL, while restoring its function could ‘cure’ the disease.

**B-ALL can be successfully ‘reversed’ by coaxing the cancer cells back into normal development.**

When Pax5 function is compromised, developing B cells can get trapped in an immature state and become cancerous. Restoring Pax5 function, even in cells that have already become cancerous, removes this ‘block’, and enables the cells to develop into normal white blood cells.

Dr Dickins said the research shed light on the function of Pax5, which was one of about 100 genes known to ‘suppress’ human tumours. “This work shows how inactivating tumour suppressor gene Pax5 contributes to B-ALL development and how leukaemia cells become ‘addicted’ to low Pax5 levels to continue proliferating,” he said. “Even though B-ALL cells have multiple genetic mutations, simply reactivating Pax5 causes tumour cells to resume normal development.”

Unfortunately, Dr Dickins said it was very difficult to develop drugs that restore the function of genes lost during cancer development. “However by understanding the mechanisms by which Pax5 loss causes leukaemia, we can begin to look at ways of developing drugs that could have the same effect as restoring Pax5 function,” he said.

Collaborating organisations:
Research Institute of Molecular Pathology (Austria), St. Jude Children’s Research Hospital (US) and University of Minnesota (US).

**Funding partners:** Australian National Health and Medical Research Council, Leukaemia Foundation, Sylvia and Charles Viertel Charitable Foundation, veski and Victorian Government.


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PhD student Mr Matt Witkowski is working with Dr Ross Dickins to study the genetic causes of childhood leukaemias. Mr Witkowski is investigating how a gene called *Ikaros* is involved in leukaemia development.

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**Number of students**

10

**Number of publications**

40
Early career support a vital investment

It is often early investment by a donor that establishes a young researcher’s career.

With crucial support from the DHB Foundation, Dr Marnie Blewitt has continued her work on the molecular mechanisms behind epigenetics.

Dr Blewitt said epigenetic modifications controlled which genes were switched on and off in the cell during development.

“‘Epi’ means ‘above and beyond’, so ‘epigenetics’ is beyond what can be explained by genes alone,” Dr Blewitt said. “Genes can be thought of as letters on a page from which words can be made. However without punctuation the sentences are open to interpretation. Epigenetic marks are the punctuation marks that enable interpretation, controlling ‘expression’ of the genes.”

Dr Blewitt was recently able to secure federal government grants, thanks to the impact of her early, donor-funded research.

“It can take more than 10 years for a ‘young’ researcher to establish their reputation and attract government funding,” Dr Blewitt said. “I am very grateful for the support I have received from the DHB Foundation to directly support my laboratory in the critical early stages, allowing us to establish our laboratory and results and making us more competitive for federal funding.”

Dr Blewitt said her laboratory was specifically interested in the genes involved in epigenetic control in embryonic and adult stem cells.

“We are looking for the genes that are important in laying down or removing epigenetic marks on the genome, particularly in stem cell development,” she said. “Cancers frequently develop stem cell-like properties such as the ability to self-renew and ‘immortality’. Understanding the genes that imbue these stem cell properties will help us to discover new targets for therapies that could be pursued to treat cancers as well as in regenerative medicine.”
Major national and international meetings

Dr Esther Bandala-Sanchez
Merinoff World Congress 2013: HMGB1, oral presentation, Manhasset, US, 10/13

Dr Marnie Blewitt
ISEH-Society for Hematology and Stem Cells 42nd Annual Scientific Meeting, invited speaker, Vienna, Austria, 08/13

2014 Australian Pain Society 34th Annual Scientific Meeting, invited speaker, Hobart, Australia, 04/14

Dr Ross Dickins
ISEH-Society for Hematology and Stem Cells 42nd Annual Scientific Meeting, oral presentation, Vienna, Austria, 08/13

Professor Len Harrison
15th International Congress of Immunology, invited speaker, Milan, Italy, 08/13

Japanese Study Group of Type 1 Diabetes, keynote speaker, Karuizawa, Japan, 10/13

13th Immunology of Diabetes Society Meeting, keynote speaker, Lorne, Australia, 12/13

1st Annual Meeting of the Developmental Origins of Health and Disease Society of Australia and New Zealand, keynote speaker, Perth, Australia, 04/14

Dr Andrew Keniry
Epigenetics 2013 Australian Epigentics Alliance, oral presentation, Shoal Bay, Australia, 12/13

Ms Grace Liu
New Directions in Leukaemia Research, oral presentation, Noosa, Australia, 03/14

Dr Matthew Ritchie
European Bioconductor Developers’ Meeting, invited speaker, Cambridge, UK, 12/13

Dr Tobias Sargeant
14th International Conference on Systems Biology, invited speaker, Copenhagen, Denmark, 08/13

Dr John Wentworth
The Annual Scientific Meeting of the Australian Diabetes Society and the Australian Diabetes Educators Association 2013, oral presentation, Sydney, Australia, 08/13

World Diabetes Congress (International Diabetes Federation), oral presentation, Melbourne, Australia, 12/13
Staff list

Etty Bonnici, administrative officer
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Kelsey Breslin, BSc(Hons) Alberta
Joy Liu, BBSc Melbourne (from 01/14)
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Miha Pakusch, BSc(Hons) Melbourne Wendy Allan, BBiomedSc Melbourne, visiting masters student (to 06/14)

Kelan Chen, BSc(Hons) Melbourne PhD student
Jamie Gearing, BSc(Hons) Melbourne PhD student (to 12/13)
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Nicholas Tan, MSc Melbourne, visiting PhD student (from 10/13)

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Yuxia Zhang, PhD IMCAS
Ralph Boehmner, PhD Hamburg, technical consultant (to 12/13)
Jeanne Butler, BSc(Hons) UWA (to 03/14)
Filipp Esselborn, BSc Ruhr MSc Ruhr (to 01/14)
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Alana Neale, BSc(Hons) Melbourne
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Jaring Schreuder, BAppSc Van Hall
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Cynthia Liu, BSc Melbourne

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Kylie Greig, BSc(Hons) Melbourne PhD Melbourne
Andrew Jarratt, BSc(Hons) York PhD Oxford
Casey Ah-Cann, BSc(Hons) Melbourne
Caleb Dawson, BSc(Hons) student
Kathryn Potts, BSc Melbourne, PhD student

Walter and Eliza Hall Institute  Annual Report 2013-2014
The Structural Biology division is interested in discovering new medicines through studies of the three-dimensional structure of large biological molecules that are either targets for drugs or potential therapeutic agents in their own right.

**Improving peptide design**

Peptides are molecules that can very effectively modulate biological processes. However their clinical application has been limited due to their rapid degradation in bodily fluids.

In collaboration with the Gellman lab in the US we have largely overcome this issue in peptides that are used to activate programmed cell death (apoptosis) machinery in the cell.

Institute researchers have shown how high resolution structural information, obtained at the Australian Synchrotron, could be used to design new and highly stable peptides. The peptides target a wider range of apoptosis proteins and are more effective in activating cell death. These peptides provide an important step toward the development of therapeutically useful molecules with applications in diseases such as cancer where apoptosis is dysregulated.

**New targets for immune disease**

Institute researchers have generated the first full-length, atomic resolution, three-dimensional structure of a protein involved in necroptosis.

Necroptosis is a recently discovered cell death pathway that, when inappropriately activated, has been linked to the development of autoimmune disease.

The three-dimensional image of the protein MLKL, obtained using the Australian Synchrotron, revealed MLKL is a ‘dead enzyme’. This image, coupled with genetic studies, allowed the team to define how MLKL must be ‘switched on’ before it can activate the necroptosis cell death pathway.

MLKL could be a perfect target for treatments because it is different from almost every other cell-signalling protein, making it easier to develop highly specific drugs and limiting potential side-effects.

**Royal Society election**

Professor Peter Colman was the only Australian elected a fellow of the Royal Society in 2014, for his contributions to structural biology.

Professor Colman determined the three-dimensional structure of the influenza virus protein neuraminidase in 1983, while at CSIRO. The team discovered anunchanging part of the neuraminidase protein on the surface of all influenza viruses, which led them to discover the anti-influenza drug zanamivir (Relenza) for treating and preventing influenza.

Professor Colman’s work at the institute focuses on solving the three-dimensional structures of molecules involved in programmed cell death, which are being pursued for treating diseases including cancers, immune disorders and neurodegenerative diseases.

**Health impact**

**Cancers:** bowel cancer, leukaemia, lymphoma, myeloma, myeloproliferative disorders

**Immune disorders:** type 1 and 2 diabetes

**Infectious disease:** malaria, schistosomiasis

**Other areas:** heart disease and stroke, neurodegenerative disease

**Faculty**

**Division head**
Professor Peter Colman

**Lab heads**
Dr Jeff Babon
Professor Tony Burgess
Dr Matthew Call
Dr Melissa Call
Dr Peter Czabotar

Dr Doug Fairlie
Dr Jacqui Gulbis
Associate Professor Mike Lawrence
Dr Colin Ward
Solving a cryptic problem

Bowel cancer is a leading cause of cancer-related deaths in Australia. Institute researchers have overturned conventional thinking on bowel mucosa development, suggesting a previously unknown mechanism for how bowel cancer starts.

The researchers implicated crypt-generating stem cells in maintaining and regenerating bowel mucosa, and indicated they may play a role in bowel cancer development.

Dr Chin Wee Tan and Professor Tony Burgess showed for the first time the bowel generates new intestinal crypts by a process called ‘budding’.

**The findings suggested crypt-generating stem cells are likely to be the initiators of bowel cancer.**

Dr Tan said the team used advanced three-dimensional imaging to show new crypts continued to be produced at a low but detectable rate in later life. “Our images clearly showed new crypts start from asymmetrical ‘buds’ that develop at the bottom of the crypt, not by each crypt splitting down the middle as was previously thought,” he said.

The research also uncovered a likely link between crypt ‘budding’ and bowel cancer. “Our images showed that – as part of normal intestinal development – only one bud at a time is produced by each regenerating crypt,” he said. “In precancerous and cancerous bowel tumours, we see a lot of out-of-control budding, and many buds associated with a single crypt. This suggests the genes that exert control over the budding process may have been ‘lost’, initiating bowel cancer development.”

Professor Burgess said the findings suggested crypt-generating stem cells were likely to be the initiators of bowel cancer, due to a critical change in the APC gene.

“Losing APC, which happens in 85 per cent of bowel cancers, disturbs control of the location and production of bowel stem cells,” Professor Burgess said. “This causes ‘chaotic’ growth of crypt buds, leading directly to precancerous and cancerous growths.”

Collaborating organisations: Ludwig Cancer Research (US) and The University of Western Australia.

Funding partners: Australian National Health and Medical Research Council and Victorian Government.


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Cells are surrounded by membranes that restrict the movement of molecules into or out of the cell. Dr Jacqui Gulbis is studying the structure and function of proteins that transport molecules across cell membranes, which has implications for a range of diseases.
Community support to stop bowel cancer

Living outside Australia’s largest cities could mean a higher risk of dying from cancer; with research showing decreases in cancer deaths in metropolitan areas are not translating to the regions.

Recently the Twin Towns Services Community Foundation, which is supported by the Twin Towns Services Club, decided to take action.

Mr Tony Mitchell, speaking on behalf of the Twin Towns Services Community Foundation, said bowel cancer was one of the most commonly diagnosed cancers in Queensland.

“Bowel cancer is the third highest cause of cancer-related death in Queensland men and women.” Mr Mitchell said. “The foundation reviewed a number of proposals, and we were inspired by Professor Tony Burgess’ project to identify more effective targeted treatment for bowel cancer.”

The foundation has committed to support Professor Burgess’ research for the next three years. Professor Burgess said this funding would enable his research team to search for effective drug combinations to target the processes that drive colon cells to become cancerous.

“More than 85 per cent of colon cancers are driven by one specific mutation, and we have already discovered one drug combination which kills cells with this mutation,” Professor Burgess said. “We will now be able to compare the efficacy of other drug combinations.”

The key to preventing bowel cancer and the spread of bowel cancer to other parts of the body was early detection and treatment, Professor Burgess said.

“In addition to identifying new treatments, this project may also help to develop a realistic chemoprevention strategy for reducing the incidence of colon cancer in our community,” he said. “We believe it is feasible to remove precancerous growths before they become cancerous, by identifying a short-term treatment with a combination of drugs which target precancerous colon cells. Support from the Twin Towns community is allowing us to investigate this possibility.”

Programmed cell death (apoptosis) is crucial for tissue development, but also plays a role in diseases such as cancer and neurodegenerative diseases. Mr Ahmad Wardak works with Dr Peter Czabotar, using structural biology to visualise cell life and death molecules in atomic detail.
Major national and international meetings

**Professor Antony Burgess**
Epidermal Growth Factor Receptor - Future Directions Joint International Research Conference of the Israel Institute for Advanced Studies and The Israel Science Foundation, *invited speaker*, Jerusalem, Israel, 11/13

**Dr Melissa Call**
7th International Leukocyte Signal Transduction Conference, *invited speaker*, Kos, Greece, 09/13

**Dr Matthew Call**
East Coast Protein Meeting 2013, *keynote speaker*, Coffs Harbour, Australia, 07/13

**Professor Peter Colman**
12th Conference of the Asian Crystallographic Association, *plenary speaker*, Hong Kong, China, 12/13

**Dr Peter Czabotar**
ComBio 2013, *invited speaker*, Perth, Australia, 10/13


Crystal29, 29th Biennial Meeting of the Society of Crystallographers in Australia and New Zealand, *invited speaker*, Lamington National Park, Australia, 05/14

The 4th Asia Pacific Protein Association Conference, *invited speaker*, Jeju Island, Korean Republic, 05/14

**Dr Jacqui Gulbis**

**Associate Professor Michael Lawrence**
XII International Symposium on Insulin Receptors and Insulin Action, *invited speaker*, Barcelona, Spain, 11/13

**Dr Douglas Fairlie**
10th Australian Peptide Conference, *oral presentation*, Penang, Malaysia, 09/13

Staff list

Pauline Drum, GradDipBus Swinburne, personal assistant
Amanda Voudouris, BSc Monash, scientific coordinator

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Angus Cowan, BBiotech(Hons) Monash, PhD student

Jeff Babon, BSc(Hons) Melbourne PhD Melbourne
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Maree Faux, BSc(Hons) Deakin PhD Melbourne
Nadia Kershaw, MChem Oxford PhD Oxford
Lauren King, BSc(Hons) Glasgow PhD Glasgow
Chin Wee Tan, BCompEng(Hons) Singapore MBIomedEng Melbourne PhD Melbourne
Francesca Walker, PhD Pavia (to 12/13)
Nicole Church, BAppSc RMIT
Melanie Condron, BSc(Hons) LaTrobe Paola Corona, MB BS Modena (to 08/13)
Yumiko Hirokawa, MVSc Japan
Janet Weinstock, BSc Monash Phong Wong, BSc Putra MSc Leicester (to 05/14)
Hui Hua Zhang, MB BS Beijing PhD Melbourne
Ryan Atkins, visiting PhD student
Mark Gregory, MChem Leeds, visiting PhD student (to 12/13)
Shabnam Khatibi, BSc Sharif, visiting PhD student
Kelvin Yip, BSc Hong Kong M.Phil Hong Kong, PhD student

Matt Call, BSc Trinity PhD Harvard
Melissa Call, BSc Auckland MSc Auckland PhD Auckland
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Cyrus Tan, BA Melbourne BSc(Hons) Melbourne, PhD student
Raphael Trenker, PhD student (from 03/14)

Peter Czabotar, BSc Curtin PhD Curtin
Geoff Thompson, BSc(Hons) Melbourne
Ahmad Wardak, BSc(Hons) LaTrobe
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Marco Evangelista, BBiotech(Hons) Adelaide
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Harrod Zhu, BSc(Honours) student (from 02/14)

Jacqui Gulbis, BSc(Hons) LaTrobe PhD LaTrobe
Lukasz Kowalczyk, MSc Gdansk PhD Gdansk (to 12/13)
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Cindy Luo, BEng Beijing
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John Menting, BSc(Hons) Melbourne PhD LaTrobe
Callum Lawrence, BBiotech(Hons) Monash, PhD student
BIOINFORMATICS

The Bioinformatics division collaborates with institute and external researchers in designing, conducting and analysing genomic and molecular sequence studies to understand biology and disease. We also conduct research to improve existing methods and develop novel methods for analysing data.

Faster, flexible RNA analysis

RNA sequencing provides a ‘snapshot’ of what is happening inside a cell at any given moment, providing information on which genes are switched on and how active they are.

Professor Gordon Smyth and colleagues have developed a faster, more robust approach to analysing RNA sequencing data.

Called Voom, the new approach greatly widens the range of downstream analysis tools that can be applied to research. It is being used at the institute in a wide range of studies relevant to many different diseases, including breast cancer, lung cancer, leukaemia and malaria.

Finding the key to epilepsy

Epileptic encephalopathies are a range of epileptic syndromes that are associated with cognitive or behavioural problems.

Associate Professor Melanie Bahlo and her team are collaborating with the Melbourne Epilepsy Research Centre to discover genes involved in epilepsy.

Their approach prioritises candidate epileptic encephalopathy genes by looking at genes expressed in the brain and how they interact with other brain-specific genes. This will hasten the discovery of genes whose malfunction causes epilepsy and other brain diseases.

Cancer and medical ‘-omics’

Associate Professor Papenfuss and his team have developed a new and sensitive method to identify genomic rearrangements in cancer genomes.

The Papenfuss lab works closely with cancer researchers in the Peter McCallum Cancer Centre, using bioinformatics to make new insights into cancer.

Professor Terry Speed, Professor Smyth, Associate Professor Bahlo and Associate Professor Papenfuss also won a $6.1 million grant from the Australian National Health and Medical Research Council to use computational and statistical bioinformatics for medical ‘omics’. Medical omics refers to sequencing information from the genome itself, gene products, proteins and metabolic products.

Health impact

Cancers: bowel cancer, breast cancer, leukaemia, lymphoma, lung cancer, myeloma, ovarian cancer, stomach cancer

Immune disorders: coeliac disease, lupus, multiple sclerosis, rheumatoid arthritis, type 1 diabetes

Infectious disease: malaria, scabies, tuberculosis

Other areas: congenital disease, heart disease and stroke, neurodegenerative disease, personalised medicine

Faculty

Division head
Professor Terry Speed

Lab heads
Associate Professor Melanie Bahlo
Associate Professor Tony Papenfuss
Professor Gordon Smyth
Better screening for Down syndrome

More than 1000 pregnant women in Victoria and Tasmania are screened each week for foetal genetic abnormalities such as Down syndrome. Down syndrome (trisomy 21) is the result of an extra copy of chromosome 21. Prenatal screening can detect the condition, however existing screening methods need to be performed within a narrow gestational window and are somewhat insensitive. This means more mothers than necessary are recommended to have invasive tests that, while giving a definitive diagnosis, carry a risk for both mother and child.

“Ideally, this ‘local’, cheaper version of the Down syndrome screening test will be available to Victorian women next year.”

Ms Dineika Chandrananda and Associate Professor Melanie Bahlo have improved the accuracy and decreased the cost of screening for Down syndrome and other genetic defects.

Ms Chandrananda said the methodology used cell-free DNA fragments from the foetus and mother that are found in the blood of pregnant women. “This DNA can be screened for genetic abnormalities using next-generation sequencing,” she said. “Trisomy 21, for example, is detected by getting more data than expected from chromosome 21. However this sequencing data is riddled with bias or ‘noise’, due to biological or sequencing processes, that hide the signal from the extra copy of chromosome 21.”

The team developed a method that sensitively corrected for biological and statistical bias, to silence the noise. “The new method improves accuracy while also reducing screening costs by decreasing the number of DNA ‘reads’ needed for an accurate result,” Ms Chandrananda said.

Working with the Victorian Clinical Genetics Services (VCGS), Associate Professor Bahlo said they hoped to see the test rolled out soon. “With VCGS, we have trialled the test on 29 donated samples, but we hope to increase this to hundreds or thousands of samples,” she said. “Ideally, this ‘local’, cheaper version of the Down syndrome screening test will be available to Victorian women next year.”

Collaborating organisations: Murdoch Children’s Research Institute, The University of California Berkeley (US), The University of Melbourne and Victorian Clinical Genetics Service.

Funding partners: Australian National Health and Medical Research Council, The John and Patricia Farrant Scholarship and Victorian Government.

Sequencing the scabies mite

Scabies is a skin infection caused by the parasitic scabies mite, which burrows into the skin causing an itchy rash. Scabies infects 300 million people worldwide each year, including in Australia. In Aboriginal and Torres Strait Islander communities in northern Australia, 25 per cent of adults and 50 per cent of children have scabies infections each year.

Associate Professor Tony Papenfuss is using the latest genomic technologies to tackle scabies. “It is appalling that in these communities seven out of 10 children under one year of age contract scabies,” he said. Scabies infections can lead to severe health problems, including childhood malnutrition and pneumonia.

Wounds are commonly infected by Group A streptococcus bacteria, which leads to acute kidney disease, rheumatic fever and rheumatic heart disease. Aboriginal and Torres Strait Islander communities have the highest rates of rheumatic heart disease in the world, with mortality rates 20 times higher than other Australians.

The Lettisier Foundation has pledged three years of support to a project to sequence the scabies mite genome. Mr David Evans, foundation trustee, said the Lettisier Foundation would contribute to an ambitious multidisciplinary collaboration between the institute, Menzies School of Health Research in Darwin and QIMR Berghofer Medical Research Institute.

“Many diseases have benefited from the genomics revolution taking place in medicine—most notably cancer,” Mr Evans said. “Indigenous Australians should share in the opportunities for state-of-the-art genomics technology to improve health.”

Associate Professor Papenfuss said by 2016 the ‘genome map’ would be ready to share with researchers internationally to accelerate the search for a scabies vaccine. It was a similar genome map of the malaria parasite that led to the development of malaria vaccines now in clinical trials.

Modern genomic technologies produce huge amounts of data that allow us to examine which genes are switched on and how active they are in any type of cell at any time.

Professor Gordon Smyth and his team develop advanced strategies to interpret this information, collaborating closely with institute scientists to understand breast and lung cancers, multiple sclerosis and immune disorders.
Major national and international meetings

Associate Professor Melanie Bahlo
8th International Conference on Genomics & Bio-IT APAC, invited speaker, Shenzhen, China, 11/13
6th Barossa Meeting ‘Cell Signalling in the Omics Era’, invited speaker, Barossa Valley, Australia, 11/13
MacTel Annual Scientific Meeting, invited speaker, New York, US, 06/14

Professor Gordon Smyth
Winter School of Mathematics, invited speaker, Brisbane, Australia, 07/13
Victorian Systems Biology Symposium, invited speaker, Melbourne, Australia, 08/13
Australasian Genomics and Technologies Association 2013, invited speaker, Surfers Paradise, Australia, 10/13
Bioinformatics Focus on Analytic Methods 2014, invited speaker, Melbourne, Australia, 03/14

Dr Saskia Freytag
60. Biometrische Kolloquium of the German Region of the International Biometric Society (IBS-DR), invited speaker, Bremen, Germany, 03/14

Mr Rick Tankard
16th International Workshop on Fragile X and Other Early Onset Disorders oral presentation, Barossa Valley, Australia, 09/13

Dr Wei Shi
BioC2013 workshop, Seattle, US, 07/13

Professor Terry Speed
29th European Meeting of Statisticians, lecture, Budapest, Hungary, 07/13
Joint Statistical Meeting 2013, invited speaker, Montréal, Canada, 08/13
The 21st St Vincent and Mater Health Research Symposium, invited speaker, Sydney, Australia, 09/13

German Conference on Bioinformatics 2013, keynote speaker, Gottingen, Germany, 09/13
International Workshop on Multivariate Analysis and Random Matrices. New Tendencies, invited speaker, Guanajuato, Mexico, 09/13
TBC/ISCB-Asia 2013 Meeting, keynote speaker, Seoul, Korea, 10/13
BioInfoSummer 2013, invited speaker, Adelaide, Australia, 11/13
International Conference on Stochastic Models in Ecology, Evolution and Genetics, plenary speaker, Angers, France, 12/13
The Big Data Conference 2014, invited speaker, Melbourne, Australia, 04/14
The Abel Symposium 2014, invited speaker, Lofoten, Norway, 05/14
**Staff list**

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

Kathryn Benton, BSc Colorado MSc Tulane (to 08/13)
Zhi-Ping Feng, BSc Peking MSc Tianjin PhD Tianjin

Jason Li, PhD Melbourne (to 06/14)
Ingrid Lonnstedt, MSc Uppsala PhD Uppsala (to 06/14)

Martin O’Hely, BSc(Hons) Monash MA Minnesota PhD Minnesota
Moshe Olshansky, BSc Israel PhD Columbia

Alan Rubin, BSc Oregon State PhD Washington (from 02/14)
Matthew Wakefield, BSc(Hons) Melbourne PhD LaTrobe

Chris Woodruff, BSc(Hons) UTAS PhD UTAS (from 03/14)
Artika Nath, visiting PhD student (from 02/14)

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

Miriam Fanjul, BSc(Hons) Manchester (from 09/13)
Saskia Freytag, MSc Georg-August PhD Georg-August (from 01/14)
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Natalie Thorne, BSc(Hons) Melbourne PhD Melbourne
Peter Diakumis, BSc Athens

**Vincent Corbin**, BSc Florida MSc Montana PhD Montana
Jan Schroeder, MSc Christian-Albrechts PhD Melbourne

Leon Di Stefano, BA Melbourne MSc Melbourne (from 01/14)
Jocelyn Penington, BSc(Hons) Monash (from 02/14)

Daniel Cameron, BE(Hons) Melbourne, PhD student
Lachlan McIntosh, visiting Masters student (from 08/14)
Ehtesham Mofiz, BSc North South, PhD student
Samuel Robinson, BSc(Hons) Auckland, visiting PhD student
Gerry Tonkin-Hill, BSc Melbourne, visiting Masters student (from 02/14)

**Katherine Smith**, BSc(Hons) Melbourne  
MBiostat Melbourne
Natacha Tessier, MBiostat France (from 09/13)
Sophia Cameron-Christie, BSc(Hons), visiting PhD student (to 08/13)
Dineika Chandrananda, BSc(Hons) Auckland, PhD student
Lyndal Henden, BSc(Hons) Massey, PhD student
Stuart Lee, BCompSc Adelaide, visiting Masters student (from 06/14)
Karen Oliver, visiting Masters student
Rick Tankard, BSc(Hons) Melbourne, PhD student

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

Jocelyn Penington, BSc(Hons) Monash (from 02/14)

Gordon Smyth, BSc(Hons) UWA PhD ANU
Yunshun Chen, BSc(Hons) Melbourne PhD Melbourne
Goknur Giner, PhD Izmir (from 04/14)
Yang Liao, BCompSc Tsinghua MIT Melbourne

Wei Shi, BCompEng Harbin MS Harbin PhD Harbin

Yifang Hu, BESoftEng Melbourne BSc Melbourne, software engineer
Keith Satterley, BSc Melbourne DipEd Melbourne DipCompSci LaTrobe, senior programmer
joshy george, ME Bangalore, visiting PhD student (to 12/13)

Natalie Thorne, BSc(Hons) Sydney, PhD student
Alex Garnham, BSc(Hons) LaTrobe, bioinformatics analyst (from 05/14)
Maria Markovic, BA RMIT DipEd LaTrobe, administrative officer

**Kathryn Benton**, BSc Colorado MSc Tulane (to 08/13)
Zhi-Ping Feng, BSc Peking MSc Tianjin PhD Tianjin

Jason Li, PhD Melbourne (to 06/14)
Ingrid Lonnstedt, MSc Uppsala PhD Uppsala (to 06/14)

Martin O’Hely, BSc(Hons) Monash MA Minnesota PhD Minnesota
Moshe Olshansky, BSc Israel PhD Columbia

Alan Rubin, BSc Oregon State PhD Washington (from 02/14)
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Chris Woodruff, BSc(Hons) UTAS PhD UTAS (from 03/14)
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**Melanie Bahlo**, BSc(Hons) Monash  
PhD Monash

Miriam Fanjul, BSc(Hons) Manchester (from 09/13)
Saskia Freytag, MSc Georg-August PhD Georg-August (from 01/14)
Thomas Scerri, BSc UCL MSc Birkbeck DPhil Oxford

Natalie Thorne, BSc(Hons) Melbourne PhD Melbourne
Peter Diakumis, BSc Athens

**Vincent Corbin**, BSc Florida MSc Montana PhD Montana
Jan Schroeder, MSc Christian-Albrechts PhD Melbourne

Leon Di Stefano, BA Melbourne MSc Melbourne (from 01/14)
Jocelyn Penington, BSc(Hons) Monash (from 02/14)

Daniel Cameron, BE(Hons) Melbourne, PhD student
Lachlan McIntosh, visiting Masters student (from 08/14)
Ehtesham Mofiz, BSc North South, PhD student
Samuel Robinson, BSc(Hons) Auckland, visiting PhD student
Gerry Tonkin-Hill, BSc Melbourne, visiting Masters student (from 02/14)
**INFECTION AND IMMUNITY**

Malaria, tuberculosis and HIV are three of the major global infectious diseases causing significant death and disease, particularly in resource-poor countries. The Infection and Immunity division aims to understand how infectious agents cause human disease and use this knowledge to develop new treatments.

**Developing new antimalarial drugs**

The malaria parasite exports hundreds of proteins to the host red blood cell during human infections. These proteins remodel the malaria-infected red blood cell so it can obtain nutrients and build protective systems to evade immune attack.

We identified an enzyme called Plasmepsin V that performs an essential step for export of these proteins to remodel the host red blood cell. In collaboration with the ACRF Chemical Biology division, we discovered and synthesised a drug that inhibits the function of Plasmepsin V, an important step in the development of new antimalarial drugs.

**International network to eliminate malaria**

The institute joined the Asia Pacific Malaria Elimination Network (APMEN) in 2014, an international collaborative network working towards eliminating malaria in the Asia-Pacific region.

The network is bringing attention and support to the under-appreciated and little-known work of malaria elimination in the Asia-Pacific region, with a particular focus on *Plasmodium vivax*.

The institute’s role in the partnership is developing and implementing tools to aid malaria elimination programs throughout the Asia-Pacific region. The institute is already working with APMEN on the evaluation of malaria treatment protocols in the Solomon Islands and Vanuatu to help inform future elimination programs.

**Rewarding quest to eradicate malaria**

In 2013, division head Professor Alan Cowman received several awards for his quest to eradicate malaria.

Professor Cowman received the 2013 Victoria Prize for Science and Innovation from the Victorian Government and the Mahathir Science Award in Tropical Research by the Mahathir Science Foundation, Malaysia.

Professor Cowman has dedicated his nearly 30-year career to understanding what makes the malaria parasite ‘tick’ and creating a vaccine that would eradicate this devastating disease. The awards recognise his major contributions to understanding malarial drug resistance, unravelling the mechanism the parasite uses to become resistant to some of the most important antimalarial drugs.

**Health impact**

**Infectious disease**: chronic infections, hepatitis B, HIV, malaria, toxoplasmosis, tuberculosis, vaccines
Discovery could turn antibiotic into antimalarial

Malaria infects hundreds of millions of people every year, causing more than 700,000 deaths.

The Plasmodium malaria parasite has developed resistance to many current antimalarial drugs, with new drugs urgently needed.

Dr Wilson Wong, Dr Jake Baum and colleagues are making progress towards new antimalarial drugs. The team recently revealed how an antibiotic called emetine blocks the proteins required for parasite survival. Although emetine is effective against malaria it cannot be used due to its significant side-effects.

“Knowing exactly how these antibiotics work will enable development of new antimalarial drugs.”

Dr Wong said the study examined the parasite’s protein-making machinery, visualising for the first time the structure of the parasite ribosome. “The ribosome constructs all proteins inside the cell from the DNA ‘blueprint’,” he said. “Emetine kills the parasite by binding to its ribosome, preventing the parasite from building the proteins it needs to produce energy, grow, reproduce and evade the immune system.”

The structure of the Plasmodium falciparum parasite ribosome, and how emetine interacts with the ribosome, was visualised to atomic precision by electron microscopy called ‘Cryo-EM’.

“This powerful technology allows us to visualise the finest details of large protein complexes,” Dr Wong said. “We had access to highly sensitive cameras, which was central to the discovery, through a collaboration with Dr Sjors Scheres at the MRC Laboratory of Molecular Biology.”

The team is working with ACRF Chemical Biology division researchers to develop molecules based on emetine and pactamycin. “Knowing exactly how these antibiotics work will enable development of new antimalarial drugs that replicate the active component of these antibiotics while changing the parts that make it toxic to patients,” Dr Wong said.

Collaborating organisations: Bio21 Institute, Imperial College London (UK) and MRC Laboratory of Molecular Biology (UK).

Funding partners: Australian National Health and Medical Research Council, Australian Research Council, Human Frontier Science Program, OzEMaR and Victorian Government.

Eradicating malaria has passionate supporters

The Walter and Eliza Hall Institute has more than 70 researchers who are working to improve treatments, develop vaccines and assist in eradicating malaria.

In 2012, the institute opened a high-containment insectary for researchers to study the very first stages of malaria infection. During early infection, the malaria parasite ‘hides’ from the host immune system in the liver, silently transforming itself into a form that can infect red blood cells.

Understanding these key stages of the malaria lifecycle could lead to new antimalarial drugs or a much-needed malaria vaccine.

The Rotary Club of Eltham is a great supporter of the institute’s malaria research. Last year, the club raised $3250 for a new dissecting microscope for the insectary, and pledged to raise a further $9000 for another essential microscope for the insectary within the next two years.

Former Rotary Club of Eltham President Mr Ken Paynter said the club was proud to support one of Australia’s leading medical research institutes.

“The Rotary Club of Eltham is a passionate supporter of the Walter and Eliza Hall Institute’s tremendous work to study and eradicate malaria,” Mr Paynter said. “It is wonderful to see this great research being done in Melbourne, and we are looking forward to our continued involvement with, and support of, the institute.”

In late 2013 the Rotary Club visited the institute for a private tour of the insectary, to see the microscope in action and learn more about the institute’s recent research.

Professor Alan Cowman, head of the institute’s malaria program, said he was delighted for the ongoing support of the Rotary Club of Eltham.

“The new microscope will be vital in assisting with the division’s research into new malaria drugs and vaccines,” Professor Cowman said. “It is also inspiring for our researchers to know that the community supports us in our continued vision to improve lives through better antimalarial treatments and vaccines, ultimately working towards malaria eradication.”

PhD student Mr Sofonias Tessema (left) and Dr Alyssa Barry (right) are studying naturally-acquired immunity to severe malaria, which develops in people constantly exposed to the parasite. They are looking for molecular targets of immunity, which may lead to a malaria vaccine and new diagnostic tools for monitoring immunity.
### Major national and international meetings

<table>
<thead>
<tr>
<th>Name</th>
<th>Event</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Professor Alan Cowman</strong></td>
<td><strong>Center for Emerging and Neglected Diseases, keynote speaker, Berkeley,</strong></td>
<td><strong>US, 01/14</strong></td>
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<td></td>
<td><strong>Lorne Infection and Immunity Conference 2014, invited speaker,</strong></td>
<td><strong>Lorne, Australia, 02/14</strong></td>
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<tr>
<td></td>
<td><strong>Japanese Society of Parasitology, plenary speaker,</strong></td>
<td><strong>Osaka, Japan, 03/14</strong></td>
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<tr>
<td><strong>Dr Jake Baum</strong></td>
<td><strong>ComBio 2013, keynote speaker,</strong></td>
<td><strong>Perth, Australia, 10/13</strong></td>
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<td></td>
<td><strong>British Parasitological Society, invited speaker,</strong></td>
<td><strong>Cambridge, UK, 02/14</strong></td>
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<tr>
<td><strong>Dr Justin Boddey</strong></td>
<td><strong>Molecular Parasitology Meeting, oral presentation,</strong></td>
<td><strong>Woods Hole, US, 09/13</strong></td>
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<tr>
<td><strong>Dr Alyssa Barry</strong></td>
<td><strong>PNG Medical Symposium, plenary speaker,</strong></td>
<td><strong>Lae, Papua New Guinea, 09/13</strong></td>
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<tr>
<td></td>
<td><strong>Queensland Tropical Health Alliance and Australasian College of Tropical</strong></td>
<td><strong>Medicine Conference, invited speaker,</strong></td>
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<td></td>
<td><strong>Keystone Symposium: The Science of Malaria Elimination, oral presentation,</strong></td>
<td><strong>Merida, Mexico, 02/14</strong></td>
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<tr>
<td><strong>Dr Chris Tonkin</strong></td>
<td><strong>12th International Conference on Toxoplasma, oral presentation,</strong></td>
<td><strong>Oxford, UK, 07/13</strong></td>
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<tr>
<td><strong>Dr Suparat Phuanukoonnong</strong></td>
<td><strong>PNG Medical Symposium, oral presentation,</strong></td>
<td><strong>Lae, Papua New Guinea, 09/13</strong></td>
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<td><strong>Joint International Tropical Medicine Meeting, invited speaker,</strong></td>
<td><strong>Bangkok, Thailand, 12/13</strong></td>
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<td></td>
<td><strong>NDOH/PIH Stakeholders meeting, plenary speaker,</strong></td>
<td><strong>Port Moresby, Papua New Guinea, 04/14</strong></td>
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<tr>
<td><strong>Dr Celine Barnadas</strong></td>
<td><strong>PNG Medical Symposium, oral presentation,</strong></td>
<td><strong>Lae, Papua New Guinea, 09/13</strong></td>
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<tr>
<td><strong>Dr Stephan Karl</strong></td>
<td><strong>23rd International Conference on the Scientific and Clinical Application of Magnetic Carriers, oral presentation,</strong></td>
<td><strong>Perth, Australia, 09/13</strong></td>
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<td><strong>Joint International Tropical Medicine Meeting, invited speaker,</strong></td>
<td><strong>Bangkok, Thailand, 12/13</strong></td>
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<td></td>
<td><strong>Workshop on Iron in disease diagnosis and treatment: Instituto de Ciencia de Materiales de Madrid, invited speaker,</strong></td>
<td><strong>Madrid, Spain, 06/14</strong></td>
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<tr>
<td><strong>Professor Ivo Mueller</strong></td>
<td><strong>PNG Medical Symposium, keynote speaker,</strong></td>
<td><strong>Lae, Papua New Guinea, 09/13</strong></td>
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<tr>
<td></td>
<td><strong>American Society of Tropical Medicine and Hygiene, invited speaker,</strong></td>
<td><strong>Washington, US, 11/13</strong></td>
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<tr>
<td></td>
<td><strong>Joint International Tropical Medicine Meeting, plenary speaker,</strong></td>
<td><strong>Bangkok, Thailand, 12/13</strong></td>
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<td></td>
<td><strong>Keystone Symposium: The Science of Malaria Elimination, invited speaker,</strong></td>
<td><strong>Mexico City, Mexico, 02/14</strong></td>
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<tr>
<td></td>
<td><strong>Australian Vaccine and Immunotherapeutics, invited speaker,</strong></td>
<td><strong>Melbourne, Australia, 05/14</strong></td>
</tr>
<tr>
<td><strong>Dr Neta Regev-Rudzki</strong></td>
<td><strong>33rd International Congress of International Society Blood Transfusion, keynote speaker,</strong></td>
<td><strong>Seoul, South Korea, 06/14</strong></td>
</tr>
<tr>
<td><strong>Professor Louis Schofield</strong></td>
<td><strong>3rd Annual Conference of the Queensland Tropical Health Alliance,</strong></td>
<td><strong>invited speaker, Cairns, Australia, 09/13</strong></td>
</tr>
<tr>
<td></td>
<td><strong>9th Annual Australia-China Symposium, invited speaker,</strong></td>
<td><strong>Canberra, Australia, 09/13</strong></td>
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<tr>
<td></td>
<td><strong>Queensland-China Workshop on Human Health and Medical Research,</strong></td>
<td><strong>keynote speaker, Brisbane, Australia, 10/13</strong></td>
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</tbody>
</table>
Staff list

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MSc Barcelona PhD Barcelona

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MSc Melbourne

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PhD student

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BSc(Hons)student (to 01/14)

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11/13)

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(from 09/13)

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BSc(Hons) Melbourne

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Krystal Evans, BMedChem(Hons)
Wollongong PhD Melbourne

Hayley Joseph, BSc(Hons) James
Cook PhD James Cook (from 01/14)

Ramin Mazhari, BSc(Hons) Justus-
Liebig MSc Philipp PhD Philipp
Wasan Forsyth, BSc(Hons) Auckland
(from 03/14)

Thuan Phuong, BSc(Hons) LaTrobe
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PhD student

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PhD student

Wai-Hong Tham, BA California PhD
Princeton

Jakub Gruszczyn, MSc Jagiellonian
PhD Paris IX (from 10/13)

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student

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BBiomedSc(Hons) Melbourne, PhD student

Rebecca Stewart, BSc(Hons) UWA,
PhD student

Melanie Williams, BBiomedSc RMIT
BSc(Hons) Melbourne, PhD student

Walter and Eliza Hall Institute   Annual Report 2013-2014
IMMUNOLOGY

The Immunology division asks how the many different types of immune response are regulated. Our aim is to improve vaccine performance and treatment of autoimmune and immunodeficient conditions, including type 1 diabetes and coeliac disease.

Improving coeliac disease diagnosis

Dr Jason Tye-Din and colleagues have developed a novel approach to coeliac disease diagnosis based on demonstrating a specific immune response to gluten after brief gluten ingestion.

The simple blood test overcomes the need for prolonged gluten consumption and may avoid intestinal biopsy altogether.

The team also showed that coeliac disease affects at least one in 70 Australians, and that half the population carry the major coeliac susceptibility (HLA) genes. Combining the HLA gene test with traditional antibody testing enhanced diagnostic accuracy by reducing false positive results, enabling many costly and invasive intestinal biopsies to be avoided.

Improving vaccines and immunity

Memory B cells and plasma cells make antibodies and provide immunity after infection or immunisation.

A research team led by Dr Kim Jacobson and Professor David Tarlinton have been researching epigenetic modifiers in B cells, to understand their role in immunity. Epigenetic modifiers control the switching on and off of genes.

In a recent study the team showed the epigenetic modifier MOZ was essential in forming memory B cells and the structures required for their programming and maintenance, enabling them to rapidly respond after infection. Manipulating MOZ could help us to control immunity therapeutically, and could be a target for improving vaccine efficacy.

‘Parent’ cells reset cell division clock

Division researchers overturned a 40-year-old theory on when and how cells divide, showing that ‘parent’ cells program a cell division time for their offspring that is different from their own.

Professor Phil Hodgkin, Dr John Markham and colleagues showed both phases of the cell cycle contribute to the overall change in division time, rather than one staying fixed in duration as previously thought. They have developed these findings into a new model that helps scientists predict how a population of cells has divided. Their research could impact our understanding of cell replication, such as occurs in the immune cells responding to disease or in cancer cells amassing tumours.

Health impact

Cancers: leukaemia, lymphoma, myeloma

Immune disorders: allergy, coeliac disease, lupus, primary immune deficiencies, type 1 diabetes

Infectious disease: influenza, vaccines

Other areas: personalised medicine, transplantation

Faculty

Division head
Professor Phil Hodgkin

Lab heads
Dr Bob Anderson (honorary)
Dr Daniel Gray
Associate Professor Andrew Lew
Emeritus Professor Jacques Miller

Dr Shalin Naik
Professor Ken Shortman
Professor David Tarlinton
Dr Jason Tye-Din
Type 1 diabetes is the most common chronic childhood illness in Australia, and has increased in incidence in the past 30 years. Associate Professor Andrew Lew is developing new strategies to target local immune responses, with the potential to improve islet transplants as a cure for type 1 diabetes.

‘Kill’ switch key to immune disorders

Regulatory T cells are critical for dampening the immune response and preventing inappropriate immune attack of the body’s own tissues – the underlying cause of autoimmune diseases such as lupus and type 1 diabetes.

Having too few regulatory T cells is linked with the development of autoimmune and inflammatory conditions, while some people with higher than normal numbers of regulatory T cells cannot fight infections properly.

“Without MCL-1 activity, regulatory T cell numbers fall, provoking lethal autoimmune disease.”

Dr Daniel Gray, Ms Antonia Policheni and colleagues from Belgium found regulatory T cells are constantly being produced in the body, with their numbers held steady by programmed cell death.

The decision regulatory T cells make on whether to live or die is controlled by the ‘Bcl-2 protein family’. This family includes proteins that can either promote cell survival or trigger cell death.

Dr Gray said the team discovered Bcl-2 family proteins were important determinants of regulatory T cell numbers. “Regulatory T cell death is highly dependent on the activity of two opposing Bcl-2 family proteins, called Mcl-1 and Bim,” he said.

“Mcl-1 is required for regulatory T cell survival, allowing them to suppress unhealthy immune responses. Without Mcl-1, regulatory T cell numbers fall, provoking lethal autoimmune disease. Conversely, Bim triggers the death of regulatory T cells. If Bim activity is lost, regulatory T cells accumulate in abnormally high numbers.”

Dr Gray said drugs that manipulate regulatory T cell survival could be developed, leading to new ways to suppress autoimmune disease or to enhance beneficial immune responses.

Collaborating organisations: Flanders Institute for Biotechnology (VIB) at University of Leuven (Belgium), Pasteur Institute (France), University of Alabama at Birmingham (US), University of California San Diego (US), University of Cincinatti (US).

Funding partners: Australian National Health and Medical Research Council, Belgian Government, European Union, VIB (Belgium) and Victorian Government.

Finding new treatments for lupus

Lupus is a disease in which the body's immune system attacks itself. The autoimmune disease systemic lupus erythaematosus (SLE or lupus) can be fatal in its most severe forms, and causes serious damage to tissues including the kidneys, heart, skin, joints, blood vessels and lungs.

Lupus affects more than 17,000 Australians and is more prevalent in women, who represent 90 per cent of people affected.

Professor David Tarlinton was the winner of the 2013 Distinguished Innovator award from the Lupus Research Institute, US, to investigate the causes of lupus and develop new approaches to its treatment.

The award will provide US$1 million over four years to investigate the immune cells at the root of lupus.

The support will allow Professor Tarlinton to significantly expand his laboratory’s investigations into how lupus develops. “Many symptoms of lupus are caused by abnormalities in antibody production,” he said. “People with lupus produce ‘autoantibodies’, which recognise the body’s own tissues as foreign and attack them. This causes the inflammation and tissue damage characteristic of lupus.”

Professor Tarlinton said his research would focus on the cell signalling pathways that regulate plasma cell survival.

“Our previous studies have shown that the protein Lyn plays an important role in plasma cell survival,” he said. “If Lyn isn’t functioning properly, more plasma cells that produce harmful antibodies can live longer than they should, contributing to the development of lupus-like symptoms.”

By determining how Lyn is involved in plasma cell survival, Professor Tarlinton aims to develop treatments that inhibit or reverse the build-up of plasma cells, either preventing disease from developing, or diminishing its severity once established.

Plasma cells are critical antibody producers. However when the cells become uncontrolled it can lead to myeloma, a plasma cell cancer. Dr Dimitra Zotos, Miss Dana Piovesan and Dr Michael Low (left to right) work with Professor David Tarlinton to study the pathways that control development and survival of plasma cells, to find new strategies for treating myeloma.
Major national and international meetings

Ms Jamie Brady
Transplant Society of Australia and New Zealand (TSANZ), oral presentation, Canberra, Australia, 06/13

Dr Melinda Hardy
Melbourne Health Research Week 2014, invited speaker, Melbourne, Australia, 06/14

Dr Susanne Heinzel
43rd Annual Meeting German Society for Immunology, invited speaker, Mainz, Germany, 09/13
43rd Australasian Society for Immunology Annual Scientific Meeting, oral presentation, Wellington, New Zealand, 12/13
Staff list

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

Phil Hodgkin, BSc(Hons) UWA PhD ANU

Vanessa Bryant, BSc Qld PhD Sydney GradDipLabourLaw Melbourne

David Fulcher, MB BS Sydney PhD Sydney FRCPA (from 02/14 to 02/14)

Susanne Heinzel, BSc(Hons) Tuebingen PhD Tuebingen

Andrey Kan, BSc Melbourne PhD Melbourne

Jae Lee, BSc(Hons) Otago PhD Korea (to 08/13)

John Markham, BEng Swinburne BSc(Hons) Melbourne PhD Melbourne (from 03/14)

Kim Pham, BSc(Hons) Melbourne PhD Swinburne (from 03/14)

Cameron Weillard, BSc(Hons) Melbourne PhD Melbourne (to 08/13)

Manuela Hancock, BAppSc RMIT

Bryan Lye, PhD student (from 05/14)

Julia Marchingo, BBiomedSc(Hons) Melbourne, PhD student

Simone Oostindie, BSc Netherlands, overseas research trainee (from 11/13 to 06/14)

Charlotte Slade, BSc(Med) Newcastle, PhD student (from 02/14)

Jie Zhou, BBiomedSc Melbourne BBiomedSc(Hons) Melbourne, PhD student

Andrew Lew, BVSc Melbourne MVSc Melbourne PhD London

Emma Carrington, BSc(Hons) Melbourne PhD Melbourne

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Lauren Cox, BBiomedSc LaTrobe

David Vremec, BAppSc RMIT

David Tarlinton, BSc(Hons) Sydney PhD Stanford

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Amanda Light, BAppSc RMIT

Kristy O’Donnell, BAppSc RMIT BSc(Hons) Melbourne

Dana Piovesan (from 07/13)

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Michael Low, BMedSci Melbourne, PhD student (from 02/14)

Jason Tye-Din, MB BS Melbourne PhD Melbourne FRACP

Melinda Hardy, BSc(Hons) Qld PhD Qld

George Varigos, MB BS Melbourne PhD Melbourne

Adam Girardin, BSc British Columbia
CELL SIGNALLING AND CELL DEATH

The Cell Signalling and Cell Death division investigates the molecular mechanisms by which cells kill themselves, and the control processes that switch cell death on and off. Many diseases are characterised by too much or too little cell death, and understanding how this process happens will help us develop new treatments for cancers and immune disorders.

Treating stomach and bowel cancers

Bowel and stomach cancers are two of the most common cancers. When a tumour develops, normal tissues around it can become inflamed, producing signalling molecules (cytokines) that promote the growth and spread of cancer cells.

Associate Professor Matthias Ernst, Dr Tracy Putoczki and colleagues found interleukin-11 (IL-11), a potent cytokine, was an important stimulator of cancer growth and spread of bowel and stomach cancers. Working with scientists at CSL, they showed blocking IL-11 stopped tumour growth and could lead to tumour shrinkage, making IL-11 a promising new target for treating solid cancers.

Overturning a cell death myth

Programmed cell death, or apoptosis, is a natural process used by damaged or diseased cells to destroy themselves without damaging other tissues in the body.

Dr Lisa Lindqvist and colleagues are studying the relationship between cell death and autophagy. Autophagy is when cells eat themselves, a process cells use to recycle their components. It was believed Bcl-2 and similar ‘pro-survival’ proteins controlled autophagy, as well as apoptosis. However Dr Lindqvist research overturned that theory, showing the ‘pro-survival’ Bcl-2 family proteins only inhibited autophagy indirectly, by acting on other apoptotic molecules.

This was an important finding, because clinical trials had been planned based on the earlier, flawed model.

New anti-inflammatory drug target

Institute scientists have revealed the three-dimensional structure of a protein essential for triggering a recently discovered cell death mechanism called necroptosis.

They have used genetics to show that the protein MLKL is essential for triggering necroptosis. The structure revealed that although MLKL is a ‘dead enzyme’, it still needs to be switched on before necroptosis will occur.

The team is now trying to determine the ‘on’ and ‘off’ states of MLKL, making possible the development of new drugs that may help treat chronic inflammatory diseases such as inflammatory bowel disease, psoriasis and rheumatoid arthritis.

Health impact

Cancers: bowel cancer, breast cancer, lung cancer, leukaemia, lymphoma, myeloproliferative disorders, stomach cancer

Immune disorders: inflammatory bowel disease, psoriasis, rheumatoid arthritis

Faculty

Division head
Professor David Vaux

Lab heads
Dr Grant Dewson
Associate Professor Paul Ekert
Associate Professor Matthias Ernst
Associate Professor John Silke
Finding the cause of inflammatory diseases

Crohn’s disease, rheumatoid arthritis and psoriasis all have something in common – they are caused by excessive and uncontrolled inflammation.

Institute researchers have shown a recently discovered type of cell death, termed necroptosis, can exacerbate inflammatory disease. Necroptosis is a form of cell death that alerts the immune system that something has gone wrong. While its normal role is to help fight infection, if unchecked it can provoke chronic inflammatory disease.

“Targeting this pathway could be useful for treating conditions such as psoriasis, rheumatoid arthritis and Crohn’s disease.”

Associate Professor John Silke, Dr Motti Gerlic and PhD students Mr James Rickard, Mr Joanne O’Donnell and Mr Joseph Evans discovered RIPK1, a molecule involved in regulating necroptosis, was needed to prevent lethal uncontrolled inflammation.

Associate Professor Silke said RIPK1 was essential in initiating necroptosis, as well as limiting runaway inflammation that can cause severe tissue damage. “Our research highlighted RIPK1 is the gatekeeper that controls whether a cell lives or dies, and the decision it makes on how to die,” he said.

Dr Gerlic said the study provided the first evidence RIPK1 was essential for inhibiting necroptosis. “For the first time, we’ve shown necroptosis and the molecules involved actually induce inflammatory disease, suggesting that targeting this pathway could be useful for treating conditions such as psoriasis, rheumatoid arthritis and Crohn’s disease,” he said.

The research team showed RIPK1 played other important roles, such as keeping blood stem cells alive after bone marrow transplant. This finding is important when considering treatments that target RIPK1, as it could have unwanted side-effects for other cells in the body. The institute is already capitalising on its expertise in necroptotic cell death with a drug discovery program to identify small molecules that could target other molecules in the necroptosis pathway, such as MLKL.

Collaborating organisations: La Trobe University, Monash University and The University of Melbourne.

Funding partners: Australian National Health and Medical Research Council, Thomas William Francis & Violet Coles Trust and Victorian Government.

Is psoriasis a cell death problem?

Psoriasis is a painful and common inflammatory skin condition that causes red scaly patches, itchiness and flaking.

Symptoms can range from mild to severe, sometimes requiring hospitalisation. At present the causes of psoriasis are not fully understood, however psoriasis is not purely a skin disorder and can have a negative impact on many organ systems. Psoriasis has been associated with an increased risk of certain cancers, cardiovascular disease and other immune-mediated disorders such as Crohn’s disease and ulcerative colitis.

Researchers in the Cell Signalling and Cell Death division are trying to better understand how psoriasis develops and search for new treatments, with support from The Thomas William Francis & Violet Coles Trust, managed by Equity Trustees.

Using a new laboratory model, Associate Professor John Silke and colleagues from the institute, in collaboration with Dr George Varigos, head of the Dermatology department at The Royal Melbourne Hospital, are testing the hypothesis that excessive cell death in the skin can cause inflammation and disease.

Psoriasis is generally considered a genetic disease that is triggered or influenced by environmental factors. Associate Professor Silke said differences in genes involved in the regulation of cell death have been found in large population studies of human patients with psoriasis.

“The next stage of the project will involve further tests using skin biopsy and blood samples from human patients with psoriasis and other dermatological disorders,” he said.

“Psoriasis can be very distressing for patients. There is no cure, and it can be difficult to treat due to its chronic, recurrent nature. A new understanding of the disease model will create new opportunities for treatments.”
Major national and international meetings

Dr Gabriela Brumatti
10th Cold Spring Harbor Laboratory Meeting on Cell Death, oral presentation, Cold Spring Harbor, US, 09/13
15th Lorne Cancer Conference, oral presentation, Lorne, Australia, 02/14

Associate Professor Matthias Ernst
Singapore Gastric Cancer Consortium 6th Annual Scientific Meeting, invited speaker, Singapore, Singapore, 07/13
2013 Annual Joint Conference of the International Cytokine Society and the International Society for Interferon and Cytokine Research (ICS/ISICR): Cytokines - from Molecular Mechanism to Human Disease, session chair, San Francisco, US, 10/13
Midyear Joint Meeting of the International Cytokine Society and International Society for Interferon and Cytokine Research, invited speaker, Kiel, Germany, 05/14

Mr Nima Etemadi
9th European Workshop on Cell Death, oral presentation, Paphos, Cyprus, 04/14

Dr Najoua Lalaoui
9th European Workshop on Cell Death, oral presentation, Paphos, Cyprus, 04/14

Dr Lisa Lindqvist
Ozophagy 2014, oral presentation, Parkville, Australia, 02/14
2014 Keystone Symposium on the Chemistry and Biology of Cell Death, oral presentation, Santa Fe, US, 02/14

Ms Dimitra Masouras
9th European Workshop on Cell Death, oral presentation, Paphos, Cyprus, 04/14

Mr Paul Nguyen
25th Lorne Cancer Conference, oral presentation, Lorne, Australia, 02/14

Dr Robert O’Donoghue
The Thoracic Society of Australia & New Zealand (TSANZSRS) Annual Scientific Meeting 2014, oral presentation, Adelaide, Australia, 04/14
Airways Inflammation and Remodelling Symposium, invited speaker, Melbourne, Australia, 04/15

Associate Professor John Silke
CRC670 Cell Death and Immunity Mini-Symposium, invited speaker, Cologne, Germany, 12/13
2014 Keystone Symposium on the Chemistry and Biology of Cell Death, invited speaker, Santa Fe, US, 02/14
9th European Workshop on Cell Death, oral presentation, Paphos, Cyprus, 04/14
Gordon Research Conference on Cell Death Mechanisms at the interface of Health and Disease, invited speaker, West Dover, US, 06/14

Professor David Vaux
25th Lorne Cancer Conference, invited speaker, Lorne, Australia, 02/14
Staff list

Michelle Birrell, BBus(Administration) Monash, administrative officer (from 03/14)

David Vaux, BMedSc Melbourne MB BS Melbourne PhD Melbourne FAA

Gabriela Brumatti, BSc(Hons) Sao Paulo PhD Sao Paulo

Li Dong, MMedSc Xinjiang PhD Shanghai (from 02/14)

Anissa Jabbour, BSc(Hons) Melbourne PhD Melbourne

Lisa Lindqvist, BSc(Hons) McGill PhD McGill

Donia Moujalled, BMedSc(Hons) LaTrobe PhD LaTrobe (to 12/13)

James Murphy, BSc(Hons) Canterbury PhD ANU

Jarrod Sandow, BBiotech Canterbury BSc(Hons) Adelaide PhD Adelaide

diep Chau, BSc Melbourne

Carmel Daunt, BSc(Hons) Melbourne

Leila Varghese, BSc(Hons) Melbourne

Steph Conos, BA Melbourne BSc Melbourne, PhD student

Paddy Dyer, BSc Melbourne, BSc(Hons) Courage student (from 02/14)

karla Fischer, PhD student (from 03/14)

Melanie Heinlein, overseas research trainee (from 10/13 to 02/14)

Dini Masouras, BSc(Hons) Melbourne, PhD student

Nisha Narayan, BBiomedSc Melbourne BSc(Hons) Melbourne, PhD student

Grant Dewson, BSc Nottingham PhD Leicester

Robert Ninnis, BBiolSc(Hons) LaTrobe PhD LaTrobe

Iris Tan, BSc(Hons) Melbourne PhD Melbourne

Jonathan Bernardini, BSc(Hons) Honours student

Destiny Dalseno, BSc Melbourne, BSc(Hons) student (from 02/14)

Mark Li, BBiomedSc(Hons) Melbourne, PhD student (from 03/14)

Matthias Ernst, BSc(Hons) Zurich PhD Zurich

Michael Buchert, PhD Zurich

Moritz Eissmann, MSc Technical PhD Frankfurt

Frederic Masson, BSc(Hons) France MSc France PhD Geneva

Robert O’Donoghue, BCom UWA BSc(Hons) Murdoch PhD UWA

Toby Phesse, BSc(Hons) Portsmouth PhD Warwick

Tom Pierce, BSc(Hons) Melbourne PhD Melbourne (to 09/13)

Shoukat Afshar-Sterle, PhD Adelaide Ash Kherlopian, BSc Monash BSc(Hons) Melbourne (to 12/13)

Nick Kocovski, BBiomedSc Melbourne BSc(Hons) Melbourne

Natasha Silke

Carlos May, BSc(Hons) student (from 07/13)

Ashleigh Poh, BSc(Hons) Melbourne, PhD student

Madeleine Reilly, BSc(Hons) Manchester, overseas research trainee (from 11/13 to 05/14)

Eva Sum, BSc(Hons) Munich MSc Munich, overseas research trainee (from 11/13 to 02/14)

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

Joanne Hildebrand, BBiomedSc(Hons) Melbourne PhD Melbourne

Najoua Lalaoui, PhD France Sabrina Muehlen, BSc Osnabrueck MSc Osnabrueck PhD Heidelberg (from 07/13 to 06/14)

Ueli Nachbur, PhD Berne

Vincent Roh, MSc Lausanne PhD Berne (from 08/13 to 12/13)

Holly Anderton, BA Canterbury BSc(Hons) Canterbury (to 06/14)

Alekandra Bankovacki, BSc(Hons) LaTrobe

Joseph Evans, BBiomedSc(Hons) LaTrobe

James Rickard, BSc LaTrobe MSc LaTrobe (to 03/14)

Nira Etemadi, BSc Iran MSc LaTrobe, PhD student

Chunyan Ma, BSc Nanjing MSc Nanjing, PhD student

Che Stafford, BSc LaTrobe, PhD student

Maria Tanzer, BSc Innsbruck MSc Innsbruck, PhD student

Anne Tripaydonis, BSc(Hons) student
INFLAMMATION

The Inflammation division seeks to understand the complex series of biological and molecular mechanisms that regulate inflammation. Our aim is to improve the diagnosis, treatment and prevention of human inflammatory diseases such as rheumatoid arthritis, systemic lupus erythematosus, sepsis and rheumatic fever.

Finding the cause of immune disorders

Necroptosis is a type of ‘controlled’ death that instructs a cell to die while stimulating an inflammatory reaction. However if it persists, it can lead to inflammatory disease.

Dr Moti Gerlic and colleagues showed uncontrolled necrotic cell death could lead to severe systemic inflammation. They showed the protein RIPK1 was essential in necroptosis and in keeping blood stem cells alive after bone marrow transplantation. This is important when considering treatments that target RIPK1, as it could have detrimental side-effects. The research may help develop better treatments for inflammatory diseases.

Treating inflammatory arthritis

Cartilage destruction is a key feature of many types of arthritis, and contributes to the debilitating symptoms that are hallmarks of arthritis.

Cartilage is made up of chondrocytes, which produce and maintain the cartilage.

Dr Tommy Liu and Professor Ian Wicks showed chondrocytes play an active role in driving inflammation and bone remodelling during inflammatory arthritis. A molecule known as SOCS3 plays a key role in restraining chondrocytes. The team identified key hormone-like signalling molecules produced by chondrocytes in the absence of SOCS3 that exacerbate joint damage, highlighting potential targets for future treatment strategies.

Existing medicines could help treat cancers

Many bowel and stomach cancers are associated with long-term inflammation.

Dr Emma Stuart, Dr Tracy Putoczki, Associate Professor Matthias Ernst and colleagues found medicines called ‘JAK inhibitors’ reduced the growth of inflammation-associated stomach and bowel cancers.

JAK inhibitors are currently used to treat the cancer-like condition myelofibrosis, and are being investigated in clinical trials for treating leukaemia, lymphoma and rheumatoid arthritis.

The study provides the first evidence supporting their use in treating other cancers.

Health impact

Cancers: bowel cancer, myeloproliferative disorders, stomach cancer

Immune disorders: inflammatory bowel disease, lupus, psoriasis, rheumatic fever and heart disease, rheumatoid arthritis, sepsis

Infectious disease: chronic infections, influenza

Faculty

Division head
Professor Ian Wicks

Lab heads
Dr Seth Masters
Dr Sandra Nicholson
Dr Tracy Putoczki
Dr James Vince
A key fighter against influenza

Influenza is a highly contagious viral disease, with different strains that vary significantly in their ability to cause death and disease (virulence). Highly virulent and pandemic flu strains have been linked to ‘cytokine storms’, a flood of inflammatory molecules released by the immune system that can result in increased severity of symptoms, multiple organ failure and death.

Using an experimental mouse model, institute researchers investigated a protein called SOCS4, demonstrating that it acts as a handbrake on the immune response to influenza, preventing the tissue damage associated with severe infection.

Dr Kedzierski said the normal immune response to influenza was also delayed in experimental models. “Without SOCS4, the immune system did not send the correct signals to mobilise virus-specific immune cells, called killer T cells, to the site of infection,” he said. “This prevented the virus from being cleared from the lungs and the infection persists, exacerbating collateral damage.”

Dr Nicholson said drugs that enhanced or mimicked SOCS4 action could present a way of treating pandemic or aggressive flu strains and other infections. “Knowing the target and function of SOCS4 may help to develop new, preventive therapies that control inflammation during influenza infection,” she said.

Collaborating organisations: The University of Melbourne.

Funding partners: Australian National Health and Medical Research Council, National Institutes of Health (US) and Victorian Government.


Drugs that enhanced or mimicked SOCS4 action could present a way of treating pandemic or aggressive flu strains.

SOCS4 is a key regulator of the immune response. Dr Lukasz Kedzierski, Dr Sandra Nicholson and colleagues found that, without SOCS4, there was an increase in the production of small molecules that promote inflammation in the lungs following influenza infection.

Cytokine storms are believed to be the primary cause of death in young and otherwise healthy people infected with influenza, particularly during pandemic flu infections.

Watch the video ▶

Acute rheumatic fever is a complication of bacterial infection that can lead to rheumatic heart disease, a potentially fatal illness. Dr Willy-John Martin is leading a project to develop a diagnostic test that identifies acute rheumatic fever, which disproportionately affects Aboriginal Australians and Pacific Islanders.
Long-term support for rheumatoid arthritis research

A partnership extending several decades has transformed our understanding and treatment of rheumatoid arthritis.

In the 1980s, John B Reid AO approached the institute to discuss opportunities for improving the treatment of arthritis. Mr Reid’s mother, Lady Gladys Reid, was afflicted with severe arthritis and, at the time, there was very little funding for research into this common disease.

In the mid-1990s, with the support of significant funding from the John T Reid Charitable Trusts, the institute appointed Professor Ian Wicks, an institute-trained researcher and rheumatologist at The Royal Melbourne Hospital, to investigate rheumatoid arthritis.

Understanding why immune cells attack joint tissues and how to ‘switch off’ the inflammatory response is now leading to better treatments for rheumatoid arthritis and many related autoimmune conditions. Surprisingly, the blood cell-producing hormones colony stimulating factors (CSFs), first discovered at the institute by Professor Don Metcalf and colleagues, have also been found to play a role in inflammation and rheumatoid arthritis. Therapies that target one of these factors (GM-CSF) to treat rheumatoid arthritis were developed and have progressed to phase 2 clinical trials.

“Discoveries take decades of determination and persistence and it makes a huge difference when you have the committed, long-term support of a donor,” Professor Wicks said. “Thanks to the John T Reid Charitable Trusts, we have been able to focus on rheumatoid arthritis in the lab and enhance clinical services for rheumatoid arthritis patients at the hospital. We have also established an arthritis tissue bank to facilitate translational research.

“The outlook for patients with rheumatoid arthritis is now so much better. With more treatment options, effective disease control and a personalised approach to diagnosis and treatment are realistic goals. In addition, what we learn from studying rheumatoid arthritis is very likely to be relevant to other autoimmune and inflammatory diseases.”

Trustee and family member Mrs Belinda Lawson recently visited the institute to hear about the latest developments. “We value long-term partnerships and personal relationships,” Mrs Lawson said. “We also like to support institutes and researchers who we have come to know and trust. This is a rewarding and inspiring partnership.”
Major national and international meetings

**Mr Akshay D’Cruz**
Innate Immunity to Viral Infections, Joint with the Meeting on Pathogenesis of Respiratory viruses, *oral presentation*, Keystone, US, 01/14

**Dr Laura Dagley**
40th Lorne Conference on Proteomics, *oral presentation*, Lorne, Australia, 02/14

**Dr Mordechay Gerlic**
7th Congress of the Federation of the Israel Societies for Experimental Biology, *oral presentation*, Eilat, Israel, 02/14

**Dr Lukasz Kedzierski**
15th International Congress of Immunology, *oral presentation*, Milan, Italy, 08/13

**Dr Kate Lawlor**
9th European Workshop on Cell Death, *oral presentation*, Paphos, Cyprus, 02/14

**Dr Tommy Liu**
2013 American College of Rheumatology annual meeting, *oral presentation*, San Diego, US, 10/13

**Dr Seth Masters**
ComBio 2013, *invited speaker*, Perth, Australia, 09/13
6th Barossa Meeting, *oral presentation*, Adelaide, Australia, 11/13
Asian-Pacific Association for the Study of the Liver, *invited speaker*, Brisbane, Australia, 03/14

**Mr Tan Nguyen**
43rd Annual Scientific Meeting Australasian Society for Immunology, *oral presentation*, Wellington, New Zealand, 12/13

**Dr Sandra Nicholson**
6th Barossa Meeting, *oral presentation*, Adelaide, Australia, 11/13

**Dr Tracy Putoczki**
6th Barossa Meeting, *oral presentation*, Adelaide, Australia, 11/13

**Professor Ian Wicks**
World Congress of Cardiology, *invited speaker*, Melbourne, Australia, 05/14
Staff list

Emma Stuart, BSc(Hons) Otago PhD Otago, scientific coordinator

Ian Wicks, MB BS Sydney PhD Melbourne FRACP

Jonathan Akikusa, MB BS Melbourne (from 07/13 to 01/14)

Gabby Goldberg, BSc(Hons) Monash PhD Monash

Tommy Liu, BSc Otago MSc VUT PhD Melbourne

Willy-John Martin, BSc Waikato MSc Waikato PhD Wellington

Devi Ngo, BBiomedSc Deakin BSc(Hons) Monash PhD Monash

Ken Pang, BBiomedSc(Hons) Melbourne MB BS(Hons) Melbourne PhD Melbourne FRACP Melbourne

Sandro Prato, BSc(Hons) Lausanne PhD Melbourne (to 09/13)

Angus Stock, BSc(Hons) Melbourne PhD Melbourne (from 09/13)

Emma Stuart, BSc(Hons) Otago PhD Otago

Jacinta Hansen, BSc(Hons) Monash Jo Keeble, BSc(Hons) Melbourne PhD Melbourne

Jane Murphy, BSc(Hons) Adelaide Ee Shan Pang, BBiomedSc(Hons) Melbourne

Blake Smith, BBiotech Newcastle BDes(Arch) Newcastle BSc(Hons) Melbourne

Marilou Barrios, MSc Philippines, PhD student (from 06/14)

Simon Chatfield, MB BS Melbourne, Reid Translational Scholar

Andrew Foers, visiting BSc(Honours) student (from 02/14)

Kathrin Grebe, BSc Germany, overseas research trainee (to 07/13)

Tan Nguyen, BBiomedSc(Hons) Deakin, PhD student

Shereen Oon, BMedSc Melbourne MB BS Melbourne, PhD student

Seth Masters, BSc(Hons) Melbourne PhD Melbourne

Richard Ferrero, BAAppSc(Hons) Sydney PhD Sydney

Mordcehay Gerlic, BBiomedSc Ben Gurion PhD Ben Gurion

Man Lyang Kim, BSc Gyeongsang MSc Gyeongsang PhD Basel (to 05/14)

Hazel Tye, BBiomedSc(Hons) Monash PhD Monash (from 04/14)

Paul Baker, BSc(Hons) Adelaide, PhD student (from 01/14)

Katelyn Chalker, BAAppSc QUT, BSc(Hons) student (from 12/13)

Damian D’Silva, BBSc, BSc(Hons) student (from 12/13)

Jo O’Donnell, BSc(Hons) Melbourne

Sandra Nicholson, BSc Monash MSc UNSW PhD Melbourne

Laura Dagley, BBiomedSc(Hons) Melbourne PhD Melbourne (from 07/13)

Lukasz Kedzierski, BSc(Hons) Monash PhD Monash

Akshay D’Cruz, BBiomedSc(Hons) Melbourne

Tatiana Kolesnik, BSc(Hons) Nizhni Novgorod MSc Nizhni Novgorod PhD Moscow

Alex Colussa, BMedSci Deakin, BSc(Hons) student (from 10/13)

Tom Hayman, BSc(Hons) student (from 02/14)

Eddie Linossi, BSc Melbourne, PhD student

Tracy Putoczki, BSc(Hons) Toronto PhD Canterbury

Nga Lam, BBiotech(Hons) Adelaide PhD Adelaide (from 09/13)

Julia Griesbach, BSc France MSc Georg-August (from 05/14)

Adele Preaudet

Eden Whitlock, BBiotech(Hons) LaTrobe (from 01/14 to 04/14)

Suad Abdirahman, BSc, BSc(Hons) student (from 02/14)

Paul Nguyen, BBiomedSc(Hons) Melbourne, PhD student

James Vince, BSc(Hons) Melbourne PhD Melbourne

Nufail Khan, BMedSci(Hons) LaTrobe PhD LaTrobe (from 08/13 to 02/14)

Kate Lawlor, BSc(Hons) Melbourne PhD Melbourne

Rowena Lewis, BSc(Hons) Deakin PhD Deakin (to 02/14)

Alison Mildenhall, BSc(Hons) Melbourne

Mary Speir, visiting PhD student

Swarna Vijayaraj, MBiology Adelaide, PhD student (from 02/14)
MOLECULAR IMMUNOLOGY

The Molecular Immunology division aims to understand the immune system and how it functions to protect us from pathogens, such as bacteria and viruses, while at the same time ignoring the harmless or beneficial microbes in our environment. By understanding the normal immune response, we aim to pinpoint the events that go awry in diseases such as lymphoma, autoimmunity or chronic infections.

‘Spontaneous’ cancers killed daily

Immune cells undergo ‘spontaneous’ changes on a daily basis that could lead to cancers if not for the diligent surveillance of our immune system.

Dr Axel Kallies, Professor David Tarlinton, Professor Stephen Nutt and colleagues found the immune system was responsible for eliminating potentially cancerous immune B cells in their early stages, before they developed into B-cell lymphomas (also known as non-Hodgkin lymphomas).

The discovery could lead to the development of an early-warning test that identifies patients at high risk of developing B-cell lymphomas, enabling proactive treatment to prevent tumours from growing and progressing to cancer.

New layer to infection battle

Langerhans cells are immune cells that provide the first line of defence against attacks through the skin. Langerhans cells can last a lifetime, and new ones are only produced when the original cells die.

Dr Michel Chopin, Professor Gabrielle Belz, Professor Stephen Nutt and colleagues have shown that, despite appearing to be identical, the original and new Langerhans cells are genetically different. The finding could have repercussions for developing and refining therapies for skin infections and cancers. It could also explain why some promising new drugs do not work outside the laboratory, and may provide guidance in developing therapeutics.

Promoting vaccine responses

Immunisation induces the activation of B cells into plasma cells, which make antibodies to protect against infection.

Dr Stéphane Chevrier, Associate Professor Lynn Corcoran and colleagues have identified a previously unknown gene that plays an important role in promoting immune responses after immunisation. The research team found the gene Zbtb20 was a key regulator of B cell development into plasma cells, and was vital for the cells to survive.

The finding has implications for improving vaccines as well as providing potential targets for cancers affecting plasma cells, such as myeloma.

Health impact

Cancers: leukaemia, lymphoma, melanoma, myeloma

Immune disorders: asthma, inflammatory bowel disease, multiple sclerosis

Infectious disease: influenza, listeria, vaccines

Faculty

Division head
Professor Stephen Nutt

Lab heads
Professor Gabrielle Belz
Associate Professor Lynn Corcoran
Dr Axel Kallies
Dr Nicholas Huntington
Dr Li Wu (Honorary)
‘Performance-enhancing’ boost helps fight infection

Institute researchers have made a discovery that could help in developing new treatments for blood diseases such as leukaemia, and autoimmune diseases in which the body attacks its own tissues, such as diabetes or rheumatoid arthritis. It could also be used to enhance immune response to HIV and other chronic infections.

“This is how the immune system guarantees that the best killer T cells survive, producing an ‘army of clones’ that maintain their killer function to fight the infection.”

Dr Axel Kallies, Mr Kevin Man and colleagues found the immune system is subject to performance enhancement, boosting immune cells to ensure the best team is selected to fight infections.

Immune cells called killer T cells are responsible for killing virus- or bacteria-infected cells, tumour cells and other damaged cells in the body.

Dr Kallies said the team showed a protein called IRF4 helped the body to identify the immune cells most capable of fighting an infection. “We found IRF4 is activated in killer T cell ‘clones’ that are best equipped to recognise and fight an infection,” Dr Kallies said. “IRF4 stimulates mass production of ‘elite’ killer T cells, as well as ensuring their survival and enhancing their performance by allowing them to take up large amounts of sugar and other nutrients.”

The team showed IRF4 was produced at the highest levels in cells that were best at recognising the foreign invader. “This is how the immune system guarantees that the best killer T cells survive, producing an army of clones that maintain their killer function to fight the infection,” he said.

Targeting the IRF4 pathway could help control these immune cells and is already being investigated by pharmaceutical companies. Blocking the IRF4 pathway could diminish immune cell populations when they are out of control, as happens in blood cancers such as leukaemia or in autoimmunity.

Funding partners: Australian National Health and Medical Research Council, Australian Research Council and Victorian Government.


Chronic infections, cancers and immune deficiencies can arise from errors in immune cell development and maintenance. Dr Nick Huntington has developed models of the human immune system to improve our understanding of immune cell development and discover and test novel therapies for human disease.
Unravelling T cell development

Highly specialised T cells are essential for our immune system.

There are several types of T cells: effector T cells that fight bacterial and viral infections and cancers, memory T cells that promote long-term immune memory after infection, and regulatory T cells that dampen the immune response to prevent damage caused by aberrant T cells that target the body's own tissues (autoimmunity).

These diverse types of T cells develop by ‘differentiation’, the process by which cells become more specialised as they divide. ‘Master regulator’ genes are responsible for switching on or off other important genes in the cell to control T cell differentiation.

With the support of a fellowship from the Sylvia and Charles Viertel Charitable Foundation, Dr Axel Kallies is studying how master regulator genes control T cell differentiation. T cells are critical for the immune system but we know little about the molecular program that regulates their differentiation into mature cells with specialised functions. Dr Kallies is developing a model that would explain the genetic determinants of differentiation for each type of T cell.

Dr Kallies said master regulator genes and the pathways they control are potential therapeutic targets in humans. “I am particularly interested in the genes Blimp1 and IRF4, which we are exploring to understand their role in T cell development and function,” he said. “This will provide a strong foundation for understanding how to best produce protective T cell memory, which is the aim of any vaccination strategy that targets T cells. It may also lead to better strategies for the therapeutic treatment of immunodeficiencies, autoimmunity and cancer.”

Dr Kallies said the philanthropic support from the Sylvia and Charles Viertel Charitable Foundation was tremendously important for the success of the project. “I'm grateful for the multi-year support provided by the Viertel fellowship, which is helping us to solve these important questions,” he said.

The Sylvia and Charles Viertel Charitable Foundation is managed by Equity Trustees together with co-trustees Mr George Curphey OAM, Mr Rex Freudenberg and Justice Debra Mullins.
Major national and international meetings

**Professor Gabrielle Belz**
Frontiers in Immunology Conference 2013, *keynote speaker*, Tokyo, Japan, 08/13

The British Society for Immunology Annual Congress, *plenary speaker*, Manchester, UK, 12/13

Future of Experimental Medicine Conference: Inflammation in disease and ageing, *keynote speaker*, Sydney, Australia, 03/14


**Dr Sebastian Carotta**
European Hematology Association (EHA), *invited speaker*, Milano, Italy, 06/14

**Associate Professor Lynn Corcoran**
43rd Australasian Society of Immunology Annual Scientific Meeting, *panel chair*, Wellington, New Zealand, 12/13

**Dr Nick Huntington**
Emerging Networks in Cytokine Signalling, *oral presentation*, Vancouver, Canada, 02/14

**Dr Axel Kallies**

**Mr Kevin Man**
43rd Australasian Society of Immunology Annual Scientific Meeting, *oral presentation*, Wellington, New Zealand, 12/13

**Professor Stephen Nutt**

TuBS Symposium on B cells: Past Present and Future, *plenary speaker*, Turku, Finland, 08/13

Keystone Symposium “Biology of B Cell Responses”, *invited speaker*, Colorado, US, 02/14


American Asthma Foundation Annual Meeting, *invited speaker*, San Francisco, US, 05/14

**Dr Milon Pang**
New Directions in Leukaemia Research 2014, *oral presentation*, Noosa, Australia, 03/14

**Dr Simon Willis**
Staff list

Renata Cubas, administrative officer

**Stephen Nutt**, BSc(Hons) Sydney PhD Vienna

Rhys Allan, BSc(Hons) Melbourne PhD Melbourne

Sebastian Carotta, PhD Vienna (from 05/14)

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

Chin Nien Lee, MSc Taiwan PhD Melbourne (to 08/13)

Julie Tellier, PhD France

Simon Willis, BSc(Hons) Melbourne PhD Melbourne

Felix Zheng, BSc(Hons) Melbourne PhD Melbourne (to 12/13)

Angela D’Amico

Nadia Iannarella

Patrick Leung, BBiomedSc Monash

Dane Newman, BEng(Hons) Deakin PhD Deakin

Christina Bruggeman, BSc Netherlands, overseas research trainee (from 07/13 to 12/13)

**Gabrielle Belz**, BVBiol Qld BVSc Qld PhD Qld

Matt Firth, MSc Guelph (from 01/14)

Jo Groom, BAppSc Charles Sturt

BSc(Hons) Melbourne PhD UNSW

Lisa Mielke, BSc Melbourne PhD Melbourne

Adele Mount, BSc(Hons) Melbourne PhD Melbourne

Cyril Seillet, MSc France PhD France

Mary Camilleri

Sara Lamont, BBiomedSc(Hons) LaTrobe

Lucille Rankin, BA Melbourne

BSc(Hons) Melbourne, PhD student

Janet Yeo, BSc(Hons) Melbourne, PhD student

Simone Farrer, BSc(Hons) Monash MSc Melbourne, editorial assistant

**Lynn Corcoran**, BSc(Hons) Melbourne PhD Melbourne

Dianne Emslie, BSc(Hons) VUT PhD VUT

Tobias Kratina, BSc(Hons) Deakin

**Nick Huntington**, BSc(Hons) LaTrobe PhD Melbourne

Milon Pang, BSc Murdoch BSc(Hons) Melbourne PhD Melbourne

Priyanka Sathe, BSc Sydney BSc(Hons) Melbourne PhD Melbourne

Rebecca Delconte, BSc(Hons) Melbourne

**Axel Kallies**, PhD Free

Klaas van Gisbergen, PhD Netherlands

Ajithkumar Vasanakumar, BSc Madurai Kamaraj MSc Madurai Kamaraj PhD Madurai Kamaraj

Renee Gloury, BSc(Hons) Melbourne

Kevin Man, BSc Melbourne LLB Melbourne, PhD student

Tom Sidwell, BSc(Hons) Monash, PhD student
SYSTEMS BIOLOGY AND PERSONALISED MEDICINE

The Systems Biology and Personalised Medicine division uses high-throughput biology to understand global changes in biological systems, and to inform therapeutic decisions. The technologies – including genomics, transcriptomics, proteomics, chemical and genetic screens – are improving our understanding of cancers, immune disorders and infectious diseases.

Funding for drug discovery
The institute is a partner and founder of the Cancer Therapeutics Cooperative Cancer Centre (CRC). Division laboratory head Associate Professor Ian Street is chief scientific officer at the Cancer Therapeutics CRC. The Cancer Therapeutics CRC received a $64 million six-year extension to continue drug discovery for cancers. The focus of the is on drug discovery into the major cause of cancer deaths – the spread and growth of secondary cancers in the lung, liver, bone and brain. They will also work with childhood cancer experts to improve development and targeting of new cancer therapies.

Personalised medicine moving forward
The Ian Potter Centre for Genomics and Personalised Medicine was established in 2012 with funding from The Ian Potter Foundation.

The centre is a collaboration between the Walter and Eliza Hall Institute and the Murdoch Children’s Research Institute. We have continued to build our capacity this year with the purchase of an automated DNA library preparation system to prepare multiple sequencing samples simultaneously and undertake larger and more complex studies.

The cancer program is continuing its studies into metastatic bowel cancer and acute myeloid leukaemia, while the immune disease program has recruited patients for the acute rheumatic fever project, and a program on childhood food allergies.

Health impact
Cancers: bowel cancer, leukaemia, lymphoma, melanoma, stomach cancer
Immune disorders: rheumatoid arthritis, rheumatic fever and heart disease
Infectious disease: malaria, vaccines
Other areas: antivenoms, congenital disease, personalised medicine

New technologies driving research
Over the past 12 months, the Systems Biology and Personalised Medicine division has doubled in size, to incorporate a number of progressive technologies available to scientists at the institute.

The division now includes the institute’s Centre for Dynamic Imaging, Flow Cytometry and High-Throughput Screening laboratories. These state-of-the-art technologies and facilities are driving forward our research programs and enabling scientists to undertake world-class research.

The division has also acquired new state-of-the-art technologies for genome editing and functional genomics that are driving innovative new science programs at the institute.

Faculty
Division head
Professor Liam O’Connor

Lab heads
Associate Professor Peter Gibbs
Dr Oliver Sieber
Associate Professor Ian Street
Predicting bowel cancer prognosis and response

Bowel cancer is a leading cause of cancer-related deaths worldwide.

Dr Dmitri Mouradov and Dr Oliver Sieber are searching for ways to improve outcomes for people with bowel cancer. The team is looking for biological markers, such as specific genetic changes, with the potential to improve diagnosis and prognosis, and guide clinical treatment decisions.

The team found changes in molecules that control how DNA is packaged within cells may play an important role in bowel cancer development.

Human bowel cancer cell lines are used worldwide to investigate tumour biology, discover new anti-tumour compounds and identify biological markers to predict responses to existing drugs. Using detailed genetic and molecular information on more than 200 bowel tumours from The Cancer Genome Atlas program, the team investigated how commonly used human bowel cancer cell lines, grown in laboratories for as long as 40 years, compared to patients’ bowel tumours.

Dr Mouradov said the laboratory-grown cell lines were genetically representative of the cancer cell subtypes commonly found in people with bowel cancer. “We confirmed commonly used cell lines were a good tool for validating biological markers and testing new drugs,” he said. “We now have a comprehensive genomic resource on 70 bowel cancer cell lines, allowing researchers to select the best cell line to answer specific research questions.”

As part of the research, the team found changes in molecules that control how DNA is packaged within cells may play an important role in bowel cancer development. “These ‘chromatin remodelling’ genes extensively change the genome ‘packaging’, switching sections of DNA on and off,” Dr Mouradov said. “This is an important lead for further investigating their role in driving bowel cancer development.”

Collaborating organisations: Johns Hopkins University (US), Ludwig Cancer Research (US), QIMR Berghofer Medical Research Institute, University of Oxford (UK), VLSCI Life Sciences Computation and Wellcome Trust Centre for Human Genetics (UK).

Funding partners: Australian National Health and Medical Research Council, Cancer Australia, Ludwig Cancer Research and Victorian Government.

A personal approach to disease

As a medical practitioner with some experience in cancer treatments, Dr George Janko has followed with interest the emerging fields of genomics and personalised medicine.

When he heard Professor Liam O’Connor being interviewed about the promise of personalised medicine and the world-class research being done at the institute, Dr Janko was inspired to contact him.

In 2014, Dr Janko visited The Ian Potter Centre for Genomics and Personalised Medicine, a collaboration between the Walter and Eliza Hall Institute and the Murdoch Children’s Research Institute established with $3 million in funding from The Ian Potter Foundation. Professor O’Connor is the institute’s team leader in the centre.

The centre conducts cutting-edge research to drive the use of genomic information to personalise therapy and improve outcomes for patients, and is now a hub for innovative therapeutic research.

The Janko-Inge Foundation has committed to support the centre’s cancer program for the next five years. The aim of the cancer program is to investigate individual differences in patients’ responses to anti-cancer therapies, and identify inherited and acquired mutations that result in chemotherapy resistance in cancer patients.

“As a doctor, I understand that one of the major sources of inefficiency in our health care system is the one-size-fits-all approach to treatment,” Dr Janko said. “Personalised medicine is a very exciting and promising area of research. It is amazing to think that researchers at the Walter and Eliza Hall Institute can now rapidly sequence an entire human genome in-house.”

A more personalised approach to treatment would mean that patients would not need to endure costly, ineffective treatments. For example, 85 per cent of bowel cancer patients do not respond to current treatments and early indicators suggest that patients who do not respond have some genetic similarities. With further research, Professor O’Connor and his team are searching for a genetic profile that will predict those bowel cancer patients likely to be resistant to treatment. A similar study is underway on resistance to childhood leukaemia treatment.
Major national and international meetings

Dr Jayesh Desai
Royal Australasian College of Surgeons Annual Scientific Congress, invited speaker, Singapore, Singapore, 05/14
American Society of Clinical Oncology Annual Scientific Meeting, invited speaker, Chicago, US, 06/14

Associate Professor Clara Gaff
Global Alliance for Genomics and Health, invited speaker, London, UK, 03/14
Otago Genomics 2014, invited speaker, Dunedin, NZ, 04/14
European Society of Human Genetics Conference, oral presentation, Milan, Italy, 05/14

Associate Professor Peter Gibbs
Ludwig Cancer Research Annual Scientific Meeting, invited speaker, Oxford, UK, 10/13
Asia Pacific Gastrointestinal Cancer Conference, invited speaker, Singapore, Singapore, 12/13
Colorectal Cancer Expert Forum, invited speaker, Hong Kong, Hong Kong, 03/14

Dr Giuseppe Infusini
19th Proteomics Symposium 2014, oral presentation, Lorne, Australia, 02/14

Dr Karl-Johan Leuchowius
Australian High Content Analysis and RNAi meeting, invited speaker, Melbourne, Australia, 07/13

Mr Simon Monard
2013 Australasian Flow Cytometry Group Meeting, invited speaker, Wellington, New Zealand, 11/13

Dr Kelly Rogers
Advanced Imaging Workshop for Malaria Researchers, UTS, Sydney, invited speaker, Sydney, Australia, 08/13
Core Technologies for Life Sciences, Workshop on Research Innovation is Services - Facilitating Research by Improving Technology Resource Management, Institut Pasteur, Paris, invited speaker, Paris, France, 02/14

Dr Andrew Webb
19th Proteomics Symposium 2014, oral presentation, Lorne, Australia, 02/14

Dr Ben Tran
Official Post American Society of Clinical Oncology Meeting 2013, invited speaker, Melbourne, Australia, 08/13
Urological Society Australia New Zealand - Victorian chapter Annual Scientific Meeting, invited speaker, Cape Schanck, Australia, 10/13
National Bladder Kidney Cancer Symposium, invited speaker, Melbourne, Australia, 02/14
Staff list

Lisa Connolly, BSc(Hons) Melbourne, scientific coordinator

Liam O’Connor, BSc(Hons) UWA PhD Melbourne
Eugene Kapp, BSc(Hons) Rhodes MSc Rhodes
Stephen Wilcox, BSc(Hons) Sussex PhD LaTrobe
Sam Wormald, BSc(Hons) Melbourne PhD Melbourne
Doreen Agypomaa, BAppSc(Hons) Melbourne

Stephen Wilcox, BSc(Hons) Rhodes MSc Rhodes
Lisa Connolly, BSc(Hons) Melbourne PhD Melbourne
Doreen Agypomaa, BAppSc(Hons) Melbourne

Liam O’Connor, BSc(Hons) Melbourne

Stephen Wilcox, BSc(Hons) Rhodes

Sussex

Liam O’Connor,
BSc(Hons)
Melbourne
PhD Melbourne
Doreen Agypomaa, BAppSc(Hons) Melbourne

Oliver Sieber, BSc(Hons) UCL PhD UCL
Bruno Catimel (from 08/13)
Dane Cheasley, PhD LaTrobe
Robert Jorissen, BSc(Hons) Monash PhD Melbourne
Sheng Liu, BSc(Hons) Melbourne PhD Melbourne
Christopher Love, BSc(Hons) Bath MSc Exeter PhD LaTrobe
Dmitri Mouradov, BSc(Hons) Qld PhD Qld

Flow Cytometry Laboratory

Simon Monard, BSc(Hons) UCL MSc Kings College, head of flow cytometry facility
David Baboyan, BSc(Hons) Javakhishvili Tbilisi State MSc(Hons) Javakhishvili Tbilisi State
Adrian Binek, BSc Swinburne
Stacey Jeffrey, BBiomedSc Swinburne (from 10/13)
Dora Kaminaris, BSc Monash
Melanie Le Page, BSc(Hons) Monash (from 11/13)
Michelle McCann, BSc Monash
Padmini Nanda, BSc Bangalore MSc Bangalore (to 12/13)
Chayanica Nasa, BSc Delhi MSc Delhi
Rumbi Tichawangana, BSc Deakin BSc(Hons) Melbourne (to 09/13)

Oliver Sieber, BSc(Hons) UCL PhD UCL
Bruno Catimel (from 08/13)
Dane Cheasley, PhD LaTrobe
Robert Jorissen, BSc(Hons) Monash PhD Melbourne
Sheng Liu, BSc(Hons) Melbourne PhD Melbourne
Christopher Love, BSc(Hons) Bath MSc Exeter PhD LaTrobe
Dmitri Mouradov, BSc(Hons) Qld PhD Qld

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Elizabeth Allan, BSc Otago PhD Melbourne
Melanie De Silva, BSc Melbourne Sukhdeep Spall, BSc India MSc LaTrobe

Proteomics laboratory

Giuseppe Infusini, BSc Naples PhD Naples
Thomas Nebi, PhD LaTrobe
Andreas Webb, BSc Monash PhD Melbourne
Sangeetha Ramdave, BEng Melbourne MS Melbourne, PhD student (from 02/14)

Screening laboratory

Kate Jarman, BSc(Hons) Adelaide PhD Adelaide
Kym Lowes, BSc(Hons) UWA PhD UWA
Rebecca Moss, BAppSc(Hons) RMIT Patrizia Novelio, BBioloSc(Hons) LaTrobe
Soo San Wan, BAgSc(Hons) LaTrobe MA MSc LaTrobe (to 04/14)
Hong Yang, PhD Norman Bethune (to 06/14)
Henry Beetham, BBiomedSc(Hons) Otago, visiting PhD student (from 09/13 to 03/14)

Ian Street, BSc(Hons) Sussex PhD British Columbia
Hendrik Falk, PhD Berlin
Karl Leuchowius, MSc Uppsala PhD Uppsala
Elizabeth Allan, BSc Otago PhD Melbourne
Melanie De Silva, BSc Melbourne Sukhdeep Spall, BSc India MSc LaTrobe

Lachlan Whitehead, BA Melbourne BSc(Hons) Melbourne PhD Melbourne

Imaging laboratory

Kelly Rogers, BSc(Hons) Deakin PhD Griffith, head of imaging facility
Mark Scott, BSc(Hons) Open BSc(Med) Curtin (from 03/14)

Ian Street, BSc(Hons) Sussex PhD British Columbia
Hendrik Falk, PhD Berlin
Karl Leuchowius, MSc Uppsala PhD Uppsala
Elizabeth Allan, BSc Otago PhD Melbourne
Melanie De Silva, BSc Melbourne Sukhdeep Spall, BSc India MSc LaTrobe

Sangeetha Ramdave, BEng Melbourne MS Melbourne, PhD student (from 02/14)

Screening laboratory

Kate Jarman, BSc(Hons) Adelaide PhD Adelaide
Kym Lowes, BSc(Hons) UWA PhD UWA
Rebecca Moss, BAppSc(Hons) RMIT Patrizia Novelio, BBioloSc(Hons) LaTrobe
Soo San Wan, BAgSc(Hons) LaTrobe MA MSc LaTrobe (to 04/14)
Hong Yang, PhD Norman Bethune (to 06/14)
Henry Beetham, BBiomedSc(Hons) Otago, visiting PhD student (from 09/13 to 03/14)
DEVELOPMENT AND CANCER

Researchers from the Development and Cancer division investigate mechanisms regulating cell growth in normal development and cancer. The molecular mechanisms underlying the rapid, but regulated, growth of cells during embryonic development are frequently deregulated in cancer.

Gene defects in development and disease

Using zebrafish, Associate Professor Joan Heath, Dr Sebastian Markmiller and colleagues demonstrated a protein called Rnpe3 was critical for the growth of many organs during development.

Rnpe3 is a component of the minor-class splicing machinery, which is required to remove a small fraction of DNA (called introns) from newly synthesised mRNA (the blueprint for proteins). The team showed that impaired minor-class splicing has widespread effects during development, disabling networks of genes required for normal cell behaviour. The study sheds light on the cause of a severe human developmental disorder known as Taybi-Linder syndrome or MOPD1 (microcephalic osteodysplastic primordial dwarfism 1).

Investigating eye disease

Division researcher Dr Leigh Coultas has established a collaboration with Associate Professor Andrew Symons at The Royal Melbourne Hospital to investigate retinopathy and retinal vascular disease.

Retinopathy and retinal vascular disease can cause blindness associated with changes to the light-sensitive retinal cell layer on the back of the eye. Retinopathy is a common complication of diabetes and macular degeneration.

Dr Coultas and Associate Professor Symons will investigate novel targets that could aid in treating or preventing these conditions, in a collaboration that bridges the gap between basic research discoveries and clinical application.

Award-winning PhD students

Division PhD students Ms Hannah Vanyai and Ms Farrah El-Saafin each won prizes for their oral presentations at major national conferences.

Ms Vanyai won the David Walsh Prize at the ComBio 2013 conference for her presentation on unraveling the complex genetic interactions that, when defective, can lead to cleft palate, a common developmental abnormality in newborns.

Ms El-Saafin won the Promega Student Award at the Lorne Genome Conference 2014 for her presentation on the molecular mechanisms underlying cell death in the embryonic brain.

Health impact

Cancers: bowel cancer, lung cancer, leukaemia, lymphoma, stomach cancer

Other areas: congenital diseases, epigenetics, regenerative medicine, vascular diseases

Faculty

Division head
Associate Professor Anne Voss

Lab heads
Dr Leigh Coultas
Associate Professor Joan Heath
Associate Professor Tim Thomas
Unlocking the secrets of (cell) life and death

Blood vessels carry the oxygen and nutrients our tissues require to grow and survive. Blood vessel development is critical for the growth of complex organisms, such as a baby growing in the womb. In adults the process is generally switched off, however it can reactivate and cause disease, such as cancers switching on blood vessel development to feed tumours.

“We showed BIM was the essential ‘death instructor’ for blood vessel cells.”

Dr Leigh Coultas is studying normal blood vessel development and how it is controlled in the body, in the hope that it could lead to ways of preventing or treating diseases such as cancer.

“As part of normal embryonic development, some of the cells that develop are no longer needed, such as the cells between our fingers and toes,” Dr Coultas said. “These cells are removed by a process called programmed cell death, which tells the cell to die quietly without causing inflammation and collateral damage.”

Recently Dr Coultas and his team showed a protein called BIM was essential for regulating the life and death of cells that make up blood vessels. “There are a number of proteins that can instruct cells to die, and different proteins are used by different tissues as the main signal to die,” Dr Coultas said. “We showed BIM was the essential ‘death instructor’ for blood vessel cells.”

The team is now looking to develop ways of controlling the life and death of blood vessel cells. “We hope this will lead to new treatments for diseases caused or exacerbated by abnormal blood vessel growth,” Dr Coultas said.

Funding partners: Australian National Health and Medical Research Council, Australian Research Council and Victorian Government.

International support for bowel cancer research

Bowel cancer is one of the most commonly diagnosed cancers in Australia, and the second leading cause of cancer-related deaths worldwide.

The international not-for-profit Ludwig Cancer Research provides funding to five research teams at the Walter and Eliza Hall Institute. The teams are studying bowel cancer biology, development, diagnostics and treatments, and are led by Professor Tony Burgess, Associate Professor Matthias Ernst, Associate Professor Peter Gibbs, Associate Professor Joan Heath and Dr Oliver Sieber.

Ludwig Cancer Research is an international community of distinguished scientists dedicated to preventing and controlling cancer. US businessman Daniel K. Ludwig began to support cancer research with the establishment of the Ludwig Institute for Cancer Research in 1971. Today Ludwig Cancer Research encompasses the Ludwig Institute and six Ludwig Centers at US institutions, all pursuing breakthroughs to alter the course of cancer.

Associate Professor Joan Heath from the institute’s Development and Cancer division is identifying novel genes required for intestinal development that may be involved in cancer, particularly bowel cancer. She said the research team used zebrafish to discover genes that were indispensable for the growth of rapidly proliferating tissues during development. “Our research is driven by the recognition that many of the dynamic processes occurring during development, such as rapid cell growth and division, are also highly active or dysregulated in cancer,” she said. “Typically the genes controlling these processes are inactive during adulthood but can be hijacked by cancer cells later in life.”

Having discovered several genes in zebrafish that are crucial for intestinal development, the team is now examining the genes’ ability to contribute to cancer development, using molecular tools to disrupt their activity in models of bowel, lung, liver and stomach cancer. “We are focused on these four cancers because, collectively, they cause nearly half of all cancer deaths globally, and new therapies are urgently needed,” Associate Professor Heath said. “We are particularly excited by one gene that appears to be required for the development of several cancers and we are currently testing whether it could be a worthwhile target for novel anti-cancer therapies.”
Major national and international meetings

Dr Leigh Coultas
2013 Joint meeting of the Australian Vascular Biology Society and the Australian and New Zealand Microcirculation Society, oral presentation, Barossa Valley, Australia, 09/13
Second meeting of the Australian Network of Cardiac and Vascular Developmental Biologists, oral presentation, Gold Coast, Australia, 10/13

Dr Karen Doggett
6th Annual Melbourne Cell and Developmental Biology Meeting, oral presentation, Melbourne, Australia, 10/13

Associate Professor Joan Heath
Zebrafish Disease Models 6, oral presentation, Murcia, Spain, 07/13
15th Annual Australia and New Zealand Zebrafish Conference, session chair, Sydney, Australia, 02/14
11th International Conference on Zebrafish Development and Genetics, session chair, Madison, US, 06/14
Zebrafish Disease Models 7, session chair, Madison, US, 06/14

Associate Professor Anne Voss
Lorne Genome Conference, co-convenor, Lorne, Australia, 02/14
The Hunter Meetings, invited speaker, Hunter Valley, Australia, 03/14
Staff list

Tim Thomas, BSc(Hons) Melbourne
PhD Melbourne
Anne Voss, BVSc Hannover PD
Goettingen PhD Hannover
Qingyan Cui, PhD Shanghai (from 03/14 to 05/14)
Andrew Kueh, BSc(Hons) Melbourne
MB BS Melbourne PhD Melbourne
Bilal Sheikh, BBiomedSc(Hons) Melbourne PhD Melbourne (to 06/14)
Rose Cobb, BBiolSci(Hons) LaTrobe
Natalie Downer, BSc(Hons) Melbourne
Farrah El-Saafin, BMedSc LaTrobe
BSc(Hons) Melbourne, PhD student
Helen McRae, BSc(Hons) Melbourne, PhD student (from 03/14)
Hannah Vanyai, BA Melbourne
BSc(Hons) Melbourne, PhD student

Leigh Coulta, BSc(Hons) Adelaide
PhD Melbourne
Monica Koenig, BBiomedSc(Hons) Monash (to 01/14)
Evelyn Trounson, BSc(Hons) VUT
Zoe Grant, BBiomedSc Melbourne, BSc(Hons) student (from 02/14)
Emma Watson, BSc Melbourne, PhD student
Lysandra Richards

Joan Heath, BA(Hons) Cambridge MA
Cambridge PhD Cambridge
Karen Doggett, BSc(Hons) Surrey
DPhil Oxford
Cristina Keightley, BSc(Hons) Monash
PhD Monash
Viola Lobert, BSc(Hons) Monash PhD
Oslo (from 01/14)
Johanna Simkin, BSc(Hons) Melbourne
PhD Melbourne
Ben Williams, BSc(Hons) UNSW PhD
Melbourne
Tyson Blanch
Janine Coates, BSc(Hons) Melbourne
Tanya de Jong-Curtain, BA Monash
BSc(Hons) Monash PhD Melbourne
Dora McPhee, BFA VCA BSc(Hons)
Monash GradDipFA VCA
Esther Kim, BBiomedSc Melbourne,
BSc(Honours) student (from 12/13)
Prime Minister’s Prize for Science

Statistician Professor Terry Speed was the winner of the 2013 Prime Minister’s Prize for Science for his influential work using mathematics and statistics to help biologists understand human health and disease.

The Prime Minister’s Prize for Science is Australia’s highest award for excellence in science research. The award recognises the significant importance of bioinformatics in modern biomedical science.

Over the course of his 44-year career, Professor Speed has developed mathematical and statistical tools that enable biologists to make sense of the vast amounts of information generated by rapidly advancing (next-generation) genetic technologies.

Bioinformatics has made it possible to look at hundreds of genes in a DNA sequence at once to understand the genetic changes involved in complicated diseases such as cancers, and is integral to the genomics revolution that is driving the sequencing of whole genomes in record times. Professor Speed has developed tools to identify genes that are responsible for different traits, diseases or cancers by sifting through these enormous volumes of data.

“Science is a collaborative effort and I would like to thank the many students, postdocs and colleagues who have supported me throughout my career.”

In addition to developing tools to help biologists analyse and explain their results, Professor Speed is working with biologists to determine the genetic traits that make normal and cancerous cells different; developing tools to help determine if thyroid growths are benign or cancerous; and determining the risk children in malaria-endemic countries have of developing clinical malaria, which helps to inform prevention and treatment strategies.

Professor Speed said it was a great honour to receive the Prime Minister’s Prize for Science. “Australia is full of many amazing and talented researchers, so it is humbling to be recognised in this way,” he said.

“Science is a collaborative effort and I would like to thank the many students, postdocs and colleagues who have supported me throughout my career. In addition, I would like to thank my wife, Sally, whose love and support over the past 50 years has enabled me to pursue my research with passion.”
**PUBLICATIONS**

BIO  Bioinformatics  
CBD  ACRF Chemical Biology division  
CHD  Cancer and Haematology division  
CSCD  Cell Signalling and Cell Death division  
DCD  Development and Cancer division  
IMM  Immunology division  
INF  Infection and Immunity division  
INFL  Inflammation division  
MGC  Molecular Genetics of Cancer division  
MIMM  Molecular Immunology division  
MMD  Molecular Medicine division  
SBD  Structural Biology division  
SBPM  Systems Biology and Personalised Medicine division  
SCC  ACRF Stem Cells and Cancer division  

Number of publications

Primary: 296  
Reviews: 80  
Book chapters: 5  
Total: 381  

**Primary**


93. Harten SK, Bruxner TJ, Bharti V, Blewitt M, Nguyen TM, Whitelaw E, Epp T. The first mouse mutants of D14Abbb1e (Fam208a) show that it is critical for early development. *Mammalian Genome*. 2014 25(7-8):293-303. MMD


124. Khaw SL, Merino D, Anderson MA, Glasper SP, Bouillet P, Roberts AW, Huang DCS. Both leukaemic and normal peripheral B lymphoid cells are highly sensitive to the selective pharmacological inhibition of pro-survival Bcl-2 with ABT-263. Leukemia. 2014 28(6):1207-1215. CHD MGC CBD


199. Ontiveros N, Tye-Din JA, Hardy MY, Anderson RP. *Ex-vivo* whole blood secretion of interferon (IFN)-gamma and IFN-gamma-inducible protein-10 measured by enzyme-linked immunosorbent assay are as sensitive as IFN-gamma enzyme-linked immunosupot for the detection of gluten-reactive T cells in human leucocyte antigen (HLA)-DQ2.5(+) -associated celiac disease. *Clinical and Experimental Immunology*. 2014 175(2):305-315. IMM


225. Schulze M, Anders AK, Sethi DK, Call MJ. Disruption of hydrogen bonds between Major Histocompatibility Complex class II and the peptide N-terminus is not sufficient to form a human leukocyte antigen-DM receptive state of major Histocompatibility Complex class II. *PLoS One.* 2013 8(7):e69228. SBD


248. Stock AT, Smith JM, Carbone FR. Type I IFN suppresses Cxcr2 driven neutrophil recruitment into the sensory ganglia during viral infection. *Journal of Experimental Medicine.* 2014 211(5):751-759. **INF**


287. Wormald S, Milla L, O’Connor L. Association of candidate single nucleotide polymorphisms with somatic mutation of the epidermal growth factor receptor pathway. BMC Medical Genomics. 2013 6:43. SBPM


291. Yao SG, Westphal D, Babon JJ, Thompson GV, Robin AY, Adams JM, Colman PM, Czubotar PE. NMR studies of interactions between Bax and BH3 domain-containing peptides in the absence and presence of CHAPS. Archives of Biochemistry and Biophysics. 2014 545:33-43. CHD MGC SBD
Reviews and book chapters


331. Ioannidis L, Nie C, Hansen D. The role of chemokines in severe malaria: more than meets the eye. Parasitology. 2014 141(5):602-613. INF


335. Kershaw NJ, Murphy JM, Lucet IS, Nicola NA, Babon JJ. Regulation of Janus kinases by SOCS proteins. Biochemical Society Transactions. 2013 41:1042-1047. CBD


343. Lucet IS, Babon JJ, Murphy JM. Techniques to examine nucleotide binding by pseudokinases. Biochemical Society Transactions. 2013 41:975-980. SBD CHD CBD


346. Murphy JM, Silke J. Ars Moriendi; the art of dying well - new insights into the molecular pathways of necroptotic cell death. EMBO Reports. 2014 15(2):155-164. CSCD CHD


349. Ottina E, Pellegrini M, Villunger A. Guarding effector T-cell survival: all for one, Mcl-1 for all? Cell Death and Differentiation. 2013 20(8):969-971. INF

351. Pang SH, Carotta S, Nutt SL. Transcriptional control of pre-B cell development and leukemia prevention. Current Topics in Microbiology and Immunology. 2014 May 16. (epub ahead of print) MIMM


373. Toe J, Pellegrini M, Mak T. Promoting immunity during chronic infection—the therapeutic potential of common gamma-chain cytokines. Molecular Immunology. 2013 55(1-2):38-47. INF


375. Vaux DL. Know when your numbers are significant. Nature. 2014 509(7502):573-574. IMM


379. Ward CW, Menting JG, Lawrence MC. The insulin receptor changes conformation in unforeseen ways on ligand binding: sharpening the picture of insulin receptor activation. Bioessays. 2013 35(11):945-954. SBD


TRANSLATION

A major goal of the institute is to harness and translate basic research discoveries into the clinic, delivering real patient benefits.

The institute’s Clinical Translation Centre provides strong links between clinicians, research and hospital partners, and supports highly skilled clinician-scientists who are helping to translate fundamental discoveries into treatments that will improve patient outcomes.

The Business Development Office initiates start-up ventures, partnerships and collaborative projects with the public and private sectors to help achieve translation of discoveries to the clinic.

MORE THAN

100 national and international clinical trials based on discoveries made at the institute

16 patents granted in 2013-14

17 patent families are licensed for research or development

36 interns completed Molecules2Medicine program across 15 organisations

22 medically qualified PhD students

15 clinically active researchers

9 Victorian partners in clinical translation and trials
CANCER

One in two Australians will be diagnosed with a cancer by the age of 85. The institute has clinical and translational research programs focused on blood, breast, bowel, lung, ovarian and stomach cancers.

Trial results bring high hopes for advanced leukaemia

Chronic lymphocytic leukaemia (CLL) is the most common leukaemia in adults, affecting one in 161 Australians by age 85.

A first-in-human clinical trial has shown impressive results for treating particularly serious forms of this leukaemia. The anti-cancer agent ABT-199 was used to treat people with advanced leukaemia for whom no conventional treatment options were available.

The treatment achieved outstanding results in a phase one trial including 78 patients with advanced CLL – clearing the cancer in 23 per cent of patients and achieving partial clearance in a further 54 per cent. The first clinical trial with this drug is still running at The Royal Melbourne Hospital (RMH) and Peter MacCallum Cancer Centre.

ABT-199 is based on a landmark discovery made in the late 1980s by Walter and Eliza Hall Institute scientists that a protein called Bcl-2 promoted cancer cell survival. ABT-199/GDC-0199 has been co-developed for clinical use by biotech companies AbbVie and Genentech, a member of the Roche group, and was discovered as part of a joint research collaboration that involved Walter and Eliza Hall Institute scientists. The institute has been closely involved in the preclinical testing and research that led to ABT-199 being used in clinical trials.

Professor Andrew Roberts, a cancer researcher at the institute and haematologist at RMH, leading the Melbourne arm of the international trial.

Professor Roberts said although CLL cells were slow to proliferate, they accumulated inexorably in the body and, in some patients, resulted in large tumours that could not be adequately combated with standard treatments.

“High levels of Bcl-2 protect the leukaemia cells from dying when using standard treatments,” Professor Roberts said. “ABT-199 selectively targets the interaction responsible for keeping the leukaemia cells alive and, in many cases, we’ve seen the cancerous cells simply melt away.

“Eighty-four per cent of patients experienced remission after treatment with ABT-199, despite their disease having failed an average of four prior treatment regimens,” he said. “The patients on the trial were typically incurable, with an average life expectancy of up to 18 months. To see complete cancer clearance in nearly one-quarter of these patients, after taking this non-chemotherapy treatment on its own, is incredibly encouraging.”

Professor Roberts said it was an important trial and drug for Australia. “We are very happy that our involvement in the discovery has meant that Melbourne patients are some of the first people in the world to benefit from the treatment,” he said. “Trials are going on around the world now to establish just how important this new drug may be for patients with CLL.”

Studies have suggested the Bcl-2 ‘survival instinct’ may play a role in other cancers, and preclinical testing has suggested drugs that target Bcl-2 could be used to treat other blood cancers, or used in combination with existing treatments to improve treatments for breast, lung and prostate cancers.

The project is an important example of how three Melbourne organisations can collaborate as members of the Victorian Comprehensive Cancer Centre to drive the next generation of improvements in the prevention, detection and treatment of cancer.
Discovering new cancer drugs

The Cancer Therapeutics Cooperative Research Centre (CRC) received a $64 million six-year extension in 2014 to continue drug discovery for cancers.

The focus of the program is on drug discovery into the major cause of cancer deaths – the process of metastasis where tumours spread and grow as secondary cancers in other organs such as lung, liver, bone and brain. The Cancer Therapeutics CRC team will also work with Australia’s experts in childhood cancer to improve the development and targeting of new therapies for children with cancer.

Four exciting cancer therapeutic projects from the Walter and Eliza Hall Institute are being progressed within the Cancer Therapeutics CRC. Inhibitors of the epigenetic regulator Moz are being developed, in a project championed by Dr Tim Thomas at the institute, which is likely to be relevant for acute myeloid leukaemia, lymphomas and potentially breast and ovarian cancers. Professor Tony Burgess and Associate Professor Guillaume Lessene are involved in projects looking for inhibitors of a molecule called RET kinase, which it is hoped will demonstrate utility in lung and other cancer types; and an anti-mitotic (inhibitor of cell division) agent with broad relevance to multiple cancer types.

Associate Professor Ian Street, in collaboration with Professor Stephen Jane and Professor David Curtis at Monash University, is participating in a project to develop inhibitors of the epigenetic regulator, PRMT5, which will be used to treat leukemia and other cancers. PRMT5 inhibitors also have potential for treating non-cancerous blood disorders such as β-thalassemia and sickle cell disease.

All projects involve medicinal chemistry to optimise lead molecules, in conjunction with thorough biological investigation of drug activity. The anti-mitotic project is the most advanced, and lead molecules have demonstrated utility in bowel, brain, non-small cell lung cancer and breast cancer. The compounds are also showing early promise for cancers that do not respond to the widely used chemotherapy agent paclitaxel. In addition, this compound is being investigated as an antibody–drug conjugate, which could allow the compound to be specifically targeted to cancerous cells. PRMT5 inhibitors are currently being evaluated in preclinical models of leukemia.

Professor Geoff Lindeman (left) and Professor Jane Visvader lead the institute’s breast cancer laboratory. Their team is developing novel diagnostics and therapeutics for breast cancer, with a strong translational focus to fast-track research discoveries to the clinic.
Improving cancer research with better models

The key to translating basic cancer discoveries to the clinic is predicting how ‘real’ human cancers respond, and become resistant, to new and existing treatments.

Institute scientists are developing realistic laboratory models of human cancers using donated tumour samples from patients. Called patient-derived xenografts (PDX), the models provide an unparalleled and relevant tool for understanding human cancers.

The models are created using human tumour samples donated by patients, and are possible thanks to collaborations between the institute and its partners, including The Royal Melbourne Hospital, Royal Women’s Hospital and Royal Children’s Hospital, and through initiatives such as the Victorian Cancer Biobank, Kathleen Cuningham Foundation Consortium for Research into Familial Breast Cancer (kConFab) and Australian Ovarian Cancer Study.

With PDX models, researchers can study the response of the tumour to multiple treatments and trial new anti-cancer drugs to see if they will be effective in human cancers.

The models exhibit similar treatment responses to what is seen in patients, including development of chemotherapy resistance. With PDX models, researchers can study the response of the tumour to multiple treatments and trial new anti-cancer drugs to see if they will be effective in human cancers. They can also act as a reference tumour to compare the cancer’s ‘evolution’ after treatment.

Six laboratories from the institute have dedicated programs to create PDX models of breast, ovarian, lung and colon cancers, as well as blood cancers including myeloma and acute lymphoblastic leukaemia. Several of these programs are supported with additional funding from the Cancer Therapeutics CRC.

The breast, ovarian and lung cancer programs have led the way in PDX development at the institute.

The breast and ovarian cancer laboratories have significant interest in familial cancers caused by mutations in the BRCA1/2 genes. The breast cancer laboratory, led by Professor Jane Visvader and Professor Geoff Lindeman, has developed more than 40 models that recapitulate all the breast cancer subtypes – oestrogen-positive cancers, HER2 (human epidermal growth factor receptor 2)-positive cancers and aggressive triple negative cancers, which are common in familial cancers. The models are being used in projects to test the response of breast stem cells to chemotherapy, and to identify ‘biomarkers’ that would help to screen for breast cancer.

The institute’s ovarian cancer laboratory, led by Associate Professor Clare Scott, has created a suite of PDX models that represent the diversity of high-grade serous ovarian cancers, the most aggressive type of ovarian cancer. These models are being used to test their response to Parp inhibitors, a new medication being trialled for treating ovarian and breast cancers. Associate Professor Scott is also investigating cancer-causing genes that drive resistance to cancer therapies and the pattern in which they occur.
International partnership to target Achilles’ heel of many cancers

The Walter and Eliza Hall Institute and European pharmaceutical company Servier have established a collaborative partnership to facilitate the development of new agents that could be effective in treating several types of cancer, particularly blood cancers.

A research team at the Walter and Eliza Hall Institute, led by Associate Professor Guillaume Lessene, will test in preclinical models how cancer cells respond to treatment with the Mcl-1-inhibitory BH3-mimetics discovered by a Servier–Vernalis collaboration.

The results will indicate whether this new class of compounds could be useful in the future for treating people with cancer, and which types of cancer the compounds would be most effective against.

Mcl-1 is a promising therapeutic target for many types of cancer, said Associate Professor Lessene. “There is a considerable body of experimental evidence pinpointing Mcl-1 as the Achilles’ heel for many cancers, particularly blood cancers,” he said.

Mcl-1 is part of a closely-related group of proteins known as the ‘Bcl-2 family’, which also includes Bcl-2 and Bcl-xL, which are important in extending the lifespan of certain types of cancer cells.

“Institute researchers made the initial discovery more than 20 years ago that Bcl-2 played a role in cancer by extending the lifespan of cancer cells,” Associate Professor Lessene said. “We have been at the forefront of research revealing how the Bcl-2 family promotes cancer development and treatment resistance and have provided considerable experience in evaluating and developing potential anti-cancer agents, including BH3-mimetics.”

Dr Jean-Pierre Abastado, head of the Oncology Pole, and Dr Olivier Geneste, director of Apoptosis Programs at Servier, said the partnership would generate critical data and ideas helping the development of Servier’s anti Mcl-1 drug candidates and facilitate bringing a highly innovative treatment to cancer patients.
Immune disorders, or chronic inflammatory diseases, are caused by an inappropriate immune response that attacks the body’s own tissues. The institute has clinical and translational research programs focused on immune disorders including coeliac disease, rheumatoid arthritis, rheumatic fever and type 1 and 2 diabetes.

On the brink of new treatments for rheumatoid arthritis

Rheumatoid arthritis is an immune disorder that can cause chronic joint inflammation, joint destruction and disability. Unlike osteoarthritis, which is more common in older people, rheumatoid arthritis typically begins in younger adults, between 20 and 40 years old.

An investigational drug called mavrilimumab, which has shown positive results in clinical trials for treating rheumatoid arthritis, can trace its origins back to discoveries made by researchers at the Walter and Eliza Hall Institute. The drug has met its safety and efficacy endpoints in phase 2 clinical trials, supporting further development.

The drug dampens specific inflammatory molecules known to exacerbate rheumatoid arthritis. This drug targets the receptor for granulocyte-macrophage colony stimulating factor (GM-CSF). GM-CSF and its receptor were first discovered at the Walter and Eliza Hall Institute by Professor Don Metcalf, Professor Nick Nicola and colleagues in the 1970s.

Clinician-scientist Professor Ian Wicks, from the Walter and Eliza Hall Institute and The Royal Melbourne Hospital, has made important contributions to the development of mavrilimumab for the treatment of rheumatoid arthritis.

“As a result of the early work of Professors Metcalf and Nicola the institute held the patent for the GM-CSF receptor,” Professor Wicks said. “We collaborated with biotechnology companies AMRAD (now CSL) and Cambridge Antibody Technology (now MedImmune, a wholly owned subsidiary of AstraZeneca) to develop the first fully human anti-GM-CSF receptor antibody. This was the start of the work that led to the clinical trials that are now showing such promise.”

MedImmune, which has a licence agreement with CSL, is leading the clinical studies.

More than a third of people with rheumatoid arthritis do not respond adequately to existing treatments that target other molecules in the inflammatory response, which is why new approaches are needed.

Professor Wicks said that mavrilimumab looked particularly exciting as a treatment for rheumatoid arthritis due to its rapid action.

“People are experiencing significant relief of symptoms and, importantly, reduced pain within 2-3 weeks, rather than on average 6 weeks [with existing drugs],” he said. “Most people associate arthritis with getting old, however rheumatoid arthritis is a very different condition. It affects young people with families to raise, jobs to go to and it makes life very difficult, so the availability of a treatment that helps you get back to your life is very important for these people.”

“This is a very Australian story,” Professor Wicks said. “The drug is a classic example of a clinical development that was possible due to basic discoveries and research at the Walter and Eliza Hall Institute. It is also testament to long-term philanthropic support from the John T Reid Charitable Trusts that has enabled my laboratory to conduct this research.”
Closing the gap in acute rheumatic fever

Acute rheumatic fever is a complication of bacterial infection with group A streptococcus. Aboriginal Australians and Pacific Islanders have some of the world’s highest rates of acute rheumatic fever and related rheumatic heart disease. Rheumatic heart disease is a chronic, sometimes fatal, illness caused by recurrent episodes of acute rheumatic fever in early life, which damages heart valves. Approximately 45 per cent of Aboriginal people who require heart valve surgery in Australia are less than 25 years old.

Researchers from the Walter and Eliza Hall Institute, Menzies School of Health Research in Darwin and Telethon Kids Institute in Perth are collaborating on a project to decrease the burden caused by rheumatic fever and heart disease in Australian Aboriginal and Pacific Islander communities.

Dr Willy-John Martin, who is leading the project together with Professor Ian Wicks, said rheumatic fever should be an Australian health and medical research priority.

“We believe cutting-edge strategies should be applied to identifying and preventing acute rheumatic fever, and ensuing rheumatic heart disease, in Aboriginal and Pacific Islander communities.”

“Despite decades of research, there is still no diagnostic test, no vaccine, and limited therapeutic options for acute rheumatic fever and its cardiac complications,” Dr Martin said. “We believe cutting-edge strategies should be applied to identifying and preventing acute rheumatic fever, and ensuing rheumatic heart disease, in Aboriginal and Pacific Islander communities.”

Dr Martin said the initial project would focus on developing a diagnostic test to identify people with acute rheumatic fever following streptococcal infection.

“We are using the latest technologies to identify biomarkers and design an assay to measure the immune response to acute rheumatic fever,” Dr Martin said. “The development of a diagnostic test for acute rheumatic fever is urgently needed to help reduce the heavy burden of rheumatic heart disease in Aboriginal Australians, in the Pacific Islands, and throughout the developing world.”

Dr Martin said the research team had begun an extensive study of blood samples from participants in the Northern Territory.

New diagnostic approaches in development for coeliac disease

Coeliac disease is an autoimmune disorder in which the body inappropriately reacts to gluten in the diet.

The disease can cause severe digestive symptoms such as nausea, vomiting and diarrhoea and is associated with malnutrition, osteoporosis, autoimmune diseases and cancer.

Institute researcher and gastroenterologist at The Royal Melbourne Hospital Dr Jason Tye-Din and colleagues have made significant progress in developing a novel diagnostic test for coeliac disease. This test may one day enable coeliac disease to be diagnosed without the need for prolonged gluten exposure or invasive small bowel biopsy.

The immune diagnostic test builds on fundamental research discoveries made at the institute on how the immune system of people with coeliac disease reacts to dietary gluten. The test works by detecting a very specific T cell response to gluten in the bloodstream, which is highly predictive of coeliac disease.

This test may one day enable coeliac disease to be diagnosed without the need for prolonged gluten exposure or invasive small bowel biopsy.

Dr Tye-Din and Dr Bob Anderson from biotechnology company ImmusanT Inc. in Boston, US, led a study of the immune test in 48 participants. The test was able to detect a gluten-specific T cell response in the majority of people with coeliac disease and, importantly, was negative in all participants who did not have coeliac disease. Larger studies are now planned to verify the tests' role as a new diagnostic approach for coeliac disease.

In a separate study working with Barwon Health, Deakin University, Healthscope Pathology and The University of Queensland Diamantina Institute, the team also found that coeliac disease is more common in Australia than previously recognised. This population-based study revealed one in 70 Australians have coeliac disease, although 80 per cent remain undiagnosed. Surprisingly, more than half of the population carried the major HLA risk genes for developing coeliac disease.

Dr Tye-Din said combining the HLA gene test with traditional screening antibody tests may improve the accuracy of testing for coeliac disease in some situations, allowing many unnecessary, costly and invasive small bowel biopsies to be avoided. “In this study the inclusion of a simple genetic test helped identify a substantial number of people whose antibody tests were falsely positive and who did not actually require a bowel biopsy to test for the possibility of coeliac disease,” he said.
Testing new molecules for chronic inflammatory diseases

Chronic inflammatory diseases are painful and debilitating conditions. Existing treatments can have serious side-effects and do not work in all cases, therefore new drugs and approaches are needed to help patients.

A recently discovered cell death pathway called necroptosis has been linked to chronic inflammatory diseases. Necroptosis is a vital process in which cells undergo programmed death while warning the immune system that something has gone wrong. However when necroptosis is inappropriately activated, it can promote inflammation and the development of inflammatory disease.

Dr James Murphy, Associate Professor John Silke and institute colleagues provided the first genetic proof that a protein named MLKL was required for necroptosis; as well as the first full length, atomic resolution, three-dimensional structure of the protein.

Their work showed MLKL is a ‘dead enzyme’, which needs to be switched on before it can kill the cell. As MLKL directly kills cells, and is unlikely to have other roles, it could be a good target for developing drugs that specifically block necroptosis without affecting other cellular processes, limiting the potential for unwanted side-effects.

Catalyst Therapeutics, a joint venture between the Walter and Eliza Hall Institute and SYNthesis Med Chem, has invested in a drug discovery project to identify small molecules that inhibit MLKL. The project has already identified a number of lead molecules, and we are working with medicinal chemists, led by Associate Professor Guillaume Lessene, to develop potential compounds for further testing.

MLKL-inhibitors have the potential to help people who are affected by chronic inflammatory diseases such as psoriasis, Crohn’s disease, inflammatory bowel disease and rheumatoid arthritis.

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Chronic idiopathic urticaria (CIU) is a disease that causes recurrent itchy hives, with no apparent trigger. Clinician and PhD student Dr Priscilla Auyeung is studying how immune cells that release inflammatory histamines become activated in CIU, to improve how the disease is diagnosed and treated.
INFECTIONOUS DISEASES

Infectious diseases continue to be a significant burden of disease globally, causing many millions of deaths. The institute has clinical and translational research focused on global health problems such as malaria, hepatitis B, HIV and tuberculosis.

Investigating new agents in hepatitis B infection

Hepatitis B is a chronic infectious disease that affects about two billion people worldwide.

Hepatitis B can often establish a lifelong infection that puts people infected with the virus at a substantially increased risk of liver damage, including cirrhosis and liver cancer.

The Walter and Eliza Hall Institute has entered into a research collaboration with TetraLogic Pharmaceuticals Corporation to examine TetraLogic’s SMAC-mimetic agent birinapant for treating viral infections.

Birinapant is an agent that targets proteins involved in the apoptosis programmed cell death pathway. It has shown promise in clinical trials for treating cancers including blood cancers and solid tumours.

Dr Marc Pellegrini is leading the project at the Walter and Eliza Hall Institute. He said the research collaboration would investigate whether birinapant could also be effective in treating viral infections such as hepatitis B.

“If successful, the use of birinapant to treat hepatitis B would represent a completely novel approach to treating viral infections.”

“Preclinical studies performed at the institute have indicated that SMAC-mimetics can decrease the viral burden in models of human hepatitis B virus,” Dr Pellegrini said. "Birinapant appears to induce apoptosis of virally infected liver cells while sparing the non-infected cells. If successful, the use of birinapant to treat hepatitis B would represent a completely novel approach to treating viral infections.”

Dr Pellegrini said birinapant was expected to enter a clinical trial in October 2014 in hepatitis B virus-infected people, to be conducted at multiple sites including Melbourne, with other centres in Adelaide, Perth, Auckland and Christchurch.

Mr Kevin Buchi, chief executive officer of TetraLogic, said the company was excited about the collaboration. “We look forward to further progress in the research program with the Walter and Eliza Hall Institute, building on pioneering basic research to attack infectious disease with a completely novel therapeutic approach.”
Australian-made malaria vaccine to enter human trials

Despite the urgent need for a malaria vaccine, no effective vaccine currently exists. It is estimated that half the world’s population is at risk of contracting malaria, which kills more than 700,000 people a year, mostly children under five and pregnant women.

Australian researchers have developed the first malaria vaccine that can be tailored to combat the many variants of malaria that exist around the world. The new vaccine uses a genetically attenuated parasite (GAP) to protect people who are at risk from malaria infection.

“The GAP vaccine has the ability to be modified to suit the variability that occurs in malaria between regions and over time.”

The vaccine was developed by a team of researchers led by Professor Louis Schofield, Dr Krystal Evans and Professor Alan Cowman from the Infection and Immunity division, and Professor James McCarthy from the QIMR Berghofer Medical Research Institute.

The vaccine targets the blood stage of malaria infection, which is responsible for classic malaria symptoms such as headache, fever, shivering and joint pain.

Dr Evans said the GAP vaccine was based on many years of research at the Walter and Eliza Hall Institute, identifying critical molecules in the malaria parasite that were recognised by the immune system.

“The funding will allow us to firstly manufacture the vaccine in sufficient quantities, and to high enough standards, for human trials,” Dr Evans said.

“We will then test how effective the vaccine is in inducing a protective immune response against malaria. If these trials are successful, the next stage will be to develop the vaccine further, by adding additional features to prevent malaria transmission, such as modifying it to match regional and species variants of the malaria parasite.”

The manufacture and trial of the GAP vaccine is being supported by an Australian National Health and Medical Research Council (NHMRC) Development Grant. The institute also received funding from the Australian Government for this project, enabling regulatory and manufacturing advice for human trials of the vaccine, which are scheduled to begin in 2015.

Professor Schofield said the GAP vaccine represented an important new approach to combating malaria.

“There is a clear need for a vaccine against malaria,” he said. “In many parts of the world, the malaria parasite has developed resistance to antimalarial medications and an effective vaccine could offer people in malaria-endemic regions long-lasting protection against this devastating disease. The GAP vaccine has the ability to be modified to suit the variability that occurs in malaria between regions and over time.”

Dr Diana Hansen is studying plasma samples from a malaria-endemic region of Papua New Guinea to identify potential targets of naturally-acquired immunity to malaria. Her research has revealed that antibody responses to the parasitic protein Plasmodium falciparum Reticulocyte Binding Protein Homologue 5 ( PfRh5) are associated with protection from high parasite numbers in the blood and clinical malaria.
The institute is involved in a number of national and international partnerships to drive research and translation forward and deliver health benefits to the community.

Consumers advocating for medical research

Consumer involvement benefits medical research, enabling researchers to draw inspiration from people’s personal and professional experiences with disease to inspire medical research design, and improving communication of results to the community.

Recognising this, the institute has laid the foundations for an institute consumer advisory panel. Dr Judith Slocombe, chief executive officer of the Alannah and Madeline Foundation, has been appointed the inaugural chair of the panel. Dr Slocombe will work closely with clinician-scientist Associate Professor Clare Scott who has championed establishment of the consumer advisory panel.

A consumer may have been affected by a disease themselves or cared for a family member with the disease. Consumers can highlight important research issues not fully considered by researchers and educate researchers about their disease from a community point of view.

In the coming decades, much of the institute’s research (particularly genetic and genomic research) will have a significant impact on the community and input from educated consumers is necessary to guide its implementation. Some funding bodies also request consumer input into grant applications. A consumer research buddy system has been implemented to encourage discussions between researchers and consumers, which the researchers will draw inspiration from during grant and project development. To date 25 buddy pairs have been established, with positive feedback already being received. Such involvement will ensure that the institute’s research is relevant for, and accessible to, the community.

Dr Judith Slocombe (left) has been appointed the inaugural chair of the institute’s consumer advisory panel, working closely with head of clinical translation Professor Andrew Roberts (right).
Driving cancer discoveries to treatment

The $1 billion Victorian Comprehensive Cancer Centre (VCCC) has begun to take shape in the Parkville biomedical hub.

The VCCC aims to improve cancer research, treatment and care. The strength of the VCCC is the collaboration between its eight members – Peter MacCallum Cancer Centre, Melbourne Health, The University of Melbourne, Walter and Eliza Hall Institute of Medical Research, Royal Women’s Hospital, Royal Children’s Hospital, Western Health and St Vincent’s Hospital Melbourne.

The Walter and Eliza Hall Institute is the research powerhouse of the VCCC. Our contribution is demonstrated through the impact of our research publications and the advances our discoveries have brought to cancer treatment, including colony stimulating factors and new therapies targeting the cell survival machinery to kill cancer cells. The VCCC will assist members to accelerate the discovery of new cancer treatments, attract the nation’s leading cancer researchers and provide a centre of excellence for people affected by cancer.

The institute has delivered benefits to millions of cancer patients and we are excited by the prospect of the patient benefits we hope will flow from the collaborative opportunities presented by the VCCC.

Alliance making personalised medicine a reality

The institute is a proud partner in a new Victorian alliance to unlock the genetic secrets behind disease.

The Melbourne Genomics Health Alliance, launched in February 2014, is integrating genomic information into everyday healthcare, bringing truly personalised medicine one step closer to reality for Australians.

The alliance brings together some of the very best health, research and education organisations in Victoria – Melbourne Health, Royal Children’s Hospital, The University of Melbourne, Walter and Eliza Hall Institute, Murdoch Children’s Research Institute, CSIRO and Australian Genome Research Facility.

The alliance is enabling patients with genetic conditions access to genome sequencing from accredited laboratories within the member organisations; researchers to analyse genomic information and conduct further research into genetic diseases and treatments; and research findings to inform improvements to patient care. Although genomic sequencing requires innovative science and cutting-edge technology, the alliance prides itself on being clinically led, ensuring ‘the patient’ always comes first, and providing the information that clinicians need to improve diagnosis and treatment approaches.

Five pilot projects are underway as part of the alliance, and have begun recruiting patients. Clinician-scientist Professor Andrew Roberts is leading a pilot project on acute myeloid leukaemia, and Associate Professor Melanie Bahlo and Dr Ian Majewski are involved in developing the bioinformatics analysis pipeline used for analysis of all the diseases.

Donating blood to research

The Volunteer Blood Donor Registry (VBDR), established in March 2012 by the Walter and Eliza Hall Institute and Melbourne Health, collects volunteer donor blood samples for ethically approved research on the Parkville campus.

The VBDR has more than 400 donors contributing to 17 research projects, including two external to the institute. More than 280 VBDR blood donors have allowed us to supply more than 450 samples to aid institute research into malaria, rheumatoid arthritis, rheumatic fever and heart disease, lupus, blood disorders, coeliac disease, diabetes and HIV.
Compounds and methods of use (1)
Singapore, Philippines, China, France, Spain, Italy, UK, New Zealand, Germany

Compounds and methods of use (2)
China, Russia, Ukraine, New Zealand

Apoptosis-inducing agents for the treatment of cancer and immune and autoimmune diseases
New Zealand, Russia, South Africa

Immunogenic compositions and uses thereof
Inventors: L Schofield
US

Alpha-helical mimetics
Inventors: G Lessene, J Baell
Canada

Structure of the C-terminal region of the insulin receptor alpha chain and the insulin-like growth factor receptor alpha chain
Inventors: M Lawrence, J Menting, C Ward, B Smith
US

Barley with low levels of hordeins
Inventors: G Tanner, C Howitt
Singapore, Philippines, China, France, Spain, Italy, UK, New Zealand, Germany

Arylsulfonamide compounds
Inventors: G Lessene, B Sleebs, J Baell, W Fairbrother, J Flygare, M Koehler
Switzerland, Italy, Germany, France, Spain, Turkey, UK

A method of cell isolation
Inventors: G Lindeman, J Visvader, F Vaillant, M Shackleton
Canada, US

Therapeutic and diagnostic agents
Inventors: L Harrison, S Mannering, A Purcell, N Williamson
Canada, India

Therapeutic molecules and methods for generating and/or selecting same
Inventors: D Fairlie, P Colman, D Huang, E Lee
US

Methods and compositions for treating malaria
Inventors: A Cowman, S Lopatiacki, J Beeson, A Maier, K Persson, J Richards
US, Australia

A method of treatment and prophylaxis
Inventors: I Wicks, D Metcalf, A Roberts, K Lawlor, I Campbell
Canada

Methods and compositions for treating and preventing malaria using an invasion ligand directed to a protease-resistant receptor
Inventors: L Chen, A Cowman, J Baum
Australia

Novel anti-cancer agents
Inventors: G Lessene, T Burgess, F Walker, K Watson, H Witchard
US

Clinical Translation Centre
Andrew Roberts, MB BS Qld PhD Melbourne FRACP FRCPA
David Segal, BSc(Hons) UWA PhD ANU
Cathy Quilici
Katya Gray, consumer advisory panel coordinator
Jenni Harris, BSc(Nursing)
Ballarat GradDipCCl(TCU) Monash GradDipSc(Nursing) VUT, clinical project officer
Kimvan Le, administrative officer to Metcalf Chair (from 11/13)
Lina Laskos, BSc(Hons) Monash PhD Melbourne, clinical translation ethics and compliance manager

Business Development Office
Julian Clark, BSc(Hons) Flinders PhD Glasgow, head of Business Development
Tim Bakker, BEComp Melbourne BSc Melbourne, project manager - information management and ICT (from 10/13)
Michele Cook, administrative officer Patricia Diggle, BSc(Hons) Monash PhD Bristol, IP and contracts associate
Clara Gaff, BSc(Hons) Melbourne PhD Melbourne, program leader (from 10/13)
Rhiannon Jones, BSc(Hons) Adelaide PhD Adelaide, project manager
Kurt Lackovic, BAppSc(Hons) LaTrobe PhD LaTrobe, business development manager
Carmela Monger, BSc LaTrobe MSc Melbourne, intellectual property and contracts manager
Sheena Segbedzi, BE(Hons) Melbourne MEng Melbourne GradDipIP Melbourne, patents administrator
Tom Williams, BSc(Hons) Adelaide PostGradMent&Cchg Monash, project manager
EDUCATION

The Walter and Eliza Hall Institute engages in education to inspire young researchers and to foster the development of the next generation of Australian scientists. Pursuing postgraduate studies at the institute provides the candidates with a stimulating and challenging research experience at the forefront of science.

- 136 PhD students
- 19 Honours students
- 20 UROP students
- 41 institute seminars
- 75 visiting seminars
- 12 publications by student authors with an impact factor >10
- 74 publications with student authors
- 14 postgraduate seminars
PhD student wins top NHMRC scholarship

Dr Michael Low was awarded the 2014 Gustav Nossal Scholarship from the National Health and Medical Research Council (NHMRC) to undertake PhD studies at the Walter and Eliza Hall Institute.

The Gustav Nossal Scholarship is awarded to the highest-ranked clinical postgraduate applicant in medical and dental science.

“[The institute offers a great educational program and many open meetings that allow close collaboration between laboratories, facilitating cooperation between scientists with different specialties.]”

Dr Low completed a Bachelor of Medicine, Bachelor of Surgery and Bachelor of Medical Science at The University of Melbourne and is also completing specialty training as a clinical and laboratory haematologist. Dr Low said he was convinced to study at the institute after meeting his supervisors.

“During my medical training I became aware of the institute and its reputation for leading the world in new biological discoveries,” he said. “There are many inspiring laboratory heads at the institute, and I was convinced to study here after meeting my supervisors, Professor David Tarlinton and Professor Stephen Nutt. They combine amazing scientific knowledge and experience with humble and approachable personalities.”

Dr Low’s project is looking into the pathways that control differentiation and survival in antibody-producing plasma cells, and how these pathways are involved in cancers of plasma cells (multiple myeloma).

Dr Low said he looked forward to combining his clinical experience with the scientific knowledge gained at the institute. “The institute offers a great educational program and many open meetings that allow close collaboration between laboratories, facilitating cooperation between scientists with different specialties,” he said.

Award-winning PhD student

Dr David Riglar, who completed his PhD at the institute in 2013, has won a number of awards for his PhD studies into malaria biology.

Dr Riglar was one of three commendees in the 2014 Victorian Premier’s Award for Health and Medical Research. He was commended for his PhD research and achievements, which included capturing malaria parasites ‘red handed’ invading red blood cells using super-resolution microscopy. He was first author on the subsequent paper, published in the journal Cell Host & Microbe.

In addition to the Premier’s award, Dr Riglar also received a Dean’s Award for Excellence in a PhD Thesis and was one of six awardees for the 2014 Chancellor’s Prize for Excellence in a PhD Thesis, both from The University of Melbourne.

David is currently undertaking postdoctoral training at Harvard Medical School, US, with funding from an NHMRC/R.G. Menzies Fellowship. The NHMRC/R.G. Menzies Fellowship is awarded in partnership with the NHMRC to the highest ranked candidate in the Overseas Early Career Fellowships category.
PhD students publish in top journal

Three PhD students were joint first authors on a paper published in the journal *Cell* in May 2014.

The students Mr James Rickard, Ms Joanne O’Donnell and Mr Joseph Evans worked with supervisors and joint final authors Associate Professor John Silke, Dr Motti Gerlic and Dr Ben Croker. *Cell* is a highly competitive journal, with an impact factor of 33.

The *Cell* paper was one of 12 publications with an impact factor of 10 or greater on which institute students were authors. Students were named on a further 62 publications in 2013-14.

The *Cell* paper demonstrated that a recently discovered type of cell death called necroptosis could be the underlying cause of inflammatory disease.

The Cell paper was one of 12 publications with an impact factor of 10 or greater on which institute students were authors.

The research team demonstrated that a previously identified molecule involved in necroptosis, called RIPK1, prevented uncontrolled inflammation and was therefore essential for survival. This finding could lead to future treatments for inflammatory diseases including Crohn’s disease, rheumatoid arthritis and psoriasis.

The researchers also showed that the ‘survival’ molecule RIPK1 acted as a ‘gatekeeper’ between cell life and death, and was essential for the cell’s decision to live or die, and their choice of how to die.

Mr Rickard and Ms O’Donnell are enrolled as PhD students through The University of Melbourne, and Mr Evans is enrolled through La Trobe University.

PhD students Mr James Rickard, Mr Joseph Evans and Ms Joanne O’Donnell (left to right) were joint first authors on a *Cell* paper published in May 2014. The paper demonstrated a protein called RIPK1 was essential for survival by preventing uncontrolled inflammation.
Supporting medical professionals during their PhD studies

Clinician-scientists engage professionally in research, but also see patients, usually in a clinical specialty connected to their research.

The clinician-scientist career is challenging, rewarding, and offers opportunities to better understand diseases and improve outcomes for patients. It also improves future career opportunities for medical professionals, and enables the translation of research discoveries to health outcomes.

The institute has 22 medical professionals and medical students who are undertaking research PhD studies.

In response to specific requirements of medical professionals commencing their PhD studies, the Education Committee and Clinical Translation Centre devised support meetings held three times a year. Commencing PhD students can meet second and third year medical graduate PhD students, and established clinician-scientists, to discuss challenges associated with moving from a position of competence and authority in the clinics into the first year of PhD studies in a basic research laboratory.

The Clinical Translation Centre is organising the meetings and has extended the support to include a practical lab skills program for new medical graduate PhD students.

Harold Mitchell Travel scholarships

The Harold Mitchell Foundation gives the institute $10,000 each year to award one postdoctoral scientist and one PhD student with $5000 to travel to overseas conferences and develop connections with potential collaborators.

In 2013 the Harold Mitchell Travel scholarships were awarded to PhD student Ms Darcy Butts from the Molecular Medicine division, and postdoctoral fellow Dr Cyril Seillet from the Molecular Immunology division.

Ms Butts said the fellowship funded her to participate in the Keystone Stem Cells and Reprogramming symposium in the US in April 2014.

“This opportunity substantially influenced my career development by providing an outstanding environment to present my PhD work and the opportunity to directly connect with trailblazers in the field of stem cell biology,” she said.

PhD completion seminars program

As part of their PhD, students at the Walter and Eliza Hall Institute are required to provide a research presentation prior to final completion of their degree.

Over the past few years student numbers have doubled, making it no longer possible to accommodate all PhD completion seminars in the existing Wednesday Seminar Series.

In response, the institute began a new series of seminars in 2014 called the PhD Completion Seminar Series, which covers a range of topics being undertaken by PhD students at the institute. The seminars are open to the general public and are an integral part of PhD candidature.
Pieces of the cell death puzzle

Programmed cell death is a pathway involved in many diseases, including cancers, immune disorders and viral infections.

Honours student Mr Damian D’Silva is working jointly with institute researchers Dr Seth Masters and Dr Silvia Alvarez-Diaz on finding novel proteins involved in programmed cell death.

Necroptosis and pyroptosis are two recently discovered forms of programmed cell death that have been implicated in disease development. Necroptosis happens when the cell has been damaged or infected and dies in a regulated manner, while signalling to the immune system that something has gone wrong. Pyroptosis occurs when immune cells swell and die in response to infection.

Mr D’Silva said his honours project provided the opportunity to work with state-of-the-art technologies being developed for the first time in Australia by institute researchers.

“As part of my project I am applying CRISPR technology for identifying novel proteins and controllers of necroptosis and pyroptosis,” Mr D’Silva said. “CRISPR has just arrived in Australia and it is a great opportunity to use this emerging technology to study a pathway that we still have so much to learn about.”

Mr D’Silva said he chose to do his honours year at the institute because of its history and expertise in researching programmed cell death. “During my undergraduate degree, I became fascinated with cell death and wanted to do my honours in that field,” he said. “The Walter and Eliza Hall Institute has a big program investigating cell death and some of the top cell death researchers, such as David Vaux and Andreas Strasser. It was a great opportunity to study a largely unknown form of programmed cell death, with lots of room to discover new things.”

Mr D’Silva said honours was a chance to try out a research career. “Honours has been a really good experience so far,” he said. “The atmosphere at the institute is friendly and open and, no matter who they are, people are always happy to talk to you and provide advice on your work. The resources and facilities are also great, allowing you to focus on your project and get the best out of your work.”

Following his honours year, Damian plans to do a PhD to continue his investigations into cell death.
Reversing leukaemia

Acute lymphoblastic leukaemia is the most common cancer affecting children.

In leukaemia, immature white blood cells replicate abnormally and build up in the bone marrow, interfering with production of normal blood cells.

PhD student Ms Grace Liu was the first author on a Genes & Development paper showing B-cell acute lymphoblastic leukaemia (B-ALL) could be successfully ‘reversed’ by coaxing cancer cells back into normal development.

The research showed switching off a gene called Pax5 could cause cancer in a model of B-ALL, while restoring its function could ‘cure’ the disease. Ms Liu and supervisor Dr Ross Dickins led the research, in collaboration with institute colleagues and collaborators in Vienna and the US.

“The Walter and Eliza Hall Institute really is a world-class institution that facilitates this level of research.”

Ms Liu said the team used a newly developed ‘genetic switch’ technology to inhibit then reactivate Pax5 in the leukaemia model. “Along with other genetic changes, deactivating Pax5 drives normal blood cells to turn into leukaemia cells, which has been shown before,” Ms Liu said.

“We showed for the first time that reactivating Pax5 enabled the cells to resume their normal development and lose their cancer-like qualities, effectively curing the leukaemia. What was intriguing for us was that simply restoring Pax5 was enough to normalise these cancer cells, despite the other genetic changes.”

Ms Liu said Pax5 was a gene frequently ‘lost’ in childhood B-ALL. “Pax5 is essential for normal development of a type of white blood cell called B cells,” she said. “When Pax5 function is compromised, developing B cells can get trapped in an immature state and become cancerous. Restoring Pax5 function, even in cells that have already become cancerous, removes this ‘block’, and enables the cells to develop into normal white blood cells.”

Ms Liu has completed her PhD and, with support from the institute’s Edith Moffatt Travel Scholarship, attended an international conference and visited laboratories in Europe to present her results. She said that her PhD studies have been highly challenging, but also stimulating and ultimately rewarding.

“Undertaking a PhD not only encourages you to ask complex and relevant questions, but also helps us to develop the skills and confidence to address them using a variety of intellectual and technical skills,” Ms Liu said.

“The Walter and Eliza Hall Institute really is a world-class institution that facilitates this level of research, both with the expertise available but also in helping us to reach out across Melbourne, Australia and the world for collaborations.”

Collaborating organisations:
Research Institute of Molecular Pathology (Austria), St. Jude Children’s Research Hospital (US) and University of Minnesota (US).


PhD student Ms Grace Liu was first author on a paper that used a newly developed ‘genetic switch’ technology to show that switching on a gene called Pax5 could reverse cancer in a model of childhood leukaemia. The paper was published in the journal Genes & Development.
Congratulations to the following students who successfully completed their studies this year.

**Doctor of Philosophy, The University of Melbourne**

Dr Yunshun (Andy) Chen  
Differential expression analysis of complex RNA-Seq experiments.  
Professor Gordon Smyth, Professor Terry Speed

Dr Silvia Corona  
Targeted therapeutics in colon cancer.  
Professor Antony Burgess, Dr Francesca Walker

Dr Alexis Delbridge  
Exploration of DNA damage-induced apoptosis and its relevance for tumour suppression.  
Professor Andreas Strasser, Dr Philippe Bouillet

Dr Jamie Gearing  
Screening for epigenetic modifiers of X-chromosome inactivation.  
Dr Marnie Blewitt, Professor Doug Hilton

Dr Eugene Kapp  
Improved bioinformatics tools for the analysis of mass spectrometry based on Peptiodomics data.  
Professor Terry Speed, Dr Thomas Nebel, Associate Professor Tony Papenfuss

Dr Francine Ke  
The role of BOK in apoptosis and development.  
Professor Andreas Strasser, Professor Jerry Adams

Dr Xiao (Tommy) Liu  
The role of suppressor of cytokine signalling-3 (SOCS-3) in chondrocytes during development and in inflammatory arthritis.  
Professor Ian Wicks, Dr Kate Lawlor, Dr Ben Croker

Dr Swee Heng Pang  
Critical roles for the transcription factor PU.1 in early lymphopoiesis in adult mice.  
Dr Li Wu, Professor Stephen Nutt, Dr Sebastian Carotta

Dr Elizabeth Valente  
Tumour suppression by p53 and therapeutic targeting of the p53-MDM2 interaction.  
Professor Andreas Strasser, Dr Philippe Bouillet

Dr Michael White  
Functional characterisation of caspase-9 in haematopoiesis.  
Professor Ben Kile, Professor David Huang

**Bachelor of Science (Honours), The University of Melbourne**

Ms Katrina Black  
Physiological regulators of ion channels.  
Dr Jacqui Gulbis, Associate Professor Mike Lawrence, Dr David Miller

Mr Michael Coffey  
Regulation of host cell invasion in Toxoplasma parasites.  
Dr Chris Tonkin, Dr Alessandro Uboldi

Mr Michael Erlichster  
Tumour suppressive mechanisms of myeloid transcription factors.  
Dr Ross Dickins, Dr Mark McKenzie

Ms Laura Galvis  
Epigenetic regulators of embryonic lung progenitor cells.  
Dr Marie-Liesse Asselin-Labat, Dr Marnie Blewitt

Mr Tran (Andrew) Giang  
Understanding the regulation of immune cell fates.  
Professor Phil Hodgkin, Dr Susanne Heinzel

Ms Natasha Jansz  
Identifying interactions between Smchd1 and other epigenetic modifiers.  
Dr Marnie Blewitt, Dr James Murphy

Mr Nikolce Kocovski  
Understanding the regulation of immune cell fates.  
Professor Phil Hodgkin, Dr Shalin Naik

Mr Mark Xiang Li  
Post-translational modifications affecting B cell behaviour.  
Professor David Tarlinton, Dr Simona Infantino

Ms Ann Ly  
Understanding the development of antibody responses to malaria.  
Dr Diana Hansen, Dr Lisa Ioannidis

Ms Helen McRae  
Understanding the regulation of brain and endocrine development through central control of chromatin.  
Associate Professor Anne Voss, Associate Professor Tim Thomas

Ms Alison Mildenhall  
Virus miRNAs that target the host innate immune response and inflammation.  
Dr Seth Masters, Dr James Vince

Mr Joseph O’Niell  
Determining the function of a malaria parasite adhesion.  
Dr Wai-Hong Tham, Professor Alan Cowman

Ms Starling Sim  
Platelet function in cancer progression.  
Dr Emma Josefsson, Professor Warren Alexander

Mr Blake Smith  
Development of new inhibitors of RIPK2 kinase.  
Associate Professor Guillaume Lessene, Dr Ueli Nachbur, Associate Professor John Silke

Ms Hayley Stratton  
Molecular and structural analysis of malaria invasion.  
Dr Tony Hodder, Professor Alan Cowman

Mr Kelvin Yapianto  
A novel model of gastric adenocarcinoma and assessment of new therapies.  
Dr Lorraine O’Reilly, Professor Andreas Strasser

**Bachelor of Science (Honours), visiting students**

Mr Jeffrey Kam  
Prolactin receptor signalling and breast cancer.  
Professor Geoff Lindeman, Professor Bruce Mann, Dr Jane Fox

Ms Mita Hapsari Hazairin  
The molecular epidemiology of Plasmodium falciparum.  
Dr Alyssa Barry, Dr Freya Fowkes
## 2013–14 PHD IN PROGRESS

Scholarships to support training

<table>
<thead>
<tr>
<th>Scholarships</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>APA</td>
<td>Australian Postgraduate Award</td>
</tr>
<tr>
<td>ARH</td>
<td>Australian Rotary Health</td>
</tr>
<tr>
<td>CCV</td>
<td>Cancer Council of Victoria</td>
</tr>
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<td>NHMRC Dora Lush</td>
</tr>
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<td>FRS</td>
<td>Faculty Research Scholarship</td>
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<tr>
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<td>International Postgraduate Research Scholarship</td>
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<td>Kidney Health Australia Scholarship</td>
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<td>Leukaemia Foundation Australia Scholarship</td>
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<td>MDS</td>
<td>NHMRC Medical/Dental Postgraduate Scholarship</td>
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<td>National Breast Cancer Foundation Scholarship</td>
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<td>Ovarian Cancer Australia Scholarship</td>
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<tr>
<td>SACM</td>
<td>Saudi Arabian Cultural Mission Scholarship</td>
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<td>WEHI</td>
<td>Walter and Eliza Hall Institute Scholarship</td>
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<td>WEHI BGS</td>
<td>Walter and Eliza Hall Institute Bev Gray Scholarship</td>
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<th>Student</th>
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<th>Supervisors</th>
<th>Funding</th>
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<tbody>
<tr>
<td>Hesham Abdulla</td>
<td>Modelling the multi-step pathogenesis of T-cell acute lymphoblastic leukaemia.</td>
<td>Dr Matthew McCormack, Professor Warren Alexander, Dr Ben Shields</td>
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<tr>
<td>Raed Alserhi</td>
<td>Targeting self-renewal mechanism in T-cell acute lymphoblastic leukaemia (T-ALL).</td>
<td>Professor Warren Alexander, Professor David Huang, Dr Matthew McCormack</td>
<td>SACM</td>
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<td>Chow Hiang</td>
<td>Role of nucleophosmin (NPM1) in normal and leukemic cells.</td>
<td>Dr Stefan Glaser, Associate Professor Paul Ekert, Professor Warren Alexander</td>
<td>MIRS/MIFRS</td>
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<tr>
<td>Natasha Anstee</td>
<td>Studies of the role of Mcl-1 in haematopoiesis and leukaemia.</td>
<td>Professor Suzanne Cory, Dr Cassandra Vandenberg</td>
<td>LFA</td>
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<td>Brandon Aubrey</td>
<td>Investigating the role of mutant p53 in lymphoma growth and development.</td>
<td>Dr Gemma Kelly, Professor Andreas Strasser</td>
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<td>Priscilla Auyeung</td>
<td>Autoreactive T cells in chronic idiopathic urticaria.</td>
<td>Professor Len Harrison, Professor Phil Hodgkin, Dr Diana Mittag</td>
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<td>Paul Baker</td>
<td>Investigating the role of caspase-4 and caspase-5 in human myeloid cell pyroptosis.</td>
<td>Dr Seth Masters, Dr Marco Herold, Dr Sammy Bedoui</td>
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<td>Marilou Barrios</td>
<td>RNA exchanges as a novel means of intracellular communication.</td>
<td>Dr Ken Pang, Dr Seth Masters</td>
<td>MIRS/MIFRS</td>
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<td>Sarah Best</td>
<td>Investigation into the role of transcription factors Snai and Id4 in mammary gland development.</td>
<td>Professor Geoff Lindeman, Professor Jane Visvader</td>
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<td>Katrina Black</td>
<td>Physiological regulators of potassium channels.</td>
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<td>Julian Bosco</td>
<td>Role of CD52 in T-cell immune regulation.</td>
<td>Professor Len Harrison, Professor Fernando Sanchez, Dr Jian-Guo Zhang</td>
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<td>Jason Brouwer</td>
<td>Structural and biochemical analysis of the pro-apoptotic protein Bak.</td>
<td>Professor Peter Colman, Dr Peter Czabotar</td>
<td>APA</td>
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<td>Darcy Butts</td>
<td>An shRNA screen for novel epigenetic regulators of neural stem cell proliferation, differentiation and survival.</td>
<td>Professor Douglas Hilton, Dr Marnie Blewitt, Dr Clare Parish</td>
<td>MIRS/MIFRS</td>
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<td>Daniel Cameron</td>
<td>Understanding the evolution of genomic instability using high-throughput sequencing data.</td>
<td>Professor Terry Speed, Associate Professor Tony Papenfuss</td>
<td>APA</td>
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<td>Blanca Capaldo</td>
<td>Defining regulators of the luminal lineage using breast cancer cells and IPS cell lines derived from human mammary epithelial cells.</td>
<td>Professor Geoff Lindeman, Professor Jane Visvader</td>
<td>APA</td>
</tr>
<tr>
<td>Dineika Chandrananda</td>
<td>Detection of foetal chromosomal abnormalities such as trisomies by massively parallel sequencing of cell-free foetal DNA in maternal plasma.</td>
<td>Professor Terry Speed, Associate Professor Melanie Bahlo, Dr Natalie Thorne</td>
<td>APA</td>
</tr>
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<td>Simon Chatfield</td>
<td>Human neutrophil activation in inflammatory arthritis.</td>
<td>Professor Ian Wicks, Dr Mark McKenzie</td>
<td>FRS The May Stewart Bursary</td>
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<td>Kelan Chen</td>
<td>Structural and functional characterisation of a novel epigenetic regulator SmcHD1.</td>
<td>Dr Marnie Blewitt, Dr James Murphy</td>
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<td>Edward Chen</td>
<td>Identification and characterisation of genetic factors that contribute to and predict relapses in acute myeloid leukaemia.</td>
<td>Professor Andrew Roberts, Dr Ian Majewski, Professor Warren Alexander</td>
<td>LFA</td>
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<tr>
<td>Hsiung Chew</td>
<td>Identification and characterisation of genetic factors that contribute to and predict relapses in acute myeloid leukaemia.</td>
<td>Professor Andrew Roberts, Dr Ian Majewski, Professor Warren Alexander</td>
<td>LFA</td>
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<td>Hui San Chin</td>
<td>Identifying and targeting novel cancer cell susceptibilities.</td>
<td>Dr Mark Van Delft, Dr Seong Lin Khaw, Professor David Huang</td>
<td>MIRS/MIFRS</td>
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<td>Chris Chiu</td>
<td>Antigenic and functional targets of the naturally acquired immunity to blood stage malaria.</td>
<td>Professor Alan Cowman, Dr Diana Hansen, Professor Ivo Mueller</td>
<td>WEHI</td>
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<tr>
<td>Kevin Chow</td>
<td>The regulation of monocyte derived cells during allograft rejection.</td>
<td>Associate Professor Andrew Lew, Dr Yifan Zhan</td>
<td>KHA/NHMRC</td>
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<td>Michael Coffey</td>
<td>Host cell effectors in Toxoplasma.</td>
<td>Dr Chris Tonkin, Dr Justin Boddey, Professor Alan Cowman</td>
<td>WEHI</td>
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<td>Stephanie Conos</td>
<td>Regulation of caspase-1 dependent cell death and inflammation.</td>
<td>Associate Professor John Silke, Dr James Vince, Dr Lisa Lindqvist</td>
<td>APA</td>
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<td>Angus Cowan</td>
<td>Structural investigations into the control of Bax.</td>
<td>Professor Peter Colman, Dr Peter Czabotar</td>
<td>APA</td>
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<tr>
<td>Akshay D’Cruz</td>
<td>Structural and biochemical characterisation of the SPRY protein interaction domain involved in innate immunity.</td>
<td>Dr Sandra Nicholson, Dr Jeff Babon, Professor Nick Nicola</td>
<td>APA</td>
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<td>Farrah El-Saafin</td>
<td>Investigating the molecular and cellular role of TBN.</td>
<td>Dr Anne Voss, Dr Tim Thomas</td>
<td>APA</td>
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<tr>
<td>Nima Etemadi</td>
<td>New insight into TNFR1 signalling.</td>
<td>Associate Professor John Silke, Professor David Vaux, Dr Ueli Nachbur</td>
<td>MIRS/MIFRS</td>
</tr>
<tr>
<td>Karla Fischer</td>
<td>Cytokine signalling in myeloid leukaemia.</td>
<td>Dr Anissa Jabbour, Professor Andreas Strasser, Professor David Vaux</td>
<td>MIRS/MIFRS</td>
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<td>Student</td>
<td>Project title</td>
<td>Supervisors</td>
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<td>Camilla Franca</td>
<td>Discovery and evaluation of novel antigens as serological markers for recent malaria exposure.</td>
<td>Professor Ivo Mueller, Dr Diana Hansen, Professor Louis Schofield</td>
<td>MIFRS/MIRS</td>
</tr>
<tr>
<td>Ivan Fung</td>
<td>Regulation of early B Cell differentiation in response to antigen.</td>
<td>Professor David Tarlinton, Professor Phil Hodgkin</td>
<td>APA</td>
</tr>
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<td>Michelle Gazdik</td>
<td>The design of small molecule inhibitors of Plasmepsin V for intervention against malaria.</td>
<td>Dr Brad Sleebs, Dr Justin Boddey, Professor David Huang, Professor Alan Cowman</td>
<td>APA</td>
</tr>
<tr>
<td>Clea Grace</td>
<td>Identifying and validating novel targets for cancer therapy.</td>
<td>Professor David Huang, Professor Andreas Strasser, Professor Liam O’Connor</td>
<td>APA</td>
</tr>
<tr>
<td>Alison Hadley</td>
<td>Mechanisms of resistance to novel therapies in DNA repair defective high-grade serous ovarian cancer.</td>
<td>Associate Professor Clare Scott, Professor Geoff Lindeman</td>
<td>NHMRC Clinical Postgraduate Research Scholarship</td>
</tr>
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<td>Lyndal Henden</td>
<td>Analysis of structural variation in sequencing data in pedigrees.</td>
<td>Associate Professor Melanie Bahlo, Professor Terry Speed</td>
<td>APA</td>
</tr>
<tr>
<td>Valerie Heong</td>
<td>Improving targeted therapy in oncogene-expressing high-grade serous ovarian cancer using novel xenografts.</td>
<td>Associate Professor Clare Scott, Professor Geoff Lindeman</td>
<td>OCA/WEHI BGS</td>
</tr>
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<td>Danika Hill</td>
<td>Functional correlates of acquired immunity to malaria.</td>
<td>Professor Louis Schofield, Professor Alan Cowman</td>
<td>APA</td>
</tr>
<tr>
<td>Colin Hockings</td>
<td>The Bak:Mcl-1 complex – a mechanism of resistance to apoptosis.</td>
<td>Dr Ruth Kluck, Professor Jerry Adams</td>
<td>APA</td>
</tr>
<tr>
<td>Sweta Iyer</td>
<td>Role for Bak and Bax C-terminus in apoptotic pore formation.</td>
<td>Dr Ruth Kluck, Professor Peter Colman, Dr Brian Smith</td>
<td>WEHI/MIFRS</td>
</tr>
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<td>Reema Jain</td>
<td>Thymic epithelial cell differentiation and apoptosis.</td>
<td>Dr Daniel Gray, Professor Andreas Strasser</td>
<td>MIFRS/MIRS</td>
</tr>
<tr>
<td>Natasha Jansz</td>
<td>Characterising novel epigenetic modifiers of X chromosome inactivation.</td>
<td>Dr Marnie Blewitt, Dr James Murphy</td>
<td>APA</td>
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<td>Charlie Jennison</td>
<td>Population structure of the human malaria parasite Plasmodium vivax in the Asia-Pacific region.</td>
<td>Dr Justin Boddey, Professor Alan Cowman</td>
<td>MIRS/MIFRS</td>
</tr>
<tr>
<td>Timothy Johanson</td>
<td>The role of microRNA’s in the differentiation and function of dendritic cells.</td>
<td>Associate Professor Andrew Lew, Dr Mark Chong, Dr Yifan Zhan</td>
<td>APA</td>
</tr>
<tr>
<td>Alexander Kennedy</td>
<td>Complement evasion mechanisms of the important human pathogen Plasmodium falciparum.</td>
<td>Dr Wai-Hong Tham, Professor Alan Cowman</td>
<td>APA</td>
</tr>
<tr>
<td>Logeswaran Krishnan</td>
<td>Investigating transmembrane organisation in the T-cell receptor complex and its relationship to receptor function.</td>
<td>Dr Matthew Call, Dr Melissa Call</td>
<td>MIFRS/MIRS</td>
</tr>
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<td>Callum Lawrence</td>
<td>Structurally guided small molecule targeting of the insulin and type 1 insulin-like growth factor receptors.</td>
<td>Dr Jacqui Gulbis, Professor Mike Lawrence</td>
<td>APA</td>
</tr>
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<td>Lily Lee</td>
<td>Cell types in normal breast and human breast cancers: when do they express the oestrogen receptor?</td>
<td>Professor Geoff Lindeman, Professor Jane Visvader</td>
<td>NBCF</td>
</tr>
<tr>
<td>Sophie (Hye Suk) Lee</td>
<td>The role of Klk1 in haematopoiesis, malignancy and angiogenesis.</td>
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<td>LFA</td>
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<td>Project title</td>
<td>Supervisors</td>
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<td>Mark Li</td>
<td>Characterising the Bak apoptotic pore by mass spectrometry.</td>
<td>Dr Grant Dewson, Dr Andrew Webb, Professor David Vaux</td>
<td>MIRS/MIFRS</td>
</tr>
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<td>Nicholas Liau</td>
<td>Inhibiting inflammatory cytokine signalling in myeloproliferative disease.</td>
<td>Dr Jeff Babon, Professor Nick Nicola</td>
<td>APA</td>
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<tr>
<td>Clara Lin</td>
<td>Dissection of merozoite surface complexes of <em>Plasmodium falciparum</em> involved in invasion.</td>
<td>Professor Alan Cowman, Dr Tony Hodder</td>
<td>APA</td>
</tr>
<tr>
<td>Edmond Linossi</td>
<td>Dissecting the role of the suppressor of cytokine signalling (SOCS)-5.</td>
<td>Dr Sandra Nicholson, Professor Nick Nicola, Dr Andrew Webb</td>
<td>APA</td>
</tr>
<tr>
<td>Grace Liu</td>
<td>Tumour suppressor mechanisms of B cell transcription factor Pax5 in mice.</td>
<td>Dr Ross Dickins, Dr Lorraine Robb</td>
<td>LFA</td>
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<tr>
<td>Jun Ting Low</td>
<td>A novel model of gastric adenocarcinoma and assessment of new therapies.</td>
<td>Dr Lorraine O’Reilly, Professor Andreas Strasser</td>
<td>APA</td>
</tr>
<tr>
<td>Michael Low</td>
<td>Regulation of Mcl-1 transcription and protein stability in myeloma and lymphoma cells.</td>
<td>Professor David Tarlinton, Professor Stephen Nutt</td>
<td>RACP, NHMRC CRB Blackburn Scholarship</td>
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<td>Aaron Lun</td>
<td>Systems biology for chromatin interaction using ChIA-PET and Hi-C.</td>
<td>Professor Stephen Nutt, Professor Gordon Smyth</td>
<td>APA</td>
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<tr>
<td>Bryan Lye</td>
<td>Characterising the immune cell responses to IMiDs.</td>
<td>Professor Phil Hodgkin, Dr Suzanne Heinzel</td>
<td>MIRS/MIFRS</td>
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<td>Chunyan Ma</td>
<td>Differential sensitivity of leukaemia cells to anti-cancer drugs.</td>
<td>Associate Professor John Silke, Dr Gabriel Brumatti, Professor Paul Ekert</td>
<td>MIFRS/MIRS</td>
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<tr>
<td>Kevin Man</td>
<td>The transcription factor IRF4 is essential for TCR affinity-mediated metabolic reprogramming and clonal expansion of T cells.</td>
<td>Professor Stephen Nutt, Dr Axel Kallies</td>
<td>APA</td>
</tr>
<tr>
<td>Danushka Marapana</td>
<td>Export of virulence proteins to the surface of the malaria-infected red blood cell of humans.</td>
<td>Professor Alan Cowman, Dr Justin Boddey</td>
<td>APA</td>
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<td>Julia Marchingo</td>
<td>Quantifying the contribution of T cell stimuli to T cell fate.</td>
<td>Professor Phil Hodgkin, Dr Suzanne Heinzel</td>
<td>APA</td>
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<td>Dimitra Masouras</td>
<td>The role of IKK in the regulation of the BH3-only protein Bim.</td>
<td>Dr Anissa Jabbour, Associate Professor Paul Ekert</td>
<td>APA</td>
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<tr>
<td>Kate McArthur</td>
<td>Investigating the apoptotic triggers Bax and Bak.</td>
<td>Associate Professor Guillaume Lessene, Dr Mark Van Delft, Professor Benjamin Kile</td>
<td>APA</td>
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<td>James McCoy</td>
<td>The role of calcium-dependent kinases in the lytic cycle of <em>Toxoplasma gondii</em>.</td>
<td>Dr Chris Tonkin, Professor Alan Cowman</td>
<td>APA</td>
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<td>Helen McRae</td>
<td>The role of PHF6 <em>in vivo</em>.</td>
<td>Dr Anne Voss, Dr Tim Thomas</td>
<td>APA</td>
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<td>Ehtesham Mofiz</td>
<td>Assembly and comparative analysis of the scabies mite genome.</td>
<td>Associate Professor Tony Papenfuss, Professor Terry Speed, Dr Torsten Seeman</td>
<td>APA</td>
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<td>Nisha Narayan</td>
<td>The role of microRNAs in myeloid differentiation and leukaemogenesis.</td>
<td>Associate Professor Paul Ekert, Dr Anissa Jabbour</td>
<td>APA</td>
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<td>Tan Nguyen</td>
<td>The role of the mammalian SID-1 orthologues in innate immunity.</td>
<td>Dr Ken Pang, Dr Seth Masters</td>
<td>APA</td>
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<td>Paul Minh Cong Nguyen</td>
<td>Characterisation of the source and function of interleukin-11 and interleukin-22 during gastrointestinal tumourigenesis.</td>
<td>Dr Tracey Putockzki, Associate Professor Matthias Ernst</td>
<td>APA</td>
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<td>Duong Nhu</td>
<td>Rocaglamide congeners as novel anti-cancer agents.</td>
<td>Dr Chris Burns, Associate Professor Guillaume Lessene</td>
<td>APA</td>
</tr>
<tr>
<td>Emma Nolan</td>
<td>Identification and application of mouse models for the prevention and treatment of breast cancer.</td>
<td>Professor Geoff Lindeman, Professor Jane Visvader</td>
<td>CCV</td>
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<tr>
<td>Joanne O’Donnell</td>
<td>Molecular regulation of inflammatory cell death.</td>
<td>Professor Andrew Roberts, Dr Ben Croker, Dr Mordechay Gerlic</td>
<td>Dora Lush</td>
</tr>
<tr>
<td>Samar Ojaimi</td>
<td>Pro-apoptotic therapies for the treatment of Mycobacterium tuberculosis disease and latent infection.</td>
<td>Dr Marc Pellegrini, Dr Gabrielle Belz</td>
<td>MDS</td>
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<tr>
<td>Maya Olisha</td>
<td>In vivo and in vitro investigation of actin regulation in the malaria parasite.</td>
<td>Dr Jacob Baum, Dr Jacqui Gulbis, Dr Wilson Wong</td>
<td>Dora Lush</td>
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<tr>
<td>Shereen Oon</td>
<td>A novel approach to cytokine blockade in systemic lupus erythematosus (SLE).</td>
<td>Professor Ian Wicks, Dr Nicholas Wilson</td>
<td>MPS</td>
</tr>
<tr>
<td>Michelle Palmieri</td>
<td>Understanding oncogenic PI3K signalling in colorectal cancer – from function to therapy.</td>
<td>Dr Oliver Sieber, Associate Professor Joan Heath, Dr Catimel</td>
<td>Australian Rotary Health</td>
</tr>
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<td>Agalya Periasamy</td>
<td>Import of polytopic proteins of the mitochondrial inner membrane: Study of structure and function.</td>
<td>Dr Jacqui Gulbis, Dr David Miller</td>
<td>APA</td>
</tr>
<tr>
<td>Ashleigh Poh</td>
<td>Investigation of the role of haematopoetic cell kinase in the growth and progression of gastrointestinal cancer.</td>
<td>Dr Robert O’Donoghue, Associate Professor Matthias Ernst</td>
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<td>Antonia Policheni</td>
<td>Identifying driver mutations in p53-deficient lymphomas.</td>
<td>Dr Daniel Gray, Professor Andreas Strasser</td>
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<tr>
<td>Kathryn Potts</td>
<td>Investigating early haematopoietic lineage specification and development in the mouse embryo.</td>
<td>Professor Douglas Hilton, Dr Samir Taoudi</td>
<td>APA</td>
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<tr>
<td>Simon Preston</td>
<td>The role of cell death and its mediators during chronic active infections.</td>
<td>Dr Marc Pellegrini, Dr Gabrielle Belz</td>
<td>MPS</td>
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<tr>
<td>Yi Wan Quah</td>
<td>Molecular epidemiology of Plasmodium vivax relapses.</td>
<td>Professor Ivo Mueller, Dr Alyssa Barry, Dr Celine Barnadas</td>
<td>MIRS/MIFRS</td>
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<td>Pravin Rajasekaran</td>
<td>The role of plasmepsin V in blood and liver stage infection of malaria.</td>
<td>Professor Alan Cowman, Dr Justin Boddey</td>
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<td>Sangeetha Ramdave</td>
<td>Developing mass spectrometry tools for identifying novel cancer targets.</td>
<td>Dr Andrew Webb, Dr Mark Van Delft, Professor David Huang</td>
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<tr>
<td>Lucille Rankin</td>
<td>The molecular mechanisms underlying the development and differentiation of innate lymphoid cells (ILCs).</td>
<td>Dr Gabrielle Belz, Dr Stephen Nutt</td>
<td>Dora Lush</td>
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<td>Maryam Rashidi</td>
<td>CD52: a negative regulator in the innate-immune system.</td>
<td>Professor Len Harrison, Dr John Wentworth</td>
<td>MIRS/MIFRS</td>
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<td>Leona Rohrbeck</td>
<td>Regulation of the pro-apoptotic BH3-ONLY protein Bim.</td>
<td>Professor Andreas Strasser, Dr Marco Herold</td>
<td>MIFRS/MIRS</td>
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<td>Michael Roy</td>
<td>Structural and chemical studies targeting pro-survival Bcl-2 family proteins.</td>
<td>Professor Peter Colman, Associate Professor Guillaume Lessene, Dr Peter Czabotar</td>
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<tr>
<td>Student</td>
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<td>Victoria Ryg-Cornejo</td>
<td>Understanding generation of high affinity antibody responses to malaria.</td>
<td>Dr Diana Hansen, Dr Axel Kallies</td>
<td>APA</td>
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<td>Natalia Sampaio</td>
<td>Suppression of malaria by the malaria parasite antigen <em>Plasmodium falciparum</em> erythrocyte membrane protein 1 (PfEMP-1).</td>
<td>Professor Louis Schofield, Dr Krystal Evans</td>
<td>NHMRC Biomedical Postgrad Scholarship</td>
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<tr>
<td>Robyn Schenk</td>
<td>Determining the role of the pro-survival Bcl-2 family member A1 in lymphoma and leukaemia.</td>
<td>Dr Marco Herold, Professor Andreas Strasser</td>
<td>LFA</td>
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<tr>
<td>Eric Si</td>
<td>Understanding the mechanisms of high-grade transformation in B-cell lymphoproliferative disease.</td>
<td>Professor Andrew Roberts, Dr Ian Majewski</td>
<td>MIRS/MIFRS</td>
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<tr>
<td>Tom Sidwell</td>
<td>The transcription factor Bach2 in the activation and differentiation of CD4 T cells.</td>
<td>Dr Gabrielle Belz, Dr Axel Kallies</td>
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<tr>
<td>Charlotte Slade</td>
<td>Lymphocyte differentiation and genetics of primary immunodeficiency.</td>
<td>Dr Vanessa Bryant, Professor Phil Hodgkin</td>
<td>NHMRC</td>
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<tr>
<td>Katherine Smith</td>
<td>Identifying inherited disease-causing mutations using massively parallel sequencing.</td>
<td>Associate Professor Melanie Bahlo, Professor Samuel Berkovic</td>
<td>Pratt Foundation Scholarship</td>
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<td>Che Stafford</td>
<td>Targeting innate immune responses using small molecules.</td>
<td>Dr Ueli Nachbur, Professor John Silke</td>
<td>APA</td>
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<td>Rebecca Stewart</td>
<td>Characterisation of intracellular signalling cascades required for invasion and egress in <em>Apicomplexan</em> parasites.</td>
<td>Dr Chris Tonkin, Dr Jacob Baum, Professor Alan Cowman</td>
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<td>Michael Stutz</td>
<td>Identifying host cell signalling and cell death pathways that can be therapeutically targeted to promote clearance of chronic active infections.</td>
<td>Dr Marc Pellegrini, Professor Gabrielle Belz, Dr James Vince</td>
<td>APA</td>
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<tr>
<td>Stephanie Tan</td>
<td>Glycosylphosphatidylinositol as a multi-stage, pan-species surface antigen in malaria.</td>
<td>Professor Louis Schofield, Dr Krystal Evans</td>
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<td>Cyrus Tan</td>
<td>Intra-membrane substrate recognition by membrane-associated E3 ligases.</td>
<td>Dr Matthew Call, Dr Melissa Call</td>
<td>APA</td>
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<tr>
<td>Rick Tankard</td>
<td>Identifying disease-causing short tandem repeats in massively parallel sequencing data, with a focus on ataxias.</td>
<td>Associate Professor Melanie Bahlo, Professor Terry Speed, Associate Professor Paul Lockard</td>
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<tr>
<td>Maria Tanzer</td>
<td>Investigation of cross talk in signalling pathways.</td>
<td>Associate Professor John Silke, Professor David Vaux, Dr Jarrod Sandow</td>
<td>VIRS Victoria International Research Scholarship</td>
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<tr>
<td>Sofonias Tessema</td>
<td>Patterns of antibody acquisition to the major surface antigen of <em>Plasmodium falciparum</em>.</td>
<td>Dr Alyssa Barry, Professor Ivo Mueller, Dr Diana Hansen</td>
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<td>Jesse Toe</td>
<td>Apoptotic regulation of CD8+ T cells during chronic viral infection.</td>
<td>Dr Marc Pellegrini, Dr Gabrielle Belz</td>
<td>Dora Lush</td>
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<td>Raphael Trenker</td>
<td>Regulation of cell-surface protein levels in immune cells by membrane-embedded E3 ubiquitin ligases.</td>
<td>Dr Matthew Call, Dr Melissa Call</td>
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<td>Hannah Vanyai</td>
<td>The role of monocytic leukaemia zinc finger protein in embryonic development.</td>
<td>Dr Anne Voss, Dr Tim Thomas</td>
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<td>Leila Varghese</td>
<td>Janus kinase activity and regulation in haematopoiesis and disease.</td>
<td>Dr James Murphy, Dr Jeff Babon, Professor Douglas Hilton</td>
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<td>Swarna Vijayaraj</td>
<td>Identifying new mechanisms of regulation of inflammasomes.</td>
<td>Dr James Vince, Dr Kate Lawlor, Professor John Silke</td>
<td>MIRS/MIFRS</td>
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<td>Andreea Waltmann</td>
<td>The molecular epidemiology of <em>Plasmodium falciparum</em> and <em>Plasmodium vivax</em> malaria in Solomon Islands.</td>
<td>Dr Alyssa Barry, Professor Ivo Mueller</td>
<td>Public Health NHMRC</td>
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<tr>
<td>Emma Watson</td>
<td>The role of Bcl-2 family genes in apoptosis regulation during angiogenesis.</td>
<td>Dr Leigh Coultas, Dr Grant Dewson, Professor David Vaux</td>
<td>APA</td>
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<tr>
<td>Clare Weedon</td>
<td>Cells of origin in lung cancer and preclinical validation of new combination therapies in xenograft mouse models of lung cancer.</td>
<td>Professor Geoff Lindeman, Dr Marie-Liesse Asselin-Labat</td>
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<tr>
<td>Christopher Weir</td>
<td>Dissection of the Interaction of key malaria parasite proteins and their erythrocyte receptors.</td>
<td>Professor Alan Cowman, Dr Anthony Hodder, Professor Paul Barlow, Dr Lin Chen</td>
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<tr>
<td>Melanie Williams</td>
<td>Structural and functional analysis of host cell invasion motor in toxoplasma parasites.</td>
<td>Professor Alan Cowman, Dr Chris Tonkin</td>
<td>APA</td>
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<td>Matthew Witkowski</td>
<td>The role of transcription factor Ikaros in acute lymphoblastic leukaemia pathogenesis and therapy-resistance.</td>
<td>Dr Ross Dickins, Dr Mark McKenzie</td>
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<tr>
<td>Annie Yang</td>
<td>Molecular mechanisms of cell traversal by <em>Plasmodium falciparum</em>.</td>
<td>Dr Justin Boddey, Professor Alan Cowman</td>
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<tr>
<td>Alan Yap</td>
<td>Role of PFRips and its homologue in the invasion of red blood cells by Plasmodium merozoites.</td>
<td>Professor Alan Cowman, Dr Paul Gilson, Dr Diana Hansen</td>
<td>Pearl Scholarship</td>
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<tr>
<td>Janet Yeo</td>
<td>Characterisation of a putative novel RNASell enzyme Mrp144.</td>
<td>Dr Gabrielle Belz, Dr Mark Chong</td>
<td>MIFRS/MIRS</td>
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<tr>
<td>Kelvin Hon Yan Yip</td>
<td>Responses of normal and cancerous intestinal stem cells to regulatory signals.</td>
<td>Dr Tony Burgess, Dr Jonathan McQualter</td>
<td>MIRS</td>
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<tr>
<td>Jie Zhou</td>
<td>Exploring cellular calculation with the B-lymphocyte model.</td>
<td>Professor Phil Hodgkin, Professor David Tarlinton</td>
<td>APA</td>
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<tr>
<td>Elizabeth Zuccala</td>
<td>Cell–cell interactions during malaria parasite invasion of erythrocytes.</td>
<td>Dr Jacob Baum, Professor Alan Cowman</td>
<td>APA</td>
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</table>
## Visiting PhD in progress: 2013-14

<table>
<thead>
<tr>
<th>Student</th>
<th>Project title</th>
<th>Supervisors</th>
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<tbody>
<tr>
<td>Mary Ann Anderson</td>
<td>Anti-lymphoma therapy.</td>
<td>Professor David Huang, Professor Andrew Roberts</td>
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<tr>
<td>Michael Christie</td>
<td>The WNT signalling pathway in colorectal cancer.</td>
<td>Dr Oliver Sieber, Professor Tony Burgess, Dr Lara Lipton</td>
</tr>
<tr>
<td>Greg Corboy</td>
<td>The clinical utility of next-generation genetic sequencing in the management of haematological malignancies.</td>
<td>Professor Paul Waring, Dr Graham Taylor, Professor Andrew Roberts, Dr Annabel Tuckfield</td>
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<tr>
<td>Betty Kao</td>
<td>Epigenetic therapy for beta-thalassemia.</td>
<td>Dr Jim Vadolas, Dr Marnie Blewitt, Dr Bradley McCoil</td>
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<tr>
<td>Shabnam Khatibi</td>
<td>Quantitative analysis and mathematical modelling of the effects of cytokine signalling on epithelial cells.</td>
<td>Professor Jonathan Manton, Professor Tony Burgess, Dr John Wagner</td>
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<tr>
<td>Kendrick Koo</td>
<td>Molecular oncogenesis of oral cavity and oropharyngeal squamous cell carcinoma.</td>
<td>Professor Tony Burgess, Dr Oliver Sieber</td>
</tr>
<tr>
<td>Anita Lerch</td>
<td>Bioinformatic analyses of <em>Plasmodium vivax</em> stage-specific transcriptome data and genome data from multi-clonal infections.</td>
<td>Professor Ivo Mueller</td>
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<tr>
<td>Artika Nath</td>
<td></td>
<td>Dr Mike Inouye, Associate Professor Stephen Turner, Professor Frank Carbone, Professor Terry Speed</td>
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<tr>
<td>Marie Parsons</td>
<td>Clinical and functional characterisation of novel cancer gene candidates for colorectal cancer.</td>
<td>Dr Hong-Jian Zhu, Dr Oliver Sieber, Dr Anu Sakhianandeswaren</td>
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<tr>
<td>Samuel Robinson</td>
<td>Venoms to drugs: a case study with <em>Conus victoriae</em>.</td>
<td>Associate Professor Tony Papenfuss</td>
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<tr>
<td>Simon Sadedin</td>
<td>Identifications of de novo variants from family-based next generation sequencing data.</td>
<td>Dr Alicia Oshlack, Professor Andrew Sinclair, Professor Terry Speed</td>
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<tr>
<td>Gaetano Speciale</td>
<td>Investigating the mechanism of glycoside hydrolases: synthesis of substrates and inhibitors for mechanistic studies.</td>
<td>Associate Professor Spencer Williams, Dr Ethan Goddard-Borger</td>
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<tr>
<td>Mary Speir</td>
<td>Manipulation of host cell death processes by the opportunistic human pathogen <em>Legionella pneumophila</em>.</td>
<td>Dr Thomas Naderer, Professor Trevor Lithgow, Dr James Vince</td>
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<tr>
<td>Monique Topp</td>
<td>Novel xenograft mouse model of human high-grade serous epithelial ovarian cancer for preclinical analysis.</td>
<td>Associate Professor Clare Scott, Dr Karla Hutt</td>
</tr>
<tr>
<td>Sook Pheng Wong</td>
<td>Notch signalling in colorectal cancer.</td>
<td>Professor Tony Burgess, Dr Nadia Kershaw</td>
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</table>
# 2013-14 Bachelor of Science (Honours) Students in Progress

<table>
<thead>
<tr>
<th>Student</th>
<th>Project Title</th>
<th>Supervisors</th>
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</thead>
<tbody>
<tr>
<td>Suad Abdirahman</td>
<td>Defining the function of the interleukin-11 signalling complex.</td>
<td>Dr Oliver Sieber, Dr Tracy Putoczki, Dr Michael Griffin</td>
</tr>
<tr>
<td>Jonathan Bernardini</td>
<td>Investigating the Bcl-2 family of apoptosis regulators in cells using novel imaging approaches.</td>
<td>Dr Grant Dewson, Dr Danny Hatters</td>
</tr>
<tr>
<td>Katelyn Chalker</td>
<td>Investigating the role of NLRP1 in asthma.</td>
<td>Dr Robert O’Donoghue, Dr Seth Masters</td>
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<tr>
<td>Margaret Cockburn</td>
<td>Molecular regulation of apoptosis.</td>
<td>Dr Marco Herold, Professor Andreas Strasser</td>
</tr>
<tr>
<td>Alexander Colussa</td>
<td>The role of SPSB1 in regulating the innate immune response.</td>
<td>Dr Sandra Nicholson, Dr Lukasz Kedzierski, Professor Gabrielle Belz</td>
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<tr>
<td>Damian D’Silva</td>
<td>Regulation of pyroptosis and necroptosis.</td>
<td>Dr Seth Masters, Dr Silvia Alvarez-Diaz</td>
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<tr>
<td>Destiny Dalseno</td>
<td>Characterising the Bak apoptotic pore by mass spectrometry.</td>
<td>Dr Grant Dewson, Dr Andrew Webb, Dr Robert Ninnis</td>
</tr>
<tr>
<td>Caleb Dawson</td>
<td>Investigating the formation and function of foetal platelets.</td>
<td>Dr Samir Taoudi, Dr Emma Josefsson, Professor Warren Alexander</td>
</tr>
<tr>
<td>Patrick Dyer</td>
<td>Somatic genetics in haploid murine cells.</td>
<td>Professor David Vaux, Dr Lisa Lindqvist, Professor Liam O’Connor</td>
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<tr>
<td>Zoe Grant</td>
<td>Investigating the role of the histone acetyltransferase HBO1 in blood vascular development.</td>
<td>Dr Leigh Coultas, Dr Anne Voss</td>
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<tr>
<td>Thomas Hayman</td>
<td>Regulating antiviral immunity.</td>
<td>Dr Sandra Nicholson, Dr Seth Masters</td>
</tr>
<tr>
<td>Sean Hewetson</td>
<td>Characterising antibodies targeting the pro-apoptotic protein Bax.</td>
<td>Dr Mark van Delft, Dr Peter Czabotar, Dr David Segal</td>
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<td>Henry Howard</td>
<td>Characterisation of the role of a novel WNT/beta-catenin pathway regulator in colorectal cancer.</td>
<td>Dr Oliver Sieber, Dr Anuratha Sakthianandeswaren</td>
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<td>Jeong Yoon Kim (Ester)</td>
<td>Investigating the influence of cell death signalling pathways on cellular reprogramming.</td>
<td>Associate Professor Joan Heath, Dr Minni Aniko, Dr Mark van Delft</td>
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<tr>
<td>Tony Le</td>
<td>Development of B cell memory and antibody responses to malaria.</td>
<td>Dr Diana Hansen, Dr Lisa Ioannidis, Dr Tony Hodder</td>
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<tr>
<td>Elizabeth Lieschke</td>
<td>Using mouse models of high-grade serous ovarian cancer to understand the role of MYCN.</td>
<td>Associate Professor Clare Scott, Dr Matthew Wakefield</td>
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<tr>
<td>Shuiping Lin (Dawn)</td>
<td>Understanding haematopoiesis at the single cell level.</td>
<td>Dr Shalin Naik, Dr Samir Taoudi</td>
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<td>Anne Tripaydonis</td>
<td>Understanding how a dead enzyme MLKL mediates cell death.</td>
<td>Dr Michael Buchert, Associate Professor John Silke, Dr James Murphy</td>
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<tr>
<td>Hoaran Zhu</td>
<td>Selective targeting of Bcl-2 proteins in cancer.</td>
<td>Dr Doug Fairlie, Dr Erinna Lee, Dr Marco Herold</td>
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</table>
2013-14 VACATION SCHOLARS

UROP students, overseas research trainees and vacation scholars.

Twenty students came to the institute as part of the Undergraduate Research Opportunities Program (UROP), which is administered through the Bio21 Cluster and gives university students an opportunity to participate in research.

The institute hosted 14 university undergraduates as vacation scholars mainly between November 2013 and March 2014, for periods from two weeks up to four months. It also hosted eight visiting Masters students and 12 overseas undergraduates to undertake short-term research training placements from Finland, France, Germany, United Kingdom and The Netherlands.

<table>
<thead>
<tr>
<th>Student</th>
<th>Project title</th>
<th>Supervisors</th>
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<tbody>
<tr>
<td>Liselle Atkin</td>
<td>UROP student</td>
<td>Dr Ethan Goddard-Borger</td>
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<td>Margaret Cockburn</td>
<td>UROP student</td>
<td>Dr Marco Herold</td>
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<tr>
<td>Adrian Di Rago</td>
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<td>Associate Professor Guillaume Lessene</td>
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<td>Karl Dudfield</td>
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<td>Laura Fielden</td>
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<td>Kaneeka Gajendra</td>
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<td>Associate Professor Matthias Ernst</td>
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<td>Hersha Kadko</td>
<td>UROP student</td>
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<td>Keilly Kuykhoven</td>
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<td>Carlos May</td>
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<td>Simone Park</td>
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<td>Damian Pavlyshyn</td>
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<td>Weiyi Pei</td>
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<td>Dr Kate Sutherland</td>
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<td>Dana Piovesan</td>
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<td>Catherine Pitt</td>
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<td>Dr Anne Voss, Dr Tim Thomas</td>
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<td>Rupoj Sarbaswa</td>
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<td>Lucy Taylor</td>
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<td>Professor Warren Alexander</td>
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<td>Jessica Tran</td>
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<td>Tuyet Tran</td>
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<td>Lynn Wang</td>
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<td>Andrea Zhu</td>
<td>UROP student</td>
<td>Professor Tony Burgess</td>
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<tr>
<td>Sabrina Bernard</td>
<td>Overseas research trainee (France)</td>
<td>Associate Professor Guillaume Lessene</td>
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<td>Christina Bruggeman</td>
<td>Overseas research trainee (The Netherlands)</td>
<td>Professor Stephen Nutt</td>
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<td>Overseas research trainee (Germany)</td>
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<td>Madeleine Reilly</td>
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<tr>
<td>Eva Sum</td>
<td>Overseas research trainee (Germany)</td>
<td>Associate Professor Matthias Ernst</td>
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<tr>
<td>Jaana Tuominen</td>
<td>Overseas research trainee (Finland)</td>
<td>Associate Professor Joan Heath</td>
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<td>Sebastian Zijl</td>
<td>Overseas research trainee (The Netherlands)</td>
<td>Dr Marie-Liesse Asselin-Labat</td>
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<tr>
<td>Shun Ch’ng</td>
<td>Vacation scholarship student</td>
<td>Dr Marnie Blewitt</td>
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<tr>
<td>Katelyn Chalker</td>
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<td>Dr Seth Masters</td>
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<tr>
<td>Alexander Colussa</td>
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<td>Dr Sandra Nicholson</td>
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<td>Damian D’Silva</td>
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<td>Dr Seth Masters</td>
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<td>Brigette Duckworth</td>
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<td>Professor Gabrielle Belz</td>
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<td>Carlos Gantner</td>
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<td>Professor Douglas Hilton</td>
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<td>Peter Gearing</td>
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<td>Jeong Kim</td>
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<td>Youlin Koh</td>
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<td>Professor David Huang</td>
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<td>Elizabeth Lieschke</td>
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<td>Associate Professor Clare Scott</td>
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<td>Shuiping Lin</td>
<td>Vacation student</td>
<td>Dr Shalin Naik</td>
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<td>Shian Su</td>
<td>Vacation student</td>
<td>Dr Matt Ritchie</td>
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<tr>
<td>Leonie Tang</td>
<td>Vacation student</td>
<td>Dr Anne Voss/Dr Tim Thomas</td>
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<tr>
<td>Farzana Zaman</td>
<td>Vacation scholarship student</td>
<td>Professor Warren Alexander</td>
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<tr>
<td>Ms Wendy Allan</td>
<td>Visiting Masters student</td>
<td>Dr Marnie Blewitt</td>
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<tr>
<td>Dr Simon He</td>
<td>Visiting Masters student</td>
<td>Professor Andrew Roberts</td>
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<tr>
<td>Ms Denise Heckmann</td>
<td>Visiting Masters student</td>
<td>Professor Liam O’Connor</td>
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<tr>
<td>Mr Alan John</td>
<td>Visiting Masters student</td>
<td>Dr Ethan Goddard-Borger</td>
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<tr>
<td>Mr Lachlan McIntosh</td>
<td>Visiting Masters student</td>
<td>Associate Professor Tony Papenfuss</td>
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<tr>
<td>Ms Karen Oliver</td>
<td>Visiting Masters student</td>
<td>Associate Professor Melanie Bahlo</td>
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<tr>
<td>Mr Gerry Tonkin-Hill</td>
<td>Visiting Masters student</td>
<td>Associate Professor Tony Papenfuss</td>
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<tr>
<td>Dr Louie Ye</td>
<td>Visiting Masters student</td>
<td>Associate Professor Clare Scott</td>
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### 2013-14 INSTITUTE SPEAKERS

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>SPEAKER</th>
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</thead>
<tbody>
<tr>
<td>1 July 2013</td>
<td>shRNA technology</td>
<td>Dr Ross Dickins, Molecular Medicine division</td>
</tr>
<tr>
<td>3 July 2013</td>
<td>Screening for epigenetic regulators of X-chromosome inactivation</td>
<td>Mr Jamie Gearing (PhD student), Molecular Medicine division</td>
</tr>
<tr>
<td>10 July 2013</td>
<td>Timing is everything: a new RIPK2 inhibitor reveals exquisite temporal regulation of anti-bacterial NOD signaling</td>
<td>Dr Ueli Nachbur, Cell Signalling and Cell Death division</td>
</tr>
<tr>
<td>31 July 2013</td>
<td>Epigenetic pathways and autoimmune disease susceptibility</td>
<td>Dr Yuxia Zhang, Molecular Medicine division</td>
</tr>
<tr>
<td>5 August 2013</td>
<td>Epigenetic modifications and the immune system</td>
<td>Dr Rhys Allan, Molecular Immunology division</td>
</tr>
<tr>
<td>21 August 2013</td>
<td>Targeting cytokines in inflammatory diseases: focus on interleukin-11</td>
<td>Dr Tracy Putoczki, Cell Signalling and Cell Death division</td>
</tr>
<tr>
<td>28 August 2013</td>
<td>Identification of key mechanisms governing natural killer cell homeostasis in mice and men</td>
<td>Dr Nick Huntington, Molecular Immunology division</td>
</tr>
<tr>
<td>11 September 2013</td>
<td>G-CSF and neutrophils – pathogenic mediators in autoimmune uveitis</td>
<td>Dr Gabrielle Goldberg, Inflammation division</td>
</tr>
<tr>
<td>18 September 2013</td>
<td>Sharing is caring: borrowing information between genes improves gene expression analysis</td>
<td>Ms Belinda Phipson (PhD student), Bioinformatics division</td>
</tr>
<tr>
<td>25 September 2013</td>
<td>Regulation of platelet production and function in health and disease</td>
<td>Dr Emma Josefssson, Cancer and Haematology division</td>
</tr>
<tr>
<td>2 October 2013</td>
<td>Apoptosis and immunological tolerance</td>
<td>Dr Daniel Gray, Molecular Genetics of Cancer division</td>
</tr>
<tr>
<td>9 October 2013</td>
<td>The emergence of a ‘dead’ enzyme MLKL as a mediator of cell death by programmed necrosis</td>
<td>Dr James Murphy, Structural Biology division</td>
</tr>
<tr>
<td>16 October 2013</td>
<td>Does Plasmspsin V make the ‘cut’ as an antimalarial drug target?</td>
<td>Dr Brad Sleebs, ACRF Chemical Biology division</td>
</tr>
<tr>
<td>30 October 2013</td>
<td>Plasmacytoid dendritic cells and lymph-resident conventional dendritic cells employ different survival strategy</td>
<td>Dr Yifan Zhan, Immunology division</td>
</tr>
<tr>
<td>13 November 2013</td>
<td>The role of SOCS3 in chondrocytes during skeletal development and in inflammatory arthritis</td>
<td>Mr Tommy Liu (PhD student), Inflammation division</td>
</tr>
<tr>
<td>20 November 2013</td>
<td>How does p53 protect us from cancer?</td>
<td>Ms Elizbeth Valente (PhD student), Molecular Genetics of Cancer division</td>
</tr>
<tr>
<td>27 November 2013</td>
<td>Targeting Bcl-2 in the treatment of leukaemia and lymphoma</td>
<td>Dr Mary Ann Anderson (PhD student), ACRF Chemical Biology division</td>
</tr>
<tr>
<td>4 December 2013</td>
<td>Cell death as a driver of inflammatory disease</td>
<td>Mr James Rickard (PhD student), Cell Signalling and Cell Death division</td>
</tr>
<tr>
<td>11 December 2013</td>
<td>Do multipotent mammary stem cells exist? Insights from 3D imaging</td>
<td>Dr Anne Rios, ACRF Stem Cells and Cancer division</td>
</tr>
<tr>
<td>18 December 2013</td>
<td>A two-site interaction underpins TRIM25 activation of the RIG-I anti-viral response</td>
<td>Mr Akahay D’Cruz (PhD student), Inflammation division</td>
</tr>
<tr>
<td>5 March 2014</td>
<td>Investigating the role of Pax5 hypomorphism in B-progenitor acute lymphoblastic leukaemia</td>
<td>Ms Grace Liu (PhD student), Molecular Medicine division</td>
</tr>
<tr>
<td>DATE</td>
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<tr>
<td>12 March 2014</td>
<td>Patient derived xenografts: precision medicine for ovarian cancer</td>
<td>Ms Monique Topp (PhD student), ACRF Stem Cells and Cancer division</td>
</tr>
<tr>
<td>19 March 2014</td>
<td>Translating research into new medicines</td>
<td>Dr Ian Street, Systems Biology and Personalised Medicine division</td>
</tr>
<tr>
<td>2 April 2014</td>
<td>Antigen-presenting cells: of life, death and transplantation</td>
<td>Associate Professor Andrew Lew, Immunology division</td>
</tr>
<tr>
<td>28 April 2014</td>
<td>Necroptotic death of RIPK1-deficient HSC compromises haematopoiesis</td>
<td>Ms Joanne O’Donnell (PhD student), Inflammation division</td>
</tr>
<tr>
<td>5 May 2014</td>
<td>Regulation of JAK/STAT signalling (SOCS mechanisms of action)</td>
<td>Dr Jeff Babon, Cancer and Haematology division</td>
</tr>
<tr>
<td>12 May 2014</td>
<td>Immune regulation by CD52 in the mouse</td>
<td>Dr Julian Bosco (PhD student), Molecular Medicine division</td>
</tr>
<tr>
<td>14 May 2014</td>
<td>Myb, Moz and memory: genetic networks regulating long-lived immunity</td>
<td>Dr Kim Jacobson, Immunology division</td>
</tr>
<tr>
<td>21 May 2014</td>
<td>Drug discovery for cancer and inflammatory diseases</td>
<td>Dr Chris Burns, ACRF Chemical Biology division</td>
</tr>
<tr>
<td>26 May 2014</td>
<td>Inflammation-associated cancers (gp130 signalling)</td>
<td>Dr Tracy Putoczki, Inflammation division</td>
</tr>
<tr>
<td>28 May 2014</td>
<td>Making sense of tumour genome sequence data</td>
<td>Associate Professor Tony Papenfuss, Bioinformatics division</td>
</tr>
<tr>
<td>4 June 2014</td>
<td>The role of calcium-dependent kinases in the lytic lifecycle of <em>Toxoplasma gondii</em></td>
<td>Mr James McCoy (PhD student), Infection and Immunity division</td>
</tr>
<tr>
<td>11 June 2014</td>
<td>IRF4 in T cells: from clonal selection and Burnet to sugar and fat</td>
<td>Dr Axel Kallies, Molecular Immunology division</td>
</tr>
<tr>
<td>16 June 2014</td>
<td>NF-κB and cancer</td>
<td>Dr Lorraine O’Reilly, Molecular Genetics of Cancer division</td>
</tr>
<tr>
<td>16 June 2014</td>
<td>JAK on, JAK off: the activation and inhibition of JAK2 in proliferative blood disorders</td>
<td>Ms Leila Varghese (PhD student), Cancer and Haematology division</td>
</tr>
<tr>
<td>18 June 2014</td>
<td>Identifying and exploiting ‘molecular matches’ to design treatments for women with high-grade serous ovarian cancer</td>
<td>Associate Professor Clare Scott, ACRF Stem Cells and Cancer division</td>
</tr>
<tr>
<td>23 June 2014</td>
<td>TNF signalling</td>
<td>Associate Professor John Silke, Cell Signalling and Cell Death division</td>
</tr>
<tr>
<td>25 June 2014</td>
<td>Mechanisms that activate and drive <em>Toxoplasma</em> host cell egress and invasion</td>
<td>Dr Chris Tonkin, Infection and Immunity division</td>
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<tr>
<td>30 June 2014</td>
<td>Type 1 diabetes</td>
<td>Associate Professor Andrew Lew, Immunology division</td>
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<tr>
<td>30 June 2014</td>
<td>Autoimmune responses in chronic idiopathic urticaria</td>
<td>Dr Priscilla Auyeung (PhD student), Molecular Medicine division</td>
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## 2013-14 VISITING SPEAKERS

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>8 July 2013</td>
<td>MicroRNAs and other small regulatory RNAs</td>
<td>Dr Mark Chong, St Vincent’s Institute of Medical Research, Australia</td>
</tr>
<tr>
<td>15 July 2013</td>
<td>Human genetics of mitochondrial DNA and nuclear causes of mitochondrial disease</td>
<td>Professor David Thorburn, Murdoch Children’s Research Institute, Australia</td>
</tr>
<tr>
<td>15 July 2013</td>
<td>Poised with purpose: understanding cell plasticity in cancer</td>
<td>Dr Christine Chaffer, Whitehead Institute of Biomedical Research, US</td>
</tr>
<tr>
<td>17 July 2013</td>
<td>The signalling networks regulating cell morphology</td>
<td>Dr Chris Bakal, The Institute of Cancer Research, UK</td>
</tr>
<tr>
<td>26 July 2013</td>
<td>The BCL-2 family and mitochondrial shape regulate ER stress</td>
<td>Dr Konstantinos Floros, Icahn School of Medicine at Mount Sinai, US</td>
</tr>
<tr>
<td>29 July 2013</td>
<td>Epigenetics</td>
<td>Professor Emma Whitelaw, La Trobe Institute of Molecular Sciences, Australia</td>
</tr>
<tr>
<td>29 July 2013</td>
<td>Single-molecule studies of DNA replication: from in vitro to in vivo</td>
<td>Antoine M van Oijen, Groningen University, Netherlands</td>
</tr>
<tr>
<td>12 August 2013</td>
<td>Bioinformatic analysis of the epigenome</td>
<td>Dr Alicia Oshlack, Murdoch Children’s Research Institute, Australia</td>
</tr>
<tr>
<td>14 August 2013</td>
<td>Junking gene expression in granulocytes</td>
<td>John E J Rasko AO, Royal Prince Alfred Hospital, Australia</td>
</tr>
<tr>
<td>20 August 2013</td>
<td>How SBML and other tools are transforming computer models of life</td>
<td>Michael Hucka PhD, California Institute of Technology, US</td>
</tr>
<tr>
<td>20 August 2013</td>
<td>Regulation of cytokine signaling: Revisiting the pseudokinase domain of JAK2</td>
<td>Professor Olli Silvennoinen, University Tampere, Finland</td>
</tr>
<tr>
<td>12 September 2013</td>
<td>Studying cellular morpho-dynamics via Biolmage informatics</td>
<td>Dr Alexandre Dufour, Institut Pasteur, France</td>
</tr>
<tr>
<td>17 September 2013</td>
<td>The APAF-1 binding protein FAM96A is involved in tumorigenicity of gastrointestinal stromal tumours</td>
<td>Dr Bettina Schwamb, Georg-Speyer-Haus Institute for Biomedical Research, Germany</td>
</tr>
<tr>
<td>26 September 2013</td>
<td>Interleukin-7: an elixir for mouse lymphocytes</td>
<td>Professor Rhodri Ceredig, INSERM, France</td>
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<tr>
<td>7 October 2013</td>
<td>Epigenetic regulation in mouse development</td>
<td>Professor Francis Stewart, Technische Universitaet Dresden, Germany</td>
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<tr>
<td>7 October 2013</td>
<td>Mice with humanised livers: a vehicle for exploring liver centric infection</td>
<td>Professor Norman Kneteman, University of Alberta, Canada</td>
</tr>
<tr>
<td>10 October 2013</td>
<td>The epigenetic cause of Facioscapulohumeral Dystrophy</td>
<td>Silvère van der Maarel, Leiden University Medical Center, Netherlands</td>
</tr>
<tr>
<td>17 October 2013</td>
<td>Aboriginal and Torres Strait Islander health, research ethics and policy changes</td>
<td>Ms Mary Guthrie, The Lowitja Institute, Australia</td>
</tr>
<tr>
<td>23 October 2013</td>
<td>Control of organ size by the Hippo pathway</td>
<td>Assistant Professor Kieran Harvey, Peter MacCallum Cancer Centre, Australia</td>
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<tr>
<td>DATE</td>
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<tr>
<td>23 October 2013</td>
<td>Regenerating the aged thymus - can Foxn1 do it all?</td>
<td>Professor Clare Blackburn, University of Edinburgh, UK</td>
</tr>
<tr>
<td>24 October 2013</td>
<td>Latest advancements and techniques in Bioenergetics Research using the Seahorse XFe Analysers</td>
<td>Laura Storjohann PhD and Ajit Divakaruni PhD, Seahorse Bioscience, Australia</td>
</tr>
<tr>
<td>29 October 2013</td>
<td>Transcription elongation and plasma cell gene expression</td>
<td>Christine Milcarek PhD, University of Pittsburgh, US</td>
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<tr>
<td>6 November 2013</td>
<td>Red cell mutants identified by chemical mutagenesis</td>
<td>Associate Professor David Curtis, Monash University, Australia</td>
</tr>
<tr>
<td>11 November 2013</td>
<td>Genetics of immune mediated diseases</td>
<td>Professor Matthew Brown, University of Queensland, Australia</td>
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<tr>
<td>14 November 2013</td>
<td>Kinase drug discovery: opportunities and challenges</td>
<td>Dr Isabelle Lucet, Monash University, Australia</td>
</tr>
<tr>
<td>14 November 2013</td>
<td>Gender issues and STEM (Science, Technology, Engineering and Mathematics)</td>
<td>Professor Helen Forgasz, Monash University, Australia</td>
</tr>
<tr>
<td>15 November 2013</td>
<td>Project grandiose: gaining insights into the molecular mechanisms driving reprogramming toward pluripotency</td>
<td>Professor Andras Nagy, Mount Sinai Hospital, Canada</td>
</tr>
<tr>
<td>18 November 2013</td>
<td>Building a research program in Aboriginal health: lessons from the edge</td>
<td>Professor Alex Brown, South Australian Health and Medical Research Institute, Australia</td>
</tr>
<tr>
<td>21 November 2013</td>
<td>Strong-self/weak-self: How T lineage cells interpret antigen affinity and avoid autoimmunity (it’s a bit of a dog’s breakfast)</td>
<td>Professor Ed Palmer, University Hospital, Switzerland</td>
</tr>
<tr>
<td>26 November 2013</td>
<td>PacBio single molecule sequencing: applications and bioinformatics tools</td>
<td>Dr Siddartha Singh, Pacific Biosciences, Singapore</td>
</tr>
<tr>
<td>2 December 2013</td>
<td>Gene-environment interactions in the pathogenesis of diabetes and metabolic syndrome – role of the gut microbiome</td>
<td>C Ronald Kahn, Joslin Diabetes Center, US</td>
</tr>
<tr>
<td>10 December 2013</td>
<td>Using microscopy to investigate cell fate decisions in vitro and in vivo: insights into novel therapies for leukemia and autoimmunity</td>
<td>Dr Edwin Hawkins, Imperial College London, UK</td>
</tr>
<tr>
<td>10 December 2013</td>
<td>c-FLIP and IkappaBNS in immune regulation</td>
<td>Professor Dr Ingo Schmitz, Helmholtz Centre for Infection Research, Germany</td>
</tr>
<tr>
<td>10 December 2013</td>
<td>A structural and biophysical comparison of the mammalian peptide transporters PepT1 and PepT2</td>
<td>Mr John Beale, University of Oxford, UK</td>
</tr>
<tr>
<td>11 December 2013</td>
<td>A pinch of salt: the effect of NaCl on macrophage activation and function</td>
<td>Dr Katrina Binger, Max-Delbruck Center for Molecular Medicine, Germany</td>
</tr>
<tr>
<td>12 December 2013</td>
<td>The public health impact and cost-effectiveness of malaria vaccine RTS,S: use of clinical trial results and simulations from the OpenMalaria large-scale individual-based modelling study</td>
<td>Melissa Penny, Swiss Tropical and Public Health Institute, Switzerland</td>
</tr>
<tr>
<td>12 December 2013</td>
<td>Towards a functional understanding of autoimmunity-associated gene variants</td>
<td>Stephen Kissler PhD, Joslin Diabetes Center, US</td>
</tr>
<tr>
<td>12 December 2013</td>
<td>The origin and relevance of epigenetic variation in mammals</td>
<td>Dr Michelle Holland, Queen Mary University of London, UK</td>
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<tr>
<td>16 December 2013</td>
<td>Nuclear export of mRNA in humans is selective, with pathways favouring gene regulation and repair</td>
<td>Dr Vihandha Wickramasinghe, University of Cambridge, UK</td>
</tr>
<tr>
<td>16 December 2013</td>
<td>High-density lipoprotein mediates anti-inflammatory reprogramming of macrophages via the transcriptional regulator ATF3</td>
<td>Dr Dominic De Nardo, University Hospitals, Germany</td>
</tr>
<tr>
<td>6 February 2014</td>
<td>Understanding immune regulation during parasitic diseases</td>
<td>Dr Christian Engwerda, Queensland Institute of Medical Research, Australia</td>
</tr>
<tr>
<td>10 February 2014</td>
<td>My journey with high-throughput screening</td>
<td>Dr Reena Halai, University of Queensland, Australia</td>
</tr>
<tr>
<td>12 February 2014</td>
<td>How to screen ion channel targets</td>
<td>Dr Hélène Sabroux Jouset, Geneva Biotech Centre, Switzerland</td>
</tr>
<tr>
<td>12 February 2014</td>
<td>The many faces of hematopoietic stem cells</td>
<td>Associate Professor Emmanuelle Passegué, University of California, San Francisco, US</td>
</tr>
<tr>
<td>12 February 2014</td>
<td>Unexpected implication of PML nuclear bodies in APL cure</td>
<td>Professor Hugues de Thé, University Paris Diderot, France</td>
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<tr>
<td>17 February 2014</td>
<td>Dissecting the molecular pathway of programmed necrosis</td>
<td>Xiaodong Wang PhD, China Member of the National Academy of Sciences, US</td>
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<tr>
<td>20 February 2014</td>
<td>'Non-genetics' and mammalian phenotypes</td>
<td>Dr Vardhman Rakyan, Blizard Institute, UK</td>
</tr>
<tr>
<td>25 February 2014</td>
<td>Stem cell origin of cancer</td>
<td>Dr Stewart Sell, Wadsworth Center, US</td>
</tr>
<tr>
<td>17 March 2014</td>
<td>Toll-like receptors</td>
<td>Dr Ashley Mansell, Prince Henry’s Institute-Monash Institute of Medical Research, Australia</td>
</tr>
<tr>
<td>24 March 2014</td>
<td>PRRs-C-type lectins</td>
<td>Dr Irene Caminschi, Burnet Institute, Australia</td>
</tr>
<tr>
<td>26 March 2014</td>
<td>Novel pathways regulating peripheral B cell survival and maturation</td>
<td>Dr Anselm Enders, Australian National University, Australia</td>
</tr>
<tr>
<td>27 March 2014</td>
<td>Evolution and ecology of drug resistance in tuberculosis</td>
<td>Dr Sonia Borrell, Swiss Tropical and Public Health Institute, Switzerland</td>
</tr>
<tr>
<td>31 March 2014</td>
<td>Inflammasomes and viral sensors</td>
<td>Dr Kate Schroder, University of Queensland, Australia</td>
</tr>
<tr>
<td>4 April 2014</td>
<td>Molecular mechanism of apoptotic cell disassembly</td>
<td>Dr Ivan Poon, La Trobe University, Australia</td>
</tr>
<tr>
<td>7 April 2014</td>
<td>Inflammation and obesity</td>
<td>Professor Mark Febbraio, Baker IDI Heart and Diabetes Institute, Australia</td>
</tr>
<tr>
<td>8 April 2014</td>
<td>Thymic selection of MHC-restricted versus MHC-independent T cells</td>
<td>François Van Laethem, National Cancer Institute, US</td>
</tr>
<tr>
<td>9 April 2014</td>
<td>Latent herpes simplex virus: on a tight leash but still barking</td>
<td>Associate Professor David Tscharke, Australian National University, Australia</td>
</tr>
<tr>
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<td>11 April 2014</td>
<td>Generating intra-thymic self-antigen diversity for tolerance induction</td>
<td>Professor Bruno Kyeswki, German Cancer Research Center, Germany</td>
</tr>
<tr>
<td>11 April 2014</td>
<td>Regulation of T lymphocyte functions by Crk adaptor proteins</td>
<td>Professor Noah Isakov, Ben Gurion University of the Negev, Israel</td>
</tr>
<tr>
<td>14 April 2014</td>
<td>Interferon signalling</td>
<td>Professor Paul Hertzog, Monash Institute of Medical Research, Australia</td>
</tr>
<tr>
<td>16 April 2014</td>
<td>Clostridial gut infections: from toxins and spores to mother’s milk</td>
<td>Associate Professor Dena Lyras, Monash University, Australia</td>
</tr>
<tr>
<td>24 April 2014</td>
<td>Can optical high speed imaging be an alternative to patch-clamp?</td>
<td>Dr Lars Kaestner, Saarland University, Germany</td>
</tr>
<tr>
<td>28 April 2014</td>
<td>Mast cells: delinquents or ‘D’-lightful?</td>
<td>Associate Professor Michele Grimbaldeston, Centre for Cancer Biology, Australia</td>
</tr>
<tr>
<td>30 April 2014</td>
<td>Focusing on new applications of ddPCR</td>
<td>Dr Eli Mrkusich, Bio-Rad Laboratories, Australia</td>
</tr>
<tr>
<td>30 April 2014</td>
<td>Personalised medicine – the triumphs and the challenges</td>
<td>Professor Paul Waring, University of Melbourne, Australia</td>
</tr>
<tr>
<td>6 May 2014</td>
<td>Dendritic cell and macrophage ontogeny</td>
<td>Dr Florent Ginhoux, Agency for Science, Technology and Research (A*STAR), Singapore</td>
</tr>
<tr>
<td>7 May 2014</td>
<td>Death receptors and bacterial diarrhoea</td>
<td>Professor Elizabeth Hartland, University of Melbourne, Australia</td>
</tr>
<tr>
<td>12 May 2014</td>
<td>Cancer microenvironment and immunity: lessons for immunotherapy</td>
<td>Dr Nicole Haynes, Peter MacCallum Cancer Centre, Australia</td>
</tr>
<tr>
<td>15 May 2014</td>
<td>From IgG fusion proteins to engineered specific human T-regs: a life of tolerance</td>
<td>Professor David W Scott, Uniformed Services School of Health Sciences, US</td>
</tr>
<tr>
<td>19 May 2014</td>
<td>The macrophage/pathogen dynamic (subversion of the host response)</td>
<td>Associate Professor Matt Sweet, University of Queensland, Australia</td>
</tr>
<tr>
<td>26 May 2014</td>
<td>Dengue virus transmission in the <em>Aedes aegypti</em> mosquito with and without <em>Wolbachia</em> infection</td>
<td>Associate Professor Elizabeth McGraw, Monash University, Australia</td>
</tr>
<tr>
<td>27 May 2014</td>
<td>Visualising the Machinery of Life</td>
<td>David S Goodsell, The Scripps Research Institute, US</td>
</tr>
<tr>
<td>2 June 2014</td>
<td>Visualisation of inflammatory immune responses</td>
<td>Professor Wolfgang Weninger, Centenary Institute, Australia</td>
</tr>
<tr>
<td>3 June 2014</td>
<td>Dissecting mechanisms of immune responses with combined peptide-MHC tetramer analysis and mass cytometry (CyTOF)</td>
<td>Dr Helen McGuire, Stanford University, US</td>
</tr>
</tbody>
</table>
## 2014 POSTGRADUATE LECTURE SERIES: CELL SIGNALLING 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.

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>SPEAKER</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 March 2014</td>
<td>Toll-like receptors</td>
<td>Dr Ashley Mansell, PHI-MIMR Institute of Medical Research</td>
</tr>
<tr>
<td>24 March 2014</td>
<td>PRRs-C-type lectins</td>
<td>Dr Irene Caminschi, Burnet Institute</td>
</tr>
<tr>
<td>31 March 2014</td>
<td>Inflammasomes and viral sensors</td>
<td>Dr Kate Schroder, University of Queensland</td>
</tr>
<tr>
<td>7 April 2014</td>
<td>Inflammation and obesity</td>
<td>Professor Mark Febbraio, Baker IDI Heart and Diabetes Institute</td>
</tr>
<tr>
<td>14 April 2014</td>
<td>Interferon signalling</td>
<td>Professor Paul Hertzog, Monash Institute of Medical Research</td>
</tr>
<tr>
<td>28 April 2014</td>
<td>Mast cells: delinquents or ‘D’-lightful?</td>
<td>Associate Professor Michele Grimbaldeston, Centre for Cancer Biology</td>
</tr>
<tr>
<td>5 May 2014</td>
<td>Regulation of JAK/STAT signalling (SOCS mechanisms of action)</td>
<td>Dr Jeff Babon, Walter and Eliza Hall Institute</td>
</tr>
<tr>
<td>12 May 2014</td>
<td>Cancer microenvironment and immunity: lessons for immunotherapy</td>
<td>Dr Nicole Haynes, Peter MacCallum Cancer Centre</td>
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<td>The macrophage/pathogen dynamic (subversion of the host response)</td>
<td>Associate Professor Matthew Sweet, University of Queensland</td>
</tr>
<tr>
<td>26 May 2014</td>
<td>Inflammation-associated cancers (gp130 signalling)</td>
<td>Dr Tracy Putocki, Walter and Eliza Hall Institute</td>
</tr>
<tr>
<td>2 June 2014</td>
<td>Visualisation of inflammatory immune responses</td>
<td>Professor Wolfgang Weninger, Centenary Institute</td>
</tr>
<tr>
<td>16 June 2014</td>
<td>NF-κB and cancer</td>
<td>Dr Lorraine O’Reilly, Walter and Eliza Hall Institute</td>
</tr>
<tr>
<td>23 June 2014</td>
<td>TNF signalling</td>
<td>Associate Professor John Silke, Walter and Eliza Hall Institute</td>
</tr>
<tr>
<td>30 June 2014</td>
<td>Type 1 diabetes</td>
<td>Associate Professor Andrew Lew, Walter and Eliza Hall Institute</td>
</tr>
</tbody>
</table>
ENGAGEMENT

The Walter and Eliza Hall Institute is committed to creating community conversations about medical research, engaging with the community, school students, colleagues and scientific audiences.

2624 people came to a scientific event at the institute

2892 members of the public toured or visited the institute

785 school students toured the institute

YouTube channel video views 379,169 | 1,801,750 institute website page views

4972 YouTube subscribers

2652 Twitter followers

3222 Facebook likes
ENGAGING WITH THE COMMUNITY

The artistic side of science

Researchers can capture some amazing images while exploring the inner workings of the body.

Art of Science is an institute competition that reveals the beauty behind medical research. Each year, our scientists submit images captured as part of their research to the institute’s Art of Science competition. These visually stunning images of real-world research are a great way to engage the public with a different aspect of science.

In October 2013, we invited the public to the institute for an exhibition of the Art of Science finalists and the Art of Science Awards. More than 150 guests attended the event, which saw the institute transformed for the night with a gallery-style exhibition and live jazz band. Ten finalists were exhibited from more than 35 entries submitted.

Winning both the Art of Science Award and the Director’s Choice Award was Heart of Science from Dr Christine Biben and Dr Anne Rios. The fairy-like image captured blood vessels forming as the heart develops. Understanding how these vessels form and renew will aid in developing therapies to repair heart tissue.

In the lead up to the awards night, the public were invited to choose their favourite image as part of the newly-established People’s Choice Award, hosted through the institute’s Facebook page. Ms Laura Galvis took out the People’s Choice Award with her image, Lungberry, which shows the early stages of lung development, in which the budding lung branches out to create sufficient surface area for breathing.

The awards were presented by institute director Professor Doug Hilton and special guest judge Ms Kelly Gellatly, director of the Ian Potter Museum of Art at The University of Melbourne. Attendees had the opportunity to purchase the prints on the night, as well as enter a draw to win a limited edition print of an artwork by WEHI.TV biomedical animator Mr Drew Berry.
Opening our doors to Melbourne

In July 2013, the Walter and Eliza Hall Institute participated in Open House Melbourne for the first time. Open House Melbourne is a free annual event that encourages people to explore the amazing buildings that make our city. In 2013, the institute was one of 111 buildings open to the public. Staff and scientists led visitors on 50 half-hour tours through the institute’s new and redeveloped Parkville facilities as part of the two-day event, welcoming more than 600 visitors across the weekend. Visitors explored some of the unique architectural features that define the Parkville building, such as the open lift atrium at the centre of the building, while learning about the medical research happening within the laboratories. One of the highlights of the day for visitors was seeing the institute’s new and improved laboratories and visiting the institute’s tearoom on the top floor, which enjoys panoramic views to the north over Parkville. The tearoom reflects the collaborative culture that exists within the institute, encouraging staff to come together and share their experiences and discoveries in an informal environment.

Viruses light White Night

White Night Melbourne is an all-night artistic festival that lights Melbourne’s CBD and adjoining areas from dusk until dawn. In 2014, more than 500,000 people attended the one-night festival in Melbourne CBD and adjacent areas. The dome of the State Library of Victoria’s La Trobe Reading Room hosted a multitude of viruses as part of White Night Melbourne in February 2014. The artwork Virus one billion times was the vision of WEHI.TV animator Mr Drew Berry, who transformed the dome into a vast microscope with a magnifying power of one billion times. At this magnification an infectious virus, usually an unimaginably small 30-nanometres across, was enlarged by the dome ‘lens’ into a giant 30-metre geometric molecular ball hovering overhead. Every two minutes the room switched to a different type of virus, including herpes, influenza, HIV, polio and smallpox. Mr Berry said the complexity of medical research meant it was often difficult for the public to feel connected with scientific discovery. “By watching biological processes in action through animations, people can intuitively grasp what even the most complex biology is about,” he said. “In the long run, this can only help the community to comprehend and appreciate the value of medical research.”

Watch the video ▶
Illuminating disease

Each year, the institute holds a series of public forums, sharing with the public the progress of institute research programs into understanding and treating disease.

This year, the institute held two public lectures for the general community. In November, our lecture attracted more than 300 people who came to hear about the latest research and outcomes for people with breast cancer. Institute clinician-scientist Professor Geoff Lindeman spoke about our breast cancer laboratory’s research, in addition to presentations from the National Breast Cancer Foundation and Breast Cancer Network Australia. Attendees also heard from breast cancer specialist and surgeon Professor Laura Esserman from the University of California San Francisco Carol Franc Buck Breast Care Center, US.

In March 2014, the institute launched the first of its new series of public forums. Called the Illumination series, the new format encourages community conversations about science, and enables the audience to ask more questions about research and engage with the presenters and extended panel of experts.

More than 250 people attended the Illuminating... personalised medicine public forum in March 2014. Researcher Professor Liam O’Connor and clinician-scientist Dr Jayesh Desai spoke about the institute’s new program in personalised medicine, which involves targeting treatment to an individual rather than a ‘one-size-fits-all’ approach to treatment. This was followed by an extended Q&A session, in which the audience could delve in-depth into the issue.

All the institute’s public forums and lectures are available on our YouTube channel: WEHImovies.

Watch the video ►

Visualising the future of biomedicine

VizbiPlus: Visualising the Future of Biomedicine is a collaborative project to improve how life science is communicated to the public, by creating visually beautiful and scientifically accurate biomedical animations.

The animations are designed to inspire and engage the public with cutting-edge Australian biomedical research. The project is a collaboration between the Walter and Eliza Hall Institute, the Garvan Institute of Medical Research and CSIRO, supported by a grant from Inspiring Australia.

WEHI.TV animator Mr Drew Berry and his colleague Ms Etsuko Uno mentored and trained the three new biomedical animators, who debuted and exhibited their work at events in Melbourne and Sydney in mid-2014.

Dr Maja Divjak from the Walter and Eliza Hall Institute created the animation Inflammation and type 2 diabetes, which highlights how diseases associated with inflammation, such as type 2 diabetes, are ‘lifestyle’ diseases that represent one of the biggest health risks in our society.

“My animation looks at the role of the newly-discovered protein called the inflammasome in type 2 diabetes, which is being studied by researchers here at the Walter and Eliza Hall Institute,” Dr Divjak said. “The inflammasome is a really amazing structure employed by the immune system to protect the body from infection. However, it also plays a key role in the development and progression of chronic immune diseases such as type 2 diabetes.”

Watch the video ►

The institute launched a new series of public forums, the Illumination series, in 2014. The forums include an extended Q&A session for audience members, to ask their questions of institute scientists. Researcher Professor Liam O’Connor presented at the first public forum, Illuminating... personalised medicine.
ENGAGING WITH SCHOOLS

Supporting science talent

Encouraging primary and secondary school students to develop their passion for science is a core part of the institute’s community engagement program.

The Walter and Eliza Hall Institute has proudly supported the Science Teachers’ Association of Victoria’s (STAV) Science Talent Search program since 2001. The STAV Science Talent Search sees primary and secondary students from across Victoria conduct experiments, take photographs, make videos, design posters and write essays for consideration by a panel of judges.

In 2013 the institute supported 34 bursaries awarded to students across a range of ages and categories. Among the winners of the institute’s bursaries in 2013 was Isabel Chu from Presbyterian Ladies’ College with her project ‘inhibitory effects of citrus extract on bacteria’.

Adelaide Wood from Methodist Ladies’ College devised an experiment to improve dental hygiene with her project ‘erosive effects of different beverages on teeth’, while Ben Toohey from St Kevin’s College probed the properties of water with his project ‘the effect of temperature and salinity on surface tension’.

Institute director Professor Doug Hilton presented at the Science Talent Search awards ceremony in November 2013, announcing the awards for experimental research and computer programs.

Inspiring regional science students

More than 200 secondary school students from four regional towns visited the institute in May 2014 for a veski inspiring students (and teachers) program.

veski is a Victorian Government seed funded initiative to foster an innovation economy and identify leading researchers and bring them to Victoria for the benefit of the Australian economy.

The veski inspiring students (and teachers) program is designed to lift participation rates and interest in science among regional Victorian students. Secondary students from Neerim District, Mooroopna, Kyneton and Keysborough secondary colleges, representing Gippsland, Hume and Loddon Mallee, attended the symposium, held at the Walter and Eliza Hall Institute.

Students from Years 7 to 10 got an insight into real-world science at the institute, through dynamic presentations, speed-meetings, and behind-the-scene laboratory tours led by veski innovation fellows, veski family members, colleagues and their research teams. Five of the 20 veski innovation fellows announced in the past 10 years are Walter and Eliza Hall Institute scientists, who were all part of the event.

The half-day event provided students with an opportunity to participate in speed-meeting opportunities with 15 veski innovation fellows; three-minute presentations focused on a range of areas from cancer and inflammatory diseases to dengue and malaria. Students also had the opportunity to share their own stories about becoming a scientist via a uniquely modern take on the traditional ‘soap box’.

veski chief executive officer Ms Julia Page said the students gave overwhelmingly positive feedback.

“The students were clearly inspired by the symposium which only reinforces the need to hold more events like this one and far more often,” Ms Page said.
Giving students an insight into medical research

In June 2014, researchers from the Walter and Eliza Hall Institute volunteered their time to show the next generation what it is like to be a medical researcher for a day.

The ‘Insights into Medical Research’ day is a collaborative venture between the Gene Technology Access Centre (GTAC) and the institute for year 9 students, providing the opportunity for 90 students from schools across Victoria to participate in this free event, with a focus on research into malaria.

The day began with an opening address by malaria and toxoplasmosis researcher Dr Chris Tonkin. Students then had the opportunity for a ‘speed dating’ session with 15 medical researchers from the Walter and Eliza Hall Institute, before a hands-on laboratory experiment to simulate what is involved in developing a malaria vaccine.

We became a scientist for a day and learnt heaps in the process.

Kalli, a year 9 student from Alphington Grammar School, said the students had a fantastic day. “We were enlightened by the idea of eradicating malaria – the third largest killer in the world and furthermore got the opportunity to attempt a very complicated yet compelling prac,” she said. “With the help and guidance of our mentor scientist, we were able to extract the DNA and proteins from human and malaria cells. We became a scientist for a day and learnt heaps in the process.”

Silver medal for Science Olympian

The Australian Science Olympiad Competition is a national extension program for top performing secondary science students. The program, coordinated by Australian Science Innovations, culminates each year in the International Science Olympiads – the Olympic Games for science students. The institute has supported the International Biology Olympiad (IBO) for several years, providing funding and mentoring for the Science Olympians who represent Australia in the competition.

“The IBO has ignited a love of research, especially into biology, and I am also very interested in promoting science to the world.”

Andrew said the experience was truly life changing. “There were around 240 students from 60 countries, and it was an incredible experience being surrounded by people with an immense love of biology, and an insatiable curiosity about the world,” he said. “In the future I would like to be a doctor, however the IBO has ignited a love of research, especially into biology, and I am also very interested in promoting science to the world! There is a lot of study involved, but the end result is very rewarding.”

Institute bioinformatician and former maths Olympian Dr Martin O’Hely spoke to biology students at the Australian Science Olympiad Summer School at Monash University in January 2014. “The Olympiads give these talented young people the chance to experience post-secondary science learning as well as providing an element of challenge which they’d rarely get in their school classrooms,” Dr O’Hely said.
ENGAGING WITH SCIENTISTS

It’s a hit: celebrating a decade of drug discovery

In November 2013 the institute celebrated a decade of translating research into potential drugs and treatments for patient benefits.

The Walter and Eliza Hall Institute’s drug discovery program has a focus on strong multidisciplinary teams, and requires a highly collaborative approach to delivering drug-like small molecules and tackling difficult targets. More than 180 people attended the 10-year celebration from the research, commercialisation and pharmaceutical sectors, with some media and general public also joining the event.

The event, supported by the Victorian Government Department of State Development, Business and Innovation (DSDBI), also looked at future programs and challenges in drug discovery in Melbourne. Professor Manfred Auer, Professor of Translational Biology from the University of Edinburgh, delivered the plenary lecture, and special guest Dr Amanda Caples from DSDBI spoke about government investment in biotechnology and drug development. The event also included presentations from medicinal chemists, researchers, biologists and clinician-scientists across the day.

Feedback from attendees was overwhelmingly positive, with participants commenting there were a number of interesting issues and challenges highlighted, and much food for thought for how they approached drug discovery and commercialisation. Overwhelming feedback from attendees supported running the event every two to three years.

Professor Auer said pharmaceutical companies needed early drug development, which provided opportunities for academic researchers to develop drug candidates.

VIIN Young Investigator Symposium

The Victorian Infection and Immunity Network (VIIN) brings together researchers from diverse disciplines across Victoria who have an interest in infection and immunity.

In September 2013, the institute hosted and provided in-kind support for the VIIN Young Investigator Symposium, which attracted more than 200 established researchers, early-career researchers and students from around Victoria.

The Young Investigator Symposium has been held at the Walter and Eliza Hall Institute in 2009, 2010, 2012 and 2013. The symposium connects established and emerging infection and immunity researchers with the goal of seeding new collaborations and strengthening research performance and capabilities.

As part of the one-day event, 30 speakers from across 10 Victorian universities and research organisations gave presentations, including a keynote address by Dr Linfa Wang from the CSIRO Australian Animal Health Laboratory. Institute researchers Ms Victoria Ryg-Cornejo and Dr Lisa Mielke were two of the eight prize winners for poster and oral presentations on the day. Dr Lisa Ioannidis from the institute’s Infection and Immunity division was the Walter and Eliza Hall Institute representative on the symposium organising committee.

Dr Lisa Mielke was a prize winner at the Victorian Infection and Immunity Network Young Investigator Symposium in September 2013. Dr Mielke also participated in the veski students (and teachers) program, giving students from regional Victorian schools the chance to see real-world science at the institute.
SERVICE TO THE SCIENTIFIC COMMUNITY

Service to biotechnology boards, committees and consultancies

Jerry Adams, Leukemia & Lymphoma Society Specialized Center of Research, director
Warren Alexander, Murigen Therapeutics Scientific Advisory Board, chair
Marie-Liesse Asselin-Labat, Victorian Comprehensive Cancer Centre Lung Research Collaborative Working Group, member
Christopher Burns, Catalyst Therapeutics Scientific Advisory Board, member
Christopher Burns, Gilead Sciences, scientific advisor
Peter Colman, Burnet Institute Board, member
Jayesh Desai, Bionomics Scientific Advisory Board, member
Jayesh Desai, Circadian/Vegenics Scientific Advisory Board, member
Ross Dickins, Victorian Centre for Functional Genomics Scientific Advisory Committee, member
Paul Ekert, Ian Potter Centre Scientific and Management Committee, member
Paul Ekert, Melbourne Genomics Health Alliance Clinical Interpretation and Reporting Advisory Group, member
Paul Ekert, Victorian Clinician Researcher Network - Advisory Group Meeting, member
Matthias Ernst, Victorian Prostate Cancer Research Council, board member
Len Harrison, Ascend Biopharmaceuticals, consultant
Len Harrison, CSL, consultant
Joan Heath, CellBank Australia Scientific Advisory Committee, chair
Eugene Kapp, The Association of Biomolecular Resource Facility/Proteome Informatics Research Group, chair
Benjamin Kile, MuriGen Therapeutics Pty Ltd, chief operating officer and chief scientific officer
Guillaume Lessene, Bionomics Ltd, consultant
Andrew Lew, Cellestis Ltd (now Qiagen), consultant
Andrew Lew, CSL Ltd, consultant
Andrew Lew, Fonterra, consultant
Andrew Lew, Genetic Technologies, consultant
Andrew Lew, ImmunsanT, consultant
Andrew Lew, Prosetta Antiviral Inc, consultant
Andrew Lew, Starfish Ventures Pty Ltd, consultant
Andrew Lew, Tecniplast, Australia, consultant
Geoffrey Lindeman, Australian Cancer Research Foundation Medical Research Advisory Committee, member
Nick Nicola, Institute for Molecular Biosciences-Advisory Board, member
Nick Nicola, Institute for Molecular Biosciences-Scientific Advisory Board, chair
Nick Nicola, KConFab Management Committee, member
Nick Nicola, Therapeutic Innovation Australia - National Research Infrastructure for Australia Expert advisory Committee, member
Nick Nicola, Victorian Comprehensive Cancer Centre Research Advisory Committee, member
Nick Nicola, Virtual Pharma (part of Therapeutic Innovation Australia Program of DISR), member
Lorraine O’Reilly, UROP (University Research Opportunity Program), interview panel member
Tony Papenfuss, Peter MacCallum Cancer Centre Clinical Genomics Initiative Steering Committee, member
Marc Pellegrini, TetraLogic Pharmaceuticals (USA), honorary consultant
Andrew Roberts, AbbVie, adviser re ABT-263 and ABT-199 (pro-bono), member
Andrew Roberts, CSL Behring, advisory committees for CSL-360 and CSL-362 (pro-bono), member
Louis Schofield, Australian Institute of Tropical Health and Medicine, director
Louis Schofield, Queensland Tropical Health Alliance, director
Clare Scott, Bio21 Scientific Advisory Board, Tetralogic Inc, Pennsylvania, board member
Clare Scott, BioMedVic Scientific Advisory Council, WEHI representative
Clare Scott, CRC for Biomarker Translation, consultant
Clare Scott, Scientific Advisory Board, Tetralogic Inc, Pennsylvania, board member
John Silke, VCCC Education & Training Committee, member
Andreas Strasser, Genentech, Inc., consultant
Andreas Strasser, Servier, research contract
Ian Street, Cancer Therapeutics CRC Portfolio Management Committee, chair
Ian Street, Children’s Cancer Institute Drug Discovery Advisory Committee, member
David Tarlinton, CSL Ltd, consultant
Jason Tye-Din, ImmunsanT Inc., consultant
David Vaux, Scientific Advisory Board, Tetralogic Inc, Pennsylvania, board member
Jane Visvader, International Society for Stem Cell Research Translational Science Advisory Committee, member
Jane Visvader, National Breast Cancer Foundation Research Advisory Committee, member
Ian Wicks, CSL, consultant
Service on clinical advisory and working groups

Melanie Bahlo, NHMRC Workshop – Translation of omics-based discoveries into clinical research and practice, panel member

Melanie Bahlo, Peter MacCallum Cancer Centre Clinical Genomics Initiative Steering Committee, bioinformatics lead

Melanie Bahlo, Theme Group – Royal Melbourne Hospital research review 2014 ‘Precision Medicine’, panel member

Antony Burgess, BioGrid Australia Management Committee, chair

Jayesh Desai, Australasian Sarcoma Study Group/Cancer Council Australia National Sarcoma Guidelines, co-chair

Paul Ekert, Melbourne Genomics Health Alliance, principal investigator

Paul Ekert, Victorian Comprehensive Cancer Centre Molecular Tumour Board, member

Phil Hodgkin, Bio21 Cluster Scientific Advisory Council, WEHI representative

Phil Hodgkin, RMIT Biomedical Science Program Advisory Committee, member

David Huang, Bio21 Cluster Scientific Advisory Council, member

David Huang, University of Melbourne Faculty of Medicine, Dentistry and Health Sciences China Strategy group, member

Geoffrey Lindeman, AMGEN – Global Scientific Breast Cancer Advisory Board Member, member

Geoffrey Lindeman, Australian Academy of Health and Medical Science -- Member of the Development Committee and nominated Foundation Member, member

Geoffrey Lindeman, Australian Cancer Research Foundation Centre for Therapeutic Target Discovery, clinical director

Geoffrey Lindeman, Australian New Zealand Breast Cancer Trials Group Board, member

Geoffrey Lindeman, Australian New Zealand Breast Cancer Trials Group Scientific Advisory Committee, member

Geoffrey Lindeman, Department of Health Implementation Committee for the Victorian Family Cancer Genetics Service, member

Geoffrey Lindeman, Implementation Committee for The Royal Melbourne Hospital Familial Cancer Centre, chair

Geoffrey Lindeman, Kathleen Cuningham Foundation Consortium for Research into Familial Breast Cancer (kConFab) Executive, member

Geoffrey Lindeman, Mater Research Scientific Advisory Committee, member

Geoffrey Lindeman, Melbourne Health Tissue Bank Implementation Committee, chair

Geoffrey Lindeman, NSW Breast Cancer Tissue Bank Scientific Advisory Panel, member

Geoffrey Lindeman, Sanofi-Aventis International Steering Committee for Sanofi-Aventis PARP inhibitor (BSI-201) Study TCD11418, member

Geoffrey Lindeman, Streamlined Research Governance and Ethics Steering Committee Member, WEHI representative

Geoffrey Lindeman, The Royal Melbourne Hospital Familial Cancer Centre, director

Geoffrey Lindeman, Victorian Cancer Biobank Consortium Committee, member

Geoffrey Lindeman, Victorian Comprehensive Cancer Centre Melbourne Health Clinical Advisory Group, member

Geoffrey Lindeman, Victorian Comprehensive Cancer Centre Melbourne Health Research Advisory Group, member

Geoffrey Lindeman, Victorian Comprehensive Cancer Centre Research Advisory Group - Tissue Bank Subcommittee, chair

Geoffrey Lindeman, Victorian Comprehensive Cancer Centre Working Party - Research, member

Geoffrey Lindeman, Victorian Cooperative Oncology Group, Genetics Advisory Committee (The Cancer Council Victoria), member

Ashley Ng, Victorian Comprehensive Cancer Centre Patient Information Services Steering Committee, scientific representative

Marc Pellegrini, National Centre in HIV Epidemiology and Clinical Research.

Andrew Roberts, Victorian Comprehensive Cancer Centre Cancer Research Advisory Committee, member

Louis Schofield, Malaria Research Eradication, member

Clare Scott, Clinical Trials Australia (CTA) Breast Stream, consultant

Clare Scott, Clinical Trials Australia (CTA) Gynaecologic Tumour Stream, consultant

Clare Scott, Clinical Trials Australia (CTA) Phase I Trials Group, consultant

Clare Scott, Cure Cancer Australia Foundation (CCAF) Board, member

Clare Scott, Cure Cancer Australia Foundation (CCAF) Research Committee, chair

Clare Scott, Royal Women's Hospital, Women's Cancer Foundation Scientific Advisory Committee, member

Clare Scott, Royal Women's Hospital, Women's Cancer Foundation Scientific Advisory Committee, member

David Tarlinton, Bio21 Cluster Scientific Advisory Council, WEHI representative

Jason Tye-Din, Medical Advisory Committee of Coeliac Australia, chair

Jane Visvader, Cancer Council Victoria Committee, member

Jane Visvader, Kathleen Cuningham Foundation Consortium for Research into Familial Breast Cancer (kConFab) Review Committee, member

Jane Visvader, National Breast Cancer Foundation Research Advisory Committee, member

Ian Wicks, Back Pain Steering Committee, member

Ian Wicks, Medical Advisory Committee, Melbourne Health, member

Ian Wicks, Melbourne Health, Scientific Review Panel, member

Ian Wicks, Neurosciences Division Management Group, member

Ian Wicks, Rheumatology Unit Management Group, chair
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, review editor
Warren Alexander, Growth Factors, editorial board member
Warren Alexander, Stem Cell Investigation, editorial board member
Melanie Bahlo, Faculty of 1000, faculty member - genetics
Alyssa Barry, The Open Parasitology Journal, member
Jake Baum, Malaria Journal, editorial board member
Philippe Bouillet, Apoptosis, associate editor
Philippe Bouillet, Cell Death & Differentiation, associate editor
Antony Burgess, Encyclopedia of Hormones, associate editor
Antony Burgess, Growth Factors, editor-in-chief
Antony Burgess, Journal of Experimental Therapeutics and Oncology, editorial board member
Christopher Burns, MedChemComm (Royal Society of Chemistry), editorial board member
Matthew Call, Journal of Visualized Experiments, member
Peter Colman, Current Opinions in Structural Biology, member
Peter Colman, IUCrJ, member
Peter Colman, Structure, member
Suzanne Cory, Cancer Research, editorial board
Suzanne Cory, Proceedings of the National Academy of Sciences of the United States of America, review editor
Alan Cowman, Science, board of review
Jayesh Desai, Journal of Clinical Oncology, editorial board member
Jayesh Desai, Journal of Oncopathology, associate editor
Jayesh Desai, Targeted Oncology, editorial board member
Grant Dewson, Open Cell Signalling Journal, editorial board
Paul Ekert, BMC Cancer, associate editor
Paul Ekert, Cell Death and Disease, editorial board member
Matthias Ernst, Cytokine, associate editor
Matthias Ernst, PLoS Genetics, guest editor
Matthias Ernst, World Journal of Gastroenterology, editorial board
Daniel Gray, Frontiers in Immunology, editorial board
Diana Hansen, Immunity and Diseases, member
Diana Hansen, International Journal for Parasitology, guest editor
Diana Hansen, ISRNParasitology, member
Diana Hansen, Parasitology, guest editor
Len Harrison, Current Diabetes Reports, member
Len Harrison, Diabetes Nutrition and Metabolism, associate editor
Len Harrison, Diabetes Prevention and Therapy, associate editor
Len Harrison, Diabetes Research and Clinical Practice, member
Len Harrison, Human Vaccines and Immunotherapeutics, associate editor
Len Harrison, Molecular Medicine, contributing editor
Len Harrison, Pediatric Diabetes, member
Phil Hodgkin, Frontiers in B Cell Biology, editorial board member
Phil Hodgkin, Immunology and Cell Biology, editorial board member
David Huang, Frontiers in Cell Death, editorial board
Eugene Kapp, Molecular and Cellular Proteomics, editorial board member
Eugene Kapp, Translational Proteomics, editorial board member
Lukasz Kedzierski, Advances in Bioscience and Biotechnology, editorial board
Lukasz Kedzierski, Journal of Tropical Medicine, editorial board
Ruth Klucz, Cell Death & Disease, member
Michael Lawrence, Frontiers in Molecular and Structural Endocrinology, associate editor
Andrew Lew, Clinical & Translational Immunology, member
Andrew Lew, Current Opinions Immunology, section editor
Andrew Lew, Frontiers Immunology, member
Andrew Lew, Immunology & Cell Biology, member
Geoffrey Lindeman, Growth Factors, member
Geoffrey Lindeman, Journal of Mammary Gland Biology and Neoplasia, member
Geoffrey Lindeman, Stem Cell Research, member
Seth Masters, Dataset Papers in Cell Biology, editorial board
Seth Masters, Frontiers in Inflammation, editorial review board
Seth Masters, The Open Inflammation Journal, editorial board
Ivo Mueller, PLoS Medicine, academic editor
Ivo Mueller, PLoS One, editor
James Murphy, Biochemical Journal, editorial advisory panel
James Murphy, International Journal of Interferon, Cytokine and Mediator Research, editorial board
Shalin Naik, Cellular Immunology, editor
Nick Nicola, Growth Factors, editorial board
Nick Nicola, Open Biotechnology, editorial board
Nick Nicola, Stem Cells, editorial board
Nick Nicola, Technology Transfer Tactics, editorial board
Ken Pang, American Journal of Clinical and Experimental Immunology, editorial board
Tony Papenfuss, Biology Direct, editorial board member
Marc Pellegrini, Clinical Translational Immunology, associate editor
Marc Pellegrini, Current Opinions in Immunology, section editor
Andrew Roberts, Leukemia, guest section editor
Louis Schofield, Cellular Microbiology, editor
Clare Scott, Board of BBA - Reviews on Cancer, member
Ken Shortman, Frontiers in Molecular Antigen Presentation, review editor
Ken Shortman, International Immunology, executive editor
John Silke, Cell Death & Differentiation, editorial board
John Silke, Open Cell Signalling Journal, editorial board
John Silke, Science Signalling, editorial board
Gordon Smyth, BMC Bioinformatics, editorial advisory 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
David Tarlinton, Frontiers in Immunology, associate editor
David Tarlinton, Immunology and Cell Biology, editorial board member
David Tarlinton, Immunology Letters, editorial board member
David Tarlinton, International Immunology, transmitting editor
David Tarlinton, Journal of Immunology, associate editor
Tim Thomas, PLoS ONE, editorial board
David Vaux, Apoptosis, editorial board
David Vaux, Cancer Medicine, editorial board
David Vaux, Cell Death & Differentiation, editorial board
David Vaux, Disease Models and Mechanisms, editorial board
David Vaux, EMBO Reports, editorial board
James Vince, Inflammation and Cell Signaling, associate editor
Jane Visvader, Breast Cancer Research, editorial board member
Jane Visvader, Cancer Cell, editorial board member
Jane Visvader, Cell Stem Cell, editorial board member
Jane Visvader, Molecular Oncology, editorial board member

Service to learned scientific societies

Jerry Adams, American Association for Cancer Research Academy, Fellow
Jerry Adams, Australian Academy of Science, Fellow
Jerry Adams, European Molecular Biology Organisation, associate member
Jerry Adams, The Royal Society of Victoria, member
Jerry Adams, The Royal Society, London, Fellow
Jerry Adams, US National Academy of Sciences, Member
Antony Burgess, Australian Academy of Science, member
Suzanne Cory, American Academy of Arts & Sciences, foreign honorary member
Suzanne Cory, Australian Academy of Science, president
Suzanne Cory, European Molecular Biology Organisation, associate member
Suzanne Cory, French Academy of Sciences, associate foreign member
Suzanne Cory, Pontifical Academy of Sciences, academician
Suzanne Cory, The Japan Academy, member
Suzanne Cory, The Royal Institution of Australia, Bragg member
Suzanne Cory, The Royal Society of Victoria, member
Suzanne Cory, The Royal Society, London, member
Suzanne Cory, US National Academy of Sciences, foreign member
Alan Cowman, Australian Academy of Science, sectional committee member
Grant Dewson, Faculty of 1000, fellow
Paul Ekert, American Society of Hematology, member
Ivo Mueller, American Society of Tropical Medicine and Hygiene, member
Clare Scott, American Association for Cancer Research, member
John Silke, Faculty of 1000, associate member
Andreas Strasser, Australian Academy of Science, member
Andreas Strasser, European Molecular Biology Organisation, associate member
David Vaux, Australian Academy of Science, Fellow
David Vaux, Faculty of 1000, section head

Service on international committees, councils, boards and foundations

Warren Alexander, American Society of Hematology Scientific Committee on Hematopoiesis, member
Marie-Liesse Asselin-Labat, European Association for Cancer Research, member
Marie-Liesse Asselin-Labat, International Association for the Study of Lung Cancer, member
Marie-Liesse Asselin-Labat, Thoracic Society of Australia and New Zealand, member
Alyssa Barry, Asia-Pacific Malaria Elimination Network, member
Suzanne Cory, Cold Spring Harbor Conferences Asia Scientific Advisory Board, member
Suzanne Cory, Gairdner Foundation Medical Advisory Board, member
Suzanne Cory, Institute of Medical Biology (A*STAR BMRC) Scientific Advisory Board, member
Suzanne Cory, KwaZulu-Natal Research Institute for Tuberculosis & HIV Scientific Advisory Board, member
Suzanne Cory, Pasteur Institute Scientific Advisory Board, member
Suzanne Cory, University of Auckland Maurice Wilkins Centre for Molecular Biodiscovery Scientific Advisory Board, member
Suzanne Cory, Vallee Visiting Professor Selection Committee, member
Alan Cowman, Howard Hughes Medical Institute Early-Career Scientist Selection Committee, member
Alan Cowman, World Federation of Parasitologists, president
Jayesh Desai, American Society of Clinical Oncology (ASCO) Education Committee, chair
Jayesh Desai, World Sarcoma Network Board, member
Grant Dewson, American Society for Biochemistry and Molecular Biology, WEHI representative
Paul Ekert, Society for Pediatric Research, member
Matthias Ernst, Swiss Australian Academic Network, president
Daniel Gray, Faculty of 1000, contributing member
Len Harrison, Diabetes Vaccine Development Centre Scientific Advisory Committee, member
Joan Heath, Zebrafish Disease Models Society Board, member
Susanne Heinzel, International Union of Immunological Societies, member of the General Assembly
Ruth Kluck, Faculty of 1000, contributing member
Nick Nicola, A-IMBN Research Advisory Committee, member
Andrew Roberts, American Society of Hematology International Members Committee, chair
Andrew Roberts, American Society of Hematology Program Committee, member
Andrew Roberts, American Society of Hematology Executive Committee, member
Louis Schofield, The Malaria Eradication Research Agenda, member
Anuratha Sakhthinandeswaram, European Association for Cancer Research, ambassador
Clare Scott, American Society of Clinical Oncology, member
Clare Scott, Australian and New Zealand Breast Cancer Trials Group, member
Clare Scott, Australian and New Zealand Gynaecology Oncology Group, member
Clare Scott, European Network for Translational Research in Ovarian Cancer, member
Clare Scott, Gynaecologic Cancer Inter-Group, Translational Committee, co-chair
Clare Scott, International Breast Cancer Study Group, member
Ken Shortman, International Society for DC and Vaccine Science Scientific Advisory Committee, member
Ken Shortman, International Union of Immunological Societies Nomenclature Committee on Dendritic Cells And Monocytes Committee, member
Andreas Strasser, Dr Josef Steiner Cancer Research Foundation Prize Committee, adviser
Andreas Strasser, Faculty of 1000 Biology Advisory Board, member
Andreas Strasser, Faculty of 1000 Medical Research Advisory Board, member
Andreas Strasser, Marcel Benoist Prize Committee, adviser
Andreas Strasser, The European Research Institute for Integrated Cellular Pathology International Advisory, member
Jason Tye-Din, Scientific Advisory Board, ImmusanT Inc., scientific adviser
David Vaux, Committee on Freedom and Responsibility in the Conduct of Science (CFRS) of the International Council for Science (ICSU), member
Jane Visvader, HUGO (Human Genome Organisation) Awards Selection Committee, member
Jane Visvader, Stinehart-Reed Awards Selection Committee, Stanford University, member

Service to international grant review panels
Marie-Liesse Asselin-Labat, Medical Research Council UK
Melanie Bahl, Marsden Fund New Zealand
Melanie Bahl, UK Muscular Dystrophy Campaign
Marnie Blewitt, Financial Mechanism Office Belgium
Antony Burgess, Dowd Foundation Research Fellowship for Neuroscience
Antony Burgess, Health Research Council of New Zealand
Antony Burgess, Israel Science Foundation
Antony Burgess, Netherlands Organisation for Scientific Research
Antony Burgess, Swiss National Science Foundation
Antony Burgess, Vanderbilt University Specialized Programs of Research Excellence in GI Cancer
Christopher Burns, Health Research Council New Zealand
Matthias Ernst, Swiss National Science Foundation
Joan Heath, Dutch Cancer Society
Joan Heath, King’s Health Partners R&D Challenge Fund (UK)
Phil Hodgkin, German-Israeli Foundation for Scientific Research
David Huang, Dutch Cancer Society
David Huang, Health Research Council, New Zealand
Emma Josefsson, The Netherlands Organization for Scientific Research Project Grants
Lukasz Kedzierski, National Science Center, Poland
Lukasz Kedzierski, Portuguese Foundation for Science and Technology
Lukasz Kedzierski, Research Council of Norway
Andrew Lew, Arthritis Research Campaign, UK
Andrew Lew, Health Research Council, New Zealand
Andrew Lew, Wellcome Trust

Andreas Strasser, Dr Josef Steiner Cancer Research Foundation Prize Committee, adviser
Andreas Strasser, Faculty of 1000 Biology Advisory Board, member
Andreas Strasser, Faculty of 1000 Medical Research Advisory Board, member
Andreas Strasser, Marcel Benoist Prize Committee, adviser
Andreas Strasser, The European Research Institute for Integrated Cellular Pathology International Advisory, member
Jason Tye-Din, Scientific Advisory Board, ImmusanT Inc., scientific adviser
David Vaux, Committee on Freedom and Responsibility in the Conduct of Science (CFRS) of the International Council for Science (ICSU), member
Jane Visvader, HUGO (Human Genome Organisation) Awards Selection Committee, member
Jane Visvader, Stinehart-Reed Awards Selection Committee, Stanford University, member

Seth Masters, Hong Kong Research Grant
Seth Masters, Israel Science Foundation
Seth Masters, Telethon Italy
Shalin Naik, French National Research Agency
Shalin Naik, Research Foundation Flanders
Nick Nicola, Leukaemia & Lymphoma Research (UK)
Nick Nicola, Medical Research Council (UK)
Marc Pellegrini, Health Research Council, New Zealand
Matthew Ritchie, Fondation pour la Recherche Médicale (FRM).
Clare Scott, Health Research Council, New Zealand
Oliver Sieber, Cancer Research Council, New Zealand
Oliver Sieber, Israel Science Foundation
Oliver Sieber, Italian Association for Cancer Research (AIRC)
John Silke, Ecole Polytechnique Federale de Lausanne (EPFL)
Terry Speed, National Institutes of Health
Andreas Strasser, European Union Large-Scale Program

Andreas Strasser, Japanese Society for Promotion of Science
Ian Street, Wellcome Trust
Robyn Sutherland, Diabetes UK
Samir Taoudi, French National Research Agency
Ian Wicks, Health Research Board, Ireland
Ian Wicks, Arthritis & Rheumatism Research Council (UK)
Ian Wicks, Medical Research Council, UK
Ian Wicks, Wellcome Trust, UK

Service on international conference organising committees

Alyssa Barry, Molecular Approaches to Malaria 2016, co-chair
Michael Buchert, Wnt Signalling International Meeting, organising committee member
Antony Burgess, IIA Conference: Epidermal Growth Factor Receptor - Future Directions, Organising Committee, chair
Christopher Burns, Pacificchem 2015, symposium organiser
Suzanne Cory, Cold Spring Harbor Conferences Asia Scientific Advisory Board, member
Jayesh Desai, Asia-Pacific Musculoskeletal Tumour Society Annual Scientific Meeting, co-convenor
Matthias Ernst, Wnt Signalling International Meeting, organising committee member
Diana Hansen, Molecular Approaches to Malaria 2016, chair
Len Harrison, 13th International Immunology of Diabetes Society, organising committee member
Joan Heath, 16th International Zebrafish Development and Genetics Conference, organising committee member
Joan Heath, Strategic Conference of Zebrafish Investigators, organising committee member
Joan Heath, Zebrafish Disease Models 8, organising committee member
Phil Hodgkin, 16th International Congress of Immunology 2016, Scientific Program Committee member
David Huang, Lorne Cancer Conference, co-convenor
David Huang, New Directions in Leukemia Research, executive committee member
Emma Josefsson, 55th American Society of Hematology Annual Meeting, abstract reviewer and session moderator
Emma Josefsson, XXIV Congress of the International Society on Thrombosis and Haemostasis, session moderator
Benjamin Kile, American Society of Hematology Annual Meeting, Scientific Committee on Platelets member
Andrew Lew, 13th Annual Scientific Meeting of the Immunology of Diabetes Society, member
Andrew Lew, 16th International Congress of Immunology 2016, Scientific Program Committee vice-president and chair
Sandra Nicholson, International Cytokine and Interferon Society, scientific organising committee
Toby Phesse, EMBO Workshop on Wnt signalling in development and disease, organising committee
Toby Phesse, Wnt Signalling International Meeting, organising committee
Andrew Roberts, American Society of Hematology, program committee chair
Clare Scott, International Gynecologic Cancer Society (IGCS) 2014, organising committee member
Ken Shortman, 13th International Symposium on Dendritic Cells, Paris, France, International Advisory Committee member
John Silke, 15th TNF Meeting, advisory committee
Gordon Smyth, Bioinformatics / BIOSTEC 2014, program committee member
Gordon Smyth, Bioinformatics / BIOSTEC 2015, program committee member
Andreas Strasser, 15th International Congress of Immunology (Roma 2013), organising committee
Andreas Strasser, 2015 TNF Conference, Ghent, Belgium, scientific committee member
Andreas Strasser, AACR 105th Annual Meeting, Scientific Program Committee member
Andreas Strasser, International Congress of Cell Biology (ICCB), Prague, Czech Republic, international advisory board
David Tarlinton, 16th International Congress of Immunology 2016, Scientific Program Committee member
Wai-Hong Tham, Molecular Approaches to Malaria 2016, co-chair
Jane Visvader, American Association for Cancer Research Breast Cancer Meeting 2013, co-chair
Jane Visvader, Breast Cancer Nobel Symposium, member
Service to national committees, councils, boards and foundations

Marie-Liesse Asselin-Labat, Australasian Society for Stem Cell Research, Member

Jerry Adams, Australian Cancer Research Foundation Medical Research Advisory Committee, member

Jerry Adams, Australian Society of Biochemistry and Molecular Biology National Advisory Council and Award Committee, member

Jerry Adams, National Health and Medical Research Council Academy, member

Warren Alexander, Children’s Cancer Institute Australia Scientific Advisory Board, member

Warren Alexander, National Health and Medical Research Council Research Committee, member

Warren Alexander, National Health and Medical Research Council Research Fellowship Interview Panel, chair

Warren Alexander, National Health and Medical Research Council Research Translation Faculty Cancer Control Steering Group, member

Philippe Bouillet, Research Translation Faculty, member

Antony Burgess, The University of Melbourne Cancer Program Advisory Committee, member

Antony Burgess, Victorian Comprehensive Cancer Centre Board, alternate member

Antony Burgess, Victorian Comprehensive Cancer Centre Cancer Research Advisory Committee, member

Chris Burns, Monash University Bachelor of Pharmaceutical Sciences Action Group, member

Melissa Call, Immunology Group of Victoria Committee, member

Suzanne Cory, Australian Synchrotron National Science Colloquium Committee, member

Suzanne Cory, Gene Technology Access Centre Board of Management, chair

Suzanne Cory, L’Oreal 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 Academy and assigner, assigner

Alan Cowman, QIMR Berghofer Medical Research Institute Appointment and Promotions Committee, member

Peter Czabotar, Australian Synchrotron Macromolecular Beamline Program Advisory Committee, member

Peter Czabotar, Australian Synchrotron User Advisory Committee, chair

Peter Czabotar, Society of Crystallographers in Australia and New Zealand, newsletter editor

Jayesh Desai, Australasian Sarcoma Study Group (ASSG), chair

Jayesh Desai, Cancer Australia Genomic Cancer Clinical Trials Initiative Steering Committee, member

Ross Dickins, Australian Phenomics Group Management Group, member

Paul Ekert, Leukaemia Foundation Australia Medical and Scientific Advisory Committee, member

Matthias Ernst, Victorian Prostate Cancer Reserach Council Scientific Advisory Committee, member

Nima Etemadi, Australian & New Zealand Association for the Advancement of Science Victorian Committee, member

Clara Gaff, Human Genetics Society of Australasia, Ethics and Social Issues Committee, member

Clara Gaff, National Health and Medical Research Council Human Genetics Advisory Committee, member

Gabrielle Goldberg, National Health and Medical Research Council Research Translation Faculty, member

Daniel Gray, Australian Society of Immunology, Victorian and Tasmanian state councillor

Daniel Gray, Immunology Group of Victoria, councillor

Diana Hansen, Victorian Infection and Immunity Network Executive, member

Len Harrison, National Health and Medical Research Council Academy, member

Joan Heath, CellBank Australia, Scientific Advisory Committee, chair

Susanne Heinzel, Australasian Society for Immunology, meeting coordinator

Phil Hodgkin, National Health and Medical Research Council Assigners Academy, assigner

Seong Lin Khaw, Royal Children’s Hospital Children’s Cancer Centre Tissue Bank Committee, member

Benjamin Kile, Australian Academy of Science National Committee on Cellular and Developmental Biology, member

Benjamin Kile, Board of the Australian Genome Research Facility, member

Benjamin Kile, Management Executive of the Australian Phenomics Network, chair

Ruth Kluck, Gene Technology Access Centre Board of Management, member

Geoffrey Lindeman, Australian Cancer Research Foundation Medical Research Advisory Committee, member

Geoffrey Lindeman, Australian Cancer Research Foundation Medical Research Advisory Committee, member

Geoffrey Lindeman, Australian New Zealand Breast Cancer Trials Group Board, member
Geoffrey Lindeman, Australian New Zealand Breast Cancer Trials Group Scientific Advisory Committee, member

Geoffrey Lindeman, National Health and Medical Research Council Research Translation Faculty, member

George Nikolakopoulos, Victorian Branch of The Royal Australian Chemical Institute Committee, member

Liam O’Connor, Melbourne University Centre for Neural Engineering Scientific Board, member

Liam O’Connor, Victorian Life Sciences Computation Initiative (VLSCI) Steering Committee, member

Liam O’Connor, VSLCI Life Sciences Computation Centre (LSCC) Executive Advisory Committees, member

Ken Pang, National Health and Medical Research Council Research Translation Faculty, member

Ken Pang, Australian Academy of Science Theo Murphy High Flyers Think Tank, member

Tracy Putoczki, National Health and Medical Research Council Translational Medicine Forum, member

Matthew Ritchie, Australian Mathematical Sciences Institute Research & Higher Education Committee, member

Andrew Roberts, Australasian Leukaemia and Lymphoma Group Board, member

Andrew Roberts, Cancer Council Victoria Executive Committee, member

Andrew Roberts, Cancer Council Victoria Executive Committee, deputy chair

Andrew Roberts, Cancer Council Victoria Executive Committee, chair

Andrew Roberts, Cancer Council Victoria Medical and Scientific Committee, chair

Andrew Roberts, National Health and Medical Research Council Academy, member

Kelly Rogers, Fluorescence Imaging Group, member

Kelly Rogers, Victorian Comprehensive Cancer Centre – Microscopy and Histology Subcommittee, member

Louis Schofield, Australian Institute of Tropical Health and Medicine Board, director

Louis Schofield, National Health and Medical Research Council Research Translation Faculty, member

Louis Schofield, Queensland Tropical Health Alliance Board, director

Clare Scott, Australian Society of Medical Research, member

Clare Scott, Clinical Oncology Society of Australia, member

Clare Scott, Cure Cancer Australia Foundation (CCAF) Board, member

Clare Scott, Cure Cancer Australia Foundation (CCAF) Research Committee, chair

Clare Scott, Gynecologic Cancer Inter Group, member

Clare Scott, Medical Oncology Group of Australia, member

Clare Scott, National Breast Cancer Foundation Research Advisory Committee, member

Clare Scott, Royal Australasian College of Physicians, member

John Silke, National Health and Medical Research Council Assigners Academy, member

Gordon Smyth, Australasian Genomic Technologies Association Executive Committee, member

Gordon Smyth, National Health and Medical Research Council Assigners Academy, lead assigner

Terry Speed, Australian Mathematical Science Institute Scientific Advisory Board, member

Kate Sutherland, Lung Foundation Australia, member

Kate Sutherland, The Australian Society for Medical Research, member

David Tarlinton, Australasian Society for Immunology, public officer and past president

David Tarlinton, Australian Research Council, Ozreader

Chris Tonkin, Victorian Infection and Immunity Network Executive, member

David Vaux, Australian & New Zealand Association for the Advancement of Science Federal Council and Victorian Committee, member

David Vaux, Australian Academy of Science National Committee for Science (ICSU), member

David Vaux, Victorian Premier’s Medical Research Award Selection Panel, 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, The Cancer Council Victoria Medical and Scientific Committee, member

Ian Wicks, External Scientific Review Board, Diamantina Institute, member

Ian Wicks, Medicine, Dentistry and Health Sciences Research Performance Review, member

Ian Wicks, National Health and Medical Research Council Academy, member

Ian Wicks, National Health and Medical Research Council Research Translation Faculty, member

Ian Wicks, Scientific Assessment Panel, Rebecca Cooper Foundation, member

Ian Wicks, University of Melbourne, Department of Medicine, Executive, member

Jie Zhou, Immunology Group of Victoria Committee, student representative
Service to national grant review panels

Warren Alexander, Cancer Council Victoria Venture Grants Committee
Warren Alexander, National Health and Medical Research Council
Marie-Liesse Asselin-Labat, Australian Research Council
Marie-Liesse Asselin-Labat, Cancer Australia
Marie-Liesse Asselin-Labat, National Health and Medical Research Council
Jeff Babon, Australian Research Council
Jeff Babon, National Health and Medical Research Council
Melanie Bahlo, Australian Research Council
Melanie Bahlo, National Health and Medical Research Council
Alyssa Barry, National Health and Medical Research Council
Jake Baum, Australian Research Council
Jake Baum, National Health and Medical Research Council
Marnie Blewitt, Australian Research Council
Marnie Blewitt, National Health and Medical Research Council
Marie-Liesse Asselin-Labat, Cancer Australia
Marie-Liesse Asselin-Labat, National Health and Medical Research Council
Jeff Babon, Australian Research Council
Jeff Babon, National Health and Medical Research Council
Melanie Bahlo, Australian Research Council
Melanie Bahlo, National Health and Medical Research Council
Alyssa Barry, National Health and Medical Research Council
Jake Baum, Australian Research Council
Jake Baum, National Health and Medical Research Council
Marnie Blewitt, Australian Research Council
Marnie Blewitt, National Health and Medical Research Council
Philippe Bouillet, National Health and Medical Research Council
Gabriela Brumatti, National Health and Medical Research Council
Michael Buchert, National Health and Medical Research Council
Antony Burgess, Australian Academy of Science France-Australia Science Innovation Collaboration
Antony Burgess, Australian Academy of Science Japan Bilateral Exchange Program
Antony Burgess, Melbourne Health Research
Antony Burgess, National Health and Medical Research Council
Christopher Burns, National Health and Medical Research Council
Melissa Call, Australian Research Council
Matthew Call, Australian Research Council
Melissa Call, National Health and Medical Research Council
Matthew Call, National Health and Medical Research Council
Anderly Chen, Australian Research Council
Anderly Chueh, National Health and Medical Research Council
Leigh Couts, Australian Research Council
Leigh Couts, National Health and Medical Research Council
Alan Cowman, National Health and Medical Research Council
Peter Czabotar, National Health and Medical Research Council
Jayesh Desai, National Health and Medical Research Council
Grant Dewson, National Health and Medical Research Council
Ross Dickins, National Health and Medical Research Council
Matthias Ernst, Cancer Australia
Matthias Ernst, National Health and Medical Research Council
Maree Faux, National Health and Medical Research Council
Peter Gibbs, National Health and Medical Research Council
Ethan Goddard-Borger, National Health and Medical Research Council
Jacqui Gubis, National Health and Medical Research Council
Diana Hansen, National Health and Medical Research Council
Len Harrison, National Health and Medical Research Council
Len Harrison, Diabetes Australia Research Trust
Len Harrison, JDRF
Len Harrison, National Health and Medical Research Council
Joan Heath, National Health and Medical Research Council
Phil Hodgkin, Australian Research Council
Phil Hodgkin, National Health and Medical Research Council
David Huang, National Health and Medical Research Council
Kim Jacobson, National Health and Medical Research Council
Emma Joseffson, National Health and Medical Research Council
Lukasz Kedzierski, Australian Research Council
Nadia Kershaw, National Health and Medical Research Council
Seong Lin Khaw, National Health and Medical Research Council
Benjamin Kile, National Health and Medical Research Council
Kate Lawlor, National Health and Medical Research Council
Michael Lawrence, National Health and Medical Research Council
Guillaume Lessene, National Health and Medical Research Council
Andrew Lew, National Health and Medical Research Council
Geoff Lindeman, National Health and Medical Research Council
Geoffrey Lindeman, NSW Cancer Institute
Ian Majewski, National Health and Medical Research Council
Ian Majewski, Wellbeing of Women Research Grants
Seth Masters, National Health and Medical Research Council
Matt McCormack, National Health and Medical Research Council
James Murphy, Australian Research Council
James Murphy, Australian Synchrotron
James Murphy, National Health and Medical Research Council
Ueli Nachbur, Australian Research Council
Shalin Naik, National Health and Medical Research Council
Ashley Ng, National Health and Medical Research Council
Nick Nicola, Australian Research Council
Nick Nicola, National Health and Medical Research Council
Robert O’Donoghue, National Health and Medical Research Council
Ken Pang, National Health and Medical Research Council
Onisha Patel, National Health and Medical Research Council
Marc Pellegrini, Australian Research Council
Marc Pellegrini, National Health and Medical Research Council
Toby Phesse, National Health and Medical Research Council
Tracy Putoczki, National Health and Medical Research Council
Tracy Putoczki, National Health and Medical Research Council
Matthew Ritchie, National Health and Medical Research Council
Louis Schofield, National Health and Medical Research Council
Clare Scott, Cancer Australia
Clare Scott, National Health and Medical Research Council
Oliver Sieber, National Health and Medical Research Council
Oliver Sieber, South Australian Health and Medical Research Institute
John Silke, National Health and Medical Research Council
Gordon Smyth, National Health and Medical Research Council
Terry Speed, Australian Research Council
Terry Speed, National Health and Medical Research Council
Andreas Strasser, National Health and Medical Research Council
Ian Street, National Health and Medical Research Council
Samir Taoudi, Australian Research Council
Samir Taoudi, National Health and Medical Research Council
Tim Thomas, National Health and Medical Research Council
Chris Tonkin, Australian Research Council
Chris Tonkin, National Health and Medical Research Council
Jason Tye-Din, National Health and Medical Research Council
David Vaux, ANZ Trustees Medical Research Grants
Anne Voss, National Health and Medical Research Council
Ian Wicks, National Health and Medical Research Council

Service to national conference organising committees

Melanie Bahlo, 10th Genemappers’ Meeting, committee member
Melanie Bahlo, ASC/IMS International Conference, session organiser
Melanie Bahlo, Lorne Genome Conference, organising committee member
Alyssa Barry, Malaria in Melbourne, co-chair
Marnie Blewitt, ComBio 2013, session chair
Chris Burns, Royal Australian Chemical Institute Biomolecular Division Conference, committee member
Peter Czabotar, Lorne Conference on Protein Structure and Function, trade liaison
Jayesh Desai, Australian Sarcoma Group Annual Scientific Meeting, co-chair
Jayesh Desai, Lorne Cancer Conference, organising committee member
Ross Dickins, New Directions in Leukaemia Research (NDLR) 2014, scientific committee member
Ross Dickins, New Directions in Leukaemia Research (NDLR) 2016, co-convenor
Matthias Ernst, Lorne Cancer Conference, organising committee member
David Huang, Lorne Cancer Conference, co-convenor
David Huang, Lorne Cancer Conference organizing committee, member
David Huang, New Directions in Leukemia Research Scientific Advisory Committee, Member
Geoff Lindeman, Australian Breast Cancer Conference 2013, organising committee chair
Toby Phesse, EMBO Workshop on Wnt Signalling, organising committee member
Louis Schofield, Queensland Tropical Health Alliance Conference, convener
Clare Scott, Australia New Zealand Gynaecological Oncology Group (ANZGOG) Annual Scientific Meeting 2013, organising committee member
Clare Scott, Biennial International Gynaecologic Cancer Society (IGCS) 2014, organising committee member
Clare Scott, Victorian Comprehensive Cancer Centre Ovarian Cancer Symposium, organising committee member
Gordon Smyth, AMATA 2014, organising committee member
Ian Street, Lowy Cancer Symposium, organising committee member
Jane Visvader, 29th International Association for Breast Cancer Research Conference (2014), organising committee member
Jane Visvader, Australian Breast Cancer Conference 2013, organising committee member
Anne Voss, Hunter Cell Biology Meeting, organising committee member
Anne Voss, Lorne Genome Conference, organising committee member
Anne Voss, Lorne Genome Conference 2014, co-convenor
Anne Voss, Lorne Genome Conference 2015, convenor and organising committee chair
Ian Wicks, Australasian Autoimmunity Workshop 2014, organising committee member
Ian Wicks, Medical Research Week, The Royal Melbourne Hospital, abstract assessor
WALTER AND ELIZA HALL INSTITUTE BOARD
The directors of the Walter and Eliza Hall Institute of Medical Research board

Mr Christopher W Thomas
BCom (Hons) MBA Melb FAICD
President
Appointed: February 2001
Mr Thomas joined executive search firm Egon Zehnder International in 1979 and retired in 2014. He was managing partner of the Melbourne office from 1986 to 2003, leader of the firm’s global Board Consulting Practice Group from 1998 to 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.

Mr Steven M Skala
AO BA LLB (Hons) Qld BCL Oxon
Vice-President
Appointed: June 1999
Mr Skala is vice chairman, Australia and New Zealand, of Deutsche Bank and a former senior partner of Arnold Bloch Leibler. He is a director of the Australian Broadcasting Corporation, Hexima Limited and Wilson HTM Investment Group Ltd.
Beyond law and commerce, Mr Skala is a director of the Centre for Independent Studies and The General Sir John Monash Foundation and is a member of the international council of New York’s Museum of Modern Art. He is a trustee of the Sir Zelman Cowen Foundation for Medical Research and Public Health, and a member of the advisory council of the Australian Innovation Research Centre, the Global Foundation and the grievance tribunal of Cricket Australia. Mr Skala is the immediate past chairman of Film Australia Limited and the Australian Centre for Contemporary Art.

Mr Robert Wylie
FCA FAICD
Honorary Treasurer
Appointed: April 2014
Mr Wylie is a fellow of the Australian Institute of Company Directors, a fellow and past president of the Institute of Chartered Accountants in Australia and a member of the Institute of Chartered Accountants in Scotland. He is a non-executive director of Maxitrans Industries Limited.
Mr Wylie joined Deloitte in 1973 in the UK, transferring to Australia in 1976. He was national chairman of Deloitte Australia from 1993 to 2001. He was deputy managing partner Asia Pacific from 2001 before joining Deloitte & Touche USA as a senior executive partner from 2002 to 2006. He was also a member of the Deloitte Global Board and Global Governance Committee as well as the Deloitte Consulting Global Board.
**Associate Professor Rufus Black**

*BA LLB (Hons) Melb, MPhil DPhil Oxon*

**Appointed:** August 2013

Associate Professor Black is the Master of Ormond College at The University of Melbourne. A strategic advisor, ethicist and theologian, he works on public policy, ethical and education issues. Associate Professor Black is a principal fellow in the Department of Philosophy at The University of Melbourne, and teaches for the Centre for Ethical Leadership. He is also a director of the law firm Corrs Chambers Westgarth.

Before becoming Master of Ormond, Associate Professor Black worked at McKinsey & Company for nine years where he was a partner. He holds degrees in law and politics from The University of Melbourne and graduate degrees in moral theology from the University of Oxford, where he studied as a Rhodes Scholar.

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**Mr Malcolm Broomhead**

*BE (Civil) MBA UQ FIE FAusIMM FAIM MICE FAICD*

**Appointed:** July 2014

Mr Broomhead is a professional non-executive director. His directorships include BHP Billiton Limited and Plc and Asciano Limited (where he is also chairman).

Mr Broomhead was formerly managing director and chief executive officer (CEO) of Orica Limited from 2001 until September 2005. Prior to Orica, he was managing director and CEO of the global diversified resources company North Limited. He has had extensive experience in the resources industry, as well as in finance, investment and construction activities. He has worked in management positions with Halcrow (UK), MIM Holdings, Peko Wallsend and Industrial Equity.

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**Mr Mike C Fitzpatrick**

*BA (Hons) Oxon BEng (Hons) UWA*

**Appointed:** February 2001

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.
Mrs Jane Hemstritch  
FICA EW FICAA FAICD BSc (Hons) UoL 

Appointed: October 2013

Mrs Hemstritch was managing director Asia Pacific for Accenture Limited from 2004 until her retirement in February 2007. In this role, Mrs Hemstritch was a member ofAccenture’s global executive leadership team and oversaw the management of Accenture’s business portfolio in Asia Pacific. She holds a Bachelor of Science with honours in biochemistry and physiology and has professional expertise in technology, communications, change management and accounting.

Mrs Hemstritch is a member of the Council of The National Library of Australia, the Council of Governing Members of The Smith Family and Chief Executive Women. She is an independent non-executive director of The Commonwealth Bank of Australia, Lend Lease Corporation Limited, Santos Ltd, Tabcorp Holdings Ltd, and Victorian Opera Company Ltd (chairman from February 2013).

Dr Gareth Goodier MB ChB MHA DHSc FRACMA FAFPHM

Appointed: August 2012

Dr Goodier commenced in the role as chief executive for Melbourne Health in June 2012. He qualified as a medical practitioner in 1974, and has practiced as a clinician in the UK, Australia and Saudi Arabia before moving into management.

Over the past 23 years, Dr Goodier has worked as the chief executive for a number of academic teaching hospitals and health authorities. In addition, he has worked as a management consultant for the World Bank and Arthur Andersen.

Dr Goodier returned to the UK as the chief executive officer (CEO) of the Royal Brompton and Harefield NHS Trust in 2003 and was later appointed as the CEO of North West London Strategic Health Authority. In September 2006, he was appointed as the CEO of Cambridge University Hospitals NHS Foundation Trust.

Professor Jim McCluskey BMedSc MB BS MD UWA FRACP FRCPA FAA

Appointed: April 2011

Professor Jim McCluskey became the deputy vice-chancellor (research) at The University of Melbourne in March 2011. 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 basic and clinical immunology. 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 Neurosciences Institute, Bionics Institute and a member of the Nossal Institute for Global Health.
Dr Graham F Mitchell  AO RDA BVSc Syd FACVSc PhD Melb FTSE FAA

**Appointed:** July 2007

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.

Dr Mitchell is an adviser on innovation to the Victorian Government and jointly acts as chief scientist for the Victorian departments of Primary Industries and Sustainability and Environment. He is a non-executive director of Antisense Therapeutics Limited and Avipep Pty Ltd.

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Mr Terry Moran  AC AO BA (Hons) La Trobe

**Appointed:** November 2013

Mr Terry Moran AC is the former secretary of the Department of Prime Minister and Cabinet and former secretary of the Victorian Department of Premier and Cabinet.

Mr Moran’s involvement in the public service has resulted in the establishment of institutions that have made important contributions to Australia’s cultural and educational landscape, such as the Wheeler Centre, the Grattan Institute, Opera Victoria, the Melbourne Recital Centre, the Australian and New Zealand School of Government and the National Institute of Public Policy.

He is the board chair for both the Barangaroo Delivery Authority and Melbourne Theatre Company, and holds the position of senior adviser at the Boston Consulting Group and Maddocks Lawyers.

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Mrs Linda B Nicholls  AO BA(Econ) Cornell MBA Harvard Hon AIBA

**Appointed:** February 2001

Mrs Nicholls is a corporate adviser and a director of a number of leading Australian companies and organisations. She is chairman of Japara Healthcare, chairman of KDR (Yarra Trams) and a director of Sigma Pharmaceutical Group, Fairfax Media, Pacific Brands and Medibank Private. Previously she was chairman of Australia Post, chairman of Healthscope, a director of St George Bank and president of the Australian Institute of Company Directors (Victorian Division).

Mrs Nicholls is also 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 Catherine M Walter  AM LLB (Hons) LLM MBA Melb FAICD
Appointed: February 2001

Ms Walter is a non-executive director of Australian Foundation Investment Company, the Reserve Bank’s Payment Systems Board, Victorian Funds Management, Victorian Opera and Melbourne Business School; 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 Stephen K Smith DSc FRCOG FMedSci
Appointed: October 2013

Professor Smith is the Dean, Faculty of Medicine, Dentistry and Health Sciences at The University of Melbourne.

A gynaecologist by training, he has published more than 230 papers on reproductive medicine and cancer. He was awarded his Doctor of Science in 2001 for his work in Cambridge on the complex gene pathways that regulate the growth of blood vessels in reproductive tissue.

Professor Smith led the formation of the UK’s first Academic Health Science Centre and its integration with Imperial College London (ICL). He was principal of the Faculty of Medicine at ICL and had been chief executive of Imperial College Healthcare National Health Service Trust since its inception, the largest such trust in the United Kingdom.

Professor Ingrid Winship MB ChB MD Cape Town FRACP
Appointed: June 2007

Professor 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 before combining an academic position at the university with a clinical position.

In 1994, Professor Winship took up an academic position at the University of Auckland where she later became Professor of Clinical Genetics, clinical director of the Northern Regional Genetic Service and associate dean for research in the Faculty of Medicine and Health Sciences (2000-2004).

She is currently chair of the Victorian Cooperative Oncology Group and a member of the Victorian Cancer Action Plan Implementation Committee. Professor Winship is also a member of the NHMRC Human Genetic Advisory Committee. She is on the steering committee for the VLSCI and the clinical advisory panel for the Australian Synchrotron.
MEMBERS OF THE INSTITUTE

during the financial year to 30 June 2014

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The University of Melbourne
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Professor Emeritus Robin Anders
Professor James Angus AO
Mr Donald Argus AC
Sir James Balderstone AC
Mrs Ann Bates
Mr Robert Bates
Mr Lance Bauer

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Professor Claude Bernard
Mr Marc Besen AO
Dr Gytha Beteras
Rev. Dr Rufus Black
Dr Peter Brennan
Mr Malcolm Broomhead
Mrs Beverley Brownstein
Dr Gerard Brownstein (deceased)
Dr Margaret Brumby AM
Professor Tony Burgess AC
Professor Christopher Burrell AO
Professor Robert Burton
Dr David Campbell
Mr Terrence Campbell AO
Mr Pat Cashin
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Mr John Cowper

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Mr John Dahlsten
Mr Stephen Daley
Mrs Annette Davis
Mr Leon Davis AO
Dr Simon de Burgh
Professor David de Kretser AC
Professor John Denton
Mrs Elizabeth Dexter
Mr Mick Dexter
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Mrs Helen Diamond
Mr Ronald Diamond
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Dr Peter Eng
Mr Robert Evans
Mr Michael Fitzpatrick
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Mrs Nolene Fraser
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Mrs Julie Gearing
Mrs Janet Gilbertson
Mr Peter Gilbertson
Ms Rose Gilder

Professor James Goding
Dr Gareth Goodier
Mr John Gough AO OBE
Associate Professor Nicholas Gough
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Mr John Greig
Sir Andrew Grimwade CBE
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Mrs Jean Hadges
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Mr Harry Hearn AM
Mrs Jane Hemstritch
Professor David Hill
Dr Margaret Holmes
Dr Margo Honeyman
Dr Thomas Hurley AO OBE
Mr Darrell Hutchinson AM
Ms Helen Kannen
Professor Emeritus Priscilla Kincaid-Smith AC OBE
Professor Frank Larkins AM
Professor Richard Larkins AO
Mr Gary Liddell
Mr Sean Lusk (deceased)
Professor Emeritus Ian Mackay AM
Mrs Avis Macphee AM
Ms Eve Mahlab AO
Mrs Robyn Male
Mr Roger Male
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Mr Barrie Marshall
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Professor Christina Mitchell
Dr Graham Mitchell AO
Dr Judith Mitchell
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Mr Hugh Morgan AC
Dr George Morstyn
Mr Bob Munro
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Ms Linda Nicholls AO
Dr Leslie Norins
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Professor David Penington AC
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Professor Emeritus Jim Pittard AM
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Mr John Prescott AC
Mrs Edith Qualtrough
Ms Lesley Qualtrough (deceased)
Professor Peter Rathjen
Ms Kate Redwood AM
Mr John Reid AO
Mr Dieter Rinke
Associate Professor Ken Roberts AM
Mr Michael Robinson AO
Ms Linda Rodger
Mrs Mary Rodger
Mrs Margaret Ross AM
Mr Fergus Ryan
Professor Graeme Ryan AC
Mr Colin Sabinfsky
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Mr Andrew Scott
Professor John Scott AO
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Mr Jack Smorgon AO
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Ms Helen Sykes
Ms Jenny Tatchell
Mr Bruce Teele
Mrs Cheryl Thomas
Mr Chris Thomas
Mr John Walker QC
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Ms Pauline Speedy
Ms Catherine Walter AM
Mr John Walter
Mr John Warburton
Mr Robert Warren
Ms Marion Webster OAM
Mr Kevin Weight
Professor Richard Wettenhall
Dr Senga Whittingham
Mr David Williamson
Professor Robert Williamson AO
Professor Ingrid Winship
Mr Peter Worcester
Mr Robert Wylie
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The supporters who make our discoveries possible

The advances in medical science at the Walter and Eliza Hall Institute are made possible by our generous supporters. We are proud to acknowledge these gifts, grants and bequests received in 2013-14. Gifts of $1000 or more are acknowledged, unless otherwise requested by our donors.

International grants

Grants of more than $500,000
Ludwig Cancer Research, US
PATH Malaria Vaccine Initiative, US
The Leukemia & Lymphoma Society, US

Grants up to $500,000
American Asthma Research Foundation, US
The Bill & Melinda Gates Foundation, US
Juvenile Diabetes Research Foundation, US
Lupus Research Institute, US
Multiple Myeloma Research Foundation, US
National Institutes of Health, US

Grants up to $100,000
Howard Hughes Medical Institute, US
The Wellcome Trust, UK
Worldwide Cancer Research, UK

Grants up to $50,000
Canadian Institutes of Health Research, Canada
The Lady Tata Memorial Trust, UK

Individual and family philanthropy

Gifts up to $500,000
Anonymous (1)
Mr Malcolm Broomhead
Albert H Maggs Charitable Trust

Gifts up to $100,000
The Joan Marshall Breast Cancer Research Fund
Dr George Morstyn and Mrs Rosa Morstyn
Mr Michael G Peterson

Gifts up to $50,000
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Brian M Davis Charitable Foundation
Drakensberg Trust
The Isabel & John Gilbertson Charitable Trust
Mrs Renate Harding

Mr Michael Harris and Ms Kelli Garrison
Janko-Inge Foundation
Ms Pauline Speedy
Mrs Jean Williamson

Gifts up to $10,000
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Mr Ronald F Diamond and Mrs Helen M Diamond
Evelyn Ann Drury Trust
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The Barbara Luree Parker Foundation Ltd
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Mr John Warburton

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The Pierce Armstrong Trust
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Mrs Jane Hemstritch
Mrs Caroline Johnston
H & K Johnston Family Foundation
Ms Helen Kennan
Mrs Christine McConnell and Mr Denis McConnell
Mr James McIntyre
Mr John McRae
Mrs Marion Page
Craig Perkins Cancer Research Foundation
Mr Peter Ruse and Mrs Barbara Ruse
Neil & Hermon Slade Trust
S.T.A.F - Rupert Ethel & Ronald Fraser & Ruby Thomas
Mr Chris Thomas and Mrs Cheryl Thomas

Gifts up to $2000
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The M I Bird Family Trust
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Mr Gordon Darling AC CMS
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Dr Janice Dudley
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Mrs Anne Naylor
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Ms Caroline Richardson
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Mr Michael Robinson AO and Mrs Judith Robinson
Mr Keith Satterley
Mr Richard Taylor and Mrs Josephine Taylor
Mrs Jean Thomas and Mr Ralph Thomas
Mrs Olive Thurlby
Ms Marjorie Wilks
Gifts from communities and companies

Gifts up to $500,000
Susan Alberti Medical Research Foundation
Coeliac Australia

Gifts up to $50,000
Donald Cant Watts Corke

Gifts up to $10,000
Coolah Lady Golfers
Latrobe Golf Club
Royal College of Pathologists of Australia
Yarra Yarra Golf Club

Gifts up to $5000
Cardinia Beaconsfield Golf Links
Rotary Club of Eltham
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Gifts up to $2000
Berwick Opportunity Shop
Commercial Club Albury Lady Golfers
Freefall United Skydiving Club
National Cancer Research Foundation
Pambula-Merimbula Golf Club
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Grants from trusts and foundations

Grants of more than $500,000
Australian Cancer Research Foundation
Cancer Council Victoria
Leukaemia Foundation of Australia
The Ian Potter Foundation
Sylvia and Charles Viertel Charitable Foundation

Grants up to $500,000
Cancer Council NSW
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Cure Cancer Australia
DHB Foundation
The Dyson Bequest
The Walter and Eliza Hall Trust
National Breast Cancer Foundation
National Heart Foundation of Australia
The Harry Secomb Foundation

Grants up to $100,000
The Thomas William Francis & Violet Coles Trust
Phyllis Connor Memorial Trust
Erica Foundation Pty Ltd
The Scobie and Claire Mackinnon Trust
The Royal Australian College of Physicians
The Royal Melbourne Hospital Home Lottery Grant

Grants up to $50,000
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Arthritis Foundation of Australia
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Grants up to $5000
The Eirene Lucas Foundation

Grants up to $2000
The Ray & Joyce Uebergang Foundation

Gifts in wills (listed by gift amount)
Estate of Anthony (Toni) William Redstone OAM
Estate of Diane Adrienne Lemaire
Estate of Yvonne Agnes Atkin Morgan
Estate Theodor James Strehlow
Estate of Sheila Mary Helpman
Estate of Maxwell Gardiner Helpman
Estate of Frederick William Jarrett
Hazel & Pip Appel Fund
George Collie Trust
Estate of Keith Goldsbury
Estate of Dorothy Guinevere Foster
Frederick and Winifred Grassick Memorial Fund
Estate of Eleanor Margaret Albiston (The Stang Bequest)
Estate of Mrs R.A. Scott
Estate of Jakob Frankiel
Estate of Ethel Mary Drummond
Estate of Dorothy Helen Croft
Estate of the Late Patricia McArthur
The Baldy Trust Fund
Estate of Florence Mary Young
Estate of Toni Gertrude Cunningham
Estate of Emily Vera Winder
The C.H. Boden Memorial Trust
Agnes Maude Reilly Charitable Trust
GT & L Potter Charitable Trust
John Frederick Bransden Charitable Trust
Margaret Lewis Reilly Charitable Trust
Estate of the late Doreen Merle Taylor
Estate of Irene Alice Lenton
The Frank Broadhurst Memorial Charitable Fund
Thomas, Annie and Doris Burgess Charity Trust

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OPERATIONAL OVERVIEW

Our centenary in 2015 marks a significant milestone for the institute, which will be the first medical research institute in Australia to reach 100 years of discoveries.

Our Professional Services and scientific staff and students have been working together to recognise this auspicious occasion. The centenary organising committee has established an exciting program of events and the institute’s staff and students are looking forward to sharing in these events with our supporters, alumni and colleagues.

I joined the institute in November 2013 as chief operating officer. I am excited about providing strategic leadership and implementing best practice and continuous improvement. My experience is in business planning and development, process system development and finance and leading teams in government, health, justice and business innovation both in Australia and internationally.

Adding value to the institute

Everyone at the institute makes a valuable contribution to the research discoveries and achievements.

Our Professional Services staff complement the institute’s scientific divisions, supporting our scientists to achieve good research outcomes. The team includes Business Development, Communications and Marketing, Facilities Management, Finance, Grants, Information Technology Services, Laboratory Operations, and People and Culture.

To support our scientists, the professional services are undergoing a period of modernisation and renewal. The improvement projects are varied and wide-ranging. Travel management, electronic management of our mice and e-Procurement systems are now being developed and delivered. We are fostering a sense of team culture to meet the needs of our organisation and ensure Professional Services teams deliver best practice and support our science.

Welcoming new leadership

In the past year, I am delighted to have welcomed new leadership in a number of senior Professional Services roles.

Mr Ian Coulson came on board in April 2014 as chief financial officer. Mr Coulson has extensive experience in leading teams across the finance function, together with skills in general management, change initiatives, planning, financial reporting and business case management. Mr Coulson has previously worked for Save the Children Australia, National Australia Bank and the Grattan Institute.

Head of People and Culture Ms Liz Slavin joined the institute in July 2014, and brings a wealth of experience spanning industries such as finance, retail and transport. In these industries, she has worked in senior leadership positions, most recently as Head of People and Culture (Asia) at National Australia Bank.

Long-standing staff members, including librarian Ms Josephine Marshall and head of Human Resources Mr Paul Fraser, left the institute in the past year, along with chief financial officer Ms Kim Tsai. I would like to thank them for their years of service to the institute and wish them well in their future endeavours.

A new five-year road map

Since the release of the institute’s current strategic plan in 2010, the organisation has doubled in size – both in space and personnel.

Significant global economic austerity measures have driven a shift in the biotechnology and medical research industries, which has affected the institute’s potential revenues.

A new strategic plan is vital for us to continue to support our scientists through best business practices, setting our scientific direction and maintaining our global reputation.

The institute has undertaken a comprehensive planning process, engaging a broad section of stakeholders to develop our future plan.

The 2015-2020 strategic plan will provide opportunities for future research, in addition to creating a sound scientific foundation.

Ms Samantha Ludolf
Chief Operating Officer
Walter and Eliza Hall Institute
“A new strategic plan is vital for us to continue to support our scientists through best business practices, setting our scientific direction and maintaining our global reputation”.
PROFESSIONAL SERVICES STAFF LIST

Director’s office

**Doug Hilton**, BSc Monash BSc(Hons) Melbourne PhD Melbourne FAA, director
Keely Burnsted O’Brien, BSc Simmons College PhD Washington, scientific education officer
Nicole Den Elzen, BSc(Hons) Qld PhD Cambridge, AAMRI executive officer

Pamela Dewhurst, personal secretary to Professor Nossal (to 01/14)
Sue Hardy, student administrator
Lisa Kuspira, AAMRI communications manager (to 06/14)
Kelly Rodger, executive assistant (administrative)
Rebecca Thorpe, BA RMIT, AAMRI communications officer (from 06/14)
Fenny Wiradjaja, BSc Monash PhD Monash, executive assistant (scientific)

Chief Operating Office

**Sam Ludolf**, BA(Hons) Lincoln MEnterp Melbourne, chief operating officer (from 11/13)
Emma Booth, BA(Hons) Humberside, project coordinator (from 12/13)
Sue Cameron-Codognotto, Administrative Officer

Bioservices

**Bioservices - Bundoora**
Elaine Major, head of Bioservices Bundoora
Kathy Barber
Denise Barker
Sheree Brown
Tara Carle
Bryce Coghlan
Cassandra D’Alessandro
Mark Do
Christopher Evans
Katie Franks
Theresa Gibbs
Stephanie Green
Aida Herrera
Jose Jimenez
Tracey Kemp
Lyn Lowe
Vicki Marshall, BSc LaTrobe
Teisha Mason
Shauna Ross
Melanie Salzone
Christina Tsatsoulis
Jayne Vella
Fiona Waters, BSc LaTrobe, central microinjection co-ordinator
Magda Wilk

Leanne Johnson (from 07/13)
Melissa Keeble
Tom Kitson
Con Koureskas
Kelly Lane, BSc Melbourne
Cameron McKenzie
Lycliah Mounsey (to 08/13)
Danni Norman (from 03/14)
Sohrab Partow
Liz Reddie
Nikki Richardson
Erica Smakman, B BiolSc LaTrobe
Bianca Smaranda
Jackie Standfield
Cheryl Thorp, administrative assistant
Collette Turfrey
Sarah Vivian
Melinda Watts
Kelly Wilson (to 02/14)

**Bioservices - Parkville**
Angela Milligan, head of Bioservices Parkville
Cathy O’Brien, BVSc Melbourne, veterinarian
Sophie Allan
Carolina Alvarado Ochoa, BVSc MAppSc Sydney
Fiona Bell, BA Melbourne BSc(Hons) Melbourne, animal ethics committee and regulatory compliance officer
Theo Bertenis (from 02/14)
Kim Birchall
Andrea Biffa
Tania Camilleri
Rebecca Cole
Dannielle Cooper
Rhiannon Crawley
Faye Dabrowski
Merle Dayton
Heather Donatucci
Carmen Gatt
Jaclyn Gilbert

Rachel Hancock
Catherine Hay
Melissa Hobbs, BSc Monash (to 04/14)
Krystal Hughes
Louise Inglis
Hannah Johnson (from 04/14)
Elizabeth Kyran
Kelly Landells
Jamie Leahey
Eren Loza
Nicole Lynch
Liana Mackiewicz
Jessica Mansheim
Kate McKenzie
Julie Merryfull
Glen Monagle
Gary Morgan
Danny Noriel
Stephanie O’Connor
Shannon Oliver
Bec Poppleton (to 02/14)
Melissa Pritchard
Lisa Reid
Leanne Scott
Giovanni Siciliano
Emilia Simankowicz
Catherine Smith
Julie Stanley, cryogenics coordinator
Crystal Stivala (from 05/14)
Keti Stoef
Silvia Stoef
Paul Tracevski
Kelly Trueman
Jenny Vasiladis
Kristy Vella
Lauren Wilkins
Jian Xiao
Communications and Marketing

Penny Fannin, BSc(Hons) Melbourne
GradDipJourn Murdoch, head of Communications and Marketing
Drew Berry, BSc(Hons) Melbourne
MSc Melbourne, biomedical animations manager
Rachel Bucknall, BVC (Hons) Monash, graphics officer
Lee Byrne, BA South Australia MA Deakin GradDipJourn USQ, web communications manager
Maja Divjak, BAppSc(Hons) Sydney
PhD Monash, biomedical animator
Alan Gill, BSc UWA, science communications officer (from 07/13)
Maureen Grant, BA communications officer (from 07/13)
Rebekah Kofer, BA Macquarie, century event manager
Peter Maltezos, graphics officer
Lucy McPhee, BA(Hons) Melbourne, communications officer (from 01/14)
Brigitte Mesiti, graphics officer
Sarah Pye, BComm(Hons) Monash, communications officer (from 08/13 to 11/13)
Charles Reilly, BBiomedSc Wellington
BSc(Hons) Melbourne GCCRS Melbourne PhD Melbourne, biomedical animator (to 03/14)
Vanessa Solomon, BSc(Hons) UTAS
PhD Melbourne, communications advisor
Simon Taplin, production manager
Lisa Trinh, BA Monash BSc Monash DipLang Monash, events officer
Etsuko Uno, BSc(Hons) UWA MA Rockefeller, biomedical animator
Cameron Wells, graphics officer
Elizabeth Williams, BSc(Hons) UWA GradDipSciComm UWA, media and publications manager

Catering

Elizabeth Bravo, catering supervisor
Madhu Dass, catering assistant

Reception

Rosie Falcone, reception coordinator
Renee Jowett, receptionist

Engineering Services

Engineering Services - Parkville
Steve Droste, BEng Melbourne, facilities manager
Nick Basalaj, essential safety measures technician (to 12/13)
Mahbub Bhuiyan, MPTC Macquarie, security and compliance manager
Peter Brown, maintenance technician
Geoff Cravino, engineering supervisor
Marek Grostal, BEng(Technology)
Warsaw, electronics engineer
Mike Ledingham, BA UTAS BArch UTAS, Engineer (to 05/14)
Cipriano Maligsoy, BEng Manila, electrical/mechanical technician
Alf Mele, trades assistant
Indy Palihakkara, BSc Sir John Kotelawala MBA Monash, maintenance manager
Onker Singh, maintenance technician
Derek Waters, refrigeration technician
Jenna Kelley, administrative assistant
Engineering Services - Bundoora
Darren Goodwin, workshop technician
Patrick Makiiean, trades assistant
Robert Mitrevski, workshop technician
Engineering Services - Kew
Graham Thorneby, maintenance technician
Tony Trajevski, trades assistant

ES Cell Laboratory

Jacob Sarkis, BSc RMIT
Elizabeth Viney, BAppSc RMIT

Finance

Ian Coulson, BSc Monash, chief financial officer (from 04/14)
Kim Tsai, BCom Melbourne DipEd Melbourne, chief financial officer (to 02/14)
Mark Adler, BA Monash, project accountant/business analyst (from 07/13 to 03/14)
Yesar Al-Hashimi, BBus(Administration) Yarmouk, accounts officer (to 12/13)
Gordana Barkovic, accounts officer
Martin Budiman, BBus(Accounting) Monash, assistant accountant (from 04/14)
Peter Chen, BCom Deakin, accounts payable officer (to 06/14)
Barbara Groves, accounts officer (to 07/13)
Gabrielle Hirsch, BSc(Hons) Monash LLB Monash LLM Melbourne, general counsel (legal)
Jacinta Kost, accounts payable supervisor (from 01/14)
Sofia Lancuba, accounts payable officer (from 01/14)
Carol Noonan, management accountant (from 09/13)
Liz Shaw, BBus(Accounting) RMIT, financial and systems manager (from 09/13 to 04/14)
Marie Sheppard, BBus(Accounting) Cork, financial accountant (from 02/14 to 03/14)
Kate Tayler, BCom Deakin, assistant management accountant (from 11/13)
Adrian Turvey, assistant accountant (to 09/13)
Malcolm Williamson, BBus(Accounting) Swinburne FCPA, financial operations manager (to 12/13)

Fundraising

Susanne Williamson, Head of Fundraising (from 07/13)
Bay Ang, BA(Hons) Monash, Database Officer
Sally Cane, BSc Deakin, Supporter Relations Manager
Alice Robinson, BA Flinders LLB Flinders, Corporate Relationships Manager
Jane Turner, BA LaTrobe, Philanthropic Grants Manager
Information Technology Services

John Wastell, BSc(Hons) Melbourne PhD Melbourne, head of Information Technology Services
Adrian Comolichi, BSc Bacharest, senior software engineer
Janice Coventchi, BSc Melbourne DipEd Melbourne, software specialist
Jason Cutler, BInfTech Monash, helpdesk engineer
Miffy Edwards, BA Monash, DBA/ software engineer
Chris Fitzgerald, helpdesk engineer
Colin Griffiths, BAppSc Swinburne, helpdesk engineer (from 09/13)
Chris Ham, BCom Monash, Apple systems engineer
David Hardy, BA(Hons) De Montfort, Apple systems manager
Edy Huynh, Apple systems technician
Norm King, computer technician (to 09/13)
Khoi Le, senior software engineer
Tri Le, BSc(Hons) Monash, Microsoft systems manager
John McFarlane, GradDipAppInfSys RMIT, manager service delivery and deputy head
Richard McGrath, BCompSc Melbourne, senior software engineer
Andrew McInneny, helpdesk team leader
Austin McLaughlin, BSc(Hons) LaTrobe, application services manager
John Nguyen, BCompEng Melbourne, Microsoft support engineer
Jakub Szarlat, BESoftEng(Hons) Melbourne, Unix/Linux systems manager
Phi Tang, BComp(Hons) Adelaide, software engineer
Tran Tran, BComp Monash, networks manager
Qui Tran, BAppSc Chisholm, Microsoft systems engineer
Rodney Van Cooten, BSc(Hons) Melbourne, CTx systems engineer

Internal audit
Stanley Balbata, CPA, internal auditor

Laboratory Operations
Helene Martin, BSc(Hons) Melbourne MBB RMIT PhD Melbourne, Laboratory Operations manager
Michael Rubira, BAAppSc RMIT, laboratory operations manager (to 08/13)
Wendy Carter, ARMIT RMIT, biological safety officer

Histology
Ellen Tsui, head of Histology
Vera Babo
Salam Hasanein (to 11/13)
Yuyin Hoang
Cary Tsui, BAAppSc RMIT, histologist
Kevin Weston

Media
Wendy Dietrich, BAAppSc Monash BAAppSc(Hons) RMIT, head of central services
Kelly Arnott
Goran Arsovski
Dora Vasilidh, media supervisor

Monoclonal Antibody Laboratory
Kaye Wycherley, head of antibody facility
Ridouan Bouhbouh
Stephanie Fennell, BBiolSc(Hons) LaTrobe (from 05/14)
Myha Huynh
Karen Mackwell, BAAppSc RMIT Paul Masendycz, BAAppSc RMIT, deputy head of antibody facility

Preparation Services
Leni Juatan
Balwinder Kaur, BA Bunjab
Christine Nwe, BSc Rangoon (from 06/14)
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 of Library and Information Management (to 03/14)
Richard Burt, BA LaTrobe MIMS Swinburne GradDipEd Monash, records officer
Wendy Hertan, BA VUT GradDipLib Melbourne, librarian
People and Culture

Paul Fraser, BSc(Hons) Melbourne DipEd Melbourne MEdAdmin New England, head of Human Resources (to 2/14)
Catherine Axiaq, BBus Swinburne, human resources officer
Louise Johansson, BAppSc Melbourne, project officer - equity and diversity (from 05/14)
Mabel Kiang, BBus Swinburne, human resources officer
Hoay Lee, BSc Melbourne, payroll officer/human resources administrator (from 10/13)
Vanessa Linde, BHealthSc Deakin, human resources officer (to 09/13)
Yvonne Sirinotis, BBus LaTrobe, human resources officer
Rita Tiziani, senior human resources officer
Tawanda Whata, BSc(Hons) Midlands State, HR/immigration administrator (from 04/14)

Procurement and Logistics

Todd Jasper OAM, Procurement and Logistics manager
Luke Baltrunas, storeperson
Oscar Canedo, storeperson
Kevin Dobson, storeperson
Mario Florides, stores and inventory clerk
Brigitte Jordanidis, receptionist/administration assistant
Claudia Kerstovitch, purchasing officer
Stella Kyvetos, shipping officer
Jim McDonagh, shipping officer
Greg Menzies, purchasing officer
Dorothy Pilarinos, purchasing officer
Richard Reeve, stores supervisor
John Sapazovski, storeperson
Boris Trajcevski, purchasing officer

Research grants

Julie Mercer, BSc Melbourne DipEd Monash PhD Monash, grants manager
Lynne Hartley, BSc(Hons) Melbourne GradDipAcc Monash, grants officer
Annette Wilson, BA(Hons) Monash MA Monash GradDipSocSci Swinburne, grants administrative assistant

Safety

Tony Hendy, BAgSc(Hons) Melbourne GCertIndHygSc Deakin, safety systems manager
Grant Thomas, BAppSc RMIT, chemical safety officer
COMMITTEES

Board committees

Appointment and promotion review committee
Professor Jim McCluskey, chair (The University of Melbourne)
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 AO
Professor Stephen Nutt
Professor Liam O’Connor
Professor Terry Speed
Professor Andreas Strasser
Professor David Vaux
Professor Jane Visvader
Professor Ian Wicks

Commercialisation advisory committee
Dr Graham Mitchell, chair
Dr Julian Clark
Professor Peter Colman
Professor Doug Hilton
Dr Kurt Lackovic
Dr George Morstyn
Professor Nick Nicola AO
Dr John Raff
Ms Carmela Monger (minutes)

Financial sustainability committee
Mr Christopher Thomas, chair
Mrs Sally Bruce
Dr Julian Clark
Mr Ian Coulson
Mr Michael Daddo
Mr John Dyson
Ms Penny Fannin
Ms Jane Hemstritch
Professor Doug Hilton
Ms Caroline Johnston
Ms Samantha Ludolf
Mr Steven Skala AO
Ms Susanne Williamson
Mr Robert Wylie
Ms Sue Cameron (minutes)

Human Research Ethics committee
Professor Rufus Black, chair
Reverend Father Michael Elligate, deputy chair
Mrs Netta McArthur
Dr John Bonacci
Dr Vanessa Bryant
Mr David Freeman
Professor Geoff Lindeman
Dr Rachel Nowak
Dr Ken Pang (from 03/14)
Ms Moira Rayner
Professor Louis Schofield
Professor Ingrid Winship
Ms Sue Cameron (minutes)
Dr Lina Laskos (observer)

Audit and risk committee
Ms Linda B Nicholls AO, chair
Mr Peter Caldwell (Deloitte)
Mr Ian Coulson
Professor Doug Hilton
Ms Samantha Ludolf
Mr Roger Male
Mr Steven Skala AO
Mr Stan Balbata (minutes)

Investment committee
Mr Robert Wylie, chair
Mr Ian Coulson
Mr Steven Daley
Professor Doug Hilton
Ms Samantha Ludolf
Mr Stephen Merlicek
Mr Stephen Milburn-Pyle
Mr John Stratton
Ms Fiona Trafford-Walker
Ms Catherine Walter AM
Mr Peter Worcester
Mr Andrew Scott (minutes)

Remuneration committee
Mr Christopher Thomas, chair
Mr Roger Male
Mr Steven Skala AO
Mr Rob Wylie
Ms Ian Coulson (minutes)
Advisory committees

**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, HHMI, 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**
Professor Doug Hilton, chair
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 AO
Professor 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
Associate Professor Anne Voss
Professor Ian Wicks
Ms Kelly Rodger (minutes)
Standing committees and subcommittees

**Animal Ethics committee**
- Professor Colin Chapman, chair
- 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)
- Dr Sarah Kinkel (scientist)
- Associate Professor Andrew Lew (veterinarian/scientist)
- Ms Julie Merryfull (senior animal technician)
- Dr Matthew McCormack (scientist)
- Ms Angela Milligan (senior animal technician)
- Dr Tony Pyman (representing the public interest)
- Ms Fiona Bell (minutes)

**Biosafety committee**
- Dr Ross Dickins, chair
- Dr Marc Pellegrini, deputy chair
- Ms Wendy Carter
- Associate Professor Andrew Lew
- Ms Samantha Ludolf
- Dr Helene Martin
- Dr Catheyn O’Brien
- Professor Stephen Nutt
- Professor Jane Visvader
- Ms Marian Cravino (minutes)
- Ms Jane Howard (The University of Melbourne)
- Con Sonza (The University of Melbourne)

**Clinical translation standing committee**
- Professor Andrew Roberts, chair
- Dr Brandon Aubrey (from March 2014)
- Dr Priscilla Auyeung
- Dr Chris Burns (from March 2014)
- Dr Julian Clark
- Dr Jayesh Desai
- Dr Ross Dickins (from March 2014)
- Associate Professor Paul Ekert
- Associate Professor Peter Gibbs
- Professor Len Harrison
- Dr Lina Laskos
- Professor Geoffrey Lindeman
- Dr Ian Majewski
- Dr Marc Pellegrini
- Mrs Cathy Quilici
- Associate Professor Clare Scott
- Dr Oliver Sieber (from March 2014)
- Dr Jason Tye-Din
- Professor Paul Waring, Department of Pathology, University of Melbourne
- Dr John Wentworth
- Professor Ian Wicks
- Ms Jenni Harris (minutes)

**Education committee**
- Dr Anne Voss, chair
- Dr Sandra Nicholson, deputy chair
- Dr Marnie Blewitt
- Dr Keely Bunstedt-O’Brien
- Dr Vanessa Bryant
- Dr Matthew Call
- Dr Melissa Call
- Dr Grant Dewson
- Associate Professor Paul Ekert
- Ms Penny Fannin
- Associate Professor Joan Heath
- Dr Ruth Kluck
- Mr Logesvaran Krshnan
- Dr Seth Masters
- Dr James Murphy
- Dr Ashley Ng
- Associate Professor John Silke
- Dr Brad Sleebs
- Ms Jenni Harris (minutes)
Engagement committee
Ms Penny Fannin, co-chair
Professor David Vaux, co-chair
Dr Kylee Aumann
Dr Keely Bumsted-O'Brien
Ms Lee Byrne
Ms Gillian Carter
Mr Jason Corbin
Dr Leigh Coultaas
Mr Ian Coulson
Professor Alan Cowman
Dr Marlyse Debrincat
Ms Angela Georgiou
Mrs Maureen Grant
Dr Kurt Lackovic
Dr Ewa Michalak
Dr Ashley Ng
Ms Mikara Robati
Ms Emma Watson
Dr Christine White
Ms Susanne Williamson
Ms Kaye Wycherley
Ms Lucy McPhee, committee secretary

Gender equity committee
Associate Professor Lynn Corcoran, co-chair
Professor Terry Speed, co-chair
Dr Marie-Liesse Asselin-Labat
Associate Professor Melanie Bahlo
Dr Alyssa Barry
Professor Sharon Bell
Dr Marnie Blewitt
Dr Justin Boddey
Dr Keely Bumsted-O'Brien
Dr Chris Burns
Dr Kim Jacobson
Dr Ben Kile
Ms Carmela Monger
Associate Professor Clare Scott
Ms Rita Tiziani
Ms Hannah Vanyai
Ms Liz Zuccala
Ms Kelly Rodger (minutes)

Health, safety and environment committee
Ms Tracey Baldwin
Mr Mahbub Bhuiyan
Ms Andrea Briffa
Ms Wendy Carter
Mr Steve Droste
Ms Jessica Janssen
Associate Professor Guillaume Lessene
Dr Kym Lowes/Tracey Kemp
Mr Denis Quilici
Mrs Helene Martin
Mr Keith Satterly
Ms Ellen Tsui/Kevin Weston
Mr Charlie Jennison (student representative)
Mr Tony Hendy (minutes)

IT standing committee
Professor Peter Colman, co-chair
Dr John Wastell, co-chair
Ms Lee Byrne
Dr Hendrik Falk (postdoctoral representative)
Mr Tom Sidwell (student representative)
Professor Phil Hodgkin
Professor Liam O'Connor
Associate Professor Tony Papenfuss
Dr Kelly Rogers
Mr Grant Thomas
Mr Zeus Villanueva (VCCC rep)
Ms Amanda Voudouris (minutes)

Reconciliation committee
Ms Louise Johanssone, chair
Dr Alyssa Barry
Ms Ngaree Blow
Ms Sharon Bonython-Ericson
Mr Jason Brouwer
Ms Lee Byrne
Dr Julian Clark
Professor Len Harrison
Dr Cristian Koepfli
Dr Willy-John Martin
Dr Julie Mercer
Dr Pat Sharp
Ms Susanne Williamson
Dr Emma Stuart (secretary)

Scientific services committee
Professor Warren Alexander, chair
Professor Gabrielle Belz
Professor David Huang
Associate Professor Guillaume Lessene
Ms Samantha Ludolf
Dr Helene Martin
Dr Kelly Rogers
Dr Chris Tonkin
Dr Sabine Kelly (minutes)
The Walter and Eliza Hall Institute acknowledges the support of these organisations

The Walter and Eliza Hall Institute is associated with the following organisations
THE YEAR AT A GLANCE

**Income**

- **Other income** 8%
- **Donations and bequests** 7%
- **Philanthropic grants (Overseas)** 6%
- **Philanthropic grants (Australia)** 9%
- **Investment income** 13%
- **Victorian Government** 7%
- **Australian Government** 50%

**Expenditure**

- **Business development** 2%
- **Administration** 7%
- **Building operation** 7%
- **Support laboratories** 19%
- **Scientific laboratories** 65%

### The year in brief

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income for research ($000)</td>
<td>102,120</td>
<td>95,262</td>
</tr>
<tr>
<td>Expenditure on research ($000)</td>
<td>103,411</td>
<td>97,760</td>
</tr>
<tr>
<td>Net surplus (deficit) from research ($000)</td>
<td>(1,291)</td>
<td>(2,498)</td>
</tr>
<tr>
<td>Number of staff and visiting scientists</td>
<td>689</td>
<td>674</td>
</tr>
<tr>
<td>Number of postgraduate students</td>
<td>175</td>
<td>151</td>
</tr>
<tr>
<td>Total staff and students (EFTs)</td>
<td>864</td>
<td>825</td>
</tr>
</tbody>
</table>
Statement of profit or loss and other comprehensive income for the year ended 30 June 2014

<table>
<thead>
<tr>
<th>Revenue for research activities</th>
<th>Note</th>
<th>2014 $'000</th>
<th>2013 $'000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Government revenue</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Health and Medical Research Council</td>
<td></td>
<td>44,497</td>
<td>45,801</td>
</tr>
<tr>
<td>Cooperative Research Centres</td>
<td></td>
<td>2,025</td>
<td>2,064</td>
</tr>
<tr>
<td>Other Australian Government grants</td>
<td></td>
<td>1,632</td>
<td>1,755</td>
</tr>
<tr>
<td>Other Australian Government fellowships</td>
<td></td>
<td>3,358</td>
<td>3,375</td>
</tr>
<tr>
<td>Victorian Government grants</td>
<td></td>
<td>6,936</td>
<td>6,771</td>
</tr>
<tr>
<td>Foreign Government grants and fellowships</td>
<td></td>
<td>506</td>
<td>472</td>
</tr>
<tr>
<td><strong>Total Government revenue</strong></td>
<td></td>
<td>58,954</td>
<td>60,238</td>
</tr>
<tr>
<td><strong>Other grant revenue</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial grants and contracts</td>
<td></td>
<td>1,696</td>
<td>1,482</td>
</tr>
<tr>
<td>Philanthropic grants and fellowships – Australia</td>
<td></td>
<td>9,024</td>
<td>6,971</td>
</tr>
<tr>
<td>Philanthropic grants and fellowships – International</td>
<td></td>
<td>6,355</td>
<td>5,376</td>
</tr>
<tr>
<td><strong>Total Other grant revenue</strong></td>
<td></td>
<td>17,075</td>
<td>13,829</td>
</tr>
<tr>
<td><strong>Other revenue</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment income</td>
<td>2</td>
<td>12,925</td>
<td>13,146</td>
</tr>
<tr>
<td>Royalty income</td>
<td></td>
<td>3,119</td>
<td>828</td>
</tr>
<tr>
<td>General income</td>
<td></td>
<td>3,369</td>
<td>2,819</td>
</tr>
<tr>
<td>Donations and bequests</td>
<td></td>
<td>6,678</td>
<td>4,402</td>
</tr>
<tr>
<td><strong>Total Other revenue</strong></td>
<td></td>
<td>26,091</td>
<td>21,195</td>
</tr>
<tr>
<td><strong>Total revenues for research activities</strong></td>
<td></td>
<td>102,120</td>
<td>95,262</td>
</tr>
</tbody>
</table>

The financial statements are to be read in conjunction with the notes to, and forming part of the financial statements.
### Expenditure on research activities

<table>
<thead>
<tr>
<th>Note</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$'000</td>
<td>$'000</td>
</tr>
<tr>
<td><strong>Scientific laboratories</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff costs</td>
<td>52,344</td>
<td>48,185</td>
</tr>
<tr>
<td>Apparatus and equipment</td>
<td>1,559</td>
<td>1,882</td>
</tr>
<tr>
<td>Consumable supplies</td>
<td>11,444</td>
<td>10,325</td>
</tr>
<tr>
<td>Other expenses</td>
<td>2,097</td>
<td>2,156</td>
</tr>
<tr>
<td>****</td>
<td><strong>67,444</strong></td>
<td><strong>62,548</strong></td>
</tr>
<tr>
<td><strong>Support laboratories</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff costs</td>
<td>14,899</td>
<td>13,943</td>
</tr>
<tr>
<td>Apparatus and equipment</td>
<td>979</td>
<td>1,605</td>
</tr>
<tr>
<td>Consumable supplies</td>
<td>1,959</td>
<td>2,753</td>
</tr>
<tr>
<td>Other expenses</td>
<td>2,341</td>
<td>2,416</td>
</tr>
<tr>
<td>****</td>
<td><strong>20,178</strong></td>
<td><strong>20,717</strong></td>
</tr>
<tr>
<td><strong>Building operation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff costs</td>
<td>1,678</td>
<td>1,699</td>
</tr>
<tr>
<td>Operating costs and repairs</td>
<td>5,171</td>
<td>5,307</td>
</tr>
<tr>
<td>****</td>
<td><strong>6,849</strong></td>
<td><strong>7,006</strong></td>
</tr>
<tr>
<td><strong>Administration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff costs</td>
<td>5,139</td>
<td>4,628</td>
</tr>
<tr>
<td>Equipment</td>
<td>57</td>
<td>46</td>
</tr>
<tr>
<td>Fundraising and marketing expenditure</td>
<td>58</td>
<td>81</td>
</tr>
<tr>
<td>Other expenses</td>
<td>1,870</td>
<td>1,035</td>
</tr>
<tr>
<td>****</td>
<td><strong>7,124</strong></td>
<td><strong>5,790</strong></td>
</tr>
<tr>
<td><strong>Business development</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff costs</td>
<td>967</td>
<td>884</td>
</tr>
<tr>
<td>Patents</td>
<td>535</td>
<td>500</td>
</tr>
<tr>
<td>Other expenses</td>
<td>314</td>
<td>315</td>
</tr>
<tr>
<td>****</td>
<td><strong>1,816</strong></td>
<td><strong>1,699</strong></td>
</tr>
<tr>
<td><strong>Total expenditure on research activities</strong></td>
<td><strong>103,411</strong></td>
<td><strong>97,760</strong></td>
</tr>
</tbody>
</table>

### Deficit from research activities

<table>
<thead>
<tr>
<th>Note</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$'000</td>
<td>$'000</td>
</tr>
<tr>
<td>Other income</td>
<td>3</td>
<td>5,324</td>
</tr>
<tr>
<td>Impairment write-down of available-for-sale financial assets</td>
<td>15(h)</td>
<td>-</td>
</tr>
<tr>
<td>Depreciation and amortisation</td>
<td>10</td>
<td>(8,671)</td>
</tr>
<tr>
<td>Gain/ (Loss) on sale of non financial assets</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td><strong>Net (deficit)/surplus before bequests and grants for capital works</strong></td>
<td><strong>(4,638)</strong></td>
<td><strong>10,443</strong></td>
</tr>
<tr>
<td>Bequests and grants for capital works</td>
<td>4</td>
<td>4,785</td>
</tr>
<tr>
<td><strong>Net surplus for the year</strong></td>
<td><strong>15(a)</strong></td>
<td><strong>147</strong></td>
</tr>
</tbody>
</table>

### Other comprehensive income

<table>
<thead>
<tr>
<th>Note</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items that may be reclassified subsequently to profit or loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain/(loss) on available-for-sale financial assets taken to equity</td>
<td>15(h)</td>
<td>20,813</td>
</tr>
<tr>
<td>Cumulative (gain)/loss reclassified to profit or loss on sale of available for sale financial assets</td>
<td>15(h)</td>
<td>(5,215)</td>
</tr>
<tr>
<td>Transfer impairment write-down of available-for-sale financial assets</td>
<td>15(h)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total comprehensive income for the year</strong></td>
<td><strong>15,745</strong></td>
<td><strong>14,846</strong></td>
</tr>
</tbody>
</table>

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 2014

<table>
<thead>
<tr>
<th>Assets</th>
<th>Note</th>
<th>2014 $'000</th>
<th>2013 $'000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current assets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and bank balances</td>
<td>16(a)</td>
<td>4,582</td>
<td>8,343</td>
</tr>
<tr>
<td>Current tax assets</td>
<td>7(a)</td>
<td>2,710</td>
<td>2,967</td>
</tr>
<tr>
<td>Trade and other receivables</td>
<td>7(b)</td>
<td>15,575</td>
<td>13,737</td>
</tr>
<tr>
<td>Other financial assets</td>
<td>7(c)</td>
<td>18,310</td>
<td>15,000</td>
</tr>
<tr>
<td>Prepaid operating lease</td>
<td>8</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total current assets</strong></td>
<td></td>
<td><strong>41,209</strong></td>
<td><strong>40,079</strong></td>
</tr>
<tr>
<td><strong>Non-current assets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other financial assets</td>
<td>9</td>
<td>217,365</td>
<td>189,831</td>
</tr>
<tr>
<td>Property, plant and equipment</td>
<td>10</td>
<td>185,893</td>
<td>190,639</td>
</tr>
<tr>
<td>Prepaid operating lease</td>
<td>8</td>
<td>2,687</td>
<td>2,720</td>
</tr>
<tr>
<td><strong>Total non-current assets</strong></td>
<td></td>
<td><strong>405,945</strong></td>
<td><strong>383,190</strong></td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td></td>
<td><strong>447,154</strong></td>
<td><strong>423,269</strong></td>
</tr>
<tr>
<td><strong>Liabilities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current liabilities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade and other payables</td>
<td>11</td>
<td>8,380</td>
<td>6,149</td>
</tr>
<tr>
<td>Employee benefits</td>
<td>12</td>
<td>16,613</td>
<td>15,179</td>
</tr>
<tr>
<td>Unearned grants and fellowships</td>
<td>13</td>
<td>24,905</td>
<td>20,664</td>
</tr>
<tr>
<td>Other liabilities</td>
<td>14</td>
<td>290</td>
<td>261</td>
</tr>
<tr>
<td><strong>Total current liabilities</strong></td>
<td></td>
<td><strong>50,188</strong></td>
<td><strong>42,253</strong></td>
</tr>
<tr>
<td><strong>Non-current liabilities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee benefits</td>
<td>12</td>
<td>1,946</td>
<td>1,741</td>
</tr>
<tr>
<td><strong>Total non-current liabilities</strong></td>
<td></td>
<td><strong>1,946</strong></td>
<td><strong>1,741</strong></td>
</tr>
<tr>
<td><strong>Total liabilities</strong></td>
<td></td>
<td><strong>52,134</strong></td>
<td><strong>43,994</strong></td>
</tr>
<tr>
<td><strong>Net assets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Funds</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent invested funds</td>
<td>15(b)</td>
<td>157,026</td>
<td>152,428</td>
</tr>
<tr>
<td>General funds</td>
<td>15(c)</td>
<td>150,132</td>
<td>160,291</td>
</tr>
<tr>
<td>Royalty fund</td>
<td>15(d)</td>
<td>19,994</td>
<td>17,551</td>
</tr>
<tr>
<td>Leadership fund</td>
<td>15(e)</td>
<td>18,975</td>
<td>17,840</td>
</tr>
<tr>
<td>Discovery fund</td>
<td>15(f)</td>
<td>2,030</td>
<td>-</td>
</tr>
<tr>
<td>Centenary fund</td>
<td>15(g)</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>Investment revaluation reserve</td>
<td>15(h)</td>
<td>46,763</td>
<td>31,165</td>
</tr>
<tr>
<td><strong>Total funds</strong></td>
<td></td>
<td><strong>395,020</strong></td>
<td><strong>379,275</strong></td>
</tr>
</tbody>
</table>

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 2014

<table>
<thead>
<tr>
<th>Note</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flows from operating activities</td>
<td>$'000</td>
<td>$'000</td>
</tr>
<tr>
<td>Donations and bequests</td>
<td>3,480</td>
<td>4,379</td>
</tr>
<tr>
<td>General income</td>
<td>3,416</td>
<td>3,101</td>
</tr>
<tr>
<td>Receipts from granting bodies</td>
<td>83,805</td>
<td>84,154</td>
</tr>
<tr>
<td>GST paid to ATO</td>
<td>(3,217)</td>
<td>(3,819)</td>
</tr>
<tr>
<td>Payments to suppliers and employees</td>
<td>(103,644)</td>
<td>(99,417)</td>
</tr>
<tr>
<td>Royalty receipts</td>
<td>3,119</td>
<td>828</td>
</tr>
<tr>
<td>Dividends received</td>
<td>11,996</td>
<td>8,377</td>
</tr>
<tr>
<td>Interest and bill discounts received</td>
<td>2,719</td>
<td>4,126</td>
</tr>
<tr>
<td><strong>Net cash generated by operating activities</strong></td>
<td>1,674</td>
<td>1,729</td>
</tr>
</tbody>
</table>

Cash flows from investing activities

<table>
<thead>
<tr>
<th>Note</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment for other financial assets</td>
<td>(31,389)</td>
<td>(116,807)</td>
</tr>
<tr>
<td>Proceeds on sale of other financial assets</td>
<td>28,385</td>
<td>109,925</td>
</tr>
<tr>
<td>Purchase of bills of exchange</td>
<td>(3,310)</td>
<td>2,000</td>
</tr>
<tr>
<td>Grants and donations for property, plant and equipment</td>
<td>3,204</td>
<td>2,105</td>
</tr>
<tr>
<td>Payment for property, plant and equipment</td>
<td>(3,937)</td>
<td>(5,861)</td>
</tr>
<tr>
<td><strong>Net cash used in investing activities</strong></td>
<td>(7,047)</td>
<td>(8,638)</td>
</tr>
</tbody>
</table>

Cash flows from financing activities

<table>
<thead>
<tr>
<th>Note</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donations and bequests to permanent invested funds</td>
<td>1,581</td>
<td>219</td>
</tr>
<tr>
<td><strong>Net cash used in financing activities</strong></td>
<td>1,581</td>
<td>219</td>
</tr>
<tr>
<td><strong>Net decrease in cash and held</strong></td>
<td>(3,792)</td>
<td>(6,690)</td>
</tr>
<tr>
<td><strong>Cash and cash equivalents at the beginning of the financial year</strong></td>
<td>8,082</td>
<td>14,772</td>
</tr>
<tr>
<td><strong>Cash and cash equivalents at the end of the financial year</strong></td>
<td>4,290</td>
<td>8,082</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Permanent funds</th>
<th>General funds</th>
<th>Royalty funds</th>
<th>Leadership funds</th>
<th>Discovery funds</th>
<th>Centenary funds</th>
<th>Investment revaluation reserve</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance at 1 July 2012</strong></td>
<td>139,073</td>
<td>162,909</td>
<td>17,079</td>
<td>16,282</td>
<td>-</td>
<td>-</td>
<td>29,086</td>
<td>364,429</td>
</tr>
<tr>
<td><strong>Surplus for the year</strong></td>
<td>13,355</td>
<td>(2,618)</td>
<td>472</td>
<td>1,558</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12,767</td>
</tr>
<tr>
<td><strong>Other comprehensive income for the year</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>27,934</td>
<td>27,934</td>
</tr>
<tr>
<td>Gain / (loss) on available-for-sale investments</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>27,934</td>
<td>27,934</td>
</tr>
<tr>
<td>Cumulative (gain) / loss reclassified to profit or loss on sale of available for sale financial assets</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(26,118)</td>
<td>(26,118)</td>
</tr>
<tr>
<td>Transfer impairment write down of available-for-sale financial assets</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>263</td>
<td>263</td>
</tr>
<tr>
<td><strong>Total comprehensive income for the year</strong></td>
<td>13,355</td>
<td>(2,618)</td>
<td>472</td>
<td>1,558</td>
<td>-</td>
<td>-</td>
<td>2,079</td>
<td>14,846</td>
</tr>
<tr>
<td><strong>Balance at 30 June 2013</strong></td>
<td>152,428</td>
<td>160,291</td>
<td>17,551</td>
<td>17,840</td>
<td>-</td>
<td>-</td>
<td>31,165</td>
<td>379,275</td>
</tr>
<tr>
<td><strong>Surplus for the year</strong></td>
<td>4,598</td>
<td>(10,159)</td>
<td>2,443</td>
<td>1,135</td>
<td>2,030</td>
<td>100</td>
<td>-</td>
<td>147</td>
</tr>
<tr>
<td><strong>Other comprehensive income for the year</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20,813</td>
<td>20,813</td>
</tr>
<tr>
<td>Gain / (loss) on available-for-sale investments</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(5,215)</td>
<td>(5,215)</td>
</tr>
<tr>
<td>Cumulative (gain) / loss reclassified to profit or loss on sale of available for sale financial assets</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(5,215)</td>
<td>(5,215)</td>
</tr>
<tr>
<td><strong>Total comprehensive income for the year</strong></td>
<td>4,598</td>
<td>(10,159)</td>
<td>2,443</td>
<td>1,135</td>
<td>2,030</td>
<td>100</td>
<td>15,598</td>
<td>15,745</td>
</tr>
<tr>
<td><strong>Balance at 30 June 2014</strong></td>
<td>157,026</td>
<td>150,132</td>
<td>19,994</td>
<td>18,975</td>
<td>2,030</td>
<td>100</td>
<td>46,763</td>
<td>395,020</td>
</tr>
</tbody>
</table>

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 2013-2014

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 185 members and the guarantee is limited to two dollars per member.

The financial report is a general purpose financial report in accordance with the Corporations Act 2001, Australian Accounting Standards (AASs) 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 18 September 2014.

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 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 to 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) Reporting Entity

The financial statements include all the activities of The Walter and Eliza Hall Institute of Medical Research.

Principal address of the Institute is:
1G Royal Parade
Parkville, Victoria, 3052

(i) Jointly controlled assets or operations

Interests in jointly controlled assets or operations are not consolidated by the Institute, but are accounted for in accordance with the policy outlined in Note 1(f) (v).

(b) 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. Depreciation is calculated on a straight-line basis so as to write off the net cost of each asset over its expected useful life.

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 table indicates the expected useful lives of non current assets on which the depreciation charges are based.

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>20 - 40 years</td>
<td>20 - 40 years</td>
</tr>
<tr>
<td>Plant and equipment</td>
<td>5 - 20 years</td>
<td>5 - 20 years</td>
</tr>
<tr>
<td>Furniture and fittings</td>
<td>5 to 15 years</td>
<td>5 to 15 years</td>
</tr>
</tbody>
</table>

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 assets will not be revalued.

(c) 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.

(d) Source of capital funds

The Institute is a company limited by guarantee and as such has no issued capital.

(i) 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 Capital Funds.

(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, Jacques Miller and Suzanne Cory to provide named fellowships to nurture the development of outstanding young scientists with the potential to be future leaders of biomedical research.

(v) The Discovery Fund consists of donations and income earned thereon, less funds spent on research to date. The Fund was established by the Institute to support specialist research and will be applied based on the merits of submissions to the Institute Director. There are three areas of focus; early drug discovery, blue sky basic biological research and technical innovation.

(vi) The Centenary Fund consists of donations and income earned thereon. The Fund was established to celebrate the centenary of the Institute and provides fellowships funding for early career research (post-doctoral fellows with up to ten years experience and new lab heads appointed between 2015-2020). The five year fellowships are awarded at the discretion of the Institute Director.

(vii) The Investment Revaluation Reserve consists of gains and losses recognised through movement in the fair value of investments and other financial assets.
(e) Revenue recognition

Grants
Government and other funding received or receivable on the condition that the specified activities are undertaken are considered reciprocal. Such grants are recognised as deferred income and revenue is recognised as services are performed or conditions fulfilled, being the expenditure incurred relating to the specified grant.

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 Institute gains control of the contribution.

Donations and bequests
Donation and bequest income is recognised on receipt of the donation or bequest. They are disclosed as part of revenue for research activities, except for, where stipulated by the donor or bequestor, certain amounts are treated as donations and bequests for capital works and are appropriated to Permanent Funds.

(f) Investments and other financial assets

All investments are initially measured 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 Institute are classified as being available-for-sale and are stated at fair value. Fair value is determined in the manner described in note 9. 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 in profit or loss. Where the investment is disposed of or is determined to be impaired, the cumulative gain or loss previously accumulated in the investments revaluation reserve is reclassified to profit or loss.

(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. Such impairment loss will not be reversed in subsequent periods.

(iii) Bills of exchange are recorded at amortised cost, with revenue recognised on an accruals basis.

(iv) Dividend revenue is recognised when the dividend is received. Interest revenue is recognised and accrued on a time proportionate basis that takes into account the effective yield on the financial asset.

(v) Interests in jointly controlled assets or operations

In respect of any interest in jointly controlled assets, the Institute recognises in the financial statements:
• its share of jointly controlled assets;
• any liabilities that it had incurred;
• its share of liabilities incurred jointly by the joint venture;
• any income earned from the selling or using of its share of the output from the joint venture; and
• any expenses incurred in relation to being an investor in the joint venture.

For jointly controlled operations, the Institute recognises: the assets that it controls and the liabilities that it incurs; expenses that it incurs; and its share of income that it earns from selling outputs of the joint venture.

(g) 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.

(h) Trade and Other Receivables

Trade and other receivables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest rate method less any accumulated impairment.

(i) Trade and Other Payables

Trade payables and other accounts payables are initially measured at fair value and then subsequently carried at amortised cost. They are recognised when the Institute becomes obliged to make future payments resulting from the purchase of goods and services.

(j) Research costs

Research costs are recognised as an expense when incurred and reported in the financial year in which they relate.
(k) 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 within operating cash flows.

(l) 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 Institute in respect of services provided by employees up to the reporting date.

(m) 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 and exchange differences are recognised in the net surplus or deficit in the period in which they arise.

(n) 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.

(o) Impairment of non-financial assets
All 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.

(p) 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 the 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.

(q) Impact of new and revised Accounting 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. There has been no financial impact in the current year.

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 Institute’s financial report:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Effective for annual reporting periods beginning on or after</th>
<th>Expected to be initially applied in the financial year ending</th>
</tr>
</thead>
<tbody>
<tr>
<td>AASB 9 ‘Financial Instruments’, and the relevant amending standards</td>
<td>1 January 2017</td>
<td>30 June 2018</td>
</tr>
<tr>
<td>“AASB 2014-1 ‘Amendments to Australian Accounting Standards’</td>
<td>1 January 2015</td>
<td>30 June 2015</td>
</tr>
<tr>
<td>- Part B: ‘Defined Benefit Plans: Employee Contributions (Amendments to AASB 119)’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Part C: ‘Materiality’ “</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AASB 2014-1 ‘Amendments to Australian Accounting Standards’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Part E: ‘Financial Instruments’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(e) Comparative amounts
Certain comparatives have been reclassified where appropriate.
2. Income

The following has been prepared in support of the items of income shown in the income statement.

**Investment income from investments received during the year, prior to adjustments for amounts carried forward:**

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognised in surplus or deficit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dividends and distributions income on available-for-sale financial assets</td>
<td>12,417</td>
<td>11,303</td>
</tr>
<tr>
<td>Interest income on available-for-sale financial assets</td>
<td>2,719</td>
<td>3,587</td>
</tr>
<tr>
<td>Amortisation of investment premiums</td>
<td>-</td>
<td>(98)</td>
</tr>
<tr>
<td></td>
<td>15,136</td>
<td>14,792</td>
</tr>
<tr>
<td>Less transfer to grants and fellowships</td>
<td>-2,211</td>
<td>-1,646</td>
</tr>
<tr>
<td></td>
<td>12,925</td>
<td>13,146</td>
</tr>
</tbody>
</table>

The Institute has updated its disclosure in the current year financial statements in relation to Grant and Donation details. This updated disclosure brings the Institute in line with other similar entities.

Specific details on Grant and Donations are included within the Institute Annual Report.

3. Other income

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain on sale of available-for-sale investments</td>
<td>5,324</td>
<td>21,598</td>
</tr>
<tr>
<td></td>
<td>5,324</td>
<td>21,598</td>
</tr>
</tbody>
</table>

4. Bequests and grants for capital works

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total bequests and grants for capital works</td>
<td>4,785</td>
<td>2,324</td>
</tr>
</tbody>
</table>

5. Operating expenses

The following items of expense are included in the net surplus.

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remuneration of auditors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auditing the financial report: $60,410 (2013: $57,230)</td>
<td>60</td>
<td>57</td>
</tr>
<tr>
<td>Other regulatory audit services: Nil (2013: $9,440)</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Non audit services $24,000 (2013: $24,000)</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>75,027</td>
<td>69,339</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation of non-current property, plant and equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>4,901</td>
<td>4,888</td>
</tr>
<tr>
<td>Plant and equipment</td>
<td>3,678</td>
<td>3,288</td>
</tr>
<tr>
<td>Furniture and fittings</td>
<td>92</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>8,671</td>
<td>8,396</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating lease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating lease expense</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>
6. Directors’ remuneration

The directors of the Walter and Eliza Hall Institute of Medical Research during the year were:

CW Thomas  RER Black  J McCluskey  SK Smith
SM Skala  MC Fitzpatrick  GF Mitchell  OM Walter
RE Male  JS Hemstritch  TF Moran  IM Winship
JA Angus  GJ Goodier  LB Nicholls  RH Wylie

The aggregate income paid or payable, or otherwise made available, in respect of the financial year, to all directors of the Institute, directly or indirectly, by the company or by any related party was nil (2013: nil).

Aggregate retirement benefits paid to all directors of the Institute, by the Institute or by any related party was nil (2013: nil).

7. Current assets

(a) Current tax assets

Franking credits receivable  2,710  2,967

(b) Trade and other receivables

Sundry debtors* and prepayments  4,754  3,643
Grants receivable  2,974  9,724
Accrued income  7,847  370

*Terms of payment are 30 days

(c) Other financial assets

Bills of exchange  18,310  15,000

8. 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 Institute exercises its option to renew. The Institute 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  2,559  2,592

2,719  2,752
9. Other financial assets

Non-quoted available-for-sale investments at fair value

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed interest securities</td>
<td>20,666</td>
<td>16,053</td>
</tr>
<tr>
<td>Shares</td>
<td>394</td>
<td>268</td>
</tr>
</tbody>
</table>

Quoted available-for-sale investments at fair value

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shares</td>
<td>174,163</td>
<td>145,882</td>
</tr>
<tr>
<td>Unit trusts</td>
<td>1,086</td>
<td>974</td>
</tr>
<tr>
<td>Perpetual floating rate securities</td>
<td>21,056</td>
<td>26,654</td>
</tr>
<tr>
<td>Total</td>
<td>217,365</td>
<td>189,831</td>
</tr>
</tbody>
</table>

(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.

(b) Reconciliation of level 3 fair value measurements of financial assets

<table>
<thead>
<tr>
<th></th>
<th>Level 1 $'000</th>
<th>Level 2 $'000</th>
<th>Level 3 $'000</th>
<th>30 June 2014 $'000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total available for sale financial assets</td>
<td>$217,365</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quoted shares</td>
<td>174,163</td>
<td>-</td>
<td>-</td>
<td>174,163</td>
</tr>
<tr>
<td>Fixed interest securities</td>
<td>-</td>
<td>20,666</td>
<td>-</td>
<td>20,666</td>
</tr>
<tr>
<td>Perpetual floating rate securities</td>
<td>-</td>
<td>21,056</td>
<td>-</td>
<td>21,056</td>
</tr>
<tr>
<td>Unit trusts</td>
<td>-</td>
<td>1,086</td>
<td>-</td>
<td>1,086</td>
</tr>
<tr>
<td>Unquoted shares</td>
<td>-</td>
<td>-</td>
<td>394</td>
<td>394</td>
</tr>
<tr>
<td>Total</td>
<td>174,163</td>
<td>42,808</td>
<td>394</td>
<td>217,365</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available-for-sale unquoted equities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opening balance</td>
<td>268</td>
<td>213</td>
</tr>
<tr>
<td>Purchases</td>
<td>145</td>
<td>-</td>
</tr>
<tr>
<td>Revaluation</td>
<td>(19)</td>
<td>55</td>
</tr>
<tr>
<td>Closing balance</td>
<td>394</td>
<td>268</td>
</tr>
</tbody>
</table>
## 10. Property, plant and equipment

<table>
<thead>
<tr>
<th></th>
<th>Buildings</th>
<th>Work in progress</th>
<th>Plant and equipment</th>
<th>Furniture and fittings</th>
<th>Land Lease</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$'000</td>
<td>$'000</td>
<td>$'000</td>
<td>$'000</td>
<td>$'000</td>
<td>$'000</td>
</tr>
<tr>
<td><strong>Gross carrying amount</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Balance at 30 June 2012</strong></td>
<td>176,696</td>
<td>2,713</td>
<td>35,668</td>
<td>1,634</td>
<td>16,200</td>
<td>232,911</td>
</tr>
<tr>
<td>Additions at cost</td>
<td>1,174</td>
<td>393</td>
<td>4,248</td>
<td>36</td>
<td>-</td>
<td>5,851</td>
</tr>
<tr>
<td>Transfers</td>
<td>74</td>
<td>(2,489)</td>
<td>2,415</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Disposals</td>
<td>-</td>
<td>-</td>
<td>(1,645)</td>
<td>(231)</td>
<td>-</td>
<td>(2,100)</td>
</tr>
<tr>
<td><strong>Balance at 30 June 2013</strong></td>
<td>177,944</td>
<td>393</td>
<td>40,686</td>
<td>1,439</td>
<td>16,200</td>
<td>236,662</td>
</tr>
<tr>
<td>Additions at cost</td>
<td>382</td>
<td>3,551</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>3,937</td>
</tr>
<tr>
<td>Transfers</td>
<td>(393)</td>
<td>393</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Disposals</td>
<td>(14)</td>
<td>-</td>
<td>(14)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Balance at 30 June 2014</strong></td>
<td>178,326</td>
<td>-</td>
<td>44,616</td>
<td>1,443</td>
<td>16,200</td>
<td>240,585</td>
</tr>
<tr>
<td><strong>Accumulated depreciation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Balance at 30 June 2012</strong></td>
<td>(14,861)</td>
<td>-</td>
<td>(23,462)</td>
<td>(1,190)</td>
<td>-</td>
<td>(39,513)</td>
</tr>
<tr>
<td>Disposals</td>
<td>-</td>
<td>1,655</td>
<td>231</td>
<td>-</td>
<td>1,886</td>
<td></td>
</tr>
<tr>
<td>Depreciation expense</td>
<td>(4,888)</td>
<td>-</td>
<td>(3,288)</td>
<td>(220)</td>
<td>-</td>
<td>(8,396)</td>
</tr>
<tr>
<td><strong>Balance at 30 June 2013</strong></td>
<td>(19,749)</td>
<td>-</td>
<td>(25,095)</td>
<td>(1,179)</td>
<td>-</td>
<td>(46,023)</td>
</tr>
<tr>
<td>Disposals</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Depreciation expense</td>
<td>(4,901)</td>
<td>(3,678)</td>
<td>(92)</td>
<td></td>
<td></td>
<td>(8,671)</td>
</tr>
<tr>
<td><strong>Balance at 30 June 2014</strong></td>
<td>(24,650)</td>
<td>-</td>
<td>(28,771)</td>
<td>(1,271)</td>
<td>-</td>
<td>(54,692)</td>
</tr>
<tr>
<td><strong>Carrying amounts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As at 30 June 2013</td>
<td>158,195</td>
<td>393</td>
<td>15,591</td>
<td>260</td>
<td>16,200</td>
<td>190,639</td>
</tr>
<tr>
<td>As at 30 June 2014</td>
<td>153,676</td>
<td>-</td>
<td>15,845</td>
<td>172</td>
<td>16,200</td>
<td>185,893</td>
</tr>
</tbody>
</table>

Aggregate depreciation allocated, whether recognised as an expense or capitalised as part of the carrying amount of other assets during the year:

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$'000</td>
<td>$'000</td>
</tr>
<tr>
<td>Buildings</td>
<td>4,901</td>
<td>4,888</td>
</tr>
<tr>
<td>Plant and equipment</td>
<td>3,678</td>
<td>3,288</td>
</tr>
<tr>
<td>Furniture and fittings</td>
<td>92</td>
<td>220</td>
</tr>
<tr>
<td><strong>Total depreciation</strong></td>
<td>8,671</td>
<td>8,396</td>
</tr>
</tbody>
</table>
11. Trade and Other Payables

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Creditors</td>
<td>3,060</td>
<td>4,343</td>
</tr>
<tr>
<td>Accrued Expenses</td>
<td>4,245</td>
<td>1,685</td>
</tr>
<tr>
<td>Current Tax Liability</td>
<td>1,075</td>
<td>121</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8,380</strong></td>
<td><strong>6,149</strong></td>
</tr>
</tbody>
</table>

12. Employee benefits

The aggregate employee benefit liability recognised and included in the financial statements is as follows:

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Provisions*</td>
<td>16,613</td>
<td>15,179</td>
</tr>
<tr>
<td>Non Current Provisions</td>
<td>1,946</td>
<td>1,741</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18,559</strong></td>
<td><strong>16,920</strong></td>
</tr>
</tbody>
</table>

* Included in current provisions are $7.82m (2013: $8.11m) of long service leave for which current entitlement exists.

Number of employees at end of financial year (full time equivalents)

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff</td>
<td>675</td>
<td>659</td>
</tr>
<tr>
<td>Visiting scientists</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>689</strong></td>
<td><strong>674</strong></td>
</tr>
</tbody>
</table>

13. Unearned grants and fellowships

Grants and fellowships already committed and applicable to future periods:

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grants</td>
<td>23,582</td>
<td>19,435</td>
</tr>
<tr>
<td>Fellowships</td>
<td>1,323</td>
<td>1,229</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24,905</strong></td>
<td><strong>20,664</strong></td>
</tr>
</tbody>
</table>

14. Other Liabilities

Monies Held in Trust:

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff Salary Packaging deposits</td>
<td>290</td>
<td>261</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>290</strong></td>
<td><strong>261</strong></td>
</tr>
</tbody>
</table>
## 15. Capital movements

(a) The net surplus for the financial year is $146,805 (2013 - $12,767,026)

This has been appropriated as follows:

<table>
<thead>
<tr>
<th>Fund</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer to Permanent Invested Funds</td>
<td>4,598</td>
<td>13,355</td>
</tr>
<tr>
<td>Transfer to (from) General Funds</td>
<td>(10,159)</td>
<td>(2,618)</td>
</tr>
<tr>
<td>Transfer to Royalty Fund</td>
<td>2,443</td>
<td>472</td>
</tr>
<tr>
<td>Transfer to Leadership Fund</td>
<td>1,135</td>
<td>1,558</td>
</tr>
<tr>
<td>Transfer to Discovery Fund</td>
<td>2,030</td>
<td>-</td>
</tr>
<tr>
<td>Transfer to Centenary Fund</td>
<td>100</td>
<td>-</td>
</tr>
</tbody>
</table>

Total appropriations to funds: 147,12,767

(b) Permanent Invested Funds

Balance at beginning of year: $152,428, $139,073
Deficit for year transferred from income statement: $4,598, $13,355

Total Permanent Invested Funds: $157,026, $152,428

(c) General Funds

Balance at beginning of year: $160,291, $162,909
Deficit for year transferred from income statement: $(10,159), $(2,618)

Total General Funds: $150,132, $160,291

(d) Royalty Fund

Balance at beginning of year: $17,551, $17,079
Deficit for year transferred from income statement: $2,443, $472

Total Royalty Fund: $19,994, $17,551

(e) Leadership Fund

Balance at beginning of year: $17,840, $16,282
Deficit for year transferred from income statement: $1,135, $1,558

Total Leadership Fund: $18,975, $17,840

(f) Discovery Fund

Balance at beginning of year: -
Deficit for year transferred from income statement: $2,030

Total Discovery Fund: $2,030

(g) Centenary Fund

Balance at beginning of year: -
Deficit for year transferred from income statement: $100

Total Centenary Fund: $100

(h) Investment revaluation reserve

Balance at beginning of year: $31,165, $29,086
Valuation gain/(loss) recognised for the year: $20,813, $27,934
Transfers to gain or loss on sale of investment: $(5,215), $(26,118)
Transfers due to loss on impairment: - $263

Total investment revaluation reserve: $46,763, $31,165

Total funds: 395,020, 379,275
16. 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, monies held at trust (salary packaging bank account for staff) 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:

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>2,561</td>
<td>802</td>
</tr>
<tr>
<td>Deposits at call</td>
<td>2,021</td>
<td>7,541</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,582</strong></td>
<td><strong>8,343</strong></td>
</tr>
</tbody>
</table>

Represented by:

Cash for Institute operations (as per Cash Flow Statement)

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash balances not available for use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Monies Held in Trust - Staff Salary Packaging Deposits</td>
<td>292</td>
<td>261</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,582</strong></td>
<td><strong>8,343</strong></td>
</tr>
</tbody>
</table>

(b) Reconciliation of net surplus to net cash flows from operating activities

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net surplus</td>
<td>147</td>
<td>12,767</td>
</tr>
<tr>
<td>Depreciation</td>
<td>8,671</td>
<td>8,396</td>
</tr>
<tr>
<td>Gain on Disposal of Property Plant and Equipment</td>
<td>(8)</td>
<td>-</td>
</tr>
<tr>
<td>Donations and bequests moved to permanent fund</td>
<td>(1,581)</td>
<td>(219)</td>
</tr>
<tr>
<td>Gain on sale of available-for-sale financial assets</td>
<td>(5,324)</td>
<td>(21,598)</td>
</tr>
<tr>
<td>Write down of available-for-sale investments</td>
<td>-</td>
<td>263</td>
</tr>
<tr>
<td>Increase in Investments – dividend reinvestment plans</td>
<td>(678)</td>
<td>(1,895)</td>
</tr>
<tr>
<td>Grants and donations for capital works</td>
<td>(3,204)</td>
<td>(2,105)</td>
</tr>
<tr>
<td>Amortisation of investment premiums</td>
<td>-</td>
<td>98</td>
</tr>
<tr>
<td>Donated Financial Assets</td>
<td>(2,910)</td>
<td>(23)</td>
</tr>
<tr>
<td>Transfer of Capital Work in Progress</td>
<td>-</td>
<td>225</td>
</tr>
<tr>
<td>Prepaid Operating Lease</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>(4,855)</strong></td>
<td><strong>(4,059)</strong></td>
</tr>
</tbody>
</table>

Changes in net assets and liabilities:

(Increase)/decrease in assets:

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax assets</td>
<td>257</td>
<td>(849)</td>
</tr>
<tr>
<td>Sundry debtors and prepayments</td>
<td>(1,111)</td>
<td>186</td>
</tr>
<tr>
<td>Income receivable</td>
<td>(727)</td>
<td>(2,119)</td>
</tr>
<tr>
<td>Net Movement in Monies Held in Trust</td>
<td>(2)</td>
<td>(3)</td>
</tr>
</tbody>
</table>

Increase/(decrease) in liabilities:

<table>
<thead>
<tr>
<th>Description</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade payables</td>
<td>(1,283)</td>
<td>(237)</td>
</tr>
<tr>
<td>Accrued Expenses</td>
<td>2,560</td>
<td>167</td>
</tr>
<tr>
<td>Tax Liabilities</td>
<td>954</td>
<td>121</td>
</tr>
<tr>
<td>Current provisions</td>
<td>1,435</td>
<td>900</td>
</tr>
<tr>
<td>Other current liabilities(Grants)</td>
<td>4,241</td>
<td>7,500</td>
</tr>
<tr>
<td>Non-current provisions</td>
<td>205</td>
<td>122</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,674</strong></td>
<td><strong>1,729</strong></td>
</tr>
</tbody>
</table>

(c) Non-cash financing and investing activities

During the financial year:

Dividends of $678,499 (2013 - $1,894,841) were reinvested as part of dividend and distribution reinvestment plans.
17. Economic dependency

The Institute is reliant upon grants from the Australian Government National Health and Medical Research Council for 46.8% of operating expenditure (2013 - 46.8%) and the Victorian Department of State Development, Business and Innovation for 5.9% of operating expenditure (2013 - 5.7%) for support of its basic research activities.

18. Segment information

The Institute operates predominantly in medical research in Australia.

19. Capital expenditure commitments

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>$'000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not longer than 1 year</td>
<td>-</td>
<td>2,355</td>
</tr>
<tr>
<td>After 1 year but not more than 5 years</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total commitments</td>
<td>-</td>
<td>2,355</td>
</tr>
</tbody>
</table>

20. Key management personnel compensation

The aggregate compensation of the key management personnel of the institute is set out below:

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>$'000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-term employee benefits</td>
<td>1,028,672</td>
<td>1,057,455</td>
</tr>
<tr>
<td>Post-employment benefits</td>
<td>163,054</td>
<td>176,511</td>
</tr>
<tr>
<td>Total</td>
<td>1,191,726</td>
<td>1,233,966</td>
</tr>
</tbody>
</table>

21. 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 administered 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% after tax 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 2014 was 97 (2013 – 101).

(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:

<table>
<thead>
<tr>
<th>Scheme</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>UniSuper – Defined Benefit Division</td>
<td>1,843</td>
<td>1,882</td>
</tr>
<tr>
<td>UniSuper – Accumulation Super (2)</td>
<td>395</td>
<td>405</td>
</tr>
<tr>
<td>UniSuper – Accumulation Super (1)</td>
<td>5,351</td>
<td>4,764</td>
</tr>
<tr>
<td>Other superannuation funds</td>
<td>206</td>
<td>180</td>
</tr>
<tr>
<td>Total</td>
<td>7,795</td>
<td>7,231</td>
</tr>
</tbody>
</table>
22. 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 and financial liability are disclosed in note 1 to the financial statements.

(b) Significant terms, conditions and objectives of derivative financial instruments
The Institute does not enter into or trade derivative financial instruments.

(c) Capital risk management
The Institute 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 Institute. The capital structure consists of permanent funds, retained earnings and reserves.

(d) Financial risk management
The Institute minimises financial risk through the charter given to the investment sub-committee. In line with this charter, the Institute invests short term funds in an appropriate combination of fixed and floating instruments.

(e) Interest rate risk management
The Institute 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 is 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 of the changes in the fair value of available-for-sale fixed rate instruments.

<table>
<thead>
<tr>
<th>Interest rate risk</th>
<th>Minimum 25bp</th>
<th>Maximum 100bp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2014 $000's</td>
<td>2013 $000's</td>
</tr>
<tr>
<td>Effect on surplus</td>
<td>(110)</td>
<td>(126)</td>
</tr>
<tr>
<td>Effect on reserve</td>
<td>49</td>
<td>38</td>
</tr>
</tbody>
</table>

(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 / lower:
- net surplus for the year ended 30 June 2014 would have been unaffected as the equity investments are classified as available-for-sale; and
- investment revaluation reserve would decrease/increase by $8.8 million (2013: $7.3 million) mainly as a result of the changes in fair value of available-for-sale shares.

The Institute’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 Institute. The Institute has adopted a policy of only dealing with creditworthy counter parties as a means of mitigating the risk of financial loss from defaults. The Institute’s exposure is continuously monitored and reviewed. Trade receivables consist of a large number of customers including granting bodies. The Institute 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 Institute’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 Institute’s short, medium and long-term funding and liquidity management. The Institute 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 Institute does not have any interest bearing liabilities. The remaining contractual maturity for its non-interest-bearing financial liabilities is $8.380 million payable within 3 months of 30 June 2014 (2013: $6.149 million).

(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 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 2014 and 30 June 2013.

<table>
<thead>
<tr>
<th></th>
<th>Average interest rate</th>
<th>Variable interest rate</th>
<th>Less than 1 year</th>
<th>1 to 5 years</th>
<th>More than 5 years</th>
<th>Non-Interest Bearing</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>30 June 2014</strong></td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
</tr>
<tr>
<td><strong>Financial assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>2.09%</td>
<td>4,582</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4,582</td>
</tr>
<tr>
<td>Tax assets</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,710</td>
</tr>
<tr>
<td>Sundry debtors and prepayments</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4,754</td>
</tr>
<tr>
<td>Accrued income</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7,847</td>
</tr>
<tr>
<td>Grants Receivable</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,974</td>
</tr>
<tr>
<td>Bills of exchange</td>
<td>3.47%</td>
<td>-</td>
<td>18,310</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18,310</td>
</tr>
<tr>
<td>Fixed interest securities</td>
<td>4.19%</td>
<td>-</td>
<td>17,030</td>
<td>3,637</td>
<td>-</td>
<td>-</td>
<td>20,667</td>
</tr>
<tr>
<td>Shares</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>174,163</td>
</tr>
<tr>
<td>Unit trusts</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1,086</td>
</tr>
<tr>
<td>Perpetual floating rate securities</td>
<td>4.46%</td>
<td>-</td>
<td>9,490</td>
<td>11,566</td>
<td>-</td>
<td>-</td>
<td>21,056</td>
</tr>
<tr>
<td>Non listed shares</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>394</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>258,543</td>
</tr>
<tr>
<td><strong>30 June 2013</strong></td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
</tr>
<tr>
<td><strong>Financial liabilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade payables</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8,380</td>
</tr>
<tr>
<td>Other liabilities</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>290</td>
</tr>
<tr>
<td>Grants carried forward</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>24,905</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33,575</td>
</tr>
<tr>
<td><strong>30 June 2013</strong></td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
<td>$0'000</td>
</tr>
<tr>
<td><strong>Financial assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>1.96%</td>
<td>8,343</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8,343</td>
</tr>
<tr>
<td>Tax assets</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,967</td>
</tr>
<tr>
<td>Sundry debtors and prepayments</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3,643</td>
</tr>
<tr>
<td>Accrued income</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>370</td>
</tr>
<tr>
<td>Grants Receivable</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9,724</td>
</tr>
<tr>
<td>Bills of exchange</td>
<td>4.06%</td>
<td>-</td>
<td>15,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>15,000</td>
</tr>
<tr>
<td>Fixed interest securities</td>
<td>4.70%</td>
<td>-</td>
<td>9,200</td>
<td>6,853</td>
<td>-</td>
<td>-</td>
<td>14,053</td>
</tr>
<tr>
<td>Shares</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>145,882</td>
</tr>
<tr>
<td>Unit trusts</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>974</td>
</tr>
<tr>
<td>Perpetual floating rate securities</td>
<td>5.28%</td>
<td>-</td>
<td>16,504</td>
<td>10,150</td>
<td>-</td>
<td>-</td>
<td>26,654</td>
</tr>
<tr>
<td>Non listed shares</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>268</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>229,876</td>
</tr>
</tbody>
</table>

**Walter and Eliza Hall Institute Annual Report 2013-2014**
### 23. Jointly controlled operations and assets

#### Victorian Comprehensive Cancer Centre Limited

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The member entities have committed to the establishment of a world leading comprehensive cancer centre in Parkville, Victoria, through the joint venture, with a view to saving lives through the integration of cancer research, education and training, and patient care. The Institute’s interest in the above jointly controlled operations is detailed below.

The amounts are included in the financial statements under their respective categories:

#### Assets

**Current Assets**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and cash equivalents</td>
<td>223</td>
<td>169</td>
</tr>
<tr>
<td>Trade and other receivables</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total current assets</strong></td>
<td>231</td>
<td>199</td>
</tr>
</tbody>
</table>

**Non-current Assets**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property, plant and equipment</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total non-current assets</strong></td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

**Share of total assets**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>236</td>
<td>204</td>
</tr>
</tbody>
</table>

#### Liabilities

**Current liabilities**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade and other payables</td>
<td>47</td>
<td>31</td>
</tr>
<tr>
<td>Employee benefits</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total current liabilities</strong></td>
<td>85</td>
<td>68</td>
</tr>
</tbody>
</table>

**Non-current liabilities**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee benefits</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total non-current liabilities</strong></td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

**Share of total liabilities**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>91</td>
<td>73</td>
</tr>
</tbody>
</table>

**Net Assets**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>145</td>
<td>131</td>
</tr>
</tbody>
</table>

**Share of VCCC’s net assets**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>145</td>
<td>131</td>
</tr>
</tbody>
</table>

**Revenue for research activities**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-operative Research Centres</td>
<td>183</td>
<td>182</td>
</tr>
<tr>
<td>Other Australian Government Grants</td>
<td>189</td>
<td>226</td>
</tr>
<tr>
<td>Investment Income - Interest</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total revenues for research activities</strong></td>
<td>378</td>
<td>416</td>
</tr>
</tbody>
</table>

**Expenditure on research activities**

**Support laboratories**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff costs</td>
<td>114</td>
<td>117</td>
</tr>
<tr>
<td>Other expenses</td>
<td>131</td>
<td>168</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>245</td>
<td>285</td>
</tr>
</tbody>
</table>

**Administration**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff costs</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Other expenses</td>
<td>45</td>
<td>65</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>85</td>
<td>110</td>
</tr>
</tbody>
</table>

**Business development**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff costs</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Other expenses</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>33</td>
<td>9</td>
</tr>
</tbody>
</table>

**Total expenditure on research activities**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>363</td>
<td>404</td>
</tr>
</tbody>
</table>

**Surplus from research activities**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
<td>12</td>
</tr>
</tbody>
</table>
24. Contingent liability

As part of the daily management of the Institute’s investment portfolio, transactions are undertaken based on advice of external advisers and authorised personnel. During FY2013, certain authorised transactions were undertaken as part of managing the investment portfolio, resulting in income of $0.658m recognised and received during FY2013.

During the current financial year, these transactions became subject to review by the Australian Taxation Office, the outcome of which may result in a potential repayment of the amount. The matter is in the early stages of review and based on current advice, the Institute may request a Private Binding Ruling to assist in resolving the matter.
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 Institute 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 and Investment 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 2014. 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 2014 are:

<table>
<thead>
<tr>
<th>Name</th>
<th>Joined Board</th>
<th>Meetings held while a Director</th>
<th>Meetings Attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christopher W Thomas</td>
<td>2001</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Chairman and President of the Institute</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steven M Skala AO</td>
<td>1999</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Vice President of the Institute</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roger E Male ¹</td>
<td>1998</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Honorary Treasurer (until April 2014)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robert H Wylie ²</td>
<td>2014</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Honorary Treasurer (from April 2014)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>James A Angus AO ³</td>
<td>2003</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Rufus ER Black ⁴</td>
<td>2013</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Malcolm W Broomhead ⁵</td>
<td>2014</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Michael C Fitzpatrick</td>
<td>2001</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Gareth J Goodier</td>
<td>2012</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Jane S Hemstritch ⁶</td>
<td>2013</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>James McCluskey</td>
<td>2011</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Graham F Mitchell AO</td>
<td>2007</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Terence F Moran AC ⁷</td>
<td>2013</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Linda B Nicholls AO</td>
<td>2001</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Stephen K Smith ⁷</td>
<td>2013</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Catherine M Walter AM</td>
<td>2001</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Ingrid M Winship</td>
<td>2007</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>


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 four times during the year.

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 $1,291,356 (2013 deficit of $2,498,035). After allowing for the surplus arising from 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 $146,805 (2013 – $12,767,026). 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.

Appreciation

The board wishes to extend its appreciation to the members of the various committees (Appointments and Promotions Committee, Human Research Ethics Committee, Investment Committee, Commercialisation Advisory Committee and the Financial Sustainability 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. A table of attendance at the various committees is listed below.
### Committee attendance

#### Audit and Risk Committee
- Ms Linda Nicholls (Chair) 4 4
- Mr Roger Male 4 4
- Mr Steven Skala 4 1

#### Commercialisation Advisory Committee
- Professor Graham Mitchell (Chair) 3 3
- Professor George Morstyn 3 1
- Mr John Raff 3 2
- Professor Doug Hilton 3 0
- Professor Peter Colman 3 2
- Professor Nic Nicola 3 2
- Dr Julian Clark 3 3
- Dr Kurt Lackovic 3 3
- Ms Carmela Monger 3 3

#### Financial Sustainability Committee
- Mr Christopher Thomas (Chair) 5 5
- Ms Sally Bruce 5 4
- Mr Greg Camm 5 1
- Dr Julian Clark 5 2
- Mr Ian Coulson (from May 2014) 1 1
- Mr Michael Daddo 5 2
- Mr John Dyson 5 3
- Ms Penny Fannin 5 5
- Ms Jane Hemstritch 5 0
- Professor Doug Hilton 5 3
- Ms Caroline Johnston 5 5
- Mr Rowan Kennedy (until March 2014) 4 1
- Ms Samantha Ludolf (from November 2013) 3 1
- Mr Steven Skala 5 3
- Ms Kim Tsai (until January 2014) 3 2
- Ms Susanne Williamson 5 4
- Mr Rob Wylie 5 4

#### Human Research Ethics Committee
- Associate Professor Rufus Black (Chair) 7 5
- Dr John Bonacci 7 7
- Dr Vanessa Bryant (on maternity leave) 3 3
- Rev Father Michael Elligate (Deputy Chair) 7 6
- Associate Professor Paul Ekert (until March 2014) 5 3
- Mr David Freeman 7 7
- Professor Geoff Lindeman 7 7
- Mrs Netta McArthur 7 5
- Dr Rachel Nowak 7 6
- Dr Ken Pang (from April 2014) 1 1
- Ms Moira Rayner 7 2
- Associate Professor Louis Schofield 7 3
- Professor Ingrid Winship 7 3

#### Investment Committee
- Mr Roger Male (Chair) 6 6
- Mr Ian Coulson (from June 2014) 1 1
- Mr Stephen Daley 6 2
- Professor Doug Hilton 6 2
- Ms Samantha Ludolf (from November 2013) 3 2
- Mr Stephen Mericke 6 4
- Mr Stephen Milburn-Pile 6 4
- Mr Andrew Scott 6 6
- Ms Fiona Trafford-Walker 6 3
- Ms Kim Tsai (until January 2014) 3 3
- Ms Catherine Walter 6 3
- Mr Peter Worcester 6 2
- Mr Robert Wylie (from June 2014) 1 1
Auditors’ independence declaration

The Auditors’ independence declaration is included on page 25 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

Christopher Thomas  Robert Wylie
President  Treasurer
Melbourne, 18 September 2014

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

Christopher Thomas  Robert Wylie
President  Treasurer
Melbourne, 18 September 2014
The Board of Directors
The Walter and Eliza Hall Institute of Medical Research
1G Royal Parade
Parkville VIC 3052

18 September 2014

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 2014, 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

DELOITTLE TOUCHE TOHMATSU

P A Caldwell
Partner
Chartered Accountants
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 2014, the statement of profit or loss and other comprehensive income, the statement of cash flows and the statement of changes in equity for the year then ended, notes comprising a summary of significant accounting policies and other explanatory information, and the directors’ declaration as set out on pages 1 to 20 and 24.

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 and fair presentation of the financial report, 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.

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:

(a) the financial report of The Walter and Eliza Hall Institute of Medical Research is in accordance with the Corporations Act 2001, including:

(i) giving a true and fair view of the company’s financial position as at 30 June 2014 and of its performance for the year ended on that date; and

(ii) complying with Australian Accounting Standards and the Corporations Regulations 2001; and

(b) the financial statements also comply with International Financial Reporting Standards as disclosed in Note 1.

DELOITTE TOUCHE TOHMATSU

P A Caldwell
Partner
Chartered Accountants
Melbourne, 18 September 2014
### Research revenue

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
<th>2012</th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Government</td>
<td>51,512</td>
<td>52,995</td>
<td>49,962</td>
<td>45,973</td>
<td>39,291</td>
</tr>
<tr>
<td>Victorian Government</td>
<td>6,936</td>
<td>6,771</td>
<td>7,074</td>
<td>6,842</td>
<td>7,638</td>
</tr>
<tr>
<td>Foreign governments</td>
<td>506</td>
<td>472</td>
<td>359</td>
<td>557</td>
<td>953</td>
</tr>
<tr>
<td><strong>Government revenue</strong></td>
<td>58,954</td>
<td>60,238</td>
<td>57,395</td>
<td>53,372</td>
<td>47,882</td>
</tr>
<tr>
<td>Industrial grants and contracts</td>
<td>1,696</td>
<td>1,482</td>
<td>1,114</td>
<td>1,846</td>
<td>3,518</td>
</tr>
<tr>
<td>Philanthropic grants and fellowships – Australia</td>
<td>9,024</td>
<td>6,971</td>
<td>5,285</td>
<td>3,830</td>
<td>3,644</td>
</tr>
<tr>
<td>Philanthropic grants and fellowships – international</td>
<td>6,355</td>
<td>5,376</td>
<td>2,180</td>
<td>3,235</td>
<td>4,399</td>
</tr>
<tr>
<td>Investment income</td>
<td>12,925</td>
<td>13,146</td>
<td>11,280</td>
<td>11,486</td>
<td>9,278</td>
</tr>
<tr>
<td>Royalty income</td>
<td>3,119</td>
<td>828</td>
<td>810</td>
<td>2,513</td>
<td>1,071</td>
</tr>
<tr>
<td>General revenue</td>
<td>3,369</td>
<td>2,819</td>
<td>3,054</td>
<td>2,647</td>
<td>2,761</td>
</tr>
<tr>
<td>Donations and bequests</td>
<td>6,678</td>
<td>4,402</td>
<td>3,043</td>
<td>3,305</td>
<td>958</td>
</tr>
<tr>
<td><strong>Non-government revenue</strong></td>
<td>43,166</td>
<td>35,024</td>
<td>26,766</td>
<td>28,862</td>
<td>25,629</td>
</tr>
<tr>
<td><strong>Total revenue for research</strong></td>
<td>102,120</td>
<td>95,262</td>
<td>84,161</td>
<td>82,234</td>
<td>73,511</td>
</tr>
</tbody>
</table>

### Research expenditure and financial results

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
<th>2012</th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff costs</td>
<td>75,027</td>
<td>69,339</td>
<td>61,559</td>
<td>54,799</td>
<td>48,938</td>
</tr>
<tr>
<td>Laboratory operating costs</td>
<td>17,841</td>
<td>17,650</td>
<td>16,452</td>
<td>15,424</td>
<td>16,310</td>
</tr>
<tr>
<td>Laboratory equipment</td>
<td>2,538</td>
<td>3,487</td>
<td>4,119</td>
<td>2,862</td>
<td>2,474</td>
</tr>
<tr>
<td>Building operations</td>
<td>5,171</td>
<td>5,307</td>
<td>4,746</td>
<td>4,353</td>
<td>4,356</td>
</tr>
<tr>
<td>Administration</td>
<td>1,985</td>
<td>1,162</td>
<td>1,203</td>
<td>1,002</td>
<td>1,225</td>
</tr>
<tr>
<td>Business development</td>
<td>849</td>
<td>815</td>
<td>899</td>
<td>684</td>
<td>879</td>
</tr>
<tr>
<td><strong>Total research expenditure</strong></td>
<td>103,411</td>
<td>97,760</td>
<td>88,978</td>
<td>79,124</td>
<td>74,182</td>
</tr>
<tr>
<td><strong>Results from research activities</strong></td>
<td>(1,291)</td>
<td>(2,498)</td>
<td>(4,817)</td>
<td>3,110</td>
<td>(671)</td>
</tr>
<tr>
<td><strong>Other income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit and loss on sale of long-term assets</td>
<td>5,324</td>
<td>21,600</td>
<td>746</td>
<td>7,712</td>
<td>1,151</td>
</tr>
<tr>
<td>Contribution income for recognition of land lease</td>
<td>-</td>
<td>-</td>
<td>12,782</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Donations and bequests</td>
<td>1,581</td>
<td>219</td>
<td>3,461</td>
<td>1,566</td>
<td>2,120</td>
</tr>
<tr>
<td>Grants and donations for capital works</td>
<td>3,204</td>
<td>2,105</td>
<td>906</td>
<td>117</td>
<td>428</td>
</tr>
<tr>
<td><strong>Total other income</strong></td>
<td>10,109</td>
<td>23,924</td>
<td>17,895</td>
<td>9,395</td>
<td>3,699</td>
</tr>
<tr>
<td><strong>Other expenses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss on impairment write down of long-term investments</td>
<td>-</td>
<td>(263)</td>
<td>(2,333)</td>
<td>(2,945)</td>
<td>(203)</td>
</tr>
<tr>
<td>Depreciation and amortisation</td>
<td>(8,671)</td>
<td>(8,396)</td>
<td>(5,681)</td>
<td>(6,375)</td>
<td>(3,877)</td>
</tr>
<tr>
<td><strong>Total other expenses</strong></td>
<td>(8,671)</td>
<td>(8,659)</td>
<td>(8,014)</td>
<td>(9,320)</td>
<td>(4,080)</td>
</tr>
<tr>
<td><strong>Net operating surplus</strong></td>
<td>147</td>
<td>12,767</td>
<td>5,064</td>
<td>3,185</td>
<td>(1,052)</td>
</tr>
</tbody>
</table>

### Capital funds

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2013</th>
<th>2012</th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent invested capital funds</td>
<td>157,026</td>
<td>152,428</td>
<td>139,073</td>
<td>134,457</td>
<td>129,802</td>
</tr>
<tr>
<td>General funds</td>
<td>150,132</td>
<td>160,291</td>
<td>162,909</td>
<td>138,752</td>
<td>90,534</td>
</tr>
<tr>
<td>Royalty fund</td>
<td>19,994</td>
<td>17,551</td>
<td>17,079</td>
<td>16,788</td>
<td>14,823</td>
</tr>
<tr>
<td>Leadership fund</td>
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<td>15,873</td>
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<td>Discovery Fund</td>
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<td>-</td>
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<td>Centenary Fund</td>
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<td>31,165</td>
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<td>38,812</td>
<td>37,961</td>
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<td>379,275</td>
<td>364,429</td>
<td>344,991</td>
<td>288,993</td>
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### Capital expenditure

<table>
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<tr>
<th></th>
<th>2014</th>
<th>2013</th>
<th>2012</th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property, plant and equipment</td>
<td>3,937</td>
<td>5,852</td>
<td>43,348</td>
<td>53,579</td>
<td>64,516</td>
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<td><strong>Staff numbers:</strong> (equivalent full-time) at 30 June</td>
<td>2014</td>
<td>2013</td>
<td>2012</td>
<td>2011</td>
<td>2010</td>
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<td>Scientific research staff:</td>
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<tr>
<td>– Senior faculty</td>
<td>78</td>
<td>76</td>
<td>64</td>
<td>64</td>
<td>52</td>
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<tr>
<td>– Postdoctoral scientists</td>
<td>197</td>
<td>186</td>
<td>160</td>
<td>147</td>
<td>143</td>
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<tr>
<td>– Visiting scientists</td>
<td>14</td>
<td>15</td>
<td>10</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>– Other laboratory research staff</td>
<td>265</td>
<td>268</td>
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<td>246</td>
<td>245</td>
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<td>Supporting staff:</td>
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<tr>
<td>– Other support services</td>
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<td>129</td>
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<td><strong>Total staff and visiting scientists</strong></td>
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<td>674</td>
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<td>Papers published</td>
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<td>298</td>
<td>284</td>
<td>250</td>
<td>249</td>
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## 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, 2014.

*New donations of capital received in current financial year.

<table>
<thead>
<tr>
<th>Fund Name and Description</th>
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<td>Adair John Bequest (ex MF)</td>
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<tr>
<td>Anonymous – Victoria</td>
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<td>Attwell Samuel E Estate</td>
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<td>Brittain W &amp; VI Mem Fund</td>
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<td>Burnet Sir Macfarlane Estate</td>
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<td>Duncan PH Estate</td>
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<td>Grubb Walter Joseph Estate</td>
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**Note:** The information provided is a snapshot of the financial statements as of 30 June, 2014, and may not reflect the most current financial data. For the most up-to-date information, please refer to the institute’s annual report or financial statements.
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<thead>
<tr>
<th>Name of Estate</th>
<th>Amount ($)</th>
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<td>Muller FG Estate</td>
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<td>Newton Evelyn</td>
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<td>Scott Annie May Estate</td>
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<td>Sharp II Estate</td>
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<td>Shaw Eileen Coryn Estate</td>
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<td>Shelton Edgar Estate</td>
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<td>Sidwell OB Estate</td>
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<tr>
<td>Skinner Phyllis May Estate</td>
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</table>

Financial Statements

Financial Statements

2013-2014
### Fellowship and Scholarship Funds

<table>
<thead>
<tr>
<th>Fund Name</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Carty EM</td>
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<td>Mackay Dr Ian Fellowship Fund</td>
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<td>Moffatt Edith Scholarship Fund</td>
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<td>*Paddy Pearl Fund</td>
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<td>Skea Lyndal and Jean Leukaemia Fund</td>
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<td>Syme Colin Fellowship Fund</td>
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<td>Wilson Ed Memorial Fellowship</td>
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### Other Funds

<table>
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<th>Fund Name</th>
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<td>*Anonymous Seminar Award</td>
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<tr>
<td>Balderstone Award</td>
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<tr>
<td>Gideon Goldstein Fund</td>
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<td>*Bev Gray Scholarship Fund</td>
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<td>Mckay C N Fund</td>
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<td>The following Estates in which the institute</td>
<td></td>
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<tr>
<td>had an interest, were managed during</td>
<td></td>
</tr>
<tr>
<td>the year by Trustees. (Income received by</td>
<td></td>
</tr>
<tr>
<td>the institute in the financial year is treated</td>
<td></td>
</tr>
<tr>
<td>similarly to donations and bequests):</td>
<td></td>
</tr>
<tr>
<td>The Baldy Trust Fund</td>
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<tr>
<td>CH Boden Memorial Trust</td>
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<tr>
<td>John Frederick Bransden Memorial Fund</td>
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<tr>
<td>Frank Broadhurst Estate</td>
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<tr>
<td>Thomas, Annie &amp; Doris Burgess Charity Trust</td>
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<tr>
<td>George Collie Estate</td>
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<tr>
<td>Miss EM Drummond Estate</td>
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<tr>
<td>Frederick and Winfred Grassick Memorial Fund</td>
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<tr>
<td>The Helpman Family Foundation</td>
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<tr>
<td>The Mackie Bequest</td>
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<tr>
<td>Irene and Ronald MacDonald Foundation</td>
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<tr>
<td>Albert H Maggs Charitable Trust</td>
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<tr>
<td>Mrs AM Reilly</td>
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<td>Miss ML Reilly</td>
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<td>The Stang Bequest</td>
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<td>Emily Vera Winder Estate</td>
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<td>Florence Mary Young Charitable Trust</td>
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</table>

### Leadership Fund

The Leadership Fund was established in honour of Professors Gustav Nossal, Donald Metcalf, Jacques Miller and Suzanne Cory 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 2014 included the following permanent funds ($10,000 and over):

<table>
<thead>
<tr>
<th>Fund Name</th>
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<tbody>
<tr>
<td>Sir Harold Dew and Family Estate</td>
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<td>Chugai Pharmaceutical Co Ltd</td>
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<td>The Ian Potter Foundation</td>
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<td>Anonymous</td>
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<tr>
<td>Anonymous</td>
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<td>Eunice L Lambert Estate</td>
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<td>The Sidney Myer Fund</td>
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<td>The R &amp; J Law-Smith Gift</td>
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<td>Arthur Andersen &amp; Co Foundation</td>
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<td>Arthur Robinson &amp; Hedderwicks</td>
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<td>C M Walter</td>
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</tbody>
</table>
100 years of discoveries for humanity

In 2015 Australia’s oldest medical research institute, the Walter and Eliza Hall Institute, celebrates 100 years of discoveries for humanity.

Over the past 100 years, more than 20 million people around the world have benefited from our discoveries. These discoveries included improved cancer treatments, protecting people against influenza and reducing death from snakebite.

Today more than 100 clinical trials are underway based on institute discoveries, including anti-cancer drugs to treat leukaemia and vaccines for coeliac disease, type 1 diabetes and malaria.

A shared success story

For 100 years our success has been a shared journey supported by thousands of donors, many of whom have made gifts to the institute in their will. It is these gifts that have funded innovative blue-sky research, the challenging initial phase of drug discovery and the early work of our most promising young scientists.

Together we can ensure future generations of Australians continue to benefit from world-class medical research and treatments.

For more information contact:
Walter and Eliza Hall Institute of Medical Research
1G Royal Parade Parkville VIC 3052
T: 03 9345 2962
E: williamson.s@wehi.edu.au
W: www.wehi.edu.au

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