ANNUAL REPORT 2013

Centenary Institute research for life

L-R Professor Mathew Vadas AO, The Hon Michael Egan AO, Dr Kimberley Beaumont (recipient of a Cancer Institute NSW grant for Melanoma research), Nicole Santer (Melanoma survivor) and Professor David Currow, Chief Cancer Officer of NSW and Chief Executive Officer of the Cancer Institute NSW

RESEARCH PERSPECTIVE

*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.

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CHAIRMAN AND EXECUTIVE DIRECTOR REPORT

The Honourable Michael Egan AO, Chairman

Professor Mathew Vadas AO, Executive Director

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 proud record is being maintained and we believe will be enormously enhanced by our association 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 Governors, 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 Willcox to our board of highly skilled and experienced leaders.

We farewell Assistant Director, Geoff McCaughan and welcome Barbara Fazekas de St Groth who joins Warwick 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

Professor Mathew Vadas AO

BOARD OF GOVERNORS

The Hon Michael Egan AO (Chairman)
Appointed Chair in October 2005

Mr Egan, a former Treasurer of NSW (1995-2005), 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.

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 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.

Professor 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.

Mr Graham Kelly
Appointed Governor in 2006

Mr Kelly is non-executive Chairman of listed GDI Property Group and a Director of Harness Racing NSW. He has been non-executive Chairman of various other listed companies, including TAB Limited. He was formally a Partner of law firm Freehills 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.

Professor Bruce Robinson AM
Appointed Governor in 2007

Professor Robinson is Dean of the Faculty of Medicine, University of Sydney, and Head of the Cancer Genetic Laboratory at the Kolling Institute. In 2003, he was awarded the Daiichi Prize by the Asia and Oceania Thyroid Association. Professor Robinson is the Founding Chairman of the Hoc Mai Australia Vietnam Medical Foundation.

Ms Josephine Sukkar
Appointed Governor in 2011

Ms Sukkar is co-owner and Principal of construction company Buildcorp. 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.

Professor Mathew Vadas AO
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.

Ms Deborah Willcox
Appointed Governor in 2013

Ms Willcox is the Acting Director of Operations, Sydney Local Health District and General Manager, Royal Prince Alfred Hospital. She has held senior positions in NSW Health and NSW Government, both as an advisor to the Deputy Premier and Minister for Health and later as Chief of Staff in the portfolios of Planning, Housing and Aboriginal Affairs.

FOUNDATION TRUSTEES

Mr Joseph Carrozzi (Chairman)
Mr Alastair Davidson
The Hon Michael Egan AO
Mr Neil Lawrence
Dr Susan Pond AM (from Sep)

STAFF

Head of Fundraising and Marketing
Jill Atherton (from Mar)
Fundraising and Marketing Manager
Suzie Graham (to Jan)
Manager Special Projects
Karen McBrien (from Jun)
Communications and Donor Relations
Katherine Finch (to Nov)
Corporate Partnerships Consultant
Leonie Walton (to Apr)
Donor Services and Administration
Keri Turuwhenua
Donor Services Assistant
Maria Krikelis (to Feb)
Fundraising and Database Coordinator
Barbara Smith (to Oct)
Fundraising and Digital Marketing
Felix Daniel
Philanthropy Coordinator
Laura Beth Albanese (to May)

CENTENARY INSTITUTE FOUNDATION FUNDRAISING COMMITTEE MEMBERS

Mr Joseph Carrozzi (Chairman)
Justice Margaret Beazley AO
Ms Suanne Colley (from Nov)
Ms Elizabeth Dibbs
Mr Simon Dulhunty
Mrs Julie Ford
Mr Simon Ford
Mrs Tanya Jones (from Nov)
Mrs Caroline Lawrence (until June)
Mr Neil Lawrence (until June)
Mr John Samaha
Mr Andrew White

YOUNG CENTENARY FOUNDATION

Ms Anna Lawrence (Chair until Aug)
Ms Erin Moy (Chair from Aug)
Ms Caroline Fanning
Dr Jeff Holst
Dr Amy Marshall
Ms Georgie Skipper (until Aug)
Ms Lauren Sullivan

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 Bioinformatics 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.

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.

"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 Moy, Chair

FOUNDATION FUNDRAISING COMMITTEE SPONSORS AND SUPPORTERS

The generosity and belief of our sponsors and supporters enables the voluntary fundraising committee to contribute directly to the work of Centenary's researchers.

Albert Jangtong, Lawrence Creative
Annette Larkin Fine Art
ANZ Stadium
Arthouse Tasmania
Azuma Japanese Restaurant
Belvoir St Theatre
Bobby Richman
Carlos Barrios
Caroline Lawrence
City of Sydney
Clarendon Hills
Clonakilla Wines
Del Kathryn Barton
Dominik Mersch Gallery
Ensemble Theatre Company
Fiona Campbell of SheRocks
Heather Rose
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Janet Laurence
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John Cutler – J H Cutler Bespoke Tailor
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Madeline Prowd Glass
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Oobie Baby
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Steven Ingate
Taronga Zoo
The Library House, Tasmania
Tim Johnson
Tintilla Estate
Torbreck Barossa Valley

COMMUNITY FUNDRAISERS

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Peter Wally Bamford Memorial Concert

Sarah Bellingham

Sarah Bornstein

Jessica Boyd

Kate Bremner

Magdalena Budzinska

Kieran Cato

Geoff and Jan Cook

Kimberly Curtis

Wil D'Avigdor

Felix Daniel

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Josep Font

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Anna Lawrence

Aaron McGrath

Julian McInerney

Erin Moy

Frank Nicolson

Tom O'Neill

Helen O'Sullivan

Victoria Payne

Jeremy Perrot

Sophie Quist

Ben Roediger

Richard Rosendorff

Jane Rowden

Georgie Skipper

Jess Smith

Rowan Stephenson

Lauren Sullivan

Megan Taylor

Rachel van Middeldyk

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 ($28,009) 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 12 more years with my family and I.

The importance of liver research to me is immeasurable."

Dr Masaomi Kato, Research Officer

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
Jujiao Kuang
(from May)

Research Assistant
Swas Kumar

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 the lifetime. 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 gain insight into our healthy ageing. Our model organism, the nematode, *C. elegans* is ideal for testing our hypotheses as it has relatively a short lifespan, provides powerful genetics and shares many age-related issues with humans.

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

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 their 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 an 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.

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-assisted genomics tests. Already, this type of computer disease diagnosis is undertaken overseas and Australia is not far behind.

"I believe that clinical diagnosis, treatment and research can and will be turbocharged by computer science and machine learning."

Dr William Ritchie, Associate Faculty

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 'Markovian 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.

Dr William Ritchie, Associate Faculty

HIGHLIGHT

Our Bioinformatics group published the only computer program capable of detecting a new means of gene regulation through suicide sequences. This was published in one of the most prestigious scientific journals, Cell.

STAFF

Associate Faculty
William Ritchie

PhD Scholar
Dadi Gao

Senior Bioinformatician
Robert Middleton
(from Nov)

Professor John Rasko AO, Faculty

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.

STAFF

Faculty
John Rasko

Associate Faculty
Jeff Holst

Associate Faculty
William Ritchie

Senior Research Officer
Chuck Bailey

Research Officer
Amy Marshall

Research Officer
Justin Wong

Research Officer
Kevin Wang

Research Officer
Katherine Lau
(May- Oct)

Editorial Research Officer
Carl Power

Research Assistant
Cynthia Metierre

Research Assistant
Katherine Champ

Research Assistant
Kinsha Baidya
(to Jan)

Research Assistant
Natalia Pinello

Research Assistant
Yue Feng

Research Assistant
Rajini Nagarajah

Research Assistant/ PhD Scholar
Michelle Simmons
(to Mar)

PhD Scholar
Abram Wassef

PhD Scholar
Fiona Guan

PhD Scholar
Jane Gordon

PhD Scholar
Liane Khoo

PhD Scholar
Keren Weiss

Medical Student
Nick Otte
(from Sep)

Honours Student
Anne Moran

Visiting Researcher
John Doan
(to Aug)

Visiting Researcher
Alice Klein
(to Aug)

Visiting Researcher
Lyn Moir

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

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 chromatin, 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 uncontrolled 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 starving the cancer cells.

Dr Chuck Bailey, Scott Canner Memorial Research Fellow, Tour de Cure Senior Research Officer, Gene and Stem Cell Therapy Centenary Institute

Professor Wolfgang Weninger, Faculty

HIGHLIGHT

In an international collaboration, we discovered a novel population of skin cells, termed group 2 innate lymphoid cells (ILC2). Using our live imaging microscopy we showed that ILC2 cells are capable of generating inflammatory skin disease responses, as published in ***Nature Immunology.***

STAFF

Faculty
Wolfgang Weninger

Associate Faculty
Chris Jolly

Associate Faculty
Nikolas Haass

Associate Faculty
Paulus Mrass
(to Sep)

Senior Research Officer
Lois Cavanagh

Research Officer
Andrew Mitchell

Research Officer
Ben Roediger

Research Officer
Adam Cook
(from Jun)

Research Officer
Ichiko Kinjo
(to Oct)

Research Officer
Kimberley Beaumont

Research Officer
Marcia Munoz

Research Officer
Mate Biro

Research Officer
Rohit Jain

Research Officer
Saparna Pai

Research Officer
Sioh Yang Tan

Research Officer
Szun Szun Tay

Research Assistant
Timothy Durack

Research Assistant
Jeremy Chou
(to Jan)

Research Assistant
Jim Qin
(to Apr)

Research Assistant
Mary Rizk

Research Assistant
Lisa Shaw
(from Jul)

Research Assistant
Rona Barugahare
(from Apr)

Research Assistant
Danae Sharp
(from Apr)

PhD Scholar/ Research Assistant
Edwin Lau
(to Apr)

PhD Scholar
Philip Tong

PhD Scholar Eddy
Thientosapol

Masters Student
Jorge Luis Galeano Nino

Honours student
Daniel Bosnjak

Visiting Researcher
Radjesh Bisoendial

Visiting Researcher
Hsien Chan

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 2000 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 defence 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

DISCOVER

Discovery of a new immune cell type linked to allergic skin conditions. Our team discovered a new type of immune cell in the skin that plays a role in fighting off parasites such as ticks, mites and worms, and could be linked to eczema and allergic skin diseases. The new cell type is part of a family known as group 2 innate lymphoid cells (ILC2) that was discovered less than five years ago in humans. Using our live imaging microscope we showed that ILC2 cells are capable of generating inflammatory skin disease responses.

UNDERSTAND

Understanding the basis of immune responses. Our research group uses cutting edge multi-photon microscopy, to generate a better understanding of the causes of skin diseases including infectious and allergic skin conditions. We use these specialised microscopes to track the behaviour of immune cells, microbes (bacteria and viruses), and cancer cells in real time in the skin and other organs. This is a valuable capability for studying disease progression. We are also researching the molecular basis of immune responses, such as the DNA repair mechanisms that contribute to the maturation and production of antibodies.

IMPROVE

Improved treatment outcomes for melanoma. Melanoma is an extremely aggressive skin cancer and is the most common cancer in young Australian adults. We are investigating the characteristics and resistance to cancer drugs of the different types of cells in melanomas. Using multiphoton microscopy we are able to examine in detail the behaviour of the melanoma tumour proliferation and invasion in real time. Our goal is to improve the targeting of melanoma tumour cells using chemo and immuno-therapy.

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

DISCOVER

Discovery of the molecular mechanisms underlying immune tolerance. We discovered that when liver cells engulf and destroy T cells it produces the dampening effect on the immune system, termed immune tolerance. This research has now advanced to preclinical models in which we are exploring in more depth how the liver induces tolerance, so we can manipulate these mechanisms to induce a persistent immune response. Exploring the mechanism of liver regulated immunity will lead not only to better transplantation therapy by turning the immune system down, but also to more effective prevention and treatment of liver disease by strengthening its action.

UNDERSTAND

Understanding the role of white blood cells role in liver transplants. Our group has developed a unique preclinical model that enables us to study the early immune response events occurring after liver transplantation, events that are impossible to study in patients. Our work revealed that recipient T cells specific for the transplanted liver are eliminated earlier than initially thought.

IMPROVE

Improving patient outcomes after liver transplantation. Linking back to the clinic, our group is examining people undergoing liver transplantation following chronic hepatitis C infection. HCV persists post-transplant, and can cause recurrent liver disease. By studying the immune response to HCV in our group of patients, we hope to gain important insights into how we can modulate the immune response to HCV. This will aid in clearing chronic infections, ultimately leading to restoration of liver function and improved treatment outcomes in early infection.

Dr Patrick Bertolino, Faculty

HIGHLIGHT

We developed a unique preclinical model that enables us to study what happens to the immune system just after liver transplantation. This may one day help transplant patients overcome the need for immune suppression drugs that have nasty side effects, as published in ***Liver Transplantation.***

STAFF

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Research Assistant
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Claire McGuffog

PhD Scholar
Michelle Vo

Professor Geoff McCaughan, Faculty

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 therapies.

STAFF

Faculty
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Affiliate
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Associate Faculty
Mark Gorrell

Associate Faculty
Nick Shackel

Senior Research Officer
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Research Officer
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Yiqian Chen

PhD Scholar
Aimei Lee

PhD Scholar
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Hui (Emma) Zhang

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Margaret Gall

PhD Scholar
William D'Avigdor

PhD Scholar
Robert Cheng

PhD Scholar
Carlo Pulitano

Honours student
Emily Huang

Honours student
Linda Ban

Honours student
Pok Fai Wong

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 this growing problem of liver disease. The group leaders are Geoff McCaughan, Mark Gorrell, Nick Shackel and Devanshi Seth.

Our goal is to understand how liver damage occurs, which will help us improve diagnosis and therapies for all liver disease including liver cancer, cirrhosis and hepatitis. In the long term, we aim to reduce the burden of liver disease globally.

"I find the understanding of disease pathogenesis and linking it to my patient's problems a never ending but a stimulating challenge that always has the potential to improve patient's lives."

Professor Geoff McCaughan, Faculty

DISCOVER

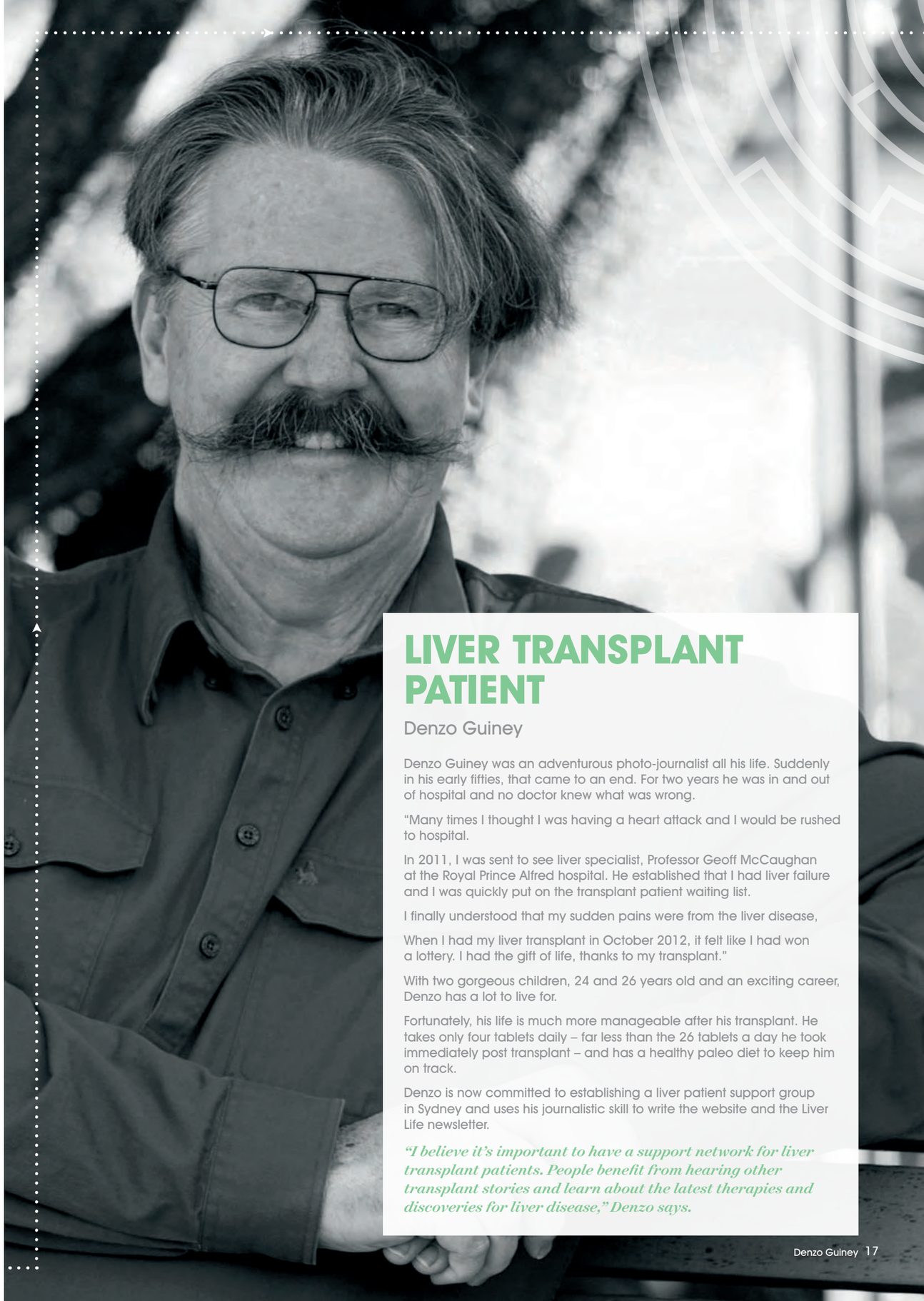
Discoveries that will lead to novel therapies for liver cancer and liver disease. Our group reported key scientific discoveries that are likely to lead to new novel therapeutics targeting liver disease, liver injury (inflammation) and liver cancer. Our group uncovered a completely novel mechanism of 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 hepatocyte 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 DPP9, 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.

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



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.

Professor 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.

STAFF

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Laura Molloy
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Research Officer
Caroline Medi

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Visiting Researcher
Vanessa Connell

MOLECULAR CARDIOLOGY

Professor Chris Semsarian, Faculty

Cardiovascular disease kills one Australian every 12 minutes.

A major highlight of our work in cardiology is preventing fatal 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

DISCOVER

Sudden death genetic discoveries. Following our discovery of genes linked to arrhythmias 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 where 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. 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.

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 diseases. By restoring the normal signalling, we will be able to treat and prevent diseases at their root.

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 clinical implication of our SphK findings and develop new therapeutic agents.

"I am fascinated by the unique biochemical language that cells use to communicate in our bodies, and I 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

DISCOVER

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.

UNDERSTAND

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.

IMPROVE

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 isoform 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.

Associate Professor Pu Xia, Faculty

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

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(to Feb)

Research Officer
Jinbiao Chen

Research Assistant
Jacob Qi

Associate Professor Mika Jormakka, Faculty

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.

STAFF

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Aaron McGrath

Research Officer
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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.

Dr Aaron McGrath, CJ Martin Fellow, Structural Biology, Centenary Institute, was a part of Centenary's Run4Research team in the City2Surf

Professor Barbara Fazekas de St Groth, Assistant Director, Faculty

HIGHLIGHT

A consortium led by T cell Biology's Professor Barbara Fazekas, Dr Adrian Smith (Centenary) and Professor Nicholas King (University of Sydney) was awarded $1.8 million in funding to set up the Ramaciotti Facility for Human Systems Biology - it will dramatically increase the speed and accuracy of processing cell analysis data and integrating this with clinical data. The facility will be accessible to researchers Australia-wide.

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Research Officer
Holly Bolton

Research Officer
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Cindy Zhu

Research Assistant
Michelle Brownlee

Research Assistant
Wendy Zhang (to Jan)

Research Assistant
Yu Qing Rain Kwan

Research Assistant
Luke Beebe

PhD Scholar
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PhD Scholar
David Hancock

PhD Scholar
Lauren McKnight

PhD Scholar
Loretta Lee

PhD Scholar
Nazri Mustaffa

PhD Scholar
Suzanne Asad

PhD Scholar
Thomas Guy

PhD Scholar
Yik Wen Loh

Honours Student
Rosemary Mulray

Visiting Researcher
Alex Hodkinson (from May)

T CELL BIOLOGY

Professor Barbara Fazekas de St Groth, Assistant Director, Faculty

Psoriasis, inflammatory bowel disease, rheumatoid arthritis, asthma and diabetes are all typical immuno-inflammatory chronic conditions – known as "Western" diseases. At least half the Australian population will suffer from an immuno-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 regulators (T regs) 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

T regs 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 T regs to prevent immune rejection. T regs interact with many other immune cells to prevent the immune system from attacking tumours. We are testing whether targeting T regs and other immune cell types simultaneously can produce long-term tumour remission.

UNDERSTAND

Understanding how T regs control our immune system. Working in preclinical models, we have been studying how T regs prevent T cells from causing immuno-inflammatory conditions such as inflammatory bowel disease and asthma. Our research has shown that T regs focus their activity on a third cell type, the dendritic cell, which in turn control which T cell is turned on and which is silenced. We have defined which molecules T regs 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 includes our immediate 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 identify methods to control the infection. Dr Saunders and her group 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.

Professor Warwick Britton, Assistant Director, Faculty

HIGHLIGHT

An important highlight of our work is the NHMRC funding of a Centre of Research Excellence in Tuberculosis Control to provide a focus for research to attack this important human health problem. This collaborative program involves immunologists, microbiologists, clinicians, and public health staff and extends from the laboratory to the community including high burden countries such as Vietnam and China.

STAFF

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Associate Faculty
Bernadette Saunders

CJ Martin Fellow
Magda Ellis

CJ Martin Fellow
Stefan Oehlers (from Jun)

Research Officer
Brian Chan (to Jan)

Research Officer
Jennifer Huch

Research Officer
Kelly Prendergast (from Sep)

Research Officer
Sebastian Stifter (from Apr)

Research Officer
Nathan Hare (from Apr)

Research Officer
Leon Lin (from May)

Research Officer
Elena Martinez (from Jun)

Research Officer
Manuela Florido

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Rachel Pinto

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Roman Pillay

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Michael Alim (from Apr)

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PhD Scholar
Greg Fox

PhD Scholar
Samantha Ellis

PhD Scholar
Simone Barry

PhD Scholar
Heni Muflihah

PhD Scholar
Thaigarajan Parumasivum

Masters student
Beatrice Nagaria

Honours student
Julie Trajcevska

Visiting Researcher
Carl Feng

Visiting Researcher
Jamie Triccas

Professor Jennifer Gamble, Faculty

HIGHLIGHT

Our group has discovered a potential drug candidate to treat vascular leak – a condition underlying many diseases including stroke, heart attack and cancer. We are now investigating our drug candidate's capacity to function in pre-clinical models in order to develop its commercial potential.

STAFF

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Senior Research Officer
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Research Officer
Gabor Hutas

Research Officer
Renjing Liu (from Aug)

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PhD Scholar
Garry Chang

PhD Scholar
Yang Zhao

Masters Student
Ella Stephens (to Jun)

Visiting Researcher
Peter Zhou

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

DISCOVER

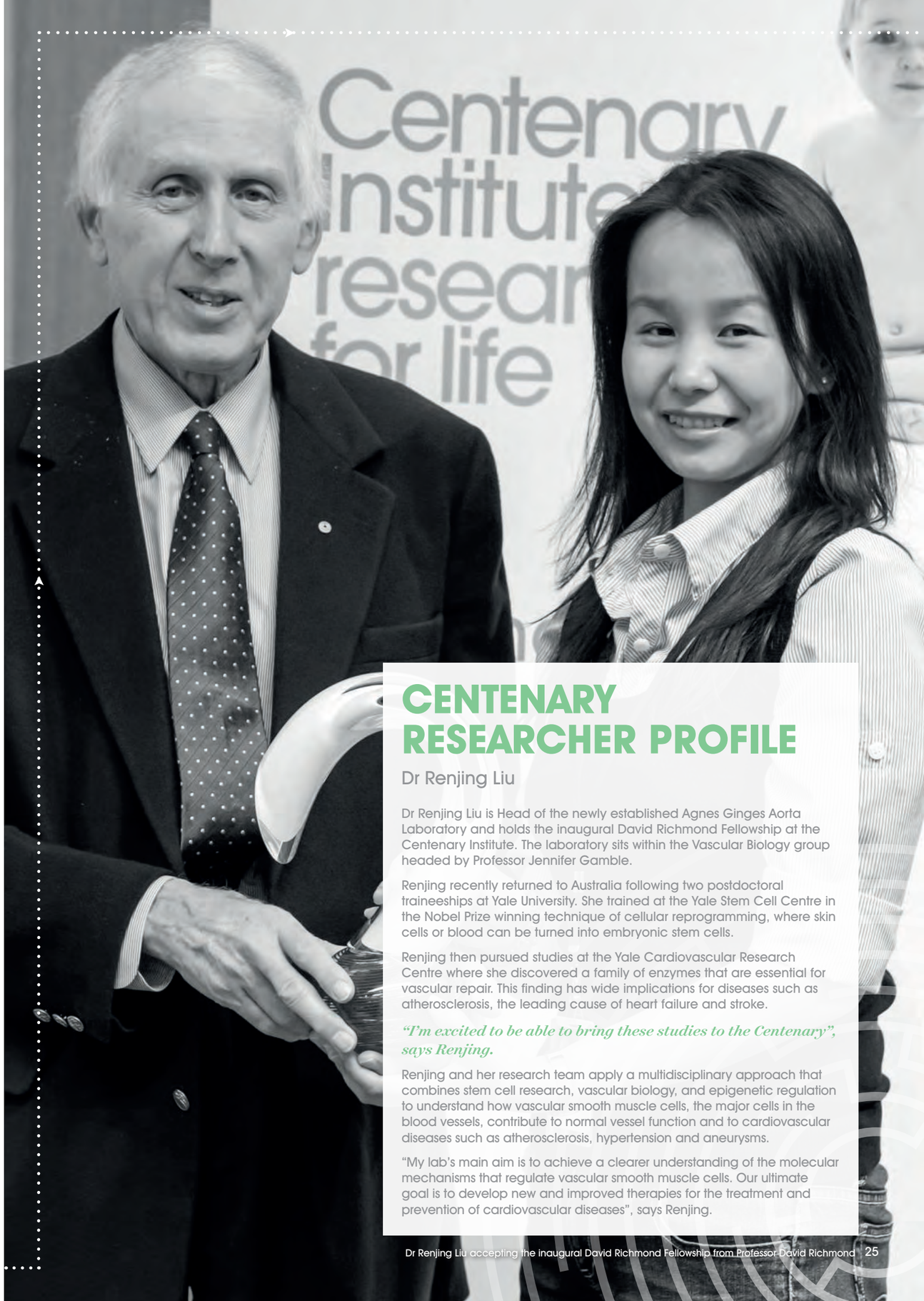
Discovery of a new drug candidate to treat vascular leak. Vascular leak (permeability) is a major problem in many diseases including stroke, heart attacks, diabetic eye disease and cancer, to name a few. Currently, there are no drugs that specifically target this serious medical problem. Our earlier laboratory research into vascular leak revealed a small natural molecule (called a miRNA) that is a strong inhibitor. This inhibitor is now our potential drug candidate that targets the major protein involved in maintaining vascular integrity, which is altered when the vessels become leaky. Currently, we are using models to test its effects and develop this inhibitor into a therapeutic drug.

UNDERSTAND

Understanding the development of thoracic aortic aneurysms. In 2013, we established, under the guidance of Dr Renjing Liu, the Diseases of the Aorta Laboratory. Our first research project is focused on thoracic aortic aneurysms, a degenerative condition characterised by weakening of the aortic wall leading to aortic ruptures and death. It is the thirteenth leading cause of death worldwide. Aortic aneurysms can develop naturally with age or have an inherited genetic component. We are investigating what happens in the blood vessel that results in the aneurysm.

IMPROVE

Healthier blood vessels may improve the ageing process. The diseases of ageing – cardiovascular disease, cancer and inflammation all have endothelial cell dysfunction as an underlying problem. We are investigating the impact of ageing on these cells in order to understand the consequence to their function.



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.

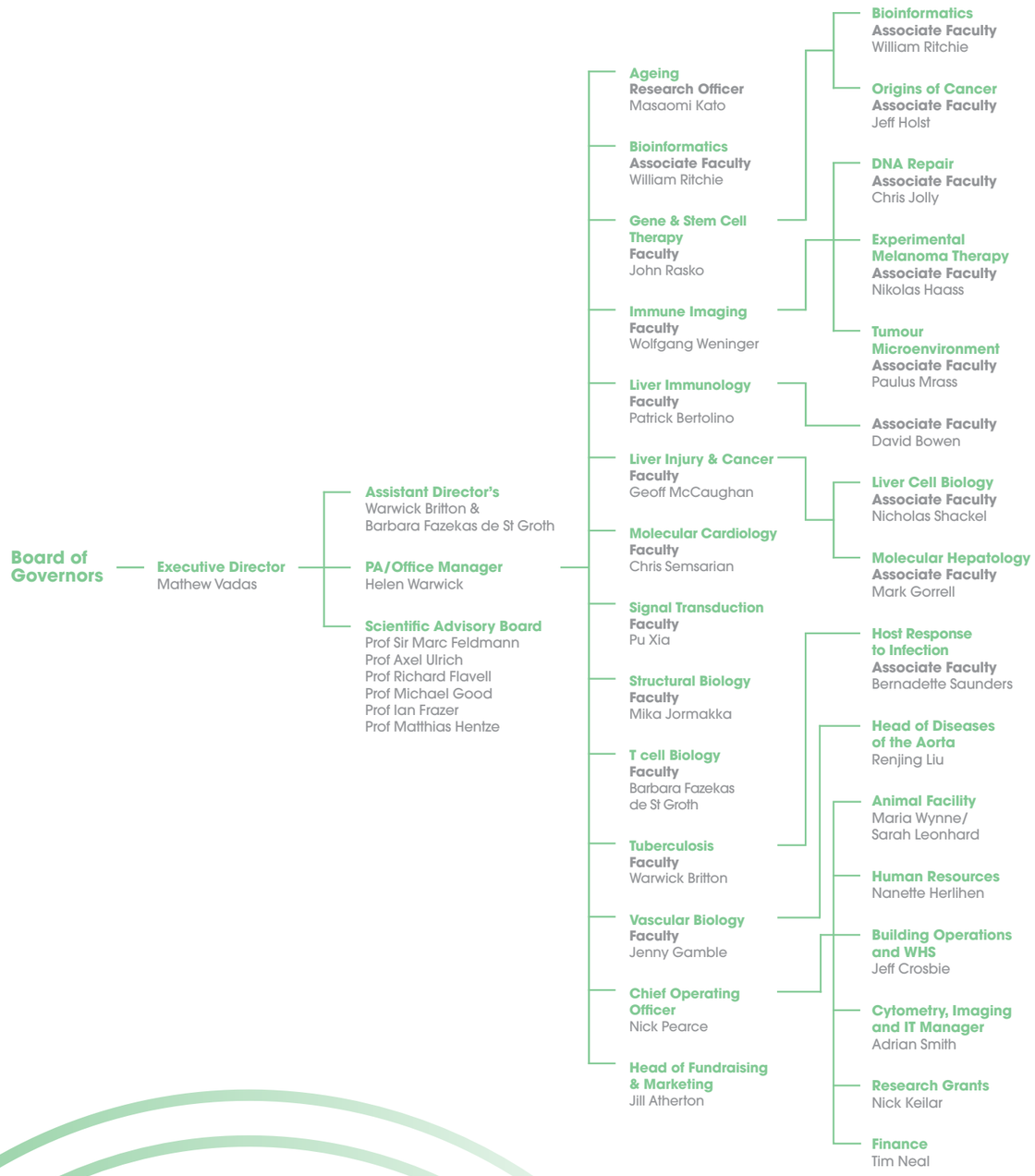
"I'm excited to be able to bring these studies to the Centenary", says Renjing.

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.

Dr Renjing Liu accepting the inaugural David Richmond Fellowship from Professor David Richmond

ORGANISATIONAL CHART



SCIENTIFIC SUPPORT

Dr Nick Pearce, Chief Operating Officer

2013 was a productive year for Centenary's research and support staff, driving our endeavours to understand and discover new diagnostics and treatments for cancer, cardiovascular and infectious diseases

Grants are the cornerstone of our income and in 2013 researchers secured an impressive 45 new grants increasing our total grant income to $10.8 million.

To ensure optimal management of all our grants and other financials, the team successfully implemented a new finance system, NetSuite, which has proven to be highly effective.

A highlight was the $1 .8 million funding we received to set up Australia's first Cytometry Time of Flight mass spectrometer (CyToF) technology, from the Ramaciotti Foundation, Cancer Institute NSW and the Australian Government.

Centenary's cytometry capabilities are already among the best in Australia and the CyToF equipment will position Centenary as world-class in the field. The CyToF technology enables up to 100 different cellular processes to be followed simultaneously in a thousand cells each second.

Congratulations to Professor Barbara Fazekas de St Groth, Dr Adrian Smith and Professor Nick King from the University of Sydney in securing the funding. The CyToF equipment will be housed in the new Ramaciotti Centre for Human Systems Biology to be opened in 2014, for use by researchers across NSW.

With our growth and expertise in the fields of cytometry, imaging and bioinformatics, which all generate large data files, there has been a growing demand for increased electronic storage. This year, we significantly increased our primary data storage capability from 120 terabytes to over 400 terabytes so we can continue to be at the forefront in our field.

Strong collaborative research efforts have continued to drive Centenary's success in 2013. This was reflected in Centenary's collaborative journal publications with an extraordinarily high number of local and international research organisations – 118 organisations. Journal publication collaborations included hospitals (54), universities (103) and medical research institutes (42).

On behalf of all the researchers and support staff, many thanks to our supporters and key stakeholders including the Australian Government (Department of Health and Ageing, ARC), State Government (OHMR, Cancer Institute NSW), non-government granting bodies, Sydney Local Health District and the general community for their ongoing support of our research.

Finally, my thanks to all the researchers and science support staff for their ongoing commitment and hard work throughout 2013 – together, we can continue to achieve important advancements in medical research.

Dr Nick Pearce, Chief Operating Officer

STAFF

Executive Director
Mathew Vadas

Chief Operating Officer
Nick Pearce

Cytometry, Imaging and IT Manager
Adrian Smith

Finance Manager
Tim Neal

Grants Manager
Nick Keilar

HR Manager
Nan Herlihen

IT Operations Manager
Daryl Hunt

Veterinary Manager
Maria Wynne
(to Jun)

Veterinary Manager
Sarah Leonhard
(from Oct)

Building Operations and WHS Manager
Jeff Crosbie

Administrative Assistant/Reception
Michael Greensmith

Administrative Assistant/Reception
Rachel Wolfenden

Administrative Assistant
Rachel Barry
(from May)

Administrative Assistant
Robyn Burdett
(to Mar)

Animal Facility Officer
Marisa Henry

Animal Facility Officer
Emma Squire
(from Mar)

Animal Facility Assistant
Victor Truong

Animal Facility Assistant
Gary Black

Animal Attendant
Kiara Ritky
(Jul-Sep)

Animal Attendant
Michelle Spoelder
(Jul-Sep)

Animal Attendant
Christine Wu
(from Oct)

Animal Attendant
Emma O'Flaherty
(from Jun)

Animal Attendant
Matthew Murarotto
(from Oct)

Animal Attendant
Vince Zappala
(from Mar)

Animal Attendant/ Animal Technician
Natalie Littlejohn
(from July)

Animal Technician
Carol Juaton

Animal Technician
Danielle Moyes

Animal Technician
David Herne

Animal Technician
Leah Miller

Animal Technician
Megan Kavazos
(to Jul)

Animal Technician
Michael Damjuncuk
(to Jul)

Building Services Assistant
Bob Thorburn

Building Services Assistant
Adam Adelpour
(from Apr)

Cytometry and Imaging Support
Suat Dervish

Cytometry Technical Support
Frank Kao

Director's PA/Office Manager
Helen Warwick

Finance Officer
Willie Entona

Assistant Accountant
Chelsea Wang

HR Advisor
Anna Slowiaczek

HR Assistant
Julie Abalain (to Jun)

Imaging Support Specialist
Kristina Jahn

IT Helpdesk
Gary Ho (from Jun)

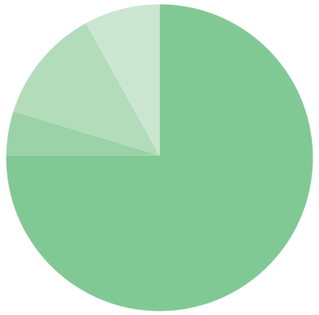
Scientific Systems Administrator
Robert Middleton
(to Oct)

Senior IT Support
Owen Hoogvliet

Senior Technical Support
Steven Allen

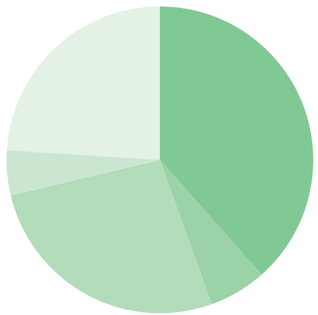
FINANCIAL HIGHLIGHTS

WHAT COSTS WHAT?



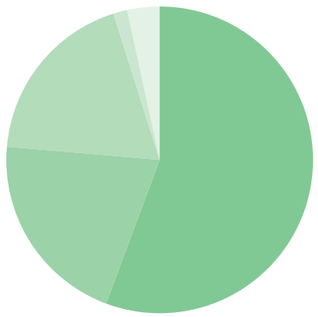
- Research Activities
- Fundraising
- Administration
- Building Operations

WHAT FUNDS COME IN?



- Federal - NHMRC + ARC
- NSW Government
- Other Research Grants
- Donations, Bequests + Events
- Commercial
- Other

WHO'S WHO?



- Direct Research Staff
- Operational Staff
- Phd
- Masters
- Honours

Total Head Count: 220

KEY FACTS AND FINANCES

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.

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**

EXPENDITURE

Research Activities	15,376	14,221
Fundraising	875	805
Administration	2,495	2,588
Building operations	1,613	2,338
Total Expenditure	**20,359**	**19,952**

SUCCESSFUL GRANT RECIPIENTS

INVESTIGATORS*	GRANTING BODY	TYPE
Mika Jormakka, Renae Ryan, **Jeff Holst**, Ronald Quinn, Ben Crossett, So Iwata	University of Sydney	Bridging (2013 - 2013)
Nicholas Shackel, Susan McLennan, Kumar Visvanathan, **David Bowen**, James Kench, **Geoff McCaughan, Fiona Warner**	University of Sydney	Bridging (2013 - 2013)
Elena Shklovskaya, Barbara Fazekas, Jamie Triccas, Wolfgang Weninger	University of Sydney	Bridging (2013 - 2013)
Chandrika Deshpande	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 Armati, Johnothan Arnold, **Charles Bailey, Patrick Bertolino, Mate Biro, Jinbiao Chen, Barbara Fazekas, Carl Feng**, Claire Goldsbury, **Michael Lovelace, Geoff McCaughan, Paulus Mrass, Saparna Pai**, John Pollard, **John Rasko, Bernadette Saunders, Nicholas Shackel, Jamie Triccas, Wolfgang Weninger**	National Health & Medical Research Council	Equipment (2013 - 2013)
Wolfgang Weninger, Richard Bagnall, Charles Bailey, Patrick Bertolino, Barbara Fazekas, Carl Feng, Chris Jolly, Geoff McCaughan, Chris Semsarian, Nicholas Shackel, Elena Shklovskaya, Mathew Vadas	National Health & Medical Research Council	Equipment (2013 - 2013)
Jodie Ingles	University of Sydney	Travel (2013 - 2013)
Adam Cook	University of Sydney	Fellowship (2013 - 2016)
Keren Weiss	Cell and Gene Trust	Scholarship (2013 - 2014)
Masaomi 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 Holst, Andrew Franklin, Kevin Mills	National Health & Medical Research Council	Project (2013 - 2015)
Chris Semsarian, Douglas Crompton, **Richard Bagnall**, Samuel Berkovic, Andrew Davis, **William Ritchie**, Ingrid Scheffer	National Health & Medical Research Council	Project (2013 - 2015)
Chris Semsarian, Richard Bagnall, William Ritchie	National Health & Medical Research Council	Project (2013 - 2015)
Barbara Fazekas, Robert Hancock, **William Ritchie**, Ranjeny Thomas	National Health & Medical Research Council	Project (2013 - 2015)
Warwick Britton, Nick West, Richard Payne, Hak-Kim Chan, **Maria Manuela Florido P Da Costa**, **Jamie Triccas**	National Health & Medical Research Council	Project (2013 - 2015)
Carl Feng, Warwick Britton, Alan Sher, **Jamie Triccas**	National Health & Medical Research Council	Project (2013 - 2015)

SUCCESSFUL GRANT RECIPIENTS

INVESTIGATORS*	GRANTING BODY	TYPE
Jamie Triccas, **Warwick Britton**, Ines Atmosukarto, Christopher Parish, **Wolfgang Weninger,** Nick West	National Health & Medical Research Council	Project (2013 - 2015)
Nick West, **Jamie Triccas**, **Warwick Britton**, Ian Charles, Roy Chaudhuri	National Health & Medical Research Council	Project (2013 - 2015)
Caroline Medi	National Health & Medical Research Council	Fellowship (2013 - 2017)
Aaron Mcgrath	National Health & Medical Research Council	Fellowship (2013 - 2016)
Stefan Oehlers	National Health & Medical Research Council	Fellowship (2013 - 2017)
Kimberley Beaumont, Nikolas Haass, Jennifer Stow, **Wolfgang Weninger**	Cancer Australia	Priority-driven Collaborative Cancer Research Scheme (2013-2015)
Elena Shklovskaya, Barbara Fazekas, Jamie Triccas, **Wolfgang Weninger**	Cancer Council New South Wales	Project (2013 - 2015)
Nikolas Haass, Kimberley Beaumont, Wolfgang Weninger	Cancer Council New South Wales	Project (2013 - 2015)
William Ritchie	Cancer Institute NSW	Fellowship (2013 - 2015)
Barbara Fazekas, Nick King, Adrian Smith, **Charles Bailey**, Philp Beale, Jane Beith, Judy Black, Robert Brink, Iain Campbell, Richard Christopherson, Georgina Clark, Stuart Cordwell, Merlin Crossley, Miles Davenport, Philip Fromm, Ewa Goldys, Peter Gunning, Gary Halliday, Brett Hambley, Derek Hart, Philip Hogg, Andrew Holmes, Eddie Holmes, **Jeff Holst**, Lisa Horvath, Michael Huang, Patric Jansson, Dayong Jin, Douglas Joshua, Danuta Kalinowski, Steven Kao, Rick Kefford, Zaklina Kovacevic, Georgina Long, Graham Mann, Mark Molloy, **Paulus Mrass,** John Pimanda, **John Rasko**, Louis Rendina, Des Richardson, **William Ritchie**, Helen Rizos, **Elena Shklovskaya,** Stephen Simpson, Alec Swarbrick, Stuart Tangye, Tony Weiss, **Wolfgang Weninger,** John Zaunders	Clive and Vera Ramaciotti Foundation	Biomedical Research Award (2013-2016)
Nicholas Shackel, Sue McLennan, Alex Sharland	National Foundation for Medical Research and Innovation	Project (2013-2015)
Jennifer Gamble	Sydney Catalyst	Pilot & Seed Funding (2013 - 2013)
Chris Semsarian, Robert Weintraub	The Financial Markets Foundation for Children	Project (2013 - 2015)
Bernadette Saunders	Perpetual Trust	Project (2013 - 2014)
Wolfgang Weninger, Ernan Cantos, Hsien Chan, **Ben Roediger, Szun Tay, Philip Tong**	Australian College of Dermatologists	Project (2013 - 2014)
Wolfgang Weninger, Alberto Catalano, Hsien Chan, Harry Iland, **Ben Roediger, Szun Tay, Philip Tong**	Australian College of Dermatologists	Project (2013 - 2014)
Barbara Fazekas	Cancer Institute NSW	Equipment (2013 - 2014)
John Rasko, Charles Bailey	Tour de Cure	Fellowship (2013 - 2015)
Michelle Simmons	Sydney Catalyst	Scholarship (2013 - 2015)
Jodie Ingles	Thrasher Research Fund (USA)	Early Career Award (2013 - 2014)

*CIA is named first

AWARDS

2013 AWARDS AND HONOURS

Anneliese Tyne	Best Poster Australasian Society of Immunology meeting
Barbara Fazekas de St Groth	External Assessor Outstanding Contribution Honour Roll NHMRC 2010 - 2012 (awarded 2013)
Bernadette Saunders	External Assessor Outstanding Contribution Honour Roll NHMRC 2010 - 2012 (awarded 2013)
Chris Jolly, Jeff Holst, Jenny Gamble, Mathew Vadas and Warwick Britton	Peer Review Honour Role NHMRC 2013
Garry Chang	Best Poster Awarded at the Australian Vascular Biology Conference
Geoff McCaughan	Liver Transplant Society's Distinguished Service Award for outstanding contributions to the area of liver transplant research 2013
Greg Fox	Rita and John Cornforth Medal 2013, University of Sydney
Jodie Ingles	Thrasher Research Fund Early Career Award 2013
John Rasko, AO	The Royal College of Pathologists of Australasia Distinguished Fellow Award 2013
Magdalena Budzinska	Roche Diagnostics Australia Pty Ltd. Educational Grant (Hepatitis) for the oral presentation at Australian Centre for HIV and Hepatitis Virology Research (ACH2), 9th Annual Scientific Workshop
Mate Biro	Best presentation award, Cell Architecture in Development and Disease Symposium 2013, Australian Society for Biochemistry and Molecular Biology
Michael Lovelace	NHMRC Science to Art Award 2013 (winner)
Michael Lovelace	Australian Museum New Scientist Eureka Prize for Science Photography 2013 (finalist)
Michael Lovelace	Finalist in the Australasian Society for Stem Cell Research "Small Objects, Big Impact" Image Competition 2013
Michelle Simmons	Poster prize at the Australian Breast Cancer Conference
Nikolas Haass	F. & E. Bauer Foundation Prize for the presentation "BRAF new world" at the 46th Annual Scientific Meeting of the Australasian College of Dermatologists
Philip Tong	Society for Investigative Dermatology Eugene M. Farber Travel Award. 62nd Montagna Symposium on the Biology of the Skin, Washington, USA
Thomas Tu	Young Investigator Travel Grant Award, 2013 International Meeting for Molecular Biology of HBV
Warwick Britton	The Royal College of Pathologists of Australasia Distinguished Fellow Award 2013
William Ritchie	Centenary Institute Lawrence Creative Prize 2013 finalist
Wolfgang Weninger	The RPA Foundation Medal 2013

CENTENARY INSTITUTE STAFF AWARDS 2013

Anna Slowiacek	Centenary Outstanding Service Award
Barbara Fazekas de St Groth	Centenary Paper with Highest Citations
George Sharbeen	Centenary Axel Ullrich Award (Highest Impact Factor for a paper)
Ratansari (Sari) Padang	Centenary Student Paper Award (Highest Impact Factor for a student paper)
Suat Dervish	Centenary Innovation Award

CENTENARY INSTITUTE SCIENTIFIC IMAGE PRIZE 2013

Ka Ka Ting	1st place image - The Eye of Sauron
Rohit Jain	2nd place image - Corridors to Life
Garry Chang	3rd place image - The Blooming Vascular Network
Michael Lovelace	3rd place image - Tunnel Vision

2013 CENTENARY INSTITUTE LAWRENCE CREATIVE PRIZE

Dr Connie Wong
(Winner)

Dr Anne Abbott
(Finalist)

Dr William Ritchie
(Finalist)

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

L-R Anna Lawrence, Dr Connie Wong, Caroline Lawrence and Neil Lawrence

L-R Neil Lawrence, Dr Connie Wong and Professor Mathew Vadas

L-R Dr William Ritchie, Dr Connie Wong and Dr Anne Abbott

Thank you to our sponsors:

valmorgan MINDSHARE stw group UBS Deloitte.

Dr Bernadette Saunders, Postgraduate Coordinator and Associate Faculty

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 Cornforth 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
Yiqian Chen	Mark Gorrell	Liver Injury and Cancer
Candice Grzelak	Geoff McCaughan	Liver Injury and Cancer
Rhian Shephard	Chris Semsarian	Molecular Cardiology
Mei Li Ng	Pu Xia	Signal Transduction
Jacob Qi	Pu Xia	Signal Transduction
David Hancock	Barbara Fazekas de St Groth	T cell Biology
Frank Kao	Warwick Britton	Tuberculosis
Mercedes Monteleone	Warwick Britton	Tuberculosis
Paul Coleman	Jennifer Gamble	Vascular Biology

MASTER OF PHILOSOPHY

Ella Stephens	Jenny Gamble	Vascular Biology

HONOURS

Anne Moran	Jeff Holst	Gene and Stem Cell Therapy
Daniel Bosnjak	Chris Jolly	Immune imaging
Emily Huang	Devanshi Seth	Liver Injury and Cancer
Linda Ban	Nick Shackel	Liver Injury and Cancer
Pok Fai Wong	Mark Gorrell	Liver Injury and Cancer
Carina Cutmore	Chris Semsarian	Molecular Cardiology
Julie Trajcevska	Warwick Britton	Tuberculosis
Rosemary Mulray	Elena Shklovskaya	T cell Biology

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.

Tom Guy, PHD Student, T cell Biology group and Professor Mathew Vadas AO competed in the 2013 Sydney to Hobart as crew on the same yacht.

2013 PUBLICATIONS

Abbott CA & **Gorrell MD** 2013 Dipeptidyl-peptidase 8. In *Handbook of Proteolytic Enzymes 3rd Edition* (Rawlings ND & Salvesen G, eds). Chapter 746. Elsevier, San Diego.

Alsheikh-Ali AA, Link MS, **Semsarian C**, Shen WK, Estes NAM, Maron MS, Haas TS, Formisano F, Boriani G, Spirito P, Maron BJ 2013, 'Ventricular tachycardia/fibrillation early after defibrillator implantation in patients with hypertrophic cardiomyopathy is explained by a high-risk subgroup of patients' *Heart Rhythm*, vol. 10 no. 2, pp. 214-218.

Bendorf A, Kelly PJ, Kerridge IH, **McCaughan GW**, Myerson B, Stewart C, Pussell BA, 2013. 'An international comparison of the effect of policy shifts to organ donation following cardiocirculatory death (DCD) on donation rates after brain death (DBD) and transplantation rates.' *PLoS One*, vol. 8 no. 5, pp. e62010.

Biro M, Romeo Y, Kroschwald S, Bovellan M, Boden A, Tcherkezian J, Roux PP, Charras G, Paluch EK 2013, 'Cell cortex composition and homeostasis resolved by integrating proteomics and quantitative imaging' *Cytoskeleton*, vol. 70, no. 11, pp. 741-54.

Brandner JM, **Haass NK** 2013, 'Melanoma's connections to the tumour microenvironment', *Pathology*, vol. 45, no. 5, pp. 443-452.

Burke C, Liu M, **Britton W**, **Triccas JA**, Thomas T, **Smith AL**, **Allen S**, Salomon R, Harry E 2013, 'Harnessing single cell sorting to identify cell division genes and regulators in bacteria.', *PloS One*, vol. 8, no. 4, pp. e60964.

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Cunningham EC, **Tay SS**, Wang C, Rtshiladze M, Wang ZZ, **McGuffog C**, Cubitt J, **McCaughan GW**, Alexander IE, **Bertolino P**, **Sharland AF**, **Bowen DG**, Bishop GA 2013, 'Gene therapy for tolerance: high-level expression of donor major histocompatibility complex in the liver overcomes naive and memory responses to skin grafts.', *Transplantation*, vol. 95, no. 1, pp. 70-77.

Deshpande CN, **McGrath AP, Font J**, **Guilfoyle AP**, **Maher M**, **Jormakka M** 2013, 'Structure of an atypical FeoB G-domain reveals a putative domain-swapped dimer.', *Acta Crystallographica Section F-Structural Biology and Crystallization Communications*, vol. 69, pp. 399-404.

El-Assaad F, Wheway J, **Mitchell AJ**, Lou NJ, Hunt NH, Combes V, Grau GER 2013, 'Cytoadherence of plasmodium berghei-infected red blood cells to murine brain and lunch microvascular endothelial cells in vitro.', *Infection and Immunity*, vol. 81, no. 11, pp. 3984-3991.

Evans E, **Bagnall R**, Duflou J, **Semsarian** C 2013, 'Postmortem Review and Genetic Analysis in Sudden Infant Death Syndrome (SIDS): An 11-Year Review.', *Human Pathology*, vol. 44, no. 9, pp. 1730-1736.

Figtree G, **Bagnall R**, Abdulla I, Buchholz S, Karimi K, Galugahi R, Yan W, Tan T, Neil C, Horowitz D, **Semsarian C**, Ward M 2013, 'No association between G Protein coupled receptor kinase 5 or beta adrenergic receptor polymorphisms with Takotsubo cardiomyopathy in a large Australian cohort.', *European Journal of Heart Failure*, vol. 15, no. 7, pp. 730-733.

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Fox GJ, Nhung NV, Sy DN, **Britton WJ**, Marks GB 2013, 'Household contact investigation for tuberculosis in Vietnam: study protocol for a cluster randomized controlled trial.', *Trials*, vol. 14, pp. 342

Gall MG, **Chen Y**, **Vieira de Ribeiro AJ**, **Zhang H**, **Bailey CG**, Spielman D, Yu DM, **Gorrell MD** 2013, 'Targeted inactivation of Dipeptidyl Peptidase 9 enzyme activity causes mouse neonate lethality., *PLoS ONE*, vol. 8, no. 11, pp. e0078378

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2013 PUBLICATIONS

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Tong, PL, **Qin J**, Cooper CL, Lowe PM, Murrell DF, Kossard S, Ng LG, **Roediger B**, **Weninger W**, **Haass NK** 2013, 'A quantitative approach to histopathological dissection of elastin-related disorders using multiphoton microscopy.' *British Journal of Dermatology*, vol. 169, pp. 869-879.

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Tsoutsman T, Wang X, Garchow K, Riser B, Twigg S, **Semsarian, C** 2013, 'CCN2 plays a key role in extracellular matrix gene expression in severe hypertrophic cardiomyopathy and heart failure.' *Journal of Molecular and Cellular Cardiology*, vol. 62, pp.164-178.

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Walters SB, Kieckbusch J, Nagalingam G, Swain A, Latham SL, Grau GE, **Britton WJ**, Combes V, **Saunders BM** 2013, 'Microparticles from mycobacteria-infected macrophages promote inflammation and cellular migration.', *Journal of Immunology*, vol. 190, no. 2, pp. 669-77.

Wang Q, **Tiffen J**, **Bailey CG**, Lehman ML, **Ritchie W**, Fazli L, **Metierre C**, **Feng Y**, Li E, Gleave M, Buchanan G, Nelson CC, **Rasko JEJ**, **Holst J** 2013, 'Targeting amino acid transport in metastatic castration-resistant prostate cancer: Effects on cell cycle, cell growth and tumor development.', *Journal of the National Cancer Institute*, vol. 105, no. 19, pp. 1463-1473.

Williams KH, **Shackel NA**, **Gorrell MD**, McLennan SV, Twigg SM 2013, 'Diabetes and nonalcoholic Fatty Liver Disease: A Pathogenic Duo.', *Endocrine Review*, vol. 34, no. 1, pp. 84-129.

Wong JJ-L, **Ritchie W**, Ebner OA, Selbach M, Wong JWH, Huang Y, **Gao D**, **Pinello N**, **Gonzalez M**, **Baidya K, Thoeng A**, **Khoo T-L**, **Bailey CG**, **Holst J**, **Rasko JEJ** 2013, 'Orchestrated intron retention regulates normal granulocyte differentiation.', *Cell*, vol. 154, no. 3, pp. 583-595.

Wroblewski D, Mijatov B, **Mohana-Kumaran N**, Lai F, Gallagher SJ, **Haass NK**, Zhang XD, Hersey P 2013, 'The BH3-mimetic ABT-737 sensitizes human melanoma cells toapoptosis induced by selective BRAF inhibitors but does not reverse acquired resistance.', *Carcinogenesis*, vol. 34, no. 2, pp. 237-247.

Yeates L, Hunt L, Saleh M, **Semsarian C, Ingles J** 2013, 'Poor psychological wellbeing particularly in mothers following sudden cardiac death in the young.', *European Journal of Cardiovascular Nursing*, vol. 12, no. 5, pp. 484-91.

Young J, **Ting KK**, Li J, Moller T, Dunn L, Lu Y, Moses J, Prado-Lourenço L, Khachigian L, **Ng M**, Gregory PA, Goodall GJ, Tsykin A, Lichtenstein I, Hahn CN, Tran N, **Shackel N**, Kench J, **McCaughan G**, **Vadas MA**, **Gamble JR** 2013, 'Regulation of vascular leak and recovery from ischaemic injury by general and VE-cadherin-restricted miRNA antagonists of miR-27.', *Blood*, vol. 122, no. 16, pp. 2911-9.

Zhang N, **Dai L**, **Qi Y**, Di W, **Xia P** 2013, 'Combination of FTY720 with cisplatin exhibits antagonistic effects in ovarian cancer cells: Role of autophagy.', *International Journal of Oncology*, vol. 42, no. 6, pp. 2053-2059.

Cententary research staff published in international journal and front cover feature.

INVITED PRESENTATIONS

INTERNATIONAL

Bertolino P, An overview in liver immunology, APASL 2013 Meeting, From Pathogenesis to Therapy of Viral Hepatitis Workshop, June 2013, Singapore

Bertolino P, Both passenger leucocytes and hepatic parenchyma contribute to activation and deletion of graft-reactive CD8 T cells in liver transplantation, 100th Annual Meeting of the American Association of Immunology (AAI), May 2013, Honolulu, Hawaii, USA

Bertolino P, Early events of T cell tolerance following liver transplantation, International Liver Transplantation Society 19th Annual Congress, June 2013, Sydney, NSW

Bertolino P, From antigen presentation to immune responses in the liver, De l'immunologie à la biologie des systèmes: Scientific Day in Commemoration of Chantal Rabourdin-Combe, March 2013, Lyon, France

Bertolino P, The liver: a site of primary T cell activation leading to tolerance? San Raffaele Scientific Institute (seminar), March 2013, Milan, Italy

Britton WJ, Enzymes of the sulfate assimilation pathway induced during intracellular growth are novel protective antigens of *Mycobacterium tuberculosis*, Third Forum on Tuberculosis Vaccines, April 2013, Cape Town, South Africa

Britton WJ, Protein vaccines against tuberculosis: new antigens and new delivery strategies, Ninth Elsinore Meeting on Infection Immunity, May 2013, Elsinore, Denmark

Britton WJ, Immunology of Leprosy 2013, 18th International Leprosy Congress, September 2013, Brussels, Belgium

Britton WJ, New collaborative approaches to tuberculosis research and control in Australia, Australasian TB Conference, November 2013, Auckland, New Zealand

Britton WJ, Pulmonary immunisation against tuberculosis, 43rd Annual Scientific Meeting, Australian Society of Immunology, December 2013, Wellington, New Zealand

Fazekas de St Groth B, Regulatory T cells fine-tune DC costimulation in vivo to set the threshold for T cell proliferation, 15th International Congress of Immunology, August 2013, Milan, Italy

Fazekas de St Groth B, Moving cytometry into the world of systems biology, AFCG annual meeting, AFCG annual meeting, November 2013, Wellington, New Zealand

Fazekas de St Groth B, Analysis of immunoregulatory networks in mouse and man, ASI annual meeting, December 2013, Wellington, New Zealand

Gall MG, Neonate lethality from DPP9 enzyme deficiency, International Proteolysis Society, October 2013, Cape Town, South Africa

Gamble J, The Ageing Endothelium, Institute for Basic Science-Korea, August 2013, Daejeon, Korea

Gorrell MD, FAP and DPP4 as liver disease biomarkers, Personalised Medicine 2013, August 2013, Chicago, USA

Gorrell MD, FAP and DPP4 in liver disease associated with diabetes, Diabetes-2013, August 2013, Chicago, USA

Gorrell MD, Pathogenic roles of fibroblast activation protein in liver disease, Department of Biochemistry, Tufts University, August 2013, Boston, USA

Guy T, How to win a game of chess against melanoma, ASI annual meeting, December 2013, Wellington, New Zealand

Haass N, Real-time tracking of cell cycle progression in melanoma and its implications for the 'real world', 40th Annual Meeting of the Arbeitsgemeinschaft Dermatologische Forschung (ADF), March 2013, Dessau, Germany

Haass N, Dynamics of cell division and cell death of individual melanoma cells within the complex tumor microenvironment, 40th Annual Meeting of the Arbeitsgemeinschaft Dermatologische Forschung (ADF), March 2013, Dessau, Germany

Haass N, Echtzeit-Bildgebung des Zellzyklus in dreidimensionalen Melanommodellen, Invited seminar at University-Hospital Hamburg-Eppendorf, December 2013, Hamburg, Germany

Holst J, Targeting amino acid transport in prostate cancer, Prostate Cancer World Congress, August 2013, Melbourne

Holst J, Nutrient stress induced resistance, ACPCRA Symposium, August 2013, Port Douglas

Ingles J, To test or not to test: The psychological impact of predictive testing on children and teens, Annual Educational Conference of the National Society of Genetic Counselors, October 2013, Anaheim, USA

Ingles J, Key role of cardiac genetic counselling, Asia-Pacific Heart Rhythm Society and CardioRhythm, September 2013, Hong Kong, China

Ingles J, Psychological support following sudden death in the young, Scientific Sessions of the American Heart Association, November 2013, Dallas, USA

Rasko J, Stem cells through the eyes of a haematologist, ICMHS-18th NCMHS-MSHG-12thASMCPath, May 2013, Kota Bharu, Malaysia

Rasko J, Gene therapy – the future is now, ICMHS-18th NCMHS-MSHG-12thASMCPath, May 2013, Kota Bharu, Malaysia

Rasko J, Gene and cell therapy update & Haemopoiesis and the stem cell niche, UTAR Stem Cell Seminar, May 2013, Bandar Sungai Long, Malaysia

Rasko J, Gene & cell therapy update, Singapore Society of Haematology - Singapore General Hospital May 2013, Singapore, Singapore

Rasko J, Wild ones: assembly and characterization of a planarian species collection, Institute of Molecular Cell Biology, September 2013, Dresden, Germany

Rasko J, Update on Gene & Cell Therapy, 45th Congress of the International Society of Paediatric Oncology, September 2013, Hong Kong, China

Rasko J, Finding the Niche for Blood Stem Cells, The Hong Kong College of Pathologists, September 2013, Hong Kong, China

Rasko J, Gene expression under the microscope, Department of Pathology - The University of Hong Kong, October 2013, Hong Kong, China

Rasko J, Hidden layers of gene expression control, 3rd UTAR Seminar on Stem Cell & iPSC Research, December 2013, Kuala Lumpur, Malaysia

Ritchie W, Intron retention regulates normal granulopoiesis, Molecular Medicine, November 2013, Haiku, China

Roediger B, Regulation of cutaneous inflammation by skin-resident type 2 innate lymphoid cells, International Investigative Dermatology meeting, May 2013, Edinburgh, Scotland

Roediger B, Visualisation of cutaneous immunosurveillance and regulation of inflammation, European Academy of Allergy and Clinical Immunology International Symposium on Molecular Allergology, December 2013, Vienna, Austria

Semsarian C, Advances in genetics and genomics of arrhythmias, Heart Rhythm Society Meeting, May 2013, Denver, USA

Semsarian C, When the heart is normal at cardiological screening, American Heart Association Meeting, Nov 2013, Dallas, USA

Semsarian C, Hypertrophic cardiomyopathy case presentation Expert panel, American Heart Association Meeting, Nov 2013, Dallas, USA

Semsarian C, Genetic testing in sudden unexplained death, 6th APHRS Meeting, September 2013, Hong Kong, China

Semsarian C, Everything you wanted to know about the realities of genetic testing for HCM, HCM Summit V, September 2013, Minneapolis, USA

Seth D, Alcohol Infection & Cancer, 8th International Symposium on Alcoholic Liver and Pancreatic Diseases and Cirrhosis (ALPD), November 2013, New Delhi, India

Seth D, Macrophages: Master regulators of injury and regeneration in liver diseases, 8th International Symposium on Alcoholic Liver and Pancreatic Diseases and Cirrhosis (ALPD), November 2013, New Delhi, India

Shackel N, Functional Genomics of Liver Disease, Asian Pacific Study of Liver Disease Meeting, March 2013, Singapore, Singapore

Shklovskaya E, Cooperation of immune cell subsets in the anti-tumour immune response, ASI annual meeting, December 2013, Wellington, New Zealand

Tong P, The immune atlas: A topographical 3D study of the skin immune system, 62nd Montagna Symposium on the Biology of the Skin, October 2013, Washington, USA

Weninger W, Role of hemolysin-alpha in immunoevasion by S. aureus, Gordon Research Conference Directed Cell Migration, January 2013, Galveston, USA

Weninger W, Role of perivascular macrophages in neutrophil recruitment to infected skin, International Investigative Dermatology meeting, May 2013, Edinburgh, Scotland

Weninger W, Visualising innate immune responses in the skin, Seminar Series, Charles Institute, University College Dublin, May 2013, Dublin, Ireland

Weninger W, Role of perivascular macrophages in neutrophil recruitment to infected skin, Australasian Society of Immunology Annual Meeting, December 2013, Wellington, New Zealand

NATIONAL

Biro M, Uncovering the dynamics of cellular protrusions and the actomyosin cortex in invasive tumour cell migration, Focus on Metastasis, Cancer Research Network, June 2013, Sydney

Britton WJ, History of leprosy as a neurological disease, International Society for the History of the Neurosciences, June 2013, Sydney

Britton WJ, TB vaccines and Collaborative regional TB research, Advances in Tuberculosis: Australian and Regional perspectives, June 2013, Melbourne

Britton WJ, Pulmonary immunisation against tuberculosis infection, Annual Scientific Meeting - Australian Society of Microbiology, July 2013, Adelaide

Fazekas de St Groth B, Regulatory T cells, TSANZ annual meeting, June 2013, Canberra

Fazekas de St Groth B, Something about DCs, DC Down Under, August 2013, Sydney

Gamble J, The Ageing Endothelium, COMBIO, September 2013, Perth

Gamble J, MiRNA Regulation of Vascular Leak, Victor Chang- Vascular Biology and Renal Denervation Symposium, December 2013, Sydney

Gamble J, A Negative Regulator of Angiogenic Sprouting, Hunter Cell Biology Meeting, March 2013, NSW.

Haass N, BRAF New World, 46th Annual Scientific Meeting of the Australasian College of Dermatologists, May 2013, Sydney

Haass N, Induction of endoplasmic reticulum stress as a strategy for melanoma therapy, Joint conference of the Australasian Society for Dermatology Research (ASDR) and Asian Society for Pigment Research (ASPCR), May 2013, Sydney

Haass N, Advanced techniques – 2-photon microscopy, Workshop on Advanced Imaging Techniques for Malaria Researchers - University of Technology Sydney, August 2013, Sydney

Haass N, Defining the mode of melanoma growth by real-time cell cycle imaging, Princess Alexandra Hospital Health Symposium, August 2013, Brisbane

Haass N, Making stressed melanoma self-destruct, Cancer Council New South Wales, December 2013, Sydney

Holst J, Invited Speaker, Prostate Cancer World Congress, August 2013, Melbourne

Ingles J, Integration of basic and clinical research in perinatal science, Australian Centre for Perinatal Science Inaugural Symposium, August 2013, Sydney

Ingles J, Genetic testing: conveying results to the patient and their family, CSANZ Annual Scientific Meeting, August 2013, Gold Coast

Ingles J, The Early Career Researcher's Yammer Network, Sydney Medical School Early Career Researcher Annual Showcase, April 2013, Sydney

Ingles J, Getting to the heart of sudden death, RPA Hospital Medical Grand Rounds, July 2013, Sydney

Kato M, The Molecular Biology of Ageing in C. *elegans*, BMRI – University of Sydney, April 2013, Sydney

Lovelace M, Super-resolution microscopy applied to studying the localisation of SENEX in endothelial cells, 3rd Sydney Imaging Group Symposium, March 2013, Sydney

Lovelace M, SENEX localization in endothelial cells, Sydney Medical School Early Career Researcher Showcase, April 2013, Sydney

Lovelace M, Super-resolution microscopy applied to studying the localisation of SENEX in endothelial cells, Leica Ground-State Depletion Microscope Symposium - Bosch Institute, May 2013, Sydney

Rasko J, Clinical gene and cell therapy update, ABCAM Meeting - Stem Cells and Cancer, April 2013, Melbourne

INVITED PRESENTATIONS

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, New guidelines for genetic screening, Biotronik Expert Viewpoints 2013, March 2013, Sydney

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, ACPS 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 SUDEP, 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

Professor Ian Frazer AC presented the keynote address at Centenary's 2013 Annual Meeting.

CENTENARY INSTITUTE COLLABORATIONS 2013

ActivX Biosciences, CA, USA

Advanced Telecommunications Research Institute International, Kyoto, Japan

Agency for Science, Technology and Research, Singapore

Albert Einstein College of Medicine, NY, USA

AMGEN Australia, Sydney, NSW

Anandaban Hospital, Kathmandu, Nepal

ANZAC Research Institute, Sydney, NSW

Applied Biosystems, Melbourne, VIC

Australian National University, Canberra, ACT

AVI BioPharma, **Cambridge**, MA, USA

Baxter Healthcare, Sydney, NSW

Bern University, Bern, Switzerland

Bosch Institute, University of Sydney, Sydney NSW

Bristol Myers Squibb, Sydney, NSW

Centre for Immunology, Sydney, NSW

Children's Hospital Milwaukee, WI, USA

Children's Hospital Montefiore, NY, USA

Children's Hospital of Philadelphia, Philadelphia, PA, USA

Children's Hospital Oakland Research Institute, Oakland, CA, USA

Children's Medical Research Institute, Sydney, NSW

Chris O'Brien Lifehouse, Sydney, NSW

Centre Hospitalier Universitaire de Sherbrooke, QC, Canada

Concord Hospital, Sydney, NSW

Cornell University, NY, USA

CS Mott Children's Hospital, Michigan, USA

CSIRO, Geelong, VIC

Dartmouth College, Hanover, NH, USA

Department of Forensic Medicine, Sydney, NSW

Diamantina Institute, Brisbane, QLD

Elastagen, Sydney, NSW

European Molecular Biology Laboratory, Melbourne, VIC

Eskitis Institute, Gold Coast, QLD

Flevoziekenhaus Hospita, Almere, Netherlands

Flinders University, Adelaide, SA

Fudan University, Shanghai, China

Gambro BCT, Sydney, NSW

Genscreen, Melbourne, VIC

Genome Institute, St Louis, MO, USA

Garvan Institute, Sydney, NSW

Griffith University, Gold Coast, QLD

GlaxoSmithKline, Boronia, Victoria

Groningen University, Groningen, Netherlands

Harvard Medical School, Harvard University, Boston, MA, USA

Heart and Vascular Institute, Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates

Heart Research Institute, Sydney, NSW

Hebrew University of Jerusalem, Jerusalem, Israel

Hopital Claude Huriez Z Lille, France

Hopital Cochin, Paris, France

Howard Florey Institute, Melbourne, VIC

Imperial College, London, UK

Indiana University, Bloomington, IN, USA

INSERM, Villejuif Cedex, France

Institute Cochin Inserm, Paris, France

Institute for Research in Immunology and Cancer, Quebec, Canada

Institute of Liver and Biliary Science (ILBS), New Delhi, India

Institute of Molecular Bioscience, Brisbane, QLD

Institute of Molecular Genetics, Prague, Czech Republic

Japanese Agency for Marine-Earth Science and Technology, Japan

Jiaotong University, Shanghai, China

Kyoto University, Kyoto, Japan

Johnson and Johnson Research Australia, Sydney, NSW

La Trobe University, Melbourne, VIC

Liverpool Hospital, Sydney, NSW

Louisiana State University, Baton Rouge, LA, USA

Maasstad Ziekenhuer, DZ, Rotterdam

Macquarie University, Sydney, NSW

Mlaghan Institute for Medical Research, Wellington, New Zealand

Max Planck Institute for Molecular Biomedicine, Muenster, Germany

Max-Delbrunk Centre for Molecular Medicine, Berlin, Germany

Mayo Clinic, Minnesota, USA

Melbourne Brain Centre, Melbourne, VIC

Melbourne University, Melbourne, VIC

Minnesota Heart Center, Minnesota, MN, USA

Minneapolis Heart Institute Foundation, Minnesota, USA

Mirrx Therapeutics, Vejle, Denmark

Monash University, Melbourne, VIC

Monaldo Hospital, Naples Italy

Murdoch Children's Research Institute, Parkville, VIC

Nara Institute of Science and Technology, Nara, Japan

National Cancer Institute, Bethesda, MD, USA

National Cerebral and Cardiovascular Centre, Osaka, Japan

National Lung Hospital, Hanoi, Vietnam

National Institute of Allergy and Infectious Disease, MD, USA

National Measurement Institute, Sydney, NSW

National Taiwan University, Taipei, Taiwan

National University of Singapore, Singapore

New York Presbyterian Hospital, New York, NY, USA

Newcastle University, Newcastle, UK

NHMRC Regional Primate Facility, Sydney, NSW

NICTA, Sydney, NSW

Ningxia Medical University, NHAR, China

Oxford University, Oxford, UK

Pacific Biosciences, Menlo Park, CA, USA

Pôle Biologie Santé- Medecine Sud, Poitiers Cedex, France

Prince Henrys Institute for Medical Research, Melbourne, VIC

Prince of Wales Hospital, Sydney, NSW

Princeton University, Princeton, NJ, USA

Privatklinik Meiringen, Meiringen, Switzerland

Queensland Institute of Medical Research, Brisbane, QLD

Queensland University of Technology, Brisbane, QLD

Royal Brisbane Hospital, Brisbane, Qld

Royal Children's Hospital, Melbourne, VIC

Royal Melbourne Hospital, Melbourne, VIC

Royal Prince Alfred Hospital, Sydney, NSW

Salem Medical Centre, Heidelberg, Germany

Santaris, San Diego, CA, USA

Save Sight Institute, Sydney, NSW

South Australia Health & Medical Research Institute, Adelaide, SA

Stanford University and Hospital, CA, USA

St George Hospital, Sydney, NSW

St Jude Children's Research Hospital, Memphis, TN, USA

St. Luke's-Roosevelt Hospital Center, New York, NY, USA

St Vincent's Hospital, Melbourne, VIC

St Vincent's Hospital, Sydney, NSW

Statens Serum Institute, Copenhagen, Denmark

Sydney Cancer Centre, Sydney, NSW

Sydney Eye Hospital, Sydney, NSW

The Canberra Hospital, Canberra, ACT

The Sanger Centre, Cambridge, UK

The Spanienza University of Rome, Rome, Italy

The Institute of Molecular and Cellular Biology, Warsaw, Poland

Toronto General Hospital, Ontario, Canada

Translational Research Institute, Brisbane, QLD

Tufts University, Boston, MA, USA

Università di Torino, Torino, Italy

University Medical Centre Hamburg-Eppendorf, Hamburg, Germany

University Medical Centre Utrecht, Utrecht, Netherlands

University of Amsterdam, Netherlands

University of Athens, Athens, Greece

University of Aachen, Aachen, Germany

University of Adelaide, Adelaide, SA

University of Antwerp, Antwerp, Belgium

University of Auckland, Auckland, New Zealand

University of Bologna, Bologna, Italy

University of British Columbia, BC, Canada

University of California, Berkeley, CA, USA

University of Cambridge, Cambridge, UK

University of Copenhagen, Copenhagen, Denmark

University of Cincinnati, Ohio, USA

University of Freiburg, Freiburg, Germany

University of Kiel, Kiel, Germany

University of London, London, UK

University of Melbourne, Melbourne, VIC

University of Minnesota, Minnesota, MN, USA

University of Montreal, Montreal, Quebec

University of New South Wales, Sydney, NSW

University of Newcastle, Newcastle, NSW

University of Pennsylvania, PA, USA

University of Queensland, Brisbane, QLD

University of Southern California, Los Angeles, CA, USA

University of Sydney, Sydney, NSW

University of Technology Sydney, Sydney, NSW

University of Texas Medical Branch, Galveston, TX, USA

University of Tokyo, Tokyo, Japan

University of Western Sydney, Sydney, NSW

University of Wollongong, Wollongong, NSW

Victor Chang Cardiac Research Institute, Sydney, NSW

Victoria Genetics, Melbourne, VIC

Victorian Institute of Forensic Medicine, Melbourne, VIC

Walter and Elizabeth Hall Institute of Medical Research, Melbourne, VIC

Wellcome Trust Centre for Human Genetics, Oxford, UK

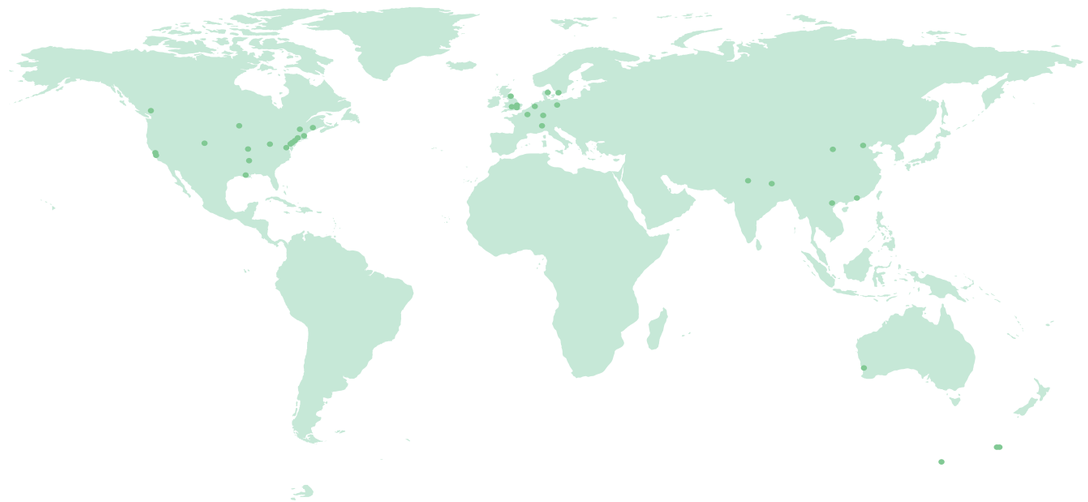
Westmead Children's Hospital, Sydney, NSW

Western Australian Institute for Medical Research, Perth, WA

Wistar Institute, Philadelphia, PA, USA

Woolcock Institute, Sydney, NSW

Yale University, New Haven, CT, USA



'The Eye of Sauron'. The image is by Dr Ka 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.

Centenary Institute research for life

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