

LuminesCent

The newsletter of the Centenary Institute | Winter 2014

Executive message

It is with great pleasure we bring you this Winter edition of LuminesCent, the newsletter of the Centenary Institute.



In particular we highlight the achievements of some of our young and dynamic researchers. These innovative and creative researchers will be leading Centenary's future and as we launch our 'Research for Life' fund I invite and encourage you to join us and help us to build the resources we need to recruit more of the Renjing Lui's to Centenary.

We have come a long way since our inception; not only have we recorded great scientific advances, but we are now at the centre of one of the greatest developments in medical research in Australia. Lifehouse and the Charles Perkins Centre (CPC), two great institutions we helped to bring about, now surround us.

We are excited about launching the "Research for Life" fund and I thank all those who believe in and support us in this and our research endeavours.

Professor Mathew Vadas AO

Centenary
Institute
research
for life



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Inaugural fellowship awarded to innovative young researcher

The inaugural Agnes Ginges Laboratory for Disease of the Aorta, Centenary Institute - David Richmond Fellow awarded to Dr Renjing Liu.

Professor Richmond was in attendance at Centenary's Annual Meeting to present the inaugural David Richmond Fellow to Dr Liu, whose research focuses on thoracic aortic aneurysms that can result in sudden death and affects approximately 1 in 500 people.

Our study into diseases of the Aorta is a new initiative established in collaboration with clinicians at Royal Prince Alfred Hospital and Dr Liu is heading the newly established Agnes Ginges, Diseases of the Aorta Laboratory at Centenary.

"The aorta is the main conduit of blood in the body and an aortic aneurysm is a general term for an enlargement of the aorta. A thoracic aortic aneurysm is an aortic aneurysm that presents primarily in the thorax. Through our research our aim is to identify the molecular determinants of disease progression, which will expose opportunities to influence disease outcome", Dr Liu says.



Professor Richmond with Dr Liu displaying the commemorative handcrafted artwork of an aorta created by Nick Mount.

The impact of major disease on our society

Cancer

In 2010, more than 42,800 Australians died from cancer.¹

Cancer is a disease caused by an uncontrolled division of abnormal cells in a part of the body and it affects nearly every Australian in some way be it directly or indirectly.

In 2010, cancer accounted for about 3 in 10 deaths in Australia, making it the second most common cause of death, exceeded only by cardiovascular diseases.²

Centenary's work in the area of cancer research

Across our scientific laboratories our teams are immersed in projects to help fight a number of cancers.

Most recently, three of Centenary's scientists were awarded Early Career Fellowships by the Cancer Institute New South Wales.

They are:

Dr Maté Biro of the Immune Imaging Group, who is investigating how melanoma cells move to spread throughout the body.

Dr Justin Wong of the Gene & Stem Therapy Research Laboratory, who is looking at the details of a genetic cause for acute myeloid leukaemia.

Dr Kimberley Beaumont, who is determining whether statins can stop melanoma progression.

Cardiovascular

Cardiovascular disease claimed 31% (45,600) of all deaths in Australia in 2011.³

Cardiovascular disease (CVD) is the term used for heart, stroke and blood vessel diseases.

In 2009-2010 Cardiovascular diseases accounted for the greatest spending (\$7.9 billion or 11%) of the \$121.4 billion spent in Australia on health.⁴

Centenary's work in the area of cardiovascular research

We hope that, over the next decade or two, our vascular research will allow us to understand and control the endothelium in disease conditions - especially those associated with ageing.

The goal of the vascular research conducted by our Vascular Biology laboratory is to be able to manipulate blood vessels as an avenue of disease control. For instance, there is an increase in heart disease with age. Understanding what age means to the functioning of endothelial cells will potentially allow us to identify individuals at greatest risk and to develop new treatments.

We at Centenary are excited about our discovery of a compound that could help stop the amount of blood leakage after a stroke or heart attack, dramatically reducing the amount of disability for individuals as we age.

Infectious

Tuberculosis (TB) once killed more Australians than cancer. In 2011 we saw just four deaths.

But the fight against TB is getting harder, particularly with Australia's ageing population being more vulnerable and our nearest neighbour, Papua New Guinea, has more than 70 times the cases.

TB is an infectious disease that is caused by a bacterium called *Mycobacterium tuberculosis*.

TB remains a threat in the 21st century as new varieties of the disease which are deadlier and harder to treat have taken hold across the globe.

Centenary's work in the area of infectious diseases

A \$2.5 million, six-nation initiative to fight tuberculosis has opened at the Centenary Institute, bringing together over 14 Institutes.

The Centre for Excellence in Tuberculosis Control (TB-CRE) was set up to link researchers in six countries to improve TB control, with the ultimate goal of eliminating TB transmission in Australia, and contributing to the world-wide campaign to eliminate TB by 2050.

The threat is not only to developing countries. Our ageing population and high numbers of chronic health conditions increases our vulnerability as a nation.

Latest news in medical research

Starving cells may control melanoma

Could we treat melanoma by cutting off its food source?

The latest research from Sydney's Centenary Institute and the University of Sydney suggests we could.

Our researchers have already shown they could starve prostate cancer. Now a further discovery opens up the prospect of a new class of drugs that could work across a range of cancers including melanoma.

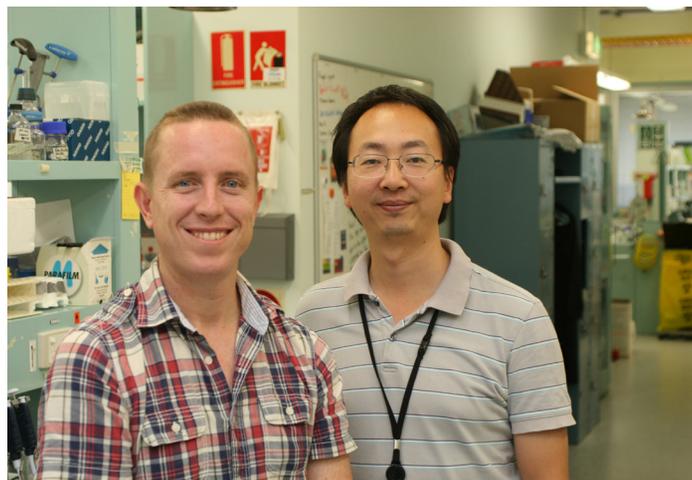
Australia has the highest rate of melanoma in the world. It is the deadliest form of skin cancer, and third most common cancer in Australia.

Unlike normal cells, melanoma and other cancer cells rely on the amino acid glutamine instead of glucose for the energy required to divide and grow. Thus, in order to fuel their rapid growth, cancer cells need to pump glutamine into their cells.

Our research, published in the International Journal of

Cancer has found that not only do melanoma cells have more glutamine pumps on their surface, but that blocking these pumps stops their growth. The work was led by Dr Jeff Holst, who heads the Centenary Institute's Origins of Cancer Research Group, together with post-doctoral fellow Dr Qian (Kevin) Wang.

"We've shown that if we starve melanoma of these essential nutrients, we can stop the cancer from growing" says Dr Holst (pictured below with Dr Wang).



New immune cell discovery

Our researchers have discovered a new type of immune cell in skin that plays a role in fighting off parasitic invaders 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) which was discovered less than five years ago in the gut and the lung, where it has been linked to asthma. But this is the first time such cells have been found in the skin.

Researchers from our Immune Imaging and T Cell laboratories collaborated with colleagues from SA Pathology in Adelaide, the Malaghan Institute in Wellington, New Zealand and the USA, with findings published in the respected journal, Nature Immunology.

"There's a great deal we don't understand about the

debilitating skin conditions of allergies and eczema," says Professor Weninger, Head of Centenary's Immune Imaging group "but they affect hundreds of millions of people worldwide. Dermal ILC2 cells could be the clue we need to start unravelling the causes of these diseases".

Our Immune Imaging group has developed techniques for marking different cells of the immune system and tracking them live under the microscope.



Recognising the brilliance of young researchers

Creative Prize champions the future of research in Australia

The Centenary Institute Lawrence Creative 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.

Dr Connie Wong from Monash University was announced the winner of the 2013 Prize at the award ceremony hosted by UBS Sydney.



Mr Neil Lawrence, Dr Connie Wong and Professor Mathew Vadas

The \$25,000 prize will help her develop her ideas and research on how diet could prevent stroke deaths. Dr Wong thinks we may be able to prevent early deaths following stroke with a fibre-based diet.

Exceptional young scientists can be hard to keep in Australia and we hope this award will not only celebrate their achievements but also encourage a domestic culture of brilliance in this truly important field. The prize is a national award open to researchers from any institution.

The two other finalists were Dr Anne Abbott from Monash University and we were delighted that our very own Dr William Ritchie was the first finalist from Centenary since the inception of the award.

The Prize acknowledges and thanks our partners and supporters for enabling us to recognise Australia's most creative young medical researchers.



YCF support four inspirational young researchers

Over \$30,000 has been raised by the passionate group of young professional volunteers from the Young Centenary Foundation (YCF) since their inception in 2011.

The group of inspiring young Sydneysiders have worked tirelessly hosting a series of successful fundraising events that have not only raised invaluable funds but introduced and promoted Centenary's work to a new and enthusiastic younger group of the community.

From a Las Vegas Low Rollers themed band night to a charity art auction and running the City2Surf, YCF's dedicated fundraising efforts awarded \$20,000 in grants to four early career Centenary scientists for their inspirational research.

The grants were split into two research categories - General Research and Hematological Cancer. YCF's general fundraising sponsored the general grants and the efforts of Sarah Bornstein, a YCF supporter who shaved her head to raise funds for Centenary, provided the funding for the Hematological Cancer grants.

The general grants were awarded to Dr Kimberley Beaumont and Dr Ben Roediger and the Hematological grants to Dr Amy Marshall and Dr Justin Wong.



Dr Kimberley Beaumont recipient of a YCF grant

Thank you to all the members of the Young Centenary Foundation, their friends and those who support the YCF's fundraising events.

Inspiring fundraisers make a real difference

We're inspired by our community fundraisers

We are truly grateful to the wonderful individuals and organisations who share our vision to improve human health through excellence in medical research.

Every donation we receive - no matter how small or great contributes to the future health and well-being of our nation.

We are inspired each day by the commitment of our supporters who believe as we do that investment in medical research enables discoveries and life changing advances, which improve the long-term health of every one of us.

We share Sophie's story with you - just one example of an individual who has supported our work.

Sophie's father Keighley Quist was diagnosed with liver disease. Thanks to a life saving liver transplant and treatment by Centenary's Professor Geoff McCaughan, Sophie and her family were given another 12 years with her cherished father.

In memory of her dad Sophie and a dedicated team of family and friends were inspired to participate in last year's City2Surf raising over \$28,000 for Centenary.

'Team Quist' were part of Centenary's 'Run4Research' City2Surf team - in total \$48,000 was raised from this group of truly inspiring individuals.

Creativity and excellence drives our Foundation

The Centenary Institute Medical Research Foundation's fundraising committee members share stories of discovery and innovation to inspire giving.

The committee continues to work alongside our researchers to generate awareness of and engagement in our work by the wider community.

The annual Foundation's Dinner raises in excess of \$120,000 each year, directly contributing to our research programs.

Members of the committee also host the annual 'Soiree with Scientists', an intimate evening where guests meet Centenary scientists and research staff and are provided with the opportunity to hear first hand about our work.

The committee receives significant support from the corporate sector, enabling funds raised to go directly to providing our researchers with the resources they need to help them discover the next medical research breakthrough.

We thank the committee for helping Centenary help each generation live healthier, longer lives. We acknowledge in particular the committed supporters of the Foundation and thank each of them.

Accolade Wines
Albert Jangtong and Wendy Collins
Alex Ford
Annette Larkin Fine Art
ANZ Stadium
Arthouse Tasmania
Azuma Japanese Restaurant
Bangarra Dance Theatre
Belvoir St Theatre
Burberry
Burch Family Wines
Carlos Barrios
Caroline and Neil Lawrence
City of Sydney
Clarendon Hills
Clonakilla Wines
David Hall OAM
Dominik Mersch Gallery
Ella Baché
Ensemble Theatre Company
Fiona Campbell of She Rocks
First Aid For You
Flutter Lyon
Free Radical Enterprises
Garfish
Golden Door Health Retreat Elysia
Greater Western Sydney Giants
Heather Rose
Henschke Wines
Hunt Leather
Imax Theatre
India Ford
Janet Laurence
John and Lynette Cunnington
John Cutler Bespoke Tailor
Jonathan Zwart
Lawrence Creative Strategy
Lindt Chocolate
Live and Cookin Lizotte's
Macquarie Telecom
Magdalena Photography
Maui Jim
MONA
Mount Mary Vineyard, Yarra Valley
Mr Black
Nick Mount
Oobie Baby
Paul Sumner, Mossgreen Auctions
Penfolds
Posh Boutique
PricewaterhouseCoopers
Qantas
Racing NSW
Rockford Wines
Rockpool Bar and Grill
Sony Music
Susan Lancaster
Tanya and Bruce Jones
Taronga Zoo
Tennis Australia
The Library House, Tasmania
Theme & Variations Piano Services
Torbreck Barossa Valley
Waterford
Young Centenary Foundation

Our research collaborations

A human systems biology centre for Sydney

“We’ll be able to ask individual immune cells where they’ve been and who they’ve been talking to...”

Centenary and the University of Sydney will establish the Ramaciotti Centre for Human Systems Biology this year following the announcement of a \$1 million Ramaciotti Biomedical Research Award. This Centre is also supported by a \$500,000 grant from the Cancer Institute of NSW and \$300,000 from the Australian Research Council (ARC).

The award was made to the Centenary’s Professor Barbara Fazekas de St Groth and her colleagues Professor Nicholas King, University of Sydney and Dr Adrian Smith, Centenary Institute.



“At the heart of the Centre will be a unique technology that will allow us to study millions of white blood cells and reveal where they’ve been and who they’ve been talking to...” says Professor Fazekas de St Groth.

The Centre will be home to Australia’s first CyTOF (cytometry by time of flight) mass spectrometer which can follow up to 100 different cellular processes simultaneously in a thousand cells each second.

This cellular approach to understanding human diseases will be the focus of the Centre, and cancer will be a major theme.

Professor Fazekas is determined to ensure that the equipment and expertise of the new Centre is freely available to the wider NSW research community.

Living active lives at 85 years

There is no hiding from the fact - our population is living longer. Between 30 June 1992 and 30 June 2012, the proportion of people in Australia aged 65 years and over increased from 11.5% to 14.2%. During the same period, the proportion of population aged 85 years and over more than doubled from 0.9% of the population at 30 June 1992 to 1.9% of the total population at 30 June 2012.¹

At Centenary we’ve gathered an exceptional group of international and national researchers and a resource of the latest technologies to advance our research and clinical practice in the field of inflammatory diseases such as cancer and diabetes, and of the disease processes in ageing.

Earlier this year we shared our advances with the wider international community hosting the inaugural Future of Experimental Medicine Conference with a focus on Inflammation in Disease and Ageing.

Attracting some of the world’s leading researchers, our aim was to bring basic and clinical research together in one room to advance the immense research development and technological innovation potential that is evident in the scientific literature for this area.

We’re living longer. That means that we’re all at greater risk of cancer and we’ll all suffer from bone loss. And for many of us, our final years will be difficult. But Professor Josef Penninger, Director of Austria’s Institute of Molecular Biotechnology who presented the conference’s Plenary Lecture, plans to change all that with his vision “of a future where we can safely surf and live active lives at 85 years of age without fear of fracture, cancer or any of the other scourges of ageing”.

Professor Penninger has proven that a protein called RANKL is the master regulator of bone loss. That work led to a new drug now used for treating osteoporosis and skeletal related events associated with cancer.

To read the full article on Professor Penninger and his work along with our story on ‘Ageing answers no longer a hard cell’ from Professor Judith Campisi, head of research labs at San Francisco’s Buck Institute for Research on Ageing and the Lawrence Berkeley National Laboratory, please visit our blog at centenarynews.org.au.

Golden staph paralyses our immune defences

“Staphylococcus aureus kills many, many people around the world. In fact, more than tuberculosis and AIDS put together. And the skin is its primary entry point into the body, so it’s important to understand what happens in the skin,” says Professor Wolfgang Weninger, Head of our Immune Imaging Research group.

When golden staph enters our skin it can identify the key immune cells and ‘nuke’ our body’s immune response - now we know how.

An international research group led by Centenary and the University of Sydney have used state-of-the-art microscopy techniques to identify key immune cells that orchestrate the body’s defenders against invading golden staph, and also how the bacteria can target and destroy these cells, circumventing the body’s immune response.

The study, published in Nature Immunology, also involved researchers from Monash University, Singapore Immunology Network (A*STAR), and Harvard Medical School.

The cost of preventable liver disease

Liver diseases have an impact on the Australian economy 40 per cent greater than chronic kidney disease and Type 2 diabetes combined, according to a report released earlier this year. The report estimates the annual burden of liver diseases in Australia at more than \$50 billion. And yet almost all liver disease is preventable.

Centenary’s liver research unit is one of the biggest in Australia. It is also one of first in the world to try to come to grips with liver damage at its most fundamental molecular level.

Centenary’s Greg Fox wins top PhD prize

Congratulations to Dr Greg Fox who has won the annual Rita and John Cornforth Medal for the highest quality PhD thesis across the University of Sydney and for contributions to the University and broader community.

For more than three years Greg, his GP wife and their young son have been living in Vietnam, where he has

set up Centenary’s Vietnam TB studies, working on two major field projects contributing to the fight against Tuberculosis.

‘Junk DNA’ can control cell development

In a twist of fate, Centenary scientists have discovered that the 97% of human DNA thought to be ‘Junk DNA’, can actually control cell development.

Using the latest gene sequencing techniques and sophisticated computer analysis, the research team led by Centenary’s Professor John Rasko, Head of our Gene and Stem Cell Therapy Program and Head of Bioinformatics, Dr William Ritchie have shown that particular white blood cells use non-coding DNA sequences (or Junk DNA) to regulate the activity of a group of genes that determines their shape and function.

Diet linked to Prostate cancer

Centenary’s Dr Jeff Holst and his Canadian colleagues are the brains behind the discovery of the ‘Holst effect’ revealing a new therapeutic option for prostate cancer.

“Western diets, high in red meat and dairy products, are correlated with prostate cancer. These foods are also high in leucine. We are looking at how changing diet affects cancer cell growth - right down to the genetic and molecular level,” says Dr Holst of our Gene and Stem Cell Therapy group.

A special thank you

A special thank you

Financial support to the Centenary Institute comes in many different ways... specific donations, general donations, donations in memory, bequests, community fundraising, corporate, trust and foundation support.

We acknowledge some of the donations in memory of a loved one and bequests received. Our sincere thanks is extended to all our donors, supporters and organisations for your gifts whether in memory of a loved one or from your own belief in our work.

- Sophie Quist, family and friends in loving memory of Keighley Quist
- Mrs Nancy Denniss in loving memory of her husband Ronald Eric Denniss
- Bamford family and friends in memory of Peter Bamford
- Helen O'Sullivan, family and friends in loving memory of Sean O'Sullivan
- Barbara Anne Kinsella and Leslie Allan Maurer who have made lasting gifts to the Centenary Institute through a bequest
- Kerry-Ann Pawlak friends and family for their annual fundraising event

No matter how big or small every gift we receive is valued.

Thank you



Sophie Quist, family and friends at the 2013 City2Surf

Events and activities

Here are a few community fundraising opportunities - make Centenary your charity of choice in 2014.

- Brisbane Times City 2 South - 25 June
- City2Swan, Perth - 13 July
- The Age Run, Melbourne - 27 July
- City2Surf, Sydney - 10 August
- ToughMudder, Sunshine Coast - 16/17 August
- Chevron City2Surf, Perth - 31 August
- Bridge to Brisbane - 7 September
- ToughMudder, Perth - 13/14 September
- Blackmores Sydney Running Festival - 21 Sept
- Sunday Mail City-Bay, Adelaide - 21 September
- ToughMudder, Sydney - 15/16 November

I believe we should be able to look forward to a healthier, longer life

\$35 \$70 \$100 \$225 my choice \$ _____ (Donations of \$2 or more are tax deductible).

or I would like to make a regular monthly gift of \$ _____ to be processed 1st or 10th of the Month

from my credit card below or my cheque/money order enclosed (payable to Centenary Institute Medical Research Foundation)

Please debit my Mastercard Visa Amex Signature: _____

Credit card number:

Expiry: / Name on card: _____ Date of Birth: ___/___/___

My contact details are: Title _____ First name _____ Surname _____

Address _____ Suburb _____ State _____ Postcode _____

Mobile _____ Home P _____ Email _____

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