Our Vision is to improve human health through excellence in medical research.

Our Mission is to discover and bring to use novel therapeutics and diagnostics.

Our Values are Excellence, Relevance and Commitment.

Our Focus is cancer, cardiovascular and infectious diseases.

Our Approach is understanding molecules and cells and applying these to diseases.

Ultimately medical researchers want to make discoveries and bring them to clinical use. Our vision reflects this.

The Centenary Institute has a highly specialised set of skills to achieve this mission: we excel at understanding how cells and molecules work and applying this knowledge to diseases.

In particular we excel at understanding the genetic basis of disease causation and how the process of inflammation drives disease processes. This specialised knowledge is then applied to three chief areas: cancer, cardiovascular and infectious diseases.

In cancer we have projects specific for prostate cancer, liver cancer, breast cancer, melanoma and leukaemia and in addition, projects that stand to improve treatment and diagnostics for all solid cancers by altering their blood supply.

In cardiovascular disease we have projects identifying the genes causing sudden death in the young, aortic aneurysms in the middle years and atheroma (causing stroke and heart attacks) in the elderly.

In infectious diseases we focus on tuberculosis and liver infections, chiefly hepatitis B and C.

Two crucial sets of interactions drive our success. Firstly our projects are intensely co-related and collaborative: infectious diseases cause inflammation and cancer, cardiovascular diseases have major genetic and inflammatory components, gene-based therapies are effective for cancer and cardiovascular disease.

Second, many of us are clinicians at Royal Prince Alfred Hospital, our immediate neighbour, and there is a constant interchange between our research work and what we observe in the clinic – a synergy of effort towards clinical needs.
For almost thirty years, the Centenary Institute has been contributing to major improvements in human health by its first-class medical research, both basic and translational. As this annual report shows, the Institute’s proudrecord is being maintained and we believe will be enormously enhanced by our associations with two of our new and immediate neighbours – the Charles Perkins Centre and the Chris O’Brien Lifehouse.

With funding from the Australian Cancer Research Foundation, this new Cancer Research Centre will bring together research excellence from the Centenary and clinical excellence from Chris O’Brien Lifehouse in the Charles Perkins Centre, thus allowing a truly remarkable tripartite collaboration.

Our vision over the next decade is to continue to maximise the opportunity that comes from our strong clinical and laboratory skills and our central location to collaborate in discoveries that reveal the insights into diseases and lead to improvements in health. Our Governor, Faculty, and Scientific Advisory Board have been working with the help of PricewaterhouseCoopers and Julian Clark Consulting to achieve this goal.

One initiative is the hosting of an international scientific Symposium, entitled, The Future of Experimental Medicine in Sydney, March 2014. The Symposium will focus on the application of research into ageing and inflammation to clinical ends. It will bring together global leaders in their field of research and encourage international collaborations and help sharpen our research focus over the next decades.

Another major initiative of which Centenary is a committed partner is Sydney Research that brings together research performed in the Sydney Local Health District. Sydney Research will not only fuel the structural collaboration needed for success in the next decades but also expand the areas needed for immediate and lasting clinical impact.

On the national level, the Centenary Institute Lawrence Creative Prize is now seen as one of the key efforts in promoting and retaining people in medical research within Australia. Our mission is to discover and bring to use novel therapeutics and diagnostics and our vision is to improve human health through excellence in medical research – the exciting pace of our science in 2013 delivered well beyond this. This year we achieved breakthrough, internationally lauded, discoveries for several diseases on a molecular and cellular level, and we continued to make significant steps towards their translation. Our research highlights include characterisation of a novel cell type in the skin that controls inflammation, our discovery that junk DNA has a key role in controlling blood cancer, and the development of microRNAs as a novel therapeutic to improve the treatment of leaky blood vessels in eye disease.

Our Annual Meeting was addressed by Professor Ian Frazer AC, Executive Director of the Translational Research Institute in Brisbane. He is also on our Scientific Advisory Board. Ian, having served on the McKeon Review of Medical Research, has a global view of the needs and challenges the discipline is facing and how these apply to our environment – special thanks to Ian for being our guest of honour.

This year, we farewell Neil Lawrence an outstanding board member and our inaugural Foundation Chairman and we welcome Elizabeth Dibbs and Deborah Wilcox to our board of highly skilled and experienced leaders.

We farewell Assistant Director, Geoff Britton as Assistant Directors.

A special thank you to each one of our Governors, Faculty, Staff and Foundation members, and our superb scientific support team headed by Nick Pearce, for their contribution in making 2013 a successful year.
The Hon Michael Egan AO (Chairman)
Appointed Governor in October 2005
Mr Egan, a former Treasurer of NSW (1995-2001), is Chancellor of Macquarie University, Chairman of the Australian Fisheries Management Authority Commission, Chairman of the Newcastle Coal Infrastructure Group Pty Ltd and a member of the Council of NHMRC. During his 25-year parliamentary career Mr Egan held several ministerial positions.

Mr John Samaha (Deputy Chairman)
Appointed Governor in 2003
Mr Samaha leads the Australian litigation and contentious regulatory practice of global law firm Allen & Overy. He has represented many leading financial institutions and corporations, as well as executives, from a wide range of sectors, especially banking, wealth management, financial markets, resources, real estate, IT and telecommunications.

Mr Alastair Davidson
Appointed Governor in 2004
Mr Davidson has held executive positions in the banking and financial services industry for over 30 years in the UK, US and Australia and is a member of the Institute of Chartered Accountants in Scotland. He is an Executive of Australasian Wealth Limited, a listed asset manager, in Sydney, and a non-executive Director of Biotech Capital.

Ms Elizabeth Dibbs
Appointed Governor in 2013
Ms Dibbs held senior legal positions throughout her career, including General Counsel of PricewaterhouseCoopers prior to her retirement. Ms Dibbs now focuses her energy on the not-for-profit sector. She is a member of the Board of Trustees of the University of Western Sydney, a Director of United Way Australia, a Council member of Chief Executive Women.

Dr Teresa Anderson
Appointed Governor in 2007
Dr Anderson is Chief Executive of the Sydney Local Health District with over 30 years experience in the public health system as a clinician and manager. Dr Anderson is a Board member for eight organisations including the ANZAC Research Institute, Ingham Institute, Inner West Sydney Medicare Local and Health Research Institute.

Mr Joseph Carrozzi
Appointed Governor in 2008
Mr Carrozzi is a Managing Partner at PricewaterhouseCoopers (PwC). He is admitted as a Barrister at Law in NSW, a Fellow of the Institute of Chartered Accountants in Australia and a Fellow of the Tax Institute of Australia. Joseph is also Chairman of Australia’s Italian Chamber of Commerce and Industry, and a 2015 Asian Cup Board member.

Mr Graham Kelly
Appointed Governor in 2006
Mr Kelly is non-executive Chairman of listed SGI Property Group and a Director of Harness Racing NSW. He has been non-executive Chairman of various other listed companies, including FAL Limited. He was formerly a Partner of law firm Freeths and was an Inspector of ICAC, and a Director of the Medical Research and Compensation Foundation.

Mr Neil Lawrence
Appointed Governor in 2006
Resigned in 2013
Neil Lawrence is the founder and CEO of Lawrence Creative Strategy and the Executive Creative Director of STW Group, Australia’s largest communications group. He was recognised as Australian Marketer of the Year in 2007 for the Kevin 07 advertising campaign and has represented Australia on the film jury at Cannes.

Dr Susan Pond AM
Appointed Governor in 2009
Dr Pond AM, FTSE is Chair of the Australian Initiative for Sustainable Aviation Fuels, Adjunct Professor of the United States Studies Centre at the University of Sydney, and Vice President of the Academy of Technological Sciences and Engineering. Dr Pond is a Board member of ANSTO, Innovation Australia and Biotron Ltd.

Dr John Horvath AO
Appointed Governor in 2007
Professor Horvath was the Commonwealth Chief Medical Officer from 2003 to 2009 and is a Fellow of the Royal Australasian College of Physicians. Professor Horvath is currently overseeing the Australian Government’s review of Medicare locals and sits on the boards of Crown Limited and the Garvan Institute of Medical Research.

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Appointed Governor in 2007
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Dr Matthew Vadas
Appointed Governor in 2007
Professor Vadas followed his medical training with a PhD at the Walter and Eliza Hall Institute in Melbourne and postdoctoral work at Harvard. He was the inaugural Director of the Hanson Centre for Cancer Research (now Hanson Institute) in Adelaide and has been the Executive Director of Centenary Institute since 2007.

Mr Neil Lawrence
Appointed Governor in 2006
Resigned in 2013
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Ms Josephine Sukkar
Appointed Governor in 2011
Ms Sukkar is co-owner and Principal of construction company Bullock. She is a Director of YWCA NSW, Opera Australia and the Sydney University Football Club Foundation. She served as a Director of The Trust Company from 2010-2013, and is also involved with the Museum of Contemporary Art, Sir John Monash Foundation and the Australian Rugby Union.


CENTENARY INSTITUTE MEDICAL RESEARCH FOUNDATION

The Centenary Institute Medical Research Foundation is Centenary’s ‘voice’ in the community. The Foundation fosters community support and promotes the life changing research being carried out by the Institute’s bold and innovative scientists.

Through the Foundation’s Fundraising Committee and Young Centenary Foundation the Institute’s scientific research is promoted and community and corporate introductions are facilitated to engage with the Institute.

Whether your support of Centenary is as a regular donor, through an annual donation, hosting a community fundraiser, giving a gift in memory or celebration or as a supporter of our fundraising events and committees, each and every individual and organisation who contributed to our efforts this year made a direct impact on the future health of our nation.

“A caring community benefits the individual, the community as well as our greater society – to each and every donor, supporter and individual who has believed in the work of the Foundation and the Institute during the past year – I thank you.”

Joseph Carrozzi, Chair

FOUNDATION FUNDRAISING COMMITTEE

The fundraising committee’s purpose is to inspire the community to support the Centenary Institute’s great scientists in their important work. The committee’s membership is a dedicated and committed group of professionals who generously volunteer their time and resources throughout the year.

During 2013, the committee raised over $150,000. They hosted their annual dinner which directly contributed to Centenary’s Biobinformatics program as well as their annual ‘Soiree with Scientists’ – an intimate evening of music, art, wine and science that not only raised funds for Centenary but introduced new supporters to Centenary and our work.

“Beginning a conversation or celebration or as a supporter of our fundraising events and committees, we are introducing new supporters to Centenary and our work.

As young people, we often see ourselves as invincible. But we aren’t. The volunteers that make up YCF realised that if we want to protect, maintain and improve our health, then we need to do our bit to support organisations like the Centenary Institute. Philanthropy isn’t normally a past-time of the young, and that is something that we want to turn around.”

Erin May, Chair

YOUNG CENTENARY FOUNDATION

The Young Centenary Foundation was established in 2011 to raise funds and awareness for the Centenary Institute within a younger demographic, and to support the development and work of Centenary’s young, early-career scientists.

Members of the committee have developed and executed a series of sell-out fundraising events, that have ranged from pop-up living room gigs to comedy shows with top Australian and international comedians. The events produced are young, cool and fun, and revolve around activities that this demographic is already engaged with.

The funds raised by the YCF through their events each year are used to recruit and retain the best young medical research scientists at Centenary and to buy their supplies. In 2013 the YCF awarded four $5,000 grants to young inspiring scientists working across haematological cancers, the role of skin in the immune system, experimental melanoma therapy, and acute myeloid leukaemia.

“Beginning a conversation or celebration or as a supporter of our fundraising events and committees, we are introducing new supporters to Centenary and our work.

As young people, we often see ourselves as invincible. But we aren’t. The volunteers that make up YCF realised that if we want to protect, maintain and improve our health, then we need to do our bit to support organisations like the Centenary Institute. Philanthropy isn’t normally a past-time of the young, and that is something that we want to turn around.”

Erin May, Chair
COMMUNITY FUNDRAISING

Community fundraising has become the lifeblood of many not-for-profit organisations. Committed and enthusiastic fundraisers not only raise invaluable funds for Centenary, they are excellent advocates for promoting awareness of who we are and explaining our work and vision. They engage their family, friends and the extended community in ways we cannot and most of our community fundraisers have a direct personal experience with the impact of disease that they are able to share – giving real meaning to their enormous efforts.

To all those individuals, their family, friends and community who supported us throughout the year by organising or participating in a community fundraising event we thank you for your energy and hard work – you have all directly contributed to Centenary’s capacity to discover, understand and improve the health of all Australians.

This year we would like to share one such story with you – that of Sophie Quist and her family.

CITY2SURF FUNDRAISER

Sophie Quist

Sophie Quist entered the City2Surf in 2013 with a goal of raising $25,000 for the Centenary Institute Liver Injury and Cancer Research team. Through her passionate support for research, she raised well over that amount ($28,099) through generous donations from 169 of her family and friends.

Sophie said “I want to continue to support Liver Research in memory of my father. The Centenary Institute has recruited one of the world’s most highly qualified researchers and specialist clinicians to find out what causes liver disease and how to control it. Professor Geoff McCaughan and his liver team at The Royal Prince Alfred Hospital gave my father an extra 12 years of life and I will forever be grateful to them. “I can’t remember a week in my life where Dadda didn’t visit a doctor. They kept him in check through days of health and illness and although he dreaded the thought of another appointment, he loved all his doctors for who they were, he trusted them and built these wonderful friendships that often were completely disconnected from illness.”

Throughout his journey, one of the most major procedures he had was a liver transplant in 2001. The liver transplant gave him an extra 12 years of life and I will forever be grateful to them.”

The importance of liver research to me is immeasurable.”
AGEING

Dr Masaomi Kato, Research Officer

More than 20% of the world’s population will be over 60 years of age by 2050. Our research is focused on understanding the biology of ageing and the discovery of therapeutics to ensure healthy ageing.

Healthy ageing starts with healthy behaviours in earlier stages of life – these include what we eat, how physically active we are and our levels of exposure to health risks such as those caused by smoking, harmful consumption of alcohol, or exposure to toxic substances.

All organisms have the ability to resist and adapt appropriately to internal and external stresses, such as reactive oxygen species or exposure to UV, to maintain homeostasis throughout their lifetimes. The hallmark of ageing is an inability to adapt and respond and withstand stress-induced errors and damage.

We aim to better understand the genetic frameworks for stress response as a first step to gaining insight into our healthy ageing. Our model organism, the nematode, C. elegans is ideal for testing our hypotheses as it has a relatively short lifespan, provides powerful genetics and shares many age-related issues with human.

Our goal is to identify key molecular targets for therapeutic intervention – ultimately a cure – for ageing and age-associated diseases such as diabetes, cancer and neurodegenerative disorders.

“Is ageing a disease? We hope to answer this most important question in biology in an effort to ensure healthy ageing in our global ageing population.”

Dr Masaomi Kato, Research Officer

BIOINFORMATICS GROUP

Dr William Ritchie, Associate Faculty

Cancer, dementia and cardiovascular disease are all serious health problems that are heavily reliant on supercomputers and complex equations to discover better treatment and diagnostic solutions.

At Centenary, bioinformatics is computing power that accelerates basic research toward the development of improved disease therapies and diagnostics.

Research and analysis that takes years in the laboratory can be conducted rapidly within minutes to hours using bioinformatics tools.

How we do biomedical research has fundamentally changed because the amount of biomedical data being created is growing faster than the power of computers and the internet. The latest approach to biomedical research is programming computers to train themselves so that they can autonomously go through massive datasets to detect new treatments and disease biomarkers.

In the next decade, we believe that patient diagnosis for diseases such as cancer or dementia will be performed by computer-aided genomics tests. Already, this type of computer disease diagnosis is undertaken overseas and Australia is not far behind.

“Believe that clinical diagnosis, treatment and research can and will be turbocharged by computer science and machine-learning.”

Dr William Ritchie, Associate Faculty

HIGHLIGHT

We have found new microRNAs that have important roles in the oxidative stress response and lifespan regulation in our model organism C. elegans. Our next studies aim to determine how they contribute to longevity by modulating stress response.

STAFF

Research Officer
Masaomi Kato
Research Officer
Jiao Yuan (Tom May)
Research Assistant
Kato Rumi

DISCOVER

Discover the role of FOXO in lifespan determination. Recent studies across multiple human cohorts suggest the importance of an evolutionary conserved transcription factor, FOXO, in human longevity. In our C. elegans model, the stress-dependent activation of FOXO is essential for normal stress survival. Our studies revealed that terminating the activity of FOXO at correct time as well as its activation is critical for normal stress survival. We have isolated novel mutants that affect the process of deactivation of FOXO, and are currently investigating its importance in stress survival and lifespan determination.

UNDERSTAND

Understanding the molecular basis of stress response and ageing. We are studying the molecular mechanisms of stress response and ageing using our simple model organism, the nematode C. elegans. C. elegans provides unique features with its powerful genetics, ease-of-handling and genetic conservation, enabling the first discoveries of longevity genes. We are investigating microRNAs that are a critical regulator in gene expression. MicroRNA may serve as a key player in a robust adaptive response against stress with its fine-tuning capability by controlling several hundreds of target genes. We are focusing on stress responsive microRNAs and their in vivo role in stress response and ageing.

IMPROVE

Improving the ageing process by preventing oxidative stress. Reactive oxygen species (ROS) are formed as a natural by-product of the normal metabolism of oxygen in the body, such as mitochondrial respiration, but the increase in the accumulation of ROS gives damage to genome and cellular functions, which is known as oxidative stress. Maintaining the ability to respond to oxidative stress is critical to facilitate healthy ageing. We have identified microRNAs that have important roles in oxidative stress response, and we are currently studying genetic pathways in which they are involved.

DISCOVER

Novel computer program discovers suicide sequences in our DNA. We discovered that suicide sequences regulate normal blood cell differentiation and can be linked to numerous blood diseases including leukaemia. By applying computer theory to replace assumptions about cell biology, we were able to reveal sequences within genes that cause the cell to eliminate them – we termed these suicide sequences. Suicide sequences were previously thought to be void of information with no impact on the genes that harbor them.

UNDERSTAND

Understanding disease by breaking down the DNA code. MicroRNAs are miniscule pieces of DNA often termed ‘micro-managers’, since they are responsible for numerous cancers, neurodegenerative diseases and heart disease. MicroRNAs are arguably the best candidates for novel therapies because they can be easily modified for a beneficial impact on cells. We have applied a code-breaking method called ‘Maltesian Chains’ to find unusually frequent patterns in the DNA code that are likely to be important for the cell. We are applying this technique to find therapeutic targets in the human genome.

IMPROVE

Genetic signature of disease may lead to improved personalised medicine. If we could identify a unique genetic signature for every disease, it would be possible to enable the prediction of outcomes. Disease conditions can take different paths depending on the genetic environment and thus require a different personalised medical approach. We are using bioinformatics approaches to probe for such signatures within the specific diseases studied at the Centenary. For example, working with the Centenary’s cancer researchers, we were able to identify genes involved in blood cell development to help understand the mechanisms of leukaemia – the long-term goal to develop personalised medicine.
GENE AND STEM CELL THERAPY

Professor John Rasko AO, Faculty

In Australia, an estimated 128,000 new cases of cancer were diagnosed this year, with that number set to rise to 150,000 in 2020. With the growing burden of cancer in Australia, developing new approaches to cancer treatment is critical.

Our Gene and Stem Cell Therapy group is focused on better understanding regenerative medicines to develop effective treatments for cancer, heart disease and genetic diseases. Regenerative medicine is the process of replacing or regenerating human cells, tissues or organs to restore or establish normal function.

In the laboratory, we are focused on identifying the triggers that switch genes on and off in cancer cells with the long-term goal of developing new cancer therapies. In the clinic, our bone marrow transplant cancer patients benefit from our research into increasing cell numbers prior to transplantation.

By integrating Centenary’s bioinformatics expertise into all of our research areas, we have significantly increased the outcomes of our research in the lab.

“I am proud to be working with a vibrant team of researchers who have laboured hard and we hope to find new therapeutic targets in diseases like leukaemia and cancer.”

Professor John Rasko AO, Faculty

STAFF

Faculty
John Rasko
Associate Faculty
Jack Heale
Associate Faculty
William Ritchie
Senior Research Officer
Chuck Bailey
Research Officer
Amy Murphy
Research Officer
Justin Wang
Research Officer
Kevin Wang
Research Officer
Katherine Lau (May-Oct)
Editorial Research Officer
Carl Power
Research Assistant
Yue Feng
Research Assistant
Fiona Guan
Research Assistant
Jane Gordon
Research Assistant
Keren Weiss
Medical Student
Mel Ooi
Honours Student
Annis Moon
Visiting Researcher
John Doan
Visiting Researcher
Alice Klein
Visiting Researcher
Lyn Moir

HIGHLIGHT

We discovered an entirely new layer of complexity that controls the exquisite balance of gene expression that is functioning in our body’s cells. The new mechanism by which genes are switched off in normal white blood cells may provide new therapeutic opportunities to target diseases like cancer, as published in Cell.

DISCOVER

Discovering new ways to target blood cancer. Our research team has discovered an entirely new mechanism by which genes are switched off in normal white blood cells – this may lead to new therapeutic targets for cancer and leukaemia. The hidden mechanism was revealed through understanding a new function of the mysterious ‘junk DNA’ which makes up by far the majority of our genetic material. We realised that many genes use a ‘molecular trash can’ that is activated by genetic ‘junk’ called ‘introns’ to dispose of unwanted gene expression.

UNDERSTAND

Understanding how cancer cells work. Cancer is caused by the accumulation of mutations (errors) in our DNA. Cancer causing mutations activate oncogenes or inactivate tumour suppressor genes. Multiple DNA mutations lead to the development of cancer. One tumour suppressor gene called CTCF is a DNA binding protein that is important for normal organisation of the chromosomes, found in our chromosomes. Mutations and deletions of the CTCF gene occur in many cancer types including blood cancer. We are working to understand how CTCF functions in normal cells, and how changes in the CTCF gene lead to cancer development.

IMPROVE

Improving cancer therapies. Cancer cells exhibit uncontrollable growth in the body; cellular nutrients must be imported into a cancer cell to sustain this growth. We are studying how cancer cells obtain these nutrients. We have discovered that various pumps responsible for nutrient uptake are increased in different cancer types. This year, we revealed that blocking these pumps in prostate cancer cells reduces the growth of the cancer. Our research is now determining ways to improve cancer therapies by blocking these nutrient pumps, thereby starvking the cancer cells.
**IMMUNE IMAGING**

Professor Wolfgang Weninger, Faculty

Australia is currently experiencing a dramatic increase in the number of severe skin conditions such as atopic dermatitis, psoriasis and skin cancer. Skin cancer takes the lives of 2,000 Australians each year, many being young adults. Skin diseases affect people of all ages. Up to 30% of Australian children suffer from the debilitating red rashes – atopic dermatitis. Psoriasis affects up to 3% of the population and can negatively impact a person’s quality of life.

The immune system plays an important role in the skin as our first defense line against pathogens and cancer cells, and as a regulator of the wound healing response. In contrast, overreaction of the immune system can lead to skin allergies, for instance atopic eczema, or autoimmune diseases, such as psoriasis.

By better understanding how the immune system causes these skin diseases, we hope to develop new therapies that will improve a patient’s quality of life and in the case of melanoma, save the lives, of Australian children and adults.

“Skin diseases carry a huge socio-economic burden. Understanding the cellular and molecular basis of skin diseases, including allergies and cancer, will lead to new treatments that improve the quality of life of all Australians.”

Professor Wolfgang Weninger, Faculty

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**LIVER IMMUNOLOGY**

Dr Patrick Bertolino, Faculty

Liver diseases caused by viral hepatitis represent a huge health burden with hepatitis B & C infection together costing the public health system over $450 million per year.

In Australia, over 300,000 people have been infected with the hepatitis C virus (HCV). Untreated, the long-term consequences of chronic hepatitis C are very serious including liver cancer, cirrhosis and liver transplant.

In the case of the hepatitis B virus, over 218,000 Australians are chronically infected with the virus, which leads to similar complications as HCV.

By 2020, the financial and human cost for HCV will significantly increase as the number of Australians with hepatitis C related liver disease is predicted to triple.

Our group is committed to understanding the unique relationship between the liver and the immune system. More specifically, we have discovered how the liver induces immune tolerance and we hope to utilise this discovery to develop an alternative new drug to immune suppression drugs that often have side effects for transplant patients.

“My research is important to me as it reveals the molecular mechanisms underlying a range of serious liver conditions, and ultimately it will help save the lives of patients suffering from these diseases.”

Dr Patrick Bertolino, Faculty
LIVER INJURY AND CANCER

Professor Geoff McCaughan, Faculty

In Australia, 20 lives are lost every day to chronic liver disease. Deloitte’s nation-wide study revealed that liver disease affected over six million Australians (over a quarter of our population) in 2012.

Our Liver Injury and Cancer group is a team of about 20 scientists and clinicians at the forefront of dealing with the growing problem of liver disease. The group leaders are Geoff McCaughan, Mark Gorrell, Nick Shackel and Devanshi Seth.

Our preclinical research revealed a key enzyme that may be important for future cancer therapeutics.

HIGHLIGHT

We are leading a multi-national consortium of eminent researchers to discover genes that put heavy drinkers at risk of severe alcohol induced liver damage. Our preclinical research revealed a key enzyme that may be important for future cancer therapeutics.

STAFF

Professor Geoff McCaughan
Assistant Professor Devanshi Seth
Associate Professor Mark Gorrell
Associate Professor Nick Shackel
Senior Research Officer Fiona Warner
Research Officer Annette Maczurek
Research Officer Fiona Keane
Research Officer Annette Maczurek
Research Officer Annette Maczurek
Research Officer Annette Maczurek
Research Assistant Bangkok Budinska
Research Assistant Vujan Cen
Research Assistant Anthony Liew
Research Assistant Elizabeth Hannah
Research Assistant Karen Voel
Research Assistant Hue Emlyn Zhao
Research Assistant Margaret Gebi
Research Assistant William D’Avidgar
Research Assistant Sarah Chang
Research Assistant Carlo Pugliano
Honours student Anthony Jiang
Honours student Linda Ban
Honours student Paixion Wong

IMPROVE

Biomarkers for liver cancer improve individual patient outcomes.

Liver cancer is a leading cause of cancer death with limited treatment options and poor outcomes. We have found a novel biomarker of liver cancer that predicts the prognosis of advanced liver cancer. Additionally, we showed Fibroblast Activation Protein, a molecule we have studied for many years, is a useful biomarker in serum to stratify patients with fatty liver disease into severe and non-severe spectrum. The use of both these biomarkers will lead to improved outcomes.

DISCOVER

Discoveries that will lead to novel therapies for liver cancer and liver disease.

Our group reported key scientific discoveries that are likely to lead to new novel therapeutics targeting liver disease, liver injury (inflammation) and liver cancer. Our group uncovered a completely novel mechanism of inflammation involving the protein CD147 that appears to be active in all forms of liver injury. We discovered that the main cell of the liver, the hepatocyte, mounts a previously unrecognised response to injury to resist encapsulation in fibrotic tissue. Further, we revealed that a small non coding microRNA 181a can reproduce hepaticocyte to mesenchymal transition which has important implications for liver cancer. Finally, we identified a unique mechanism of alcohol-induced cytokine Osteopontin mediating plasmin activation, an important process in wound healing. These findings are important in understanding the causes of injury (inflammation), responses to injury (fibrosis) and development of the consequences of injury (liver cancer).

UNDERSTAND

Understanding the role of DPP and Hedgehog proteins in liver injury.

2013 saw significant advances in our molecular understanding of liver injury providing potential novel targets (Dipeptidyl peptidase (DPP) and Hedgehog) for liver disease therapy. We showed that DPP, an enzyme protein, is made during chronic liver injury and that liver cell growth and survival is regulated by DPP9. The Hedgehog protein, which is part of a developmental pathway that is activated during liver injury – it drives the liver stem cell response that can be involved in both injury as well as the repair response.

LIVER TRANSPLANT PATIENT

Denzo Guiney

Denzo Guiney was an adventurous photo-journalist all his life. Suddenly in his early fifties, that came to an end. For two years he was in and out of hospital and no doctor knew what was wrong.

“Many times I thought I was having a heart attack and I would be rushed to hospital. In 2011, I was sent to see liver specialist, Professor Geoff McCaughan at the Royal Prince Alfred hospital. He established that I had liver failure and I was quickly put on the transplant patient waiting list.

I finally understood that my sudden pains were from the liver disease, When I had my liver transplant in October 2012, it felt like I had won a lottery. I had the gift of life, thanks to my transplant.”

With two gorgeous children, 24 and 26 years old and an exciting career, Denzo has a lot to live for.

Fortunately, his life is much more manageable after his transplant. He takes only four tablets daily – far less than the 26 tablets a day he took immediately post transplant – and has a healthy paleo diet to keep him on track.

Denzo is now committed to establishing a liver patient support group in Sydney and uses his journalistic skill to write the website and the Liver Life newsletter. “I believe it’s important to have a support network for liver transplant patients. People benefit from hearing other transplant stories and learn about the latest therapies and discoveries for liver disease,” Denzo says.
MOLECULAR CARDIOLOGY

Professor Chris Semsarian, Faculty

Cardiovascular disease kills one Australian every 12 minutes.

A major highlight of our work in cardiology is preventing total genetic heart disease. Up to 1 in 500 young Australians are at risk of a genetic heart disease. Sudden cardiac death is a rare but tragic outcome of many genetic heart diseases, and this includes death in elite athletes.

Following our group’s discovery of some of the genes associated with the genetic heart disease Hypertrophic Cardiomyopathy (HCM), we now know that HCM is the commonest structural cause of sudden death in those aged less than 35 years.

HCM is a silent killer – it affects the normal heart function and rhythm and shows no prior symptoms in up to 50% of young adults who present with sudden death. Our research is committed to preventing sudden death in young adults caused by genetic (inherited) heart disease such as HCM.

Our approach is to integrate basic science, clinical cardiology and public health strategies to better understand genetic heart conditions and our vision is to improve on existing diagnostic and therapeutic approaches for genetic heart diseases.

We believe that our research has a direct impact on the community, with patient education programs, new diagnostic approaches, and prevention of sudden death through family screening and genetic testing.

“The ultimate reward is seeing your discoveries improving the health of your patients, and in the case of prevention of sudden death, actually saving peoples lives.”

Professor Chris Semsarian, Faculty

SIGNAL TRANSDUCTION

Associate Professor Pu Xia, Faculty

There is an emerging global epidemic of cancer, diabetes and inflammation-associated disease.

The Signal Transduction group is focused on understanding the faults in cell communications, namely cell signalling, which underlie these genetic heart diseases, and this includes death in elite athletes.

Cells communicate via a unique language comprised of hundreds of thousands of chemical reactions for maintaining the normal function. Often a fault in cell communication can lead to a range of diseases. For instance, we have identified a critical signalling pathway built around an enzyme, sphingosine kinase (SphK), which is critically involved in obesity-associated diseases, including diabetes, fatty liver and heart diseases.

The group in collaboration with leading researchers in China, seeks to explore the complex implication of our SphK findings and develop new therapeutic agents.

“If I am fascinated by the unique biochemical language that cells use to communicate in our bodies, and believe that targeting the communicating pathways will reveal new therapeutic approaches for a wide range of diseases such as diabetes and cancer.”

Associate Professor Pu Xia, Faculty

STAFF

Faculty

Ann Bray

Clinical Research Coordinator

Valerie Atkinson

PhD Scholar

Yuanhui Zhao

Research Assistant

Claire Smith

PhD Scholar

Ranjan Paddan

PhD Scholar

John Shepherd

PhD Scholar

Belinda Gray

Masters student

Maiya Constantiou

Masters student

Renee Johnson

Honours student

Caitlin Cummins

Medical Student

Jennifer Kostovski

Visiting Researcher

Voravice Chinnal

Research Assistant

Dhivya Jayasundera

Research Assistant

Charlotte Lam

Research Assistant

Tatiana Tsoutsman

Research Officer

Jodie Ingles

Research Officer

Caroline Medi

Co-ordinator

Tanya Sarina

Coordinator (from Jul)

Laura Molloy

Coordinator

Clinical Research Clinic Co-ordinator

Chris Semsarian

Faculty

HIGHLIGHT

We have used a novel state-of-the-art genetic approach to discover new genes in human cardiovascular diseases. Our approach applies the latest technique called exome sequencing, where all 22,000 human genes are analysed, and will allow us to find new cardiovascular disease genes much faster than ever before.

DISCOVER

Sudden death genetic discoveries. Following our discovery of genes linked to arrhythmia in inherited heart diseases, our group wanted to find out if arrhythmia genes of the heart may also explain some cases of Sudden Infant Death Syndrome (SIDS). SIDS is the unexpected death of an infant younger than one year of age when no cause is identified at post-mortem. We recently identified a subset of genes affecting the electrolyte channels of heart cells, which might contribute to some SIDS cases.

UNDERSTAND

Understanding the key gene players. We have performed genetic studies using clinical information and DNA from over 600 Australian families suffering from HCM. By following our findings related to the genetic basis of HCM, we are continuing to look for more key genes using the latest genetic technologies, and to better understand how these genes might influence clinical disease and outcomes.

IMPROVE

Improving diagnosis of genetic heart disease. Over the next five years, our clinical research is focused on improving the diagnosis of patients with genetic heart disease through family screening and genetic testing. Since diagnoses will be based on detection of abnormal genes in patients and their families, any problem should be able to be identified earlier in life, providing a greater window for starting treatment or prevention strategies. Alongside this improved diagnosis, we are also developing programs to improve the support for families diagnosed with genetic heart disease.

RESEARCH HIGHLIGHT OF THE YEAR

For the first time, we have uncovered that SphK exerts a new signalling mechanism to protect against beta cell death in preclinical research models. This provides a new strategy for the management of diabetes, as published in FASEB Journal.

STAFF

Faculty

Pu Xia

Senior Research Officer

Caroline Medi

Research Assistant

Rhian Shephard

PhD Scholar

Jipin Das

PhD Scholar

Joanna Sweeting

Research Assistant

Belinda Gray

PhD Student

Maria Constantinou

Masters student

Belinda Gray

Research Assistant

Tatiana Tsoutsman

Research Assistant

Carol Wadham

Senior Research Officer

Pu Xia

Faculty

HIGHLIGHT

Visiting Researcher

Carina Cutmore

Renee Johnson

Masters student

Maria Constantinou

Belinda Gray

PhD Student

Rhian Shephard

PhD Scholar

Jipin Das

PhD Scholar

Joanna Sweeting

Research Assistant

Rosemary Fell

Research Assistant

Tatiana Tsoutsman

Research Officer

Lien Lam

Research Officer

Jodie Ingles

Research Officer

Caroline Medi

Research Officer

Tanya Sarina

Co-ordinator

Laura Molloy

Coordinator

Clinical Research Clinic Co-ordinator

Chris Semsarian

Faculty

CARDIOLOGY

MOLECULAR

IMPROVE

DISCOVER

UNDERSTAND

switching off SphK discovered to promote a healthy liver. We have discovered that aberrant activation of SphK promotes the process of chronic fatty liver disease, leading to the development of liver cancer. We found that switching off the SphK gene prevents fatty liver disease and cancer formation in a preclinical animal model. This is truly an exciting finding that has the potential to improve the treatment of liver disease. This preclinical research will be ongoing in collaboration with other research groups in Centenary.

Understanding a critical role of SphK in diabetes. We have made significant advances in elucidating the role of SphK in diabetes using a new preclinical animal model of obesity-associated diabetes. Diabetes is often caused by defects or suicide death of pancreatic beta cells. We found for the first time that SphK profoundly protects beta cells against suicide death, promoting cell survival under obese conditions, and thereby preventing the onset of diabetes. This research will have significant implications in the management of diabetes.

Preventing insulin resistance in the liver. Obesity that is often accompanied with insulin resistance in the liver, can lead to the development of diabetes and fatty liver disease. We have found for the first time that a specific isofrom of SphK critically regulates the effect of insulin in controlling sugar production by the liver. This information adds to our understanding of the molecular mechanisms underlying insulin resistance in the liver, paving a new path to improve the fight against diabetes.
HIGHLIGHT
‘Pumping’ iron into or out of cells is often powered by so-called GTPases, which breaks down GTP molecules into GDP and releases energy for ‘pumping’. Our group’s understanding of iron transporter proteins has led to the discovery of accelerated ‘pumping’, which underlies a number of iron deficiency diseases, colorectal cancer, testotoxicosis, and Costello syndrome, confirmed for publication in FEBS Journal.

STRUCTURAL BIOLOGY
Associate Professor Mika Jormakka, Faculty
A large proportion of the Australian population will at some stage in their lives be affected by anaemia, which is caused by deregulation in iron metabolism in chronic illnesses and cancer.

Our Structural Biology group is focused on discovering the 3D structures of the proteins involved in these disease processes with the long-term goal of benefiting future drug development for anaemia-associated diseases and cancer.

Structural biology is a research field enabling the visualisation of the smallest molecular machines in your body – proteins. We use a technique called X-ray crystallography, which includes the use of large particle accelerators, or synchrotrons, which fires electrons near the speed of light.

These synchrotrons generate powerful X-rays that we use to obtain the structures of proteins. With a structure at hand, we then have the opportunity to understand how they work in health and disease, and this is also an effective route for ‘structure based drug design’, which essentially is drug development facilitated by the structure.

“3D structures of a protein provides an unprecedented insight into the functional mechanism of a protein, and the molecular basis of health and disease.”

Associate Professor Mika Jormakka, Faculty

DISCOVER
Discovery of leucine transporters as a target for new cancer drugs. Cancer progression and development is often dependent on specific membrane proteins. The progression of prostate and breast cancer is dependent on an increasing amount of the amino-acid leucine, which is acquired through the LAT transporters. By determining the structures of membrane proteins involved in these processes, we aim to be able to provide a scaffold for the development of drugs that can effectively ‘tune’ their function and thus provide new treatments for patients.

UNDERSTAND
Understanding membrane protein 3D structures. Many of the proteins involved in cancer progression and iron metabolism are membrane proteins. Membrane proteins constitute roughly a third of the genes in genomes and perform a plethora of essential cellular functions. As this type of proteins resides in the cellular membrane, they are in particular responsible for all communication and transport between the outside environment and the inside of cells. Their importance is reflected in that they represent 50-70% of all pharmacological therapeutic targets. We aim to provide high-resolution structures of critical proteins implicated in cancer progression and iron metabolism, in order to design drugs that will maximise treatment efficiency while minimising side effects.

IMPROVE
Improving therapeutic options for iron deficiency diseases. In addition to proteins involved in cancer progression, we are interested in the structural biology of membrane proteins involved in iron metabolism. Iron is an essential element, which is acquired and distributed by a set of specific membrane proteins. Errors in the proteins involved in iron distribution can cause a range of disease states, such as cancer, hemochromatosis, and anaemia. Our group is focused on improving the therapeutic options currently used for diseases associated with iron deficiency.
T CELL BIOLOGY

Professor Barbara Fazekas de St Groth, Assistant Director, Faculty

Peroxisome, inflammatory bowel disease, rheumatoid arthritis, asthma and diabetes are all typical immune-inflammatory chronic conditions – known as “Western” diseases. At least half the Australian population will suffer from an immune-inflammatory disease during their lifetime.

Asthma for example is one of the most common chronic conditions to affect children, and it costs the Australian health system $655 million a year.

The T cell Biology group is researching how interactions between the immune system and our environment and lifestyle can lead us to develop these “Western” diseases, which are much less common in the developing world.

More specifically, we are investigating how our immune system’s T cell regulation (T reg) control the stimulation threshold at which the immune system is activated, since when this threshold is too low, the result is allergies and disorders of the immune system.

We hope that by understanding the mechanism of action of T regs, we will ultimately find cures for sufferers of immune system mediated disease, and in the long term see a huge improvement in the health of all Australians.

“I am studying one of the most important puzzles that medicine needs to solve, in a way that is unique, I believe that my work will help in making a real difference to human health”,

Professor Barbara Fazekas de St Groth, Assistant Director, Faculty

DISCOVER

Tregs discovered to be a potential player in curing cancer. Our group is studying how cancer tumours can sabotage the body’s immune response by recruiting Tregs to prevent immune rejection. Tregs interact with many other immune cells to prevent the immune system from attacking tumours. We are testing whether targeting Treg and other immune cell types simultaneously can produce long-term tumour remission.

UNDERSTAND

Understanding how Tregs control our immune system. Working in preclinical models, we have been studying how Treg cells prevent T cells from causing immune-inflammatory conditions such as inflammatory bowel disease and asthma. Our research has shown that Tregs focus their activity on a third cell type, the dendritic cell, which in turn control T cells which T cell is turned on and which is silenced. We have defined which molecules Tregs use to communicate with dendritic cells. Our innovative research may reveal new ways to use current drugs to achieve better treatment outcomes for patients.

IMPROVE

‘Personalised medicine’ to improve therapy for cancer and chronic disease. Our group is looking to improve the treatment of cancer and chronic disease by predicting which patients will respond well to new therapies – an approach called personalised medicine. Based on our new methods for immune analysis, we can already predict the type of immune changes in patients with psoriasis, inflammatory bowel disease or rheumatoid arthritis. Our new Ramaciotti Facility for Human Systems Biology will enable us to better predict an individual’s immune system response. For example how a patient’s immune system will respond to a new cancer immunotherapy, ipilimumab, to control melanoma.

TUBERCULOSIS

Professor Warwick Britton, Assistant Director, Faculty

Two billion people worldwide carry Tuberculosis (TB). Someone is infected with TB every second causing 1.5 million deaths a year.

Our region is the epicentre for TB with the largest number of patients and an emerging problem of drug resistance that threatens the control of this infection. This is compounded by TB’s ability to spread to new international neighbours, Papua New Guinea and Indonesia, and extends to Vietnam, the Philippines, China and the Indian subcontinent.

Our group is committed to controlling TB in Australia and our region and participating in the World Health Organisation’s long-term goal of the elimination of TB by 2050.

This will require new therapies and vaccines to treat and prevent TB, and will only be possible by partnership between TB research programs and national Tuberculosis programs in high burden countries.

The Centenary is leading Australia’s first Centre for Excellence in Tuberculosis Research, bringing together expertise in public health, epidemiology, basic science ethics, law and clinical medicine in a global effort to combat TB in Australia and beyond.

“The threat of drug resistant TB in our region is very real and our research uses multiple approaches to develop new vaccines and drugs to prevent the death and disability caused by TB,”

Professor Warwick Britton, Assistant Director, Faculty

DISCOVER

Discovering TB drug candidates. Our researchers are working to identify potential metabolic pathways within the TB bacterium that are essential for its survival and to use the molecules in these pathways as targets for new drug development. In particular, we are collaborating with Associate Professor Payne in the University of Sydney’s School of Chemistry to develop drugs that target the synthesis of the cell wall of TB.

UNDERSTAND

Understanding how the tiny TB organism invades our body. For many years we have studied the interaction between the TB bacterium and the host immune system to understand the infection in more detail and to identify potential vulnerabilities. We have found that particular regions of the bacterial cell wall are specifically analysing the macrophage response to infection and their release of microRNA molecules into the blood. We are studying this response in blood samples from TB patients in China and Australia and using the information to develop new biomarkers to identify active TB disease and monitor the response to therapy.

IMPROVE

Improving TB vaccines. Our group is developing better vaccines to prevent TB infection. Subunit vaccines are based on protein components of the TB bacterium, which are delivered by virus vectors or as protein-based vaccines with adjuvants to stimulate the immune response. We are currently developing methods to deliver these vaccines directly to the lung so that they stimulate immune responses at the site of TB infection in the lung.
VASCULAR BIOLOGY

Professor Jennifer Gamble, Faculty

Age is the biggest risk factor for disease. The big diseases, cardiovascular disease, cancer as well as arthritis all increase with age and all have blood vessel dysfunction as an underlying problem.

Blood vessels supply every organ in our body with blood and nutrients. The two major cells that make up the blood vessels are the endothelial cells that form the lining and interface with the blood, and on the tissue side, the smooth muscle cells that are intimately in contact with the endothelial cells.

Our research is focused on understanding how ageing affects the two major blood vessel cell types in cancer and cardiovascular disease, including diseases of the aorta.

By understanding ageing in the vascular system at a molecular and cellular level, we hope to find a strategy to intervene, to reverse or slow the age-associated dysfunction in these cells.

Understanding the impact of the ageing process on the function of blood vessels will provide us with the knowledge to develop therapeutics that can be used to intervene so that we can ‘age well’.

“I believe that studying the endothelial and smooth muscle cells within blood vessels will reveal fascinating insights into how we age and deal with disease.”

Professor Jennifer Gamble, Faculty

CENTENARY RESEARCHER PROFILE

Dr Renjing Liu

Dr Renjing Liu is Head of the newly established Agnes Ginges Aorta Laboratory and holds the inaugural David Richmond Fellowship at the Centenary Institute. The laboratory sits within the Vascular Biology group headed by Professor Jennifer Gamble.

Renjing recently returned to Australia following two postdoctoral traineeships at Yale University. She trained at the Yale Stem Cell Centre in the Nobel Prize winning technique of cellular reprogramming, where skin cells or blood can be turned into embryonic stem cells.

Renjing then pursued studies at the Yale Cardiovascular Research Centre where she discovered a family of enzymes that are essential for vascular repair. This finding has wide implications for diseases such as atherosclerosis, the leading cause of heart failure and stroke.

“I’m excited to be able to bring these studies to the Centenary”, says Renjing.

Renjing and her research team apply a multidisciplinary approach that combines stem cell research, vascular biology, and epigenetic regulation to understand how vascular smooth muscle cells, the major cells in the blood vessels, contribute to normal vessel function and to cardiovascular diseases such as atherosclerosis, hypertension and aneurysms.

“My lab’s main aim is to achieve a clearer understanding of the molecular mechanisms that regulate vascular smooth muscle cells. Our ultimate goal is to develop new and improved therapies for the treatment and prevention of cardiovascular diseases”, says Renjing.
ORGANISATIONAL CHART

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Executive Director
Mathew Vadas

PA/Office Manager
Helen Warwick

Scientific Advisory Board
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Prof Michael Good
Prof Ian Frazer
Prof Mathias Hentze

FACULTY

Tuberculosis
Mika Jormakka

Structural Biology
Pu Xia

Molecular Cardiology
Chris Sammon

Signal Transduction
Paula Missa

Liver Immunology
Patrick Bertolina

Liver Injury & Cancer
Geoff McCaughan

Cell Biology
Ralph De St Groth

T cell Biology
Briand Warrack

Tumour Immunoenvironment
Nicolai Haasa

Liver Cell Biology
Nicholas Sharwil

Molecular Hepatology
Mark Gonnell

Host Response to Infection
William Ritchie

Biostatistics
Associate Faculty
William Ritchie

Biostatistics
Associate Faculty
William Ritchie

Gene & Stem Cell Therapy
Faculty
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Liver
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Head of Fundraising & Marketing
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Suat Dervish

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Michael Greensmith

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Emma O’Flaherty

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Emma Squire

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Kiara Ritky

Animal Attendant
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Danielle Moyes

Animal Technician
Leah Miller

Animal Technician
Nick Keilar

Animal Technician
Megan Hovanes

Animal Technician
Brian Watson

Animal Technician
Allen Miller

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Building Services
Sarah Leonhard

Building Services
Michael Stavroulis

Building Services
Bob Thorburn

Building Services
Jeff Crosbie

Building Services
Bob Thorburn

Building Services
Jeff Crosbie

Building Operations
Sarah Leonhard

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Nick Keilar

HR Manager
Nan Herbert

HR Manager
Julie Berndt

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Adrian Smith

Finance Officer
Jeff Holm

Finance Officer
Mano Mlynek

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Kara Riley

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Natalie Love

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Jill Atherton

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Research Income
Federal - NHMRC + ARC 7,386 6,923
NSW Government 1,140 2,729
Other Research Grants 5,169 3,209
Total research income 13,695 12,861

Fundraising
Donations, events + other 897 1,016
Bequests 25 25
Total fundraising 922 1,041

Commercial 0 6
Other 4,623 3,508
Total Income 19,240 17,416

Research Activities 15,376 14,221
Fundraising 875 806
Administration 2,465 2,588
Building operations 1,613 2,338
Total Expenditure 20,359 19,952

Donations are critical to enabling us to conduct our valuable research. They allow us to invest in recruiting the best researchers, seed fund the most innovative research projects, as well as resource the core research facilities and basic research supplies and support necessary to perform our daily research that is not covered by grants.

Centenary’s clinical and laboratory researchers, operational staff and students work together to discover, understand and improve therapies and diagnostics for cancer, heart and infectious disease. We strongly invest in students – our future.

WHAT FUNDS COME IN?

INCOME 2013 in ’000 2012 in ’000

Research Income
Federal - NHMRC + ARC 7,386 6,923
NSW Government 1,140 2,729
Other Research Grants 5,169 3,209
Total research income 13,695 12,861

Fundraising
Donations, events + other 897 1,016
Bequests 25 25
Total fundraising 922 1,041

Commercial 0 6
Other 4,623 3,508
Total Income 19,240 17,416

RESEARCH ACTIVITIES

INVESTIGATORS*

GRANTING BODY TYPE

Miko Jormakka, Bernetta Ryan, Jeff Holt, Ronald Quinn, Ben Crossley, Sti Watts
University of Sydney Bridging (2013 - 2013)
Nicholas Shocket, Susan Mills, Namra Veyroth, David Browne, James Lynch, Geoff McCaugha, Fonne Warner
University of Sydney Bridging (2013 - 2013)
Elana Shkolovska, Barbara Fazekas, Jamie Triccas, Wolfgang Weninger
University of Sydney Bridging (2013 - 2013)
Chandrima Dashpandie
University of Sydney Early Career Researcher (2013 - 2013)
Jodie Ingles
University of Sydney Early Career Researcher (2013 - 2013)
William Ritchie
University of Sydney Early Career Researcher (2013 - 2013)
Mate Biro
University of Sydney Early Career Researcher (2013 - 2013)
Jennifer Gamble, Patricia Armiti, John Thornley
National Health & Medical Research Council Equipment (2013 - 2013)
Wolfgang Weninger, Richard Bognall, Charles Bolton, Patrick Bertolino, Mate Biro, Jonathan Chen, Barbara Fazekas, Carl Fang, Claire Goldspink, Michael Lovelace, Geoff McCaugha, Paulus Mroz, Esparina Pot, John Pollard, John Basko, Bernadette Saunders, Nicholas Shocket, Jamie Triccas, Wolfgang Weninger
National Health & Medical Research Council Equipment (2013 - 2013)
Jodie Ingles
University of Sydney Travel (2013 - 2013)
Adam Cook
University of Sydney Fellowship (2013 - 2016)
Karen Weiss
Cull and Genn Trall Scholarship (2013 - 2016)
Moscorni Kato
National Health & Medical Research Council Project (2013 - 2015)
Wolfgang Weninger, Graham Le Gros
National Health & Medical Research Council Project (2013 - 2015)
Chris Jolly, Jeff Holt, Andrew Franklin, Warren Mills
National Health & Medical Research Council Project (2013 - 2015)
Chris Semsonias, Douglas Common, Richard Bognall, Samuel Berlok, Andrew Davis, William Bitcha, Ingrid Schiffer
National Health & Medical Research Council Project (2013 - 2015)
Chris Semsonias, Richard Bognall, William Bitcha
National Health & Medical Research Council Project (2013 - 2015)
Barbara Fazekas, Robert Hancock, William Bitcha, Runaryca Thomas
National Health & Medical Research Council Project (2013 - 2015)
Warwick Britten, Nick West, Richard Pyne, Hak-Jin Chon, Motia Manurangi, Florida P Da Costa, Jamie Triccas
National Health & Medical Research Council Project (2013 - 2015)
Carl Fang, Warwick Britten, Alan Shox, Jamie Triccas
National Health & Medical Research Council Project (2013 - 2015)

WHAT COSTS WHAT?

EXPENDITURE

Research Activities 16,376 14,221
Fundraising 875 806
Administration 2,465 2,588
Building operations 1,613 2,338
Total Expenditure 20,359 19,952

WHAT IS THE MONEY USED FOR?

WHEN NEW HEAD COUNTS ARE SEEN, THEY ARE THE TOTAL HEAD COUNTS.

WHO'S WHO?

INVESTIGATORS*

GRANTING BODY TYPE

Mika Jormakka, Bernetta Ryan, Jeff Holt, Ronald Quinn, Ben Crossley, Sti Watts
University of Sydney Bridging (2013 - 2013)
Nicholas Shocket, Susan Mills, Namra Veyroth, David Browne, James Lynch, Geoff McCaugha, Fonne Warner
University of Sydney Bridging (2013 - 2013)
Elana Shkolovska, Barbara Fazekas, Jamie Triccas, Wolfgang Weninger
University of Sydney Bridging (2013 - 2013)
Chandrima Dashpandie
University of Sydney Early Career Researcher (2013 - 2013)
Jodie Ingles
University of Sydney Early Career Researcher (2013 - 2013)
William Ritchie
University of Sydney Early Career Researcher (2013 - 2013)
Mate Biro
University of Sydney Early Career Researcher (2013 - 2013)
Jennifer Gamble, Patricia Armiti, John Thornley
National Health & Medical Research Council Equipment (2013 - 2013)
Wolfgang Weninger, Richard Bognall, Charles Bolton, Patrick Bertolino, Mate Biro, Jonathan Chen, Barbara Fazekas, Carl Fang, Claire Goldspink, Michael Lovelace, Geoff McCaugha, Paulus Mroz, Esparina Pot, John Pollard, John Basko, Bernadette Saunders, Nicholas Shocket, Jamie Triccas, Wolfgang Weninger
National Health & Medical Research Council Equipment (2013 - 2013)
Jodie Ingles
University of Sydney Travel (2013 - 2013)
Adam Cook
University of Sydney Fellowship (2013 - 2016)
Karen Weiss
Cull and Genn Trall Scholarship (2013 - 2016)
Moscorni Kato
National Health & Medical Research Council Project (2013 - 2015)
Wolfgang Weninger, Graham Le Gros
National Health & Medical Research Council Project (2013 - 2015)
Chris Jolly, Jeff Holt, Andrew Franklin, Warren Mills
National Health & Medical Research Council Project (2013 - 2015)
Chris Semsonias, Douglas Common, Richard Bognall, Samuel Berlok, Andrew Davis, William Bitcha, Ingrid Schiffer
National Health & Medical Research Council Project (2013 - 2015)
Chris Semsonias, Richard Bognall, William Bitcha
National Health & Medical Research Council Project (2013 - 2015)
Barbara Fazekas, Robert Hancock, William Bitcha, Runaryca Thomas
National Health & Medical Research Council Project (2013 - 2015)
Warwick Britten, Nick West, Richard Pyne, Hak-Jin Chon, Motia Manurangi, Florida P Da Costa, Jamie Triccas
National Health & Medical Research Council Project (2013 - 2015)
Carl Fang, Warwick Britten, Alan Shox, Jamie Triccas
National Health & Medical Research Council Project (2013 - 2015)
SUCCESSFUL GRANT RECIPIENTS

<table>
<thead>
<tr>
<th>INVESTIGATORS*</th>
<th>GRANTING BODY</th>
<th>TYPE</th>
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<tbody>
<tr>
<td>Jamie Triccos, Warwick Britton, Sara Arrowsmith, Christopher Parish, Wolfgang Weninger, Nick West</td>
<td>National Health &amp; Medical Research Council</td>
<td>Project (2013 - 2015)</td>
</tr>
<tr>
<td>Nick West, Jamie Triccos, Warwick Britton, Ian Cheats, Roy Choudhuri</td>
<td>National Health &amp; Medical Research Council</td>
<td>Project (2013 - 2015)</td>
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<tr>
<td>Caroline Medi</td>
<td>National Health &amp; Medical Research Council</td>
<td>Fellowship (2015 - 2017)</td>
</tr>
<tr>
<td>Aaron McGroth</td>
<td>National Health &amp; Medical Research Council</td>
<td>Fellowship (2015 - 2016)</td>
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<tr>
<td>Stefan Oehlers</td>
<td>National Health &amp; Medical Research Council</td>
<td>Fellowship (2015 - 2017)</td>
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<tr>
<td>William Ritchie</td>
<td>Cancer Institute NW</td>
<td>Fellowship (2015 - 2016)</td>
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<tr>
<td>Bernadette Saunders</td>
<td>Perinatal Trust</td>
<td>Project (2013 - 2016)</td>
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<tr>
<td>Wolfgang Weninger, Erna CASTOOS, Helen CHAN, Ben ROEDIGER, Simon TY, Philip TONG</td>
<td>Australian College of Dermatologists</td>
<td>Project (2013 - 2016)</td>
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<tr>
<td>Wolfgang Weninger, Alberto Catelani, Helen Chan, Harryloon, Ben Roediger, Simon Toy, Philip Tong</td>
<td>Australian College of Dermatologists</td>
<td>Project (2013 - 2016)</td>
</tr>
<tr>
<td>Barbara Fazekas</td>
<td>Cancer Institute NW</td>
<td>Equipment (2013 - 2016)</td>
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<td>Michelle Simmons</td>
<td>Scholarship (2013 - 2016)</td>
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<tr>
<td>Jade Ingles</td>
<td>Trencher Research Fund (USA)</td>
<td>Early Career Award (2013 - 2014)</td>
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*CA is named first
CENTENARY INSTITUTE LAWRENCE CREATIVE PRIZE

Recognising bold young researchers who are taking the risks to ask the big questions of today – those questions that have most people saying “but that’s impossible”, the Centenary Institute Lawrence Creative Prize was created in honour of Neil Lawrence, the inaugural Chairman of the Centenary Institute Medical Research Foundation.

Neil, his wife Caroline and his family hold Centenary very near to their hearts, and are all passionate about advancing the field of medical research further within Centenary.

“The Prize is a small step towards recognising that the most creative medical research is usually done by researchers early in their career – at a time when it’s hardest for them to secure funding. As a nation we should do more to identify and support our best young researchers. We will be richer for it.”

Neil Lawrence

In its third year, the $25,000 Prize which is open to any Australian researcher from any institute, university or educational institution in Australia who is less than 8 years post doctoral was awarded to Dr Connie Wong of the Department of Immunology at Monash University. Dr Wong, along with the two other finalists Dr Ann Abbott also from Monash and Centenary’s Dr William Ritchie, who each received $5,000, attended the announcement ceremony hosted by UBS in Sydney and were joined by sponsors and supporters.

Dr Wong thinks we may be able to prevent early deaths following stroke with a fibre-based diet. She initially used innovative microscope techniques to determine how stroke weakens the immune system. Now she is studying how it also induces leakiness in the gut wall, leading to infection and an upsurge in deaths. And the solution may well lie in diet.

Stroke is the second leading cause of mortality in Australia, resulting in more than 10% of all deaths. Of the survivors, over 60% die within a year or become dependent on others. The cost to the community annually is more than $2 billion. “So any increase in understanding the mechanisms and consequences of stroke that results in more efficient treatment could have enormous social and economic benefits,” says Dr Wong.

The 2013 Centenary Institute Lawrence Creative Prize international group of esteemed judges:

- Professor Ashley Bush - Head, Oxidation Biology Laboratory, Mental Health Research Institute, Victoria AUS
- Professor Sir Marc Feldmann - Head, Kennedy Institute of Rheumatology, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford UK
- Professor Richard Flavelle - Yale School of Medicine and Howard Hughes Medical Institute, Connecticut USA
- Professor Ian Frazer AO - CEO & Director of Research, Translational Research Institute, Queensland AUS
- Professor Michael Good AO - Institute of Glycomics, Griffith University, Gold Coast Campus, Queensland AUS
- Professor Matthias Hentze - Associate Director, European Molecular Biology Laboratory (EMBL), Co-Director of the EMBL/Heidelberg University ‘Molecular Medicine Partnership Unit’, Heidelberg Germany
- Professor Peter Leedman - Head of the Laboratory for Cancer Medicine and Deputy Director of Western Australian Institute for Medical Research, Western Australia AUS
- Professor Michael Parker - Associate Director, Biota Structural Biology Laboratory, St Vincent’s Institute, Victoria AUS
- Professor Mathew Vadas AO - Executive Director, Centenary Institute, NSW AUS
- Professor Jane Visvader - The Victorian Breast Cancer Research Consortium Laboratory, Walter and Eliza Hall Institute of Medical Research, Victoria AUS

2013 CENTENARY INSTITUTE LAWRENCE CREATIVE PRIZE

Dr Connie Wong (Winner)
Dr Anne Abbott (Finalist)
Dr William Ritchie (Finalist)
POST-GRADUATE TRAINING

Achieving Excellence

2013 was another impressive year for our seven postgraduate students at the Centenary Institute. Our 2013 graduate students are now extending their careers undertaking a variety of post-doctoral positions both in Australia and overseas, including Canada, the United States and Singapore. This year, three students also won prizes for the best poster presentations at major national meetings.

Student Recognition

Australian Breast Cancer Conference: Michelle Simmons
Australasian Society of Immunology: Anneliese Tyne
Australian Vascular Biology Conference: Garry Chang

Student Profile

Dr Greg Fox, who undertook a PhD with Professor Guy Marks at the Woolcock Institute and Professor Warwick Britton in the Tuberculosis Research group at the Centenary Institute was awarded the Rita and John Comforth Medal for the best PhD in 2013 at the University of Sydney. This is the second consecutive year that one of our students has taken the top honour from across all the University PhD students. Greg’s PhD examined ‘Environmental and genetic risk factors for tuberculosis in Vietnam’. Greg was also awarded a NHMRC CJ Martin Research Fellowship in 2013 and is now undertaking post-doctoral research at McGill University in Canada but he continues to work with the Tuberculosis group on the project he established in Vietnam during his PhD.

DOCTOR OF PHILOSOPHY SUPERVISOR RESEARCH GROUP

<table>
<thead>
<tr>
<th>Name</th>
<th>Supervisor</th>
<th>Research Group</th>
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</thead>
<tbody>
<tr>
<td>Nial Chan</td>
<td>Mark Gorrell</td>
<td>Liver Injury and Cancer</td>
</tr>
<tr>
<td>Candice Grzelak</td>
<td>Geoff McCaughan</td>
<td>Liver Injury and Cancer</td>
</tr>
<tr>
<td>Rhian Shephard</td>
<td>Chris Semsarain</td>
<td>Molecular Cardiology</td>
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<tr>
<td>Mei Li Ng</td>
<td>Pu Xia</td>
<td>Signal Transduction</td>
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<tr>
<td>Jacob Qi</td>
<td>Pu Xia</td>
<td>Signal Transduction</td>
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<tr>
<td>David Hancock</td>
<td>Barbara Fasle de St Groth</td>
<td>T cell Biology</td>
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<tr>
<td>Frank Kao</td>
<td>Warwick Britton</td>
<td>Tuberculosis</td>
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<tr>
<td>Meciake Monteleone</td>
<td>Warwick Britton</td>
<td>Tuberculosis</td>
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<tr>
<td>Paul Coleman</td>
<td>Jennifer Gamble</td>
<td>Vascular Biology</td>
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MASTER OF PHILOSOPHY

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<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Ela Stephens</td>
<td>Jenny Gamble</td>
<td>Vascular Biology</td>
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HONOURS

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<thead>
<tr>
<th>Name</th>
<th>Supervisor</th>
<th>Research Group</th>
</tr>
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<tbody>
<tr>
<td>Anne Marin</td>
<td>Jeff Hollit</td>
<td>Gene and Stem Cell Therapy</td>
</tr>
<tr>
<td>Daniel Bisazza</td>
<td>Chris Joly</td>
<td>Immune Imaging</td>
</tr>
<tr>
<td>Emily Huang</td>
<td>Devarshi Seth</td>
<td>Liver Injury and Cancer</td>
</tr>
<tr>
<td>Linda Ban</td>
<td>Nick Shackel</td>
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</tr>
<tr>
<td>Pat Fa Wang</td>
<td>Mark Gorrell</td>
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<td>Cinna Culmone</td>
<td>Chris Semsarain</td>
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<tr>
<td>Julie Naviglia</td>
<td>Warwick Britton</td>
<td>Tuberculosis</td>
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<tr>
<td>Rosemary Murray</td>
<td>Elena Shkolovskaya</td>
<td>T cell Biology</td>
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PHD STUDENT

Tom Guy

“When I started university I became fascinated with the study of tumour immunology, I found it intriguing that medical scientists were looking at the immune system to fight off cancer as a new type of treatment. Now that I am at the Centenary, I am inspired by the novel research we do in collaboration with world leading experts, using some of the best equipment in the southern hemisphere. The T Cell Biology group that I work with has unique models to dissect the complex immune system piece by piece. It allows us to understand how immunity works both on the molecular level and in animal models so that one day we can develop new and improved immunotherapy approaches for cancer. I’ve had a few moments during my PhD research of being the first person ever to see something new and it’s an exhilarating feeling to see the answers start to unfold in front of you in an experiment. One of the most memorable moments as a student has been presenting my research at my first international conference. I quickly realised that Centenary’s research is world-class and highly relevant to cancer patients in the clinic,” says Tom.
A critical review of publications related to the field of medicine.
Rasko J, The changing face of gene expression in granulopoiesis, HSANZ Scientific Meeting 2013 - NSW Branch, June 2013, Sydney
Rasko J, Junking gene expression in granulocytes, WEHI, August 2013, Melbourne
Rasko J, Gene expression in blood cells: having your trifle and eating it too!, Leaders in Science Seminars - Garvan Institute of Medical Research, September 2013, Sydney
Rasko J, The changing face of gene expression, The 2013 Royal Hobart Hospital – Pathology Educational Symposium - Menzies Research Institute, University of Tasmania, October 2013, Hobart
Roediger B, Regulation of cutaneous inflammation by skin-resident type 2 innate lymphoid cells, Asian Society for Pigment Cell Research (ASPCR) and the Australasian Society for Dermatology Research (ASDR) Joint Meeting, May 2013, Sydney
Roediger B, A novel role for interleukin 2 in regulating pulmonary type 2 inflammation, ComBio2013, October 2013, Perth
Semsarian C, Sudden death and public access defibrillators, AFL (NSW/ACT) Affiliates Forum, March 2013, Sydney
Semsarian C, Becoming a well known ECR in less than 140 characters, ECR Showcase Sydney Medical School, April 2013, Sydney
Semsarian C, MRI and cardiomyopathy, Cardiac MRI Masterclass - RPAH, May 2013, Sydney
Semsarian C, Sudden cardiac death in the young: for GPs, 2013 NSW GP Clinical Meeting, June 2013, Sydney
Semsarian C, Helping families with genetic heart diseases, Young ICD Network - Royal North Shore Hospital, August 2013, Sydney
Semsarian C, Integration of basic and clinical research in perinatal science, ACRPS Inaugural Symposium - UNSW, August 2013, Sydney
Semsarian C, Hypertrophic heart as an arrhythmogenic substrate, CSANZ Annual Scientific Meeting, August 2013, Gold Coast
Semsarian C, Families with sudden death, RPA Grand Rounds, September 2013, Sydney
Semsarian C, Genetics of aortic disease, Baird Institute Conference, September 2013, Sydney
Semsarian C, Genetic testing - who to refer, how it helps, and what's available, Update on Cardiac Arrhythmias, September 2013, Melbourne
Semsarian C, Risk stratification in structural heart disease, Update on Cardiac Arrhythmias, September 2013, Melbourne
Semsarian C, Sudden cardiac death - insights into SIDER Keynote Address - Epilepsy Society of Australia, October 2013, Sydney
Semsarian C, Sudden death in 2013, FRACP RPA, BPT Revision Course, December 2013, Sydney
Semsarian C, Hypertrophic cardiomyopathy and contractile proteins, Australian Physiological Society Annual Scientific Meeting, December 2013, Geelong
Seth D, Genetics and mechanisms of alcohol damage to the liver, Australian Liver Association (ALA) Hepatology Master Class 2013, August 2013, Melbourne
Shackel N, Heterogeneity of Liver Cancer, Australia Liver Association Meeting, June 2013, Gold Coast
Shackel N, Liver Transplantation, Hepatology Master-class, May 2013, RPAH
Weninger W, Mechanisms of immunoevasion by S. aureus, Lorne Infection and Immunity Conference, Feb 2013, Lorne
Weninger W, Role of perivascular macrophages in neutrophil recruitment to infected skin, Australian Society for Microbiology, July 2013, Adelaide
Weninger W, Visualising innate immune responses in the skin, Seminar Series, QIMR Berghofer Institute, October 2013, Brisbane
The Eye of Sauron. The image is by Ching Ka Ting from our Vascular Biology group and won Centenary's 2013 Scientific Image Prize. It is a zoomed-in image of the Zebrafish eye with the green showing a distinct population of neurons in the eye and red being tubulins to outline the neuronal processes.
We all long for a day where cancer, heart disease and infectious diseases are a thing of the past. We believe medical research is the best hope we have to make this dream a reality. The scientists and staff at Centenary wish to thank every one of our supporters for making 2013 such a successful year.