





# Unravelling the mysteries of nature to cure disease



Front cover: Acriflavine bottle from the collection of the Geoffrey Kaye Museum of Anaesthetic History (Australian and New Zealand College of Anaesthetists).



[ OUR MISSION ]

Our mission is to capitalise on our multidisciplinary research strengths, academic and health partnerships, and to provide transformative and innovative solutions to major health problems.

[ OUR VISION ]

We strive to enhance human health and quality of life through groundbreaking collaborative medical research discoveries and innovation, to ensure a direct impact on the community.

[ OUR CENTRES ]



Centre for Cancer Research



Centre for Endocrinology and Metabolism



Centre for Genetic Diseases



Centre for Innate Immunity and Infectious Diseases



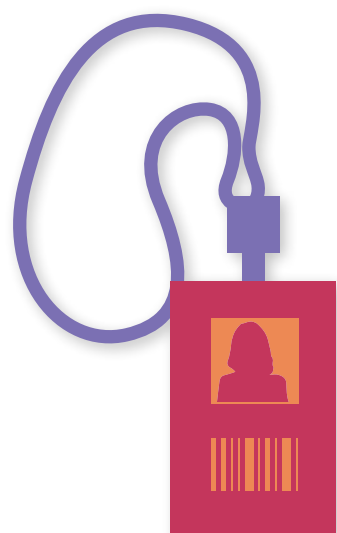
Centre for Reproductive Health



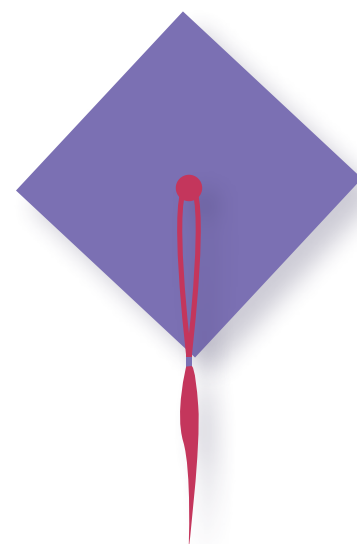
The Ritchie Centre

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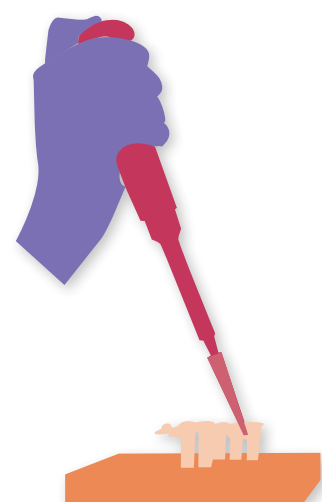
## Hudson Institute at a glance



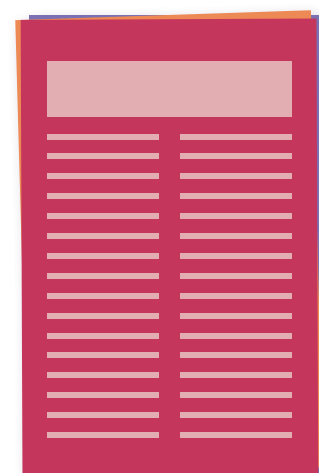
**303**  
STAFF



**183**  
STUDENTS



**69**  
DISEASES  
IMPACTED BY  
OUR RESEARCH



**333**  
RESEARCH  
PUBLICATIONS



### About us

Hudson Institute is a leading Australian medical research institute located in the heart of the Monash Health Translation Precinct (MHTP) in Clayton, Victoria. We bring together more than 450 brilliant scientific minds to unlock the mysteries of the human body and enhance human health.

Our 51 research laboratories are clustered into six specialist centres and conduct both basic and clinical research across cancer, innate immunity and infectious diseases, and women's and babies' health.

We embrace an open structure encouraging collaboration between disciplines, empowering our scientists to examine problems from a wide range of perspectives and sparking out-of-the-box approaches to discovery.

### Partnerships

Our partnership with Monash Health (Victoria's largest healthcare network) and Monash University (Australia's largest university) to form the Monash Health Translation Precinct, enables us to focus our discoveries on solving the most pressing health needs within our community and Australia.

A strong network of more than 150 leading Australian and international scientific and clinical collaborators support our work and ensure that the impact of our research is global.

We also partner with Australian and international biotechnology and pharmaceutical companies to ensure our discoveries reach patients, translating to real-world outcomes.

### Our history

Two of Australia's most trusted names in medical research, Prince Henry's Institute of Medical Research and Monash Institute of Medical Research, merged in 2014 to form Hudson Institute of Medical Research. Combined, we have more than 75 years' experience in research discoveries for Australia and beyond.

Our institute is named after Professor Bryan Hudson, the Founding Director of Prince Henry's Institute and Founding Chair of the Department of Medicine at Monash University.

### Translational Research Facility

Unique in Australia, the Translational Research Facility (TRF) co-locates clinicians and researchers within a purpose-built space, including a Clinical Trials Centre and technology platforms, ensuring our workflow is focused on meeting clinical needs and that our breakthrough discoveries are seamlessly transferred into clinical trials and patient care.

The 8-bed, 21-chair Clinical Trials Centre within the TRF is directly linked by a walk-through bridge to Monash Health. This proximity supports the movement of discoveries from initial phase I testing through to phase IV primary health trials.

This dynamic interchange between the laboratory and clinic ensures our research responds to the greatest health challenges of the 21st century.

#### Monash Health Translation Precinct Partners





# Collaborations



Adelaide, Australia  
Brisbane, Australia  
Canberra, Australia  
Darwin, Australia  
Melbourne, Australia  
Perth, Australia  
Sydney, Australia  
Graz, Austria  
Brussels, Belgium  
Leuven, Belgium  
Sao Paulo, Brazil  
Edmonton, Canada  
Toronto, Canada  
Beijing, China  
Chengdu, China  
Hangzhou, China  
Shanghai, China  
Wuhan, China  
Aarhus, Denmark  
Copenhagen, Denmark  
Cambridge, England  
Hinxton, England  
London, England  
Newcastle, England  
Oxford, England  
Warwick, England  
Turku, Finland  
Amiens, France  
Montpellier, France  
Paris, France

Bonn, Germany  
Cologne, Germany  
Freiburg, Germany  
Giessen, Germany  
Kiel, Germany  
Munich, Germany  
Makassar, Indonesia  
Dublin, Ireland  
Ness Ziona, Israel  
Florence, Italy  
Padua, Italy  
Rome, Italy  
Himeji, Japan  
Kanazawa, Japan  
Moroyama, Japan  
Osaka, Japan  
Sendai, Japan  
Suita, Japan  
Tokyo, Japan  
Leiden, Netherlands  
Nijmegen, Netherlands  
Utrecht, Netherlands  
Otago, New Zealand  
Lisbon, Portugal  
Madinah, Saudi Arabia  
Thuwal, Saudi Arabia  
Aberdeen, Scotland  
Edinburgh, Scotland  
Singapore, Singapore  
Madrid, Spain

Gothenburg, Sweden  
Solna, Sweden  
Geneva, Switzerland  
Boston, MA, USA  
Cincinnati, OH, USA  
Clay Center, NE, USA  
Cleveland, OH, USA  
Coralville, IA, USA  
Dallas, TX, USA  
Detroit, MI, USA  
Greenville, SC, USA  
Los Angeles, CA, USA  
Madison, WI, USA  
Minneapolis, MN, USA  
New Haven, CT, USA  
New York City, NY, USA  
Philadelphia, PA, USA  
Pittsburgh, PA, USA  
Providence, RI, USA  
Pullman, WA, USA  
Raleigh, NC, USA  
Salt Lake City, UT, USA  
San Francisco, CA, USA  
Seattle, WA, USA  
Silver Spring, MD, USA  
St Louis, MO, USA  
Waltham, MA, USA  
Washington, DC, USA  
West Lafayette, IN, USA  
Cardiff, Wales

# Our discoveries impact



## Cancer

Bladder cancer  
Bowel cancer  
Breast cancer  
Cancers of the female reproductive tract  
Endocrine cancers  
Endometrial cancer  
Gastrointestinal cancer  
Leukaemia and lymphomas  
Lung cancer  
Ovarian cancer  
Paediatric cancer  
Pancreatic cancer  
Testicular cancer  
Thyroid cancer

## Immunity and infectious diseases

Arthritis  
Asthma  
Chlamydia  
Chronic inflammatory diseases  
Chronic obstructive pulmonary disease  
Gastritis  
*Helicobacter pylori*  
Herpes simplex virus

## HIV

Human metapneumovirus  
Inflammatory bowel disease  
Influenza  
Respiratory syncytial virus  
Systemic lupus erythematosus  
Vocal cord dysfunction  
Zika virus

## Women's and reproductive health

Assisted reproductive technologies  
Disorders of sex development  
Disorders of testicular development  
Egg and sperm quality  
Endometriosis  
Failure of spermatogenesis  
Female reproductive tract infections, cancers and inflammatory diseases  
Fibroids  
Infertility and contraception  
IVF  
Male reproductive health  
Parkinson's disease  
Pelvic organ prolapse  
Pre-eclampsia  
Premature ovarian failure  
Testicular inflammation

## Baby and children's health

Birth asphyxia  
Bronchopulmonary dysplasia  
Cerebral palsy  
Epilepsy  
Intrauterine growth restriction  
Neonatal respiratory distress syndrome  
Placental development and dysfunction  
Premature birth  
Pulmonary hypertension  
SIDS  
Sleep-disordered breathing

## Other areas

Brain and blood  
Cardiovascular disease  
Cerebral palsy  
Clinical endocrinology research  
Epigenetics  
Genetic diseases  
Germ cell development  
Metabolic bone disease  
Mitochondrial biology  
Mitochondrial epigenetics  
Mitochondrial genetics  
Mitochondrial mutations and disease





## Board chair's report

[ DR BOB EDGAR ]

**The past year has been one of the greatest in Hudson Institute's combined 76-year history.**

The official opening of the Monash Health Translation Precinct's Translational Research Facility (TRF) in March marked the beginning of a new era that is already defining translational research. The TRF was substantially federally funded thanks to \$87.5 million from the government, along with financial contributions from Hudson Institute and Monash University, and land contributions from Monash Health.

By combining laboratory and translational research with a dedicated Clinical Trials Centre, this unique facility is fast-tracking our discoveries directly to patients, and cementing the Monash precinct as an Australian leader in translational research.

In 2016, collaborations in this unique space produced outstanding outcomes. Several clinical trials and studies are underway in collaboration with Monash Health

clinicians, including a study that may change the dietary advice given to pregnant women and a study to determine a world-first early diagnostic test for lung cancer and emphysema.

Commercial investments, such as the research collaboration signed between Hudson Institute, Monash University and Roche in November, are becoming increasingly important as part of the funding mix for independent medical research institutes. They complement and advance Hudson Institute's existing intellectual property and outstanding record of basic and clinical research.

While celebrating our success, I must draw attention to the challenging funding climate we work in. The majority of scientists looking to take discoveries to the clinic encounter the 'valley of death', where promising research becomes stalled between discovery and commercial product due to funding gaps.

The federal government's new \$1.1 billion National Innovation and Science Agenda, announced in 2016, can be an important step forward in addressing some of these challenges. The suite of measures includes a \$500 million partnership with industry to help commercialise biomedical discoveries into real-life healthcare solutions. We will watch, with interest, the outcomes of this landmark investment.

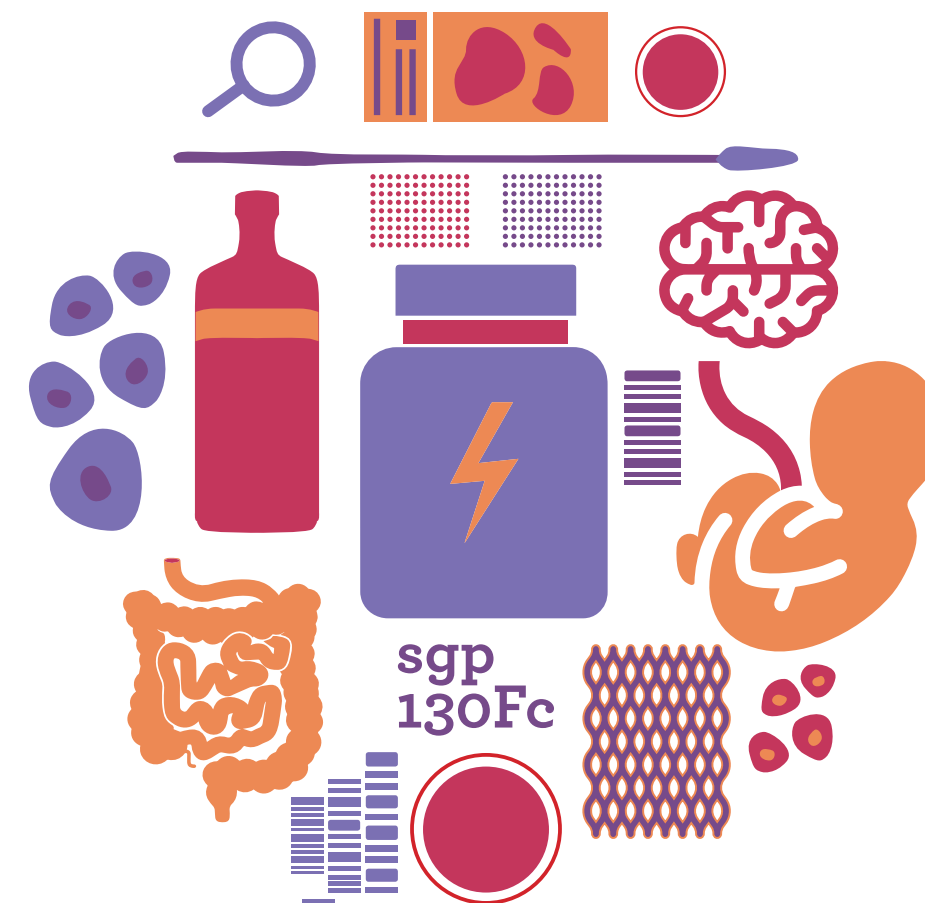
Long-term success in medical research requires foresight, ingenuity and sound management. Our vision as a board is to support our researchers to stay at the top of their game while pushing the boundaries of discovery. I am pleased to report that Hudson Institute is well-placed to navigate the pressures and challenges of our sector.

Our board underwent some significant changes during the year. I wish to thank our longstanding board directors Mrs Jane Bell, Ms Jennifer Anne Joiner and Mr John Weste, who retired in 2016, for their contributions over many years.

We welcomed three new board directors in 2016: Mr Nigel Garrard, Mr Andrew Leyden and Mrs Zita Peach; and thank them for contributing their time and expertise.

Monash Health's Chief Medical Officer, Professor Erwin Loh, joined the board as an observer during the year. Monash Health is a highly valued precinct and clinical partner of Hudson Institute. Prof Loh brings a unique mix of expertise in medicine, management and law, and extensive knowledge about the health needs of our community. I am extremely grateful for his support.

Finally, thank you to Hudson Institute's Emeritus Director and Distinguished Scientist, Professor Henry Burger AO, who retired as a Member, for his significant contributions over a number of years. We welcomed Distinguished Scientist Professor John (Jock) Findlay in his place and look forward to benefiting from his scientific experience and guidance.



**Long-term success in medical research requires foresight, ingenuity and sound management. Our vision as a board is to support our researchers to stay at the top of their game while pushing the boundaries of discovery.**

To the lifeblood of Hudson Institute, the many wonderful individuals and organisations whose generosity provides the financial support needed for our researchers to continue their discoveries, I express my sincere gratitude. These organisations are listed on page 76.

**Dr Bob Edgar**  
Board chair  
Hudson Institute of Medical Research









## Centre for Cancer Research

[ CENTRE HEAD: ASSOCIATE PROFESSOR RON FIRESTEIN ]

### Our discoveries impact

#### CANCER

Bladder cancer  
Bowel cancer  
Breast cancer  
Leukaemia and lymphomas  
Lung cancer  
Ovarian cancer  
Paediatric cancer

**Centre for Cancer Research (CCR) scientists tackle the most pressing challenges in the diagnosis and treatment of adult and childhood cancers. The Centre's goal is to explain the fundamental mechanisms of tumour biology and to use our discoveries for the development of novel cancer therapies and biomarkers (indicators) of cancer.**

#### Prostate and bowel cancer breakthrough brings personalised medicine a step closer

Targeted genetic treatment for cancer is a step closer, with a world-first clinical trial set to test the effectiveness of a new class of drugs called BET inhibitors in treating prostate and colorectal cancers.

A team of clinicians and researchers at Hudson Institute and Monash University was awarded a \$2 million Victorian Cancer Agency grant for the innovative project.

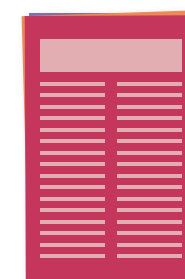
The three-year trial will involve 24 patients with stage four prostate cancer or colorectal cancer, for whom all other forms of treatment have failed.

Prostate and colorectal cancers are two of the most commonly diagnosed cancers in Australia. More than 3000 men die of prostate cancer and more than 4100 lives are claimed by colorectal cancer every year in Australia.

The trial builds on previous work by co-lead of the project and CCR Head, Associate Professor Ron Firestein, which identified a genetic marker that may explain why only some patients respond to BET inhibitors.

"BET inhibitors are a relatively new class of cancer drugs that target tumour cells at a genetic level by essentially 'switching off' the expression of certain cancer genes," A/Prof Firestein said.

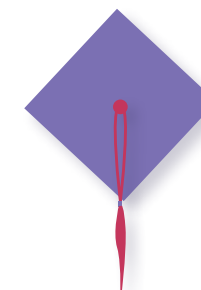
"My research at Genentech in the USA found that patients who express a particular genetic marker,



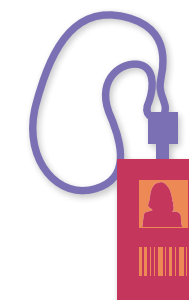
**39**  
RESEARCH  
PUBLICATIONS



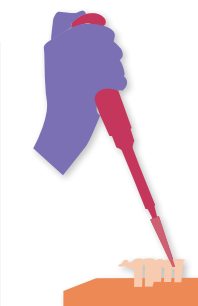
**13**  
PHD AND  
HONOURS  
GRADUATES



**30**  
STUDENTS



**31**  
STAFF



**7**  
DISEASES  
IMPACTED BY  
OUR RESEARCH

long, non-coding RNAs, may respond best to this type of genetic cancer therapy.

"This is the first clinical trial to target the treatment to patients with a specific genetic marker."

A/Prof Firestein says the aim of the project is to develop a test that could eventually be used in cancer patients to assess their genetic compatibility with BET inhibitor therapy.

Medical oncologist at Monash Health and Monash University Senior Research Fellow, Dr Arun Azad, believes around 50 per cent of prostate and colorectal cancer patients have the RNA biomarker and predicts these patients will respond well to the new class of drug.

"We're ultimately hoping to increase the range of therapeutic options available to prostate and colorectal cancer patients," added Dr Azad.

The team is optimistic about the potential for epigenetic therapies like BET inhibitors.

"Improving the effectiveness of targeted cancer therapies not only improves survival rates, it also provides more options to patients who invariably develop chemotherapy resistance," A/Prof Firestein said.

Collaborators on this study include Monash University's Professor Gail Risbridger, Associate Professor Helen Abud, colorectal surgeon Associate Professor Paul McMurrick and Cabrini's Dr Simon Wilkins.

#### New therapies targeting the cancer cell's engine

Despite being implicated in more than 50 per cent of cancer tumours, a biochemical pathway called STAT3 has remained elusive to researchers and oncologists.

STAT3 is difficult to target with cancer drugs, as high levels detected in the system are correlated with poor survival rates.

CCR scientist, Dr Daniel Gough, working with Professor Brendan

Jenkins from CiiiD, has identified a pool of STAT3 that enters the mitochondria, or the 'powerhouse', which supplies energy to a cell. From here, STAT3 can control the mitochondria's key functions and crucially, the growth of cancer tumours.

The next step is to see whether currently available cancer drugs are effective in targeting this particular pool of STAT3, providing the potential to intervene before it enters the mitochondria and thus stop the growth of cancer.

#### Linking inflammation and cancer

The Immunohaematology laboratory, led by Dr Ashish Banerjee and Dr George Grigoriadis, is working to understand the role of the cancer regulator protein 'NIK' in the growth of lymphoma, a type of blood cancer.

The laboratory has successfully generated a sophisticated and



novel model that will enhance our understanding of this important pathway.

In addition, Dr Banerjee's group is investigating the role of a transcription regulator called RelA in inflammation and cancer. Continued collaboration with the Walter and Eliza Hall Institute of Medical Research has enabled a successful NHMRC grant supporting this project, with a publication in preparation.

**New hope for paediatric solid brain tumour**

Malignant rhabdoid tumour (MRT) is a rare but devastating paediatric solid cancer that starts in the kidneys or in the brain and can spread to other parts of the body. Children are diagnosed with the disease at an average age of just 15 months.

In work published in the prestigious journal *Clinical Cancer Research*, Dr Jason Cain's research group has identified a new therapeutic target for MRT.

Dr Cain's team showed that histone deacetylase inhibitors have profound effects in both inhibiting the growth of these tumours and inducing the process of reverting cancerous tissue to normal tissue.

This work underpinned a successful collaborative NHMRC project grant to next conduct a phase II clinical trial in patients with paediatric solid tumours, that will see these preclinical research findings implemented into the clinic.

**Research group heads**

A/Prof Ron Firestein (Cancer Genetics and Functional Genomics)

A/Prof Elizabeth Algar (Genetics and Molecular Pathology)

Dr Ashish Banerjee (Immunohaematology)

Dr Kristy Brown (Metabolism and Cancer)

Dr Jason Cain (Developmental and Cancer Biology)

A/Prof Colin Clyne (Cancer Drug Discovery)

Dr Daniel Gough (STAT Cancer Biology)

Dr George Grigoriadis (Immunohaematology)

Prof Terrance Johns (Oncogenic Signalling)

Dr Anthony Sadler (Cancer and Innate Immunity)

Dr Andrew Stephens (Ovarian Cancer Biomarkers)

Prof Bryan Williams (Cancer and Innate Immunity)

**Distinguished scientist**

Prof Alan Trounson

**Our supporters**

Australian Lions Childhood Cancer Research Foundation

Bailey's Day

Children's Cancer Foundation

Evans Family Foundation

National Breast Cancer Foundation

NHMRC

Ovarian Cancer Research Foundation

United States Department of Defense

Victorian Cancer Agency



# Centre for Endocrinology and Metabolism

[ CENTRE HEAD: PROFESSOR PETER FULLER AM ]

**Our discoveries impact**

**CANCER**

Breast cancer  
Endocrine cancers  
Ovarian cancer  
Thyroid cancer

**WOMEN'S AND REPRODUCTIVE HEALTH**

Cancers of the female reproductive tract  
Male reproductive health

**OTHER**

Cardiovascular disease  
Cerebral palsy  
Clinical endocrinology research  
Metabolic bone disease

**Centre for Endocrinology and Metabolism (CEM) scientists undertake basic and clinical research to show the impact of the endocrine system on health and disease. Our researchers improve the understanding of hormones in human biology that impact reproductive health, bone health, cardiovascular disease, endocrine cancer and obesity to improve and refine diagnosis, treatment and prevention of disease.**

**Mobility and muscle mass key for maintaining bone health in cerebral palsy and spina bifida**

Our researchers have found that immobility is the most significant risk factor for fractures in children and adults with spina bifida.

Dr Anne Trinh, a clinical endocrinologist and PhD student working with Associate Professor Fran Milat in the Metabolic Bone Research group, studies the effects of cerebral palsy and spina bifida

on musculoskeletal health from childhood to young adulthood.

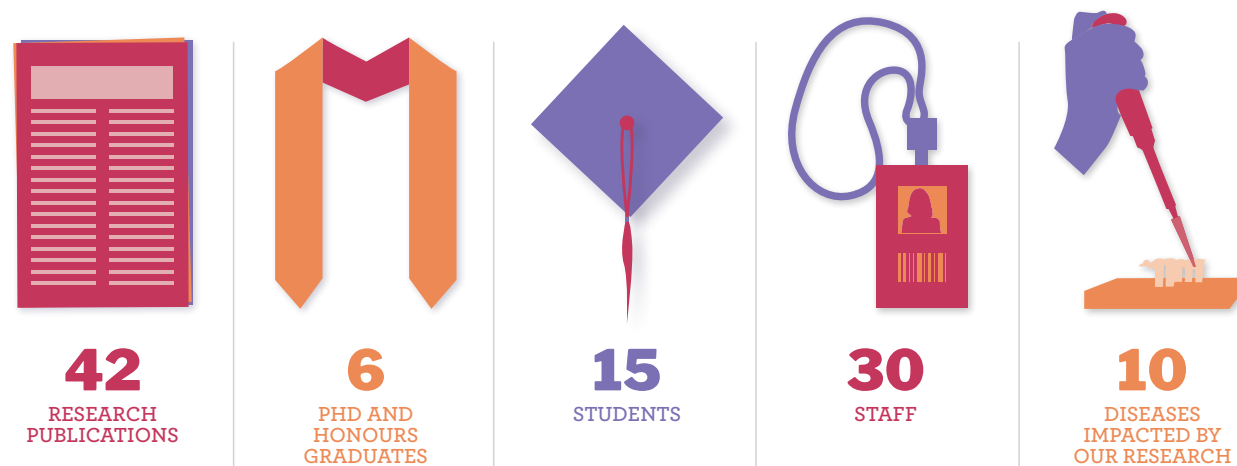
In a retrospective study of 146 spina bifida patients, ranging from toddlers to adults, Dr Trinh showed that people with spina bifida who couldn't walk independently of a mechanical aid had an increased risk of fracture, highlighting the importance of maintaining mobility in spina bifida.

In another study, Dr Trinh examined the relationship between body composition, bone mineral density and fractures in 45 adults with cerebral palsy.

This study found that maintaining muscle mass is crucial for good bone health in young adults with cerebral palsy. It also showed for the first time that hypogonadism (a lack of sex steroids, linked to an increased risk of bone fractures) was present in 20 per cent of these patients.

Hypogonadism was linked to changes in body composition, including reductions in lean tissue mass and lumbar spine bone mineral





density. In addition, low bone mineral density and fractures were found to be common in adults with cerebral palsy.

These findings could help researchers and clinicians tailor treatments to patients with cerebral palsy, to help prevent bone fractures that can limit mobility and quality of life.

“Fractures can have a devastating impact on already reduced mobility in adults with chronic neurological disease such as cerebral palsy,” Dr Trinh said.

“By identifying the importance of muscle and sex steroids in maintaining bone health, treatment can be tailored to reduce fracture risk in these individuals.

“This study goes some way to illuminating the functional and endocrine factors behind an increased risk of bone fractures in young people with cerebral palsy.”

Dr Trinh and her team are now recruiting patients for a clinical

trial at Monash Health that will show whether zoledronic acid, which is normally used to treat osteoporosis, can be used in adults with cerebral palsy.

Dr Trinh’s work is supported by a grant from Osteoporosis Australia and The Royal Australasian College of Physicians.

### Clinician-researchers open Melbourne’s first endocrine hypertension clinic

Melbourne’s first endocrine hypertension clinic opened at Monash Health this year under the auspices of CEM clinician-researchers Dr Jun Yang, Dr Jimmy Shen and Professor Peter Fuller.

The clinic is designed to streamline diagnosis for Conn’s syndrome, also known as primary aldosteronism, a common yet underdiagnosed cause of high blood pressure.

Conn’s syndrome affects up to 10 per cent of people with high blood pressure and causes more strokes,

heart attacks and heart arrhythmia than ordinary high blood pressure.

Many patients with Conn’s syndrome are not properly diagnosed and so are placed on unnecessary medication that does not treat the underlying cause of disease.

If detected early, Conn’s syndrome is potentially curable or easily managed with a specific drug.

Establishment of the clinic has led to an exponential increase in the number of referrals for the investigation of Conn’s syndrome. The clinic will integrate patient data with laboratory-based research so that cutting-edge science can be incorporated into day-to-day healthcare.

### New kidney link for blood disorder medication discovered

Thalassaemia major is a genetic disorder that affects the production of haemoglobin and results in severe anaemia. The treatment options

for this condition include blood transfusions and bone marrow transplants.

Clinician-researcher Dr Phillip Wong is investigating thalassaemia major and other transfusion-dependent haemoglobinopathies (genetic defects resulting in blood disorders), in the Metabolic Bone Research group, led by A/Prof Frances Milat.

A cross-sectional study by Dr Wong, examining 152 adults with beta-thalassaemia major and related conditions, found that a common drug used to remove excess iron that accumulates in the liver could lead to kidney damage.

Therapeutic doses of deferasirox, an iron chelator used in patients with these blood conditions who undergo regular transfusions, was linked to hypercalciuria (elevated levels of calcium in the urine).

Dr Wong’s study recommended further investigation and vigilance with the use of these drugs, as hypercalciuria can lead to impaired kidney function and kidney stones.

### Helping patients with heart disease

New treatments for patients with heart disease who are at risk of developing heart failure were discovered by Dr Morag Young’s research group, Cardiovascular Endocrinology.

The group focuses on the cell signalling processes involved in the cardiac injury and repair that underlies many cardiovascular diseases.

Their work, published in the journal *Endocrinology*, showed that cell signalling initiated by a steroid hormone receptor (the MR) in inflammatory cells within the heart is a major cause of tissue inflammation and formation of fibrotic deposits. This results in poor heart muscle function and other detrimental features of heart failure.

By studying and activating the signalling in MR inflammatory cells of the heart (macrophages) isolated from the heart and aorta, as well as other areas in the body, the team discovered regulation of specific inflammatory signals and fibrotic factors that negatively impact the heart.

### Research group heads

Prof Peter Fuller AM (Steroid Receptor Biology)

Prof Robert McLachlan AM (Clinical Andrology)

Clinical A/Prof Frances Milat (Metabolic Bone Research)

Dr Peter Stanton (Male Fertility Regulation, jointly with Centre for Reproductive Health)

Dr Morag Young (Cardiovascular Endocrinology)

### Our supporters

Amgen

Cerebral Palsy Alliance

GlaxoSmithKline

Monash Comprehensive Cancer Consortium

Monash Health

NHMRC

Osteoporosis Australia

Ovarian Cancer Research Foundation

Servier

The Endocrine Fellows Foundation, USA

The Endocrine Society of Australia

The Ian Potter Foundation

The Rebecca L. Cooper Medical Research Foundation

The Rivkin Center for Ovarian Cancer, USA

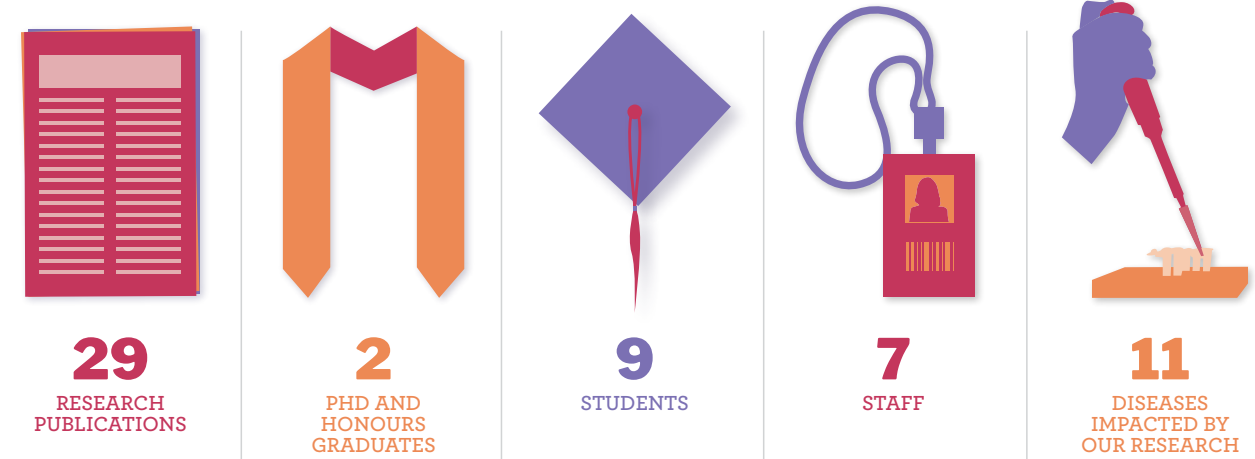
The Royal Australasian College of Physicians





# Centre for Genetic Diseases

[ CENTRE HEAD: PROFESSOR JUS ST. JOHN ]



**Our discoveries impact**

**WOMEN'S AND REPRODUCTIVE HEALTH**

Assisted reproductive technologies  
Egg and sperm quality  
Infertility

**OTHER**

Brain and blood  
Epigenetics  
Genetic diseases  
Germ cell development  
Mitochondrial biology  
Mitochondrial epigenetics  
Mitochondrial genetics  
Mitochondrial mutations and disease

**Scientists in the Centre for Genetic Diseases (CGD) focus on understanding the genetic causes underlying disease. We use innovative reproductive, developmental and stem cell models and state-of-the-art analytical approaches to better understand gene inheritance. By understanding genetic mutations, the number of copies of genes and how epigenetic regulators work, we provide a platform to improve clinical practice to prevent lifelong disease.**

**Scientists rescue poor quality eggs with genetically identical mitochondrial DNA**

Many women undergoing IVF have eggs that either fail to fertilise or arrest during very early embryo development—the result of these eggs having low counts of mitochondrial DNA.

Research by Professor Jus St. John and his team, in collaboration with commercial partners OvaScience

and colleagues at Harvard University, has shown that supplementing poor quality eggs with genetically identical mitochondrial DNA can increase the chances of achieving a pregnancy and a live birth.

The team supplemented an egg that had low counts of mitochondrial DNA with genetically identical material taken from another egg, and demonstrated that these poor quality eggs could be rescued and successfully fertilised.

“Not only were we able to show that these eggs could be rescued, we also showed that they produced high quality embryos and were very similar to those embryos generated from normal eggs,” Prof St. John, Head of CGD, said.

“We were also able to show that the embryos expressed key genes vital for embryo development and that their gene expression profiles were similar to embryos derived from good quality eggs.”

In addition, the scientists discovered that this process of mitochondrial

supplementation induces an unexpected mitochondrial DNA replication event, which ensures sufficient mitochondrial DNA is present during early embryo development.

“Previously, scientists had not realised the importance of mitochondrial DNA to the processes of fertilisation and development. Our results show that it is the amount of mitochondrial DNA that is important,” Prof St. John explained.

Data from the study has been presented to authorities that regulate the use of eggs and embryos in the UK and Japan, as well as at international meetings.

**Finding will assist new treatments for mitochondrial disorders**

Defects in mitochondria can cause disease in organs such as the brain, heart and liver. Often there are no

effective therapies for these patients and the disease is fatal because mitochondria are a vital part of a cell, generating the energy it requires. Dr Matthew McKenzie, Head of the Molecular Basis of Mitochondrial Disease research group, leads work aimed at understanding how things can go wrong in this essential cellular process.

A key component of the cell’s energy production pathway is mitochondrial complex I. To function properly, this complex needs to be precisely assembled from 45 parts. Dr McKenzie and collaborators have found that loss of just one of these parts, ND1, disrupts the early stages of mitochondrial complex I assembly.

It was also discovered that loss of ND1 impacts on another key component of energy production, mitochondrial complex IV. These findings further the understanding of how defects in mitochondrial complex I may cause disease, and will help in the design of future therapies for mitochondrial disorders.

**Safeguards for preventing genetic mutations during fetal development**

We inherit mitochondrial DNA from our mothers. Often, it has a number of mutations that, at low levels, tend to be harmless.

In this study, led by Prof St. John, scientists developed a preclinical model to understand how these mutations are passed from one generation to the next without becoming harmful. The results, taken over three generations, show that mitochondrial DNA mutations are present in eggs and embryos, but their levels are reduced in our tissues and organs. This research highlights the mechanisms in place during fetal development that restrict the replication and transmission of mutations in other parts of our bodies so that our tissues and organs can function normally.



**Key insights into ovary formation and development**

The development of reproductive organs begins while we are still in the womb. The formation of an ovary or testis is fundamental for determining a baby's gender, supporting lifelong fertility and ensuring enough reproductive sex hormones are produced.

Despite this key role, surprisingly little is known about ovarian development, especially during fetal life. Dr Patrick Western, from the Germ Cell Development and Epigenetics group, and his team have developed a new cell-based approach to examine ovary formation that will provide a greater understanding of the cell differentiation events that lead to the formation of ovaries in a fetus.

This study provided new insights into the formation of ovarian cells

that will ultimately sustain a baby girl's own egg development and production, as well as her ovary function. This research is essential for the broader understanding of female fertility, ovarian function and female reproductive health.

**Research group heads**

Prof Jus St. John (Mitochondrial Genetics)

Dr Matthew McKenzie (Molecular Basis of Mitochondrial Disease)

Dr Patrick Western (Germ Cell Development and Epigenetics)

**Our supporters**

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# Centre for Innate Immunity and Infectious Diseases

[ CENTRE HEAD: PROFESSOR PAUL HERTZOG ]

**Our discoveries impact**

**CANCER**

- Breast cancer
- Endometrial cancer
- Gastrointestinal cancer (particularly stomach adenocarcinoma and lymphoma)
- Lung cancer
- Ovarian cancer
- Pancreatic cancer

**IMMUNITY AND INFECTIOUS DISEASES**

- Arthritis
- Asthma
- Chlamydia
- Chronic inflammatory diseases
- Chronic obstructive pulmonary disease
- Gastritis
- Helicobacter pylori*
- Herpes simplex virus
- HIV
- Human metapneumovirus
- Inflammatory bowel disease

- Influenza
- Respiratory syncytial virus
- Systemic lupus erythematosus
- Vocal cord dysfunction
- Zika virus

**WOMEN'S AND REPRODUCTIVE HEALTH**

- Female reproductive tract infections, cancers and inflammatory diseases

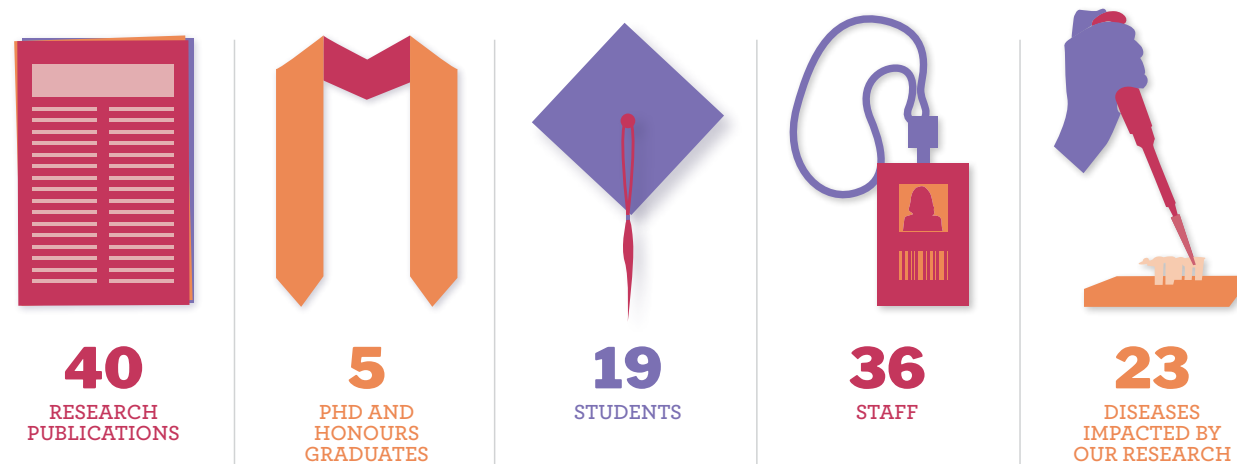
**Scientists in the Centre for Innate Immunity and Infectious Diseases (CiiiD) focus on molecules and cells that comprise our innate immune system. We aim to discover how our immune system fights infection, inflammatory diseases and cancer, and to develop new approaches to understanding, preventing, diagnosing and treating these diseases.**

**Breakthrough for lung disease**

The Cancer and Immune Signalling laboratory, headed by Professor Brendan Jenkins, discovered that the drug 'sgp130Fc' has the ability to halt the progression of lung cancer and emphysema. Combined, these lung diseases claim the lives of 15 000 Australians each year.

The study on emphysema, a culmination of six years' work for the team, including first author and NHMRC Biomedical Fellow Dr Saleela Ruwanpura, was published in the prestigious *American Journal*





of Respiratory and Critical Care Medicine. It follows on from a related study on lung cancer published earlier in 2016 by the team, including first author and PhD student Gavin Brooks, in the top-ranked *Cancer Research* journal.

In both studies, the CiiID researchers identified that an inflammation-causing molecule, interleukin 6 (IL-6), propels emphysema and lung cancer through a process called trans-signalling. Trans-signalling is the master regulator of the disease process, so it has very important effects on lung disease. Therefore, it is also an attractive target for treatment with drugs such as sgp130Fc.

The drug sgp130Fc was developed by CiiID collaborator Professor Stefan Rose-John from the University of Kiel, to specifically target the process of trans-signalling. It is currently being tested in clinical trials for other diseases that use the mechanism of trans-signalling, including inflammatory bowel disease. Prof Jenkins' team

now believes the drug has clinical potential against lung cancer and emphysema.

The Cancer and Immune Signalling laboratory in CiiID is also working with clinical colleagues at Monash Health, led by Professor Philip Bardin, to analyse the blood samples of lung cancer and emphysema patients in the hope of developing an early detection blood test for both diseases.

Lung cancer and emphysema are difficult to detect early, meaning that effective management and treatment for patients with these conditions is compromised. For example, at present, emphysema can only be diagnosed by a CT scan and only long after the disease has begun. This delay means many patients do not receive treatment until the disease has progressed to a severe state, when treatment options are limited.

A blood test has the potential to vastly improve survival rates through earlier diagnosis, while sgp130Fc has

the ability to halt the progression of lung cancer and emphysema. Not every patient with emphysema or lung cancer will benefit from this drug, but with clinical trials Prof Jenkins' team can identify which patients would respond to treatment, and at which stage of the disease they may best respond.

Lung cancer is the most common cancer in the world and the leading cause of cancer death in Australia. Emphysema is the major debilitating component of the lethal chronic obstructive pulmonary disease, which is predicted by the World Health Organization to be the third-leading cause of death worldwide by 2020, behind heart disease and cancer. The team's research was publicised widely in Victorian and national media.

### Pivotal discovery: fighting influenza outbreaks

Pandemic influenza outbreaks, such as the 1918 Spanish flu, can have devastating global consequences,

yet we still only have limited treatments for these diseases. Research by Associate Professor Ashley Mansell and Dr Michelle Tate of the Pattern Recognition Receptors and Inflammation group, published in the prestigious journal *Scientific Reports*, has shown that the influenza virus can overstimulate the NLRP3 inflammasome, which causes the body to burn up with infection from the inside, in a so-called 'cytokine storm'. Their pivotal discovery identifies that blocking the inflammasome at the height of infection with the experimental drug MCC950 can reduce this dangerous inflammatory response. Targeting the inflammasome may have potential as an effective therapeutic approach for lethal influenza infections and addresses an urgent unmet need for flu treatments. The findings from A/Prof Mansell's and Dr Tate's study may also be applied to other diseases where the NLRP3 inflammasome plays a critical role, including dengue fever, arthritis and even septic shock.

### War on superbugs

A team of CiiID researchers identified that a WWI antiseptic could be used as a front-line drug against viruses and 'superbugs'. Led by Dr Michael Gantier and Dr Gen  vieve P  pin of the Nucleic Acids and Innate Immunity group, the study found that acriflavine, a century-old antiseptic made from a derivative of coal tar, protects against the common cold by triggering an antiviral immune response. The team discovered that acriflavine binds cellular DNA to activate the host immune system and unleash a powerful immune response on a potentially broad range of pathogens. They

believe acriflavine could be a useful tool in the fight against superbug resistance and viral pandemics. Next, the team will use preclinical models to test how acriflavine mobilises the immune system in more virulent infections. The study was published in the prestigious journal *Nucleic Acids Research*, and publicised in national and international media.

### Microbiome key to good health

Scientists at the Wellcome Trust Sanger Institute in Cambridge, UK, including Dr Samuel Forster (NHMRC CJ Martin Biomedical Overseas Fellow from the Regulation of Interferon and Innate Signalling group of CiiID), have grown and catalogued more than 130 bacteria from the human intestine in a study published in *Nature*. The researchers developed a process to understand how our bacterial 'microbiome' helps keep us healthy and how imbalances contribute to complex conditions and diseases such as obesity, inflammatory bowel disease, irritable bowel syndrome and allergies. Dr Forster says, "The extensive database of genomes we have generated from these bacteria is essential for studying which bacteria are present or absent in people with gastrointestinal conditions. Now we can start to design mixtures of therapeutic candidates for use in these diseases." Dr Forster will return to continue his microbiota research in Melbourne at CiiID in 2017/18.

### Research group heads

Prof Paul Hertzog (Regulation of Interferon and Innate Signalling)

Prof Philip Bardin (Respiratory and Lung Research)

A/Prof Richard Ferrero (Gastrointestinal Infection and Inflammation)

Dr Michael Gantier (Nucleic Acids and Innate Immunity)

Prof Brendan Jenkins (Cancer and Immune Signalling)

Dr Maria Kaparakis-Liaskos (Host-Pathogen Interactions)

A/Prof Ashley Mansell (Pattern Recognition Receptors and Inflammation)

### Our supporters

Alliance for Lupus Research

Australian Centre for HIV and Hepatitis Virology Research (ACH2)

Australian Institute of Policy and Science

Australian Research Council (ARC)

Bill and Melinda Gates Foundation

Cancer Council Victoria

CASS Foundation

NHMRC

The Sylvia and Charles Viertel Charitable Foundation

United States Department of Defense

United States National Institutes of Health/National Institute of Allergy and Infectious Diseases

Victorian Endowment For Science Knowledge and Innovation (veski)

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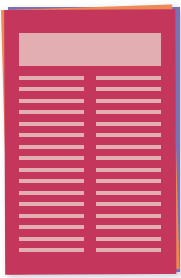
Pfizer Centers for Therapeutic Innovation



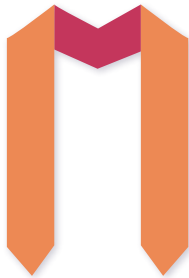


# Centre for Reproductive Health

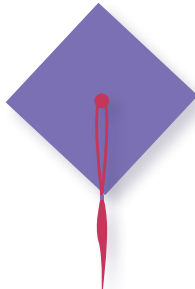
[ CENTRE HEAD: PROFESSOR LOIS SALAMONSEN ]



46  
RESEARCH  
PUBLICATIONS



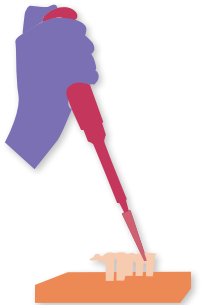
7  
PHD AND  
HONOURS  
GRADUATES



30  
STUDENTS



39  
STAFF



14  
DISEASES  
IMPACTED BY  
OUR RESEARCH

## Our discoveries impact

### CANCER

Endometrial cancer  
Ovarian cancer  
Testicular cancer

### WOMEN'S AND REPRODUCTIVE HEALTH

Disorders of sex development  
Disorders of testicular development  
Endometriosis  
Failure of spermatogenesis  
Fibroids  
Infertility and contraception  
Parkinson's disease  
Pre-eclampsia  
Testicular inflammation

### BABY AND CHILDREN'S HEALTH

Intrauterine growth restriction  
Placental development and dysfunction

**Lifelong health is determined by external factors that begin exerting their influence prior to conception. Using basic and translational science, researchers in the Centre for Reproductive Health (CRH) seek to answer critical questions about sperm and egg development, early embryo development, implantation of the embryo into the womb, formation of the placenta and nurture of the fetus until birth, and how these affect human life and development.**

### Targeting small molecule could stop growth of endometrial cancer

Endometrial cancer occurs in the inner lining of the uterus and is the most common gynaecological cancer. In 2016, the disease claimed the lives of around 441 Australian women, with an estimated 2652 new cases diagnosed.

Endometrial cancer is one of the most common types of cancer affecting postmenopausal women,

but incidences are increasing in women of child-bearing age.

CRH researchers believe blocking a small signalling molecule known as interleukin 11 (IL-11) could reduce tumour growth and spread.

Associate Professor Eva Dimitriadis' Embryo Implantation research group developed a model of endometrial cancer to test the hypothesis around IL-11. Using this model, which mimics the growth of human cancer cells, the researchers were able to show that targeting IL-11 reduces the growth and spread of endometrial cancer tumours.

"It's exciting to find that targeting this small molecule in preclinical stages could help block the growth of endometrial tumours," said Dr Amy Winship, a postdoctoral researcher in A/Prof Dimitriadis' laboratory.

"There is no screening test for this disease and there is a lack of curative therapies for patients with recurrent or aggressive disease, or for young women wanting to preserve fertility.

"Our next step will be to test the treatment in a spontaneous preclinical model of endometrial cancer before the work may proceed to clinical trials," Dr Winship said.

### Understanding male contraception

Our researchers are investigating the potential use of male hormonal contraceptives. In a paper published in the important clinical journal *Human Reproduction*, Dr Peter Stanton and his team demonstrated that a vital component of the blood-testis barrier becomes disorganised when male hormonal contraceptives are used effectively for eight weeks. The same effect is also seen in men with testicular disorders that lead to infertility, indicating that maintenance of the blood-testis barrier is important for male fertility. Understanding the way in which male hormonal contraceptives work is key to translating them to clinical use and will allow us to gain insights into the causes of male infertility.

### Male sex development breakthrough

Gender is determined at conception and during the development of the fetus. Disorders of sex development, or intersex, may be triggered by genetic disturbances during this development period. A focus of Professor Vincent Harley's Sex Development laboratory is the 'SRY' gene, which is responsible for the initiation of male sex determination in humans, along with the gene that regulates this process, known as 'SOX9'. Prof Harley and his PhD student, Dimuthi Alankarage, discovered one mechanism by which SOX9 exerts its effects on the testis to maintain a niche among stem cells that in turn promotes the development of sperm. Their discovery was published in the *International Journal of Biochemistry & Cell Biology*, and has important implications for understanding male infertility.

### Embryo-maternal communication for implantation success

Dr Hong Nguyen and Professor Lois Salamonsen, in collaboration with Dr David Greening and Professor Richard Simpson from La Trobe University, described an important step in the initiation of pregnancy in the journal *Biology of Reproduction*. They demonstrated that nanosized extracellular vesicles, released from epithelial stem cells located in the endometrium, contain hormone-specific cargo called exosomes that are taken up by trophoblast cells (the outer cells of the blastocyst, a precursor to an embryo). The vesicles release their cargo into these cells, making the trophoblast more 'adhesive', and help the embryo to implant in the endometrium—the first step in creating a healthy pregnancy.



Research group heads

Prof Lois Salamonsen (Endometrial Remodelling)

Prof David de Kretser AC (Activin Follistatin Biology and Inflammation)

A/Prof Eva Dimitriadis (Embryo Implantation)

Prof Jock Findlay AO (Ovarian Biology)

Prof Vincent Harley (Sex Development)

A/Prof Mark Hedger (Endocrinology and Immunophysiology)

Dr Joohyung Lee (Brain and Gender)

Prof Kate Loveland (Testis Development and Male Germ Cell Biology)

A/Prof Guiying Nie (Implantation and Placental Development)

Dr Peter Stanton (Male Fertility Regulation, jointly with Centre for Endocrinology and Metabolism)

Distinguished scientists

Prof David de Kretser AC, Distinguished Sir John Monash Professor

Prof Jock Findlay AO

Our supporters

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Cancer Council Victoria

CASS Foundation

Ferring Pharmaceuticals

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Monash IVF Research and Education Foundation

NHMRC

Rotary Club of Balwyn

Society for Reproductive Biology



The Ritchie Centre

[ CENTRE HEAD: PROFESSOR STUART HOOPER ]

Our discoveries impact

IMMUNITY AND INFECTIOUS DISEASES

Systemic lupus erythematosus

WOMEN'S AND REPRODUCTIVE HEALTH

Endometriosis

Infertility

IVF

Pelvic organ prolapse

Pre-eclampsia

Premature ovarian failure

BABY AND CHILDREN'S HEALTH

Birth asphyxia

Bronchopulmonary dysplasia

Cerebral palsy

Epilepsy

Intrauterine growth restriction

Neonatal respiratory distress syndrome

Premature birth

Pulmonary hypertension

SIDS

Sleep-disordered breathing

**The Ritchie Centre (TRC) is Australia's premier clinical and research centre for women, pregnancy, newborn babies and children. It adopts a unique and holistic cycle of care from pregnancy through to birth and early childhood. The collaboration between researchers and clinicians at TRC drives the energy and expertise behind finding solutions to the most important problems facing pregnant women and their babies, both in Australia and overseas.**

**\$6 million for research to reduce harm stemming from premature birth**

Minimising harm to babies exposed to adverse early life events such as premature birth and birth asphyxia is the focus of a research program made possible by a \$6.12 million NHMRC grant.

Professor Stuart Hooper, Professor Euan Wallace and Professor Peter

Davis from The Royal Woman's Hospital will lead the five-year program.

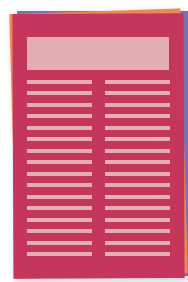
It will bring together 30 Australian and international experts in the fields of neonatology, physiology and obstetrics, as well as in clinical and basic sciences, to find ways to minimise harm stemming from events that occur shortly before or after birth.

"Adverse early life events like premature birth, perinatal asphyxia and intrauterine growth restriction can cause death or permanent disabilities like cerebral palsy," Prof Hooper explained.

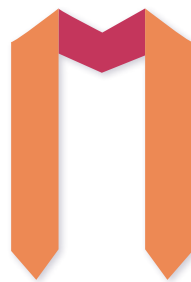
"What is less well known is that these events can have lifelong effects, with the potential to contribute to diabetes, obesity, coronary artery disease and hypertension.

"This impact on health extends from birth, through childhood and into adult life, and it can influence the health of future generations."

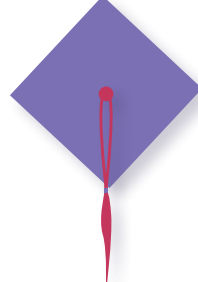




**135**  
RESEARCH  
PUBLICATIONS



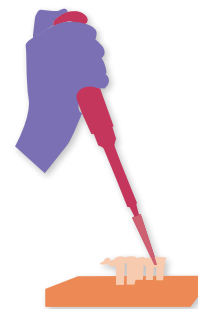
**18**  
PHD AND  
HONOURS  
GRADUATES



**80**  
STUDENTS



**100**  
STAFF



**17**  
DISEASES  
IMPACTED BY  
OUR RESEARCH

The program will look to tackle some of the most challenging problems in modern perinatal medicine, such as improving the transition to newborn life for very premature babies.

Researchers will examine the babies' crucial transition to air-breathing, a time when preterm babies and those exposed to intrauterine growth restriction, lung hypoplasia and birth asphyxia, are most at risk.

They will also look at developing new techniques for detecting, preventing and treating neonatal lung disease, a relatively common but potentially fatal condition.

"We will use a multidisciplinary approach to understand the science and develop and optimise new treatments for improving the health and care of infants during the perinatal period," Prof Hooper said.

**Menstruating rodent to progress women's health research**

Few mammals menstruate. This means that research into menstruation and menstrual disorders in women has been stalled by the lack of an appropriate preclinical model in which scientists can study these conditions.

As a result, disorders like endometriosis and premenstrual syndrome remain poorly understood, making it difficult for researchers to progress new treatments.

Researchers in Dr Hayley Dickinson's Embryology and Placental Biology group were the first in the world to observe menstruation in a rodent called the spiny mouse (*Acomys cahirinus*).

The team is developing ways to study the mechanisms of menstrual

shedding and repair in the spiny mouse to better understand pregnancy and menstrual conditions including endometriosis, which affects one in every ten women.

**Creatine could be vital for baby growth in the womb**

Dr Dickinson's team is also leading research into how a baby's growth during pregnancy may depend on a mother's levels of a critical nutrient called creatine.

Their study, published in the *British Journal of Obstetrics and Gynaecology*, demonstrated links between a mother's creatine levels during pregnancy and the size of her baby at birth.

The finding has prompted a world-first study of 900 pregnant women at Monash Health to determine optimum creatine levels during pregnancy.

Dr Dickinson said the discovery is a major breakthrough for understanding the importance of maternal diet and its impact on an unborn baby's growth.

**New research collaboration announced**

A new research collaboration between Hudson Institute of Medical Research, Monash University and Swiss-based healthcare company Roche will aim to develop next-generation treatments for autoimmune diseases, focused on proteins targeting novel molecular pathways.

The partnership, announced in late 2016, will enable the multidisciplinary research team and Roche to work together to advance and translate existing and new intellectual property into novel treatments.

The collaboration has arisen from work performed by Associate Professor Marcel Nold and Dr Claudia Nold (National Heart Foundation of Australia Future Leader Fellow) from Hudson Institute and Monash University's Department of Paediatrics, and Professor James Whisstock and Dr Andrew Ellisdon from the Monash Biomedicine Discovery Institute.

**Research group heads**

Prof Stuart Hooper (Fetal and Neonatal Health)

A/Prof Jim Buttery (Infant and Child Health)

Dr Hayley Dickinson (Embryology and Placental Biology)

A/Prof Caroline Gargett (Endometrial Stem Cells)

Prof Rosemary Horne (Infant and Child Health)

Prof Graham Jenkin (Cell Therapy and Regenerative Medicine)

Dr Rebecca Lim (Amnion Cell Biology)

A/Prof Tim Moss (Perinatal Inflammation)

A/Prof Marcel Nold and Dr Claudia Nold (Interventional Immunology in Neonatal Diseases)

Dr Graeme Polglase (Perinatal Transition)

A/Prof David Walker (Fetal and Neonatal Health Neurodevelopment)

Dr Megan Wallace (Lung Development)

A/Prof Flora Wong (Neonatal Brain Protection)

Prof Nick Freezer, Head, Department of Paediatrics, School of Clinical Sciences at Monash University

A/Prof Suzanne Miller, Department of Obstetrics and Gynaecology, School of Clinical Sciences at Monash University (Neurodevelopment and Neuroprotection)

Prof Euan Wallace, Head, Department of Obstetrics and Gynaecology, School of Clinical Sciences at Monash University (Maternal and Perinatal Medicine)

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CENTRE FOR INNATE IMMUNITY AND INFECTIOUS DISEASES (CiiID)

# WWI antiseptic could be key to fighting 21st century viral infections



[ DISCOVERY IMPACTS COMMON COLD, VIRAL INFECTION, ANTIBIOTIC RESISTANCE ]

**A topical antiseptic derived from coal tar and used to treat wounds and 'sleeping sickness' in soldiers during WWI could activate the immune system to protect against viral infection, and may prove key in the fight against antibiotic resistance, CiiID researchers have shown.**

The discovery, led by Dr Michael Gantier and Dr Geneviève Pépin, and published in the journal *Nucleic Acids Research*, revealed that the century-old antiseptic 'acriflavine' was protective against the common cold virus (rhinovirus).

The team believes the way in which acriflavine activates the immune system may also offer a useful tool in the fight against viral pandemics and could have the potential to combat superbug resistance.

## Whole picture revealed

Dr Gantier, Head of the Nucleic Acids and Innate Immunity research group, said acriflavine was used to treat everything from gonorrhoea to urinary infections prior to WWII, but a whole picture of its mechanism of action has evaded scientists until now.

The researchers pretreated human lung cells with acriflavine before introducing rhinovirus infection, and found that acriflavine protected the cells against infection by triggering an antiviral immune response.

"Acriflavine was heavily used during WWI as a topical antiseptic to treat

wounds. Early scientific literature describes its antibacterial qualities in test tubes, but its very effective action on the skin has never been fully defined or explored," Dr Gantier said.

"We have shown for the first time that acriflavine works by binding to cellular DNA and activating the host immune system, unleashing a powerful immune response on a potentially broad range of pathogens.

"The effect is twofold; acriflavine directly affects the replication of the pathogen and then the activation of the host immune system steps in, which helps to clear the infection," he explained.

## ACRIFLAVINE FACTS

Acriflavine (also known as tryptaflavine) was first identified as an antiseptic by German scientists in 1912. It was used by soldiers during WWI to treat wounds and kill the parasites that caused 'sleeping sickness'. Australia's volunteer nurses in WWII also carried acriflavine in their kits.





# Acriflavine stimulates the host immune system, rather than simply just killing bacteria, suggesting it wouldn't be as likely to drive mutations in bacteria.

## War on superbugs

Dr Pépin, first author on the paper, says acriflavine could one day offer a safeguard against antibiotic-resistant bacteria or could be used during a viral outbreak to trigger a baseline immune response to an infection, such as SARS or influenza, in at-risk groups.

"Acriflavine was used in the first half of the twentieth century as a topical antibacterial, before being supplanted by penicillin. Now, antibiotic-resistant superbugs are a growing threat to human health," Dr Pépin said.

"Our study indicates that acriflavine stimulates the host immune system, rather than simply just killing bacteria, suggesting it wouldn't be as likely to drive mutations in bacteria. This shows a safeguard against resistance and a potential alternative to current antibacterial drugs."

Next, the team will use preclinical models to test how well acriflavine mobilises the immune system against more virulent pathogens.

## Collaborating organisations

Monash Lung and Sleep at Monash Medical Centre; The ACRF Chemical Biology Division at The Walter and Eliza Hall Institute of Medical Research

## Funding partners

NHMRC; ARC

## More information

Pépin G, Nejad C, Thomas BJ, Ferrand J, McArthur K, Bardin PG, Williams BR and Gantier MP (2016) Activation of cGAS-dependent antiviral responses by DNA intercalating agents. *Nucleic Acids Res.* DOI:10.1093/nar/gkw878

## Team

Dr Geneviève Pépin, Miss Charlotte Nejad, Dr Jonathan Ferrand, Dr Belinda Thomas, Prof Philip Bardin, Prof Bryan Williams, Dr Michael Gantier





CENTRE FOR INNATE IMMUNITY AND INFECTIOUS DISEASES (CiiiD)

# Breakthrough for lung cancer and emphysema offers hope to patients

[ DISCOVERY IMPACTS LUNG CANCER, EMPHYSEMA ]

Lung cancer and emphysema combined claim the lives of about 15 000 Australians each year. These lung diseases could soon be diagnosed much earlier and targeted with an existing drug, which could vastly improve patient outcomes, thanks to a major discovery by our scientists.

## LUNG CANCER AND EMPHYSEMA FACTS

- Lung cancer is the most common cancer in the world and the leading cause of cancer death in Australia.
- Emphysema is predicted by the World Health Organization to be the third-leading cause of death worldwide by 2020, behind heart disease and cancer.
- Patients with emphysema are at an increased risk (between 25 and 30 per cent) of also developing lung cancer.

In two separate studies taking more than six years to complete, the CiiiD team, headed by Professor Brendan Jenkins, identified that an inflammation-causing molecule, interleukin 6 (IL-6), propels emphysema and lung cancer through a process called trans-signalling.

The researchers found receptors essential for the IL-6 trans-signalling process are present in high levels in the blood of both emphysema and lung cancer patients, giving both diseases the same unique signature

that can be used for early disease detection.

In a double hit, the researchers also discovered that an experimental drug called sgp130Fc has the ability to halt the progression of both diseases. This drug, developed by the team's German collaborator Professor Stefan Rose-John at the University of Kiel, is already in a clinical trial for inflammatory bowel disease.

## Expect the unexpected

"The results were surprising because lung cancer and emphysema are polar opposites. Emphysema is characterised by the loss of lung tissue and lung cancer by the uncontrolled growth of tissue," said Prof Jenkins.

"Trans-signalling and IL-6 are having very important effects on lung disease—they are master regulators and can both be targeted with sgp130Fc."

## Early detection, saving lives

"We are now working with our clinical collaborators at Monash Health, led





# In a double hit, the researchers also discovered that an experimental drug called sgp130Fc has the ability to halt the progression of both diseases.

by Professor Philip Bardin, to analyse blood samples from lung cancer and emphysema patients to develop a simple blood test that could be used to detect both diseases,” Prof Jenkins said.

Early detection for both lung cancer and emphysema is difficult, meaning mortality rates are high. Many patients present with the diseases at a late stage, so treatment options are limited. For example, emphysema can currently only be diagnosed in later stages by a CT scan.

“Early detection is crucial to effective management and treatment of both diseases. A blood test has the potential to vastly improve survival rates through earlier diagnosis, while sgp130Fc has the ability to halt the progression of lung cancer and emphysema,” said Prof Jenkins.

## Next steps

Prof Jenkins is cautiously optimistic about the drug’s potential. Armed with both findings, his team will now investigate potential uses for

sgp130Fc in managing lung cancer and emphysema.

“Not every patient with emphysema or lung cancer is a candidate for this drug, but with clinical trials we can identify which patients would respond to treatment and at which stage of the disease. We believe there’s a real opportunity here to target and treat patients with these lung diseases.”

The study on emphysema, a culmination of six years’ work for the team, including first author and NHMRC Biomedical Fellow, Dr Saleela Ruwanpura, was published in the *American Journal of Respiratory and Critical Care Medicine*. It follows on from a related study on lung cancer by the team, including first author and PhD student Gavin Brooks, which was published in the top-ranked *Cancer Research* journal.

## Collaborating organisations

Monash Health; University of Kiel, Germany; NovImmune

SA, Switzerland; University of Melbourne; RMIT University

## Funding partners

NHMRC; The Sylvia and Charles Viertel Charitable Foundation

## More information

Ruwanpura SM, McLeod L, Dousha LF, Seow HJ, Alhayyani S, Tate MD, Deswaerte V, Brooks GD, Bozinovski S, MacDonald M, Garbers C, King PT, Bardin PG, Vlahos R, Rose-John S, Anderson GP and Jenkins BJ (2016) Therapeutic targeting of the IL-6 trans-signalling/mTORC1 axis in pulmonary emphysema. *Am J Respir Crit Care Med* 194:1494-1505.

Brooks GD, McLeod L, Alhayyani S, Miller A, Russell PA, Ferlin W, Rose-John S, Ruwanpura S and Jenkins BJ (2016) IL6 Trans-signaling promotes KRAS-driven lung carcinogenesis. *Cancer Res* 76:866-876.

## Teams

Lung cancer: Mr Gavin Brooks, Ms Louise McLeod, Mr Sultan Alhayyani, Dr Alistair Miller, Dr Saleela Ruwanpura, Prof Brendan Jenkins

Emphysema: Dr Saleela Ruwanpura, Ms Louise McLeod, Mr Sultan Alhayyani, Dr Michelle Tate, Dr Virginie Deswaerte, Mr Gavin Brooks, Dr Martin MacDonald, Dr Paul King, Prof Philip Bardin, Prof Brendan Jenkins





CENTRE FOR CANCER RESEARCH (CCR)

## Australian-first service to help children with brain tumours

[ DISCOVERY IMPACTS CHILDHOOD BRAIN CANCER, MEDULLOBLASTOMA ]

Children with the most common type of brain cancer could be spared unnecessary radiation and chemotherapy, thanks to a breakthrough new program from the Centre for Cancer Research.

Our researchers are establishing a pilot for an Australian-first service that will significantly reduce the time it takes for children with the most common type of solid brain tumour, medulloblastoma, to receive a prognosis. This more efficient service will help doctors to formulate the best treatment plan with the least side effects for these children.

### MEDULLOBLASTOMA FACTS

- Medulloblastoma represents 20 per cent of all childhood brain cancers.
- There are four subgroups of medulloblastoma, each with different causes, requiring different treatments.

Tumour samples from Australia are currently sent overseas for analysis, a process that can take up to two months. This new service, a collaboration between Hudson Institute of Medical Research, Monash Health and the Monash Children's Hospital Cancer Centre, will provide the same prognostic information within three weeks.

"We are excited to be the first Australian laboratory to provide a validated local service, according to international standards," said Dr Jason Cain, who is Head of the Developmental and Cancer Biology research group within the Centre for Cancer Research at Hudson Institute.

"Our service will enable doctors to provide a prognosis more quickly and to tailor cancer treatments to fit the tumour profile with the best result for the child."

**This collaborative project is generously funded by the Australian Lions Childhood Cancer Research Foundation, Children's Cancer Foundation, Robert Connor Dawes Foundation and Bailey's Day.**

### New level of personalised treatment

There are four subgroups of medulloblastoma and all are currently treated the same way, with chemotherapy and, where it is required, radiation.

While the survival rate is around 80 per cent for average risk patients,





# Identifying key methylation differences will enable our team to catalogue medulloblastoma treatments to each tumour subgroup.

the one-size-fits-all treatment regime for this disease means children can suffer permanent and debilitating side effects like intellectual disability and issues with growth, speech and hearing loss.

Emerging research suggests there are variations within the existing tumour subgroups for medulloblastoma that require further subclassification.

As well as providing prognostic information to existing patients, the research team will also look to improve care for future patients.

The researchers will analyse tumour samples from archived tissue banks across Australia to uncover key genetic and epigenetic differences that will inform new treatments that can be targeted to the profile of a patient's tumour—an approach known as precision medicine.

“It's become clear over the last five years that medulloblastoma is not a single disease, but comprised of at least these four distinct subgroups, each with different causes and prognosis,” Dr Cain said.

“There is a low-risk group that doesn't need the same amount of chemotherapy or radiation. There are also targeted therapies in clinical trials showing some promising results, but they are only effective

in one high-risk subgroup. This is crucial information for these patients.

“Identifying key methylation differences will enable our team to catalogue medulloblastoma treatments to each tumour subgroup, minimising unnecessary toxic treatments and lifelong side effects,” Dr Cain said.

The team believes methylation array technology is also key to analysing other types of solid brain tumours, and may become the ‘gold standard’ across all extracranial solid tumours.

## What is precision cancer medicine?

Precision medicine is an emerging approach to disease treatment and prevention that takes into account individual variability in genome sequence and other unique personalised information (such as microbiome composition, health history, lifestyle and diet) to identify and deliver the right treatment to the right patient at the right time.

The use of precision medicine has the potential to revolutionise healthcare delivery by improving treatment effectiveness, as well as sparing patients the costs and side effects of therapies from which they

would not benefit, based on their individualised makeup.

Unlike traditional one-size-fits-all medicine, precision cancer medicine involves testing DNA from patients' tumours to identify the mutations or other changes that drive their cancer. Scientists and physicians then use this information to identify small molecule drugs, monoclonal antibodies and other therapies that are precisely targeted for the individual patient.

While such therapies are not widespread yet, there is a general consensus among cancer specialists globally that precision medicine will be central to the future of cancer care in improving treatment success rates and reducing side effects.

## Collaborating organisations

Monash Children's Hospital; Royal Children's Hospital

## Funding partners

Australian Lions Childhood Cancer Research Foundation; Robert Connor Dawes Foundation; Bailey's Day; Children's Cancer Foundation

## Team

A/Prof Elizabeth Algar, Dr Sara Khan, Dr Jason Cain, Dr Peter Downie





[ DISCOVERY IMPACTS ADVANCED BLADDER CANCER ]

A crucial genetic marker that heralds better treatment and outcomes for advanced bladder cancer patients has been discovered by Centre for Cancer Research scientists.

The finding, published in the journal *Molecular Cancer Therapeutics*, represents major progress in treatment for advanced bladder cancer patients.

## Hope for bladder cancer patients



CENTRE FOR CANCER RESEARCH (CCR)

### BLADDER CANCER FACTS

- Each year, more than 2800 Australians are diagnosed with bladder cancer.
- It is the fourth most common cancer among men and the ninth most common cancer among women.
- Because of high rates of recurrence and continuing invasive monitoring, bladder cancer also has the highest lifetime treatment costs per patient of all cancers.
- Treatments for advanced bladder cancer are currently limited to surgery and chemotherapy. In recurrent cancers, larger doses of chemotherapy are required and these drugs become less effective as the cancer progresses.

### Solving a vital piece of the puzzle

Researchers Dr Dhanya Sooraj, Professor Bryan Williams, Dr Dakang Xu and Dr Jason Cain were investigating why the crucial tumour

suppressor, ATF3, disappears as bladder cancer progresses. Disappearance of ATF3 correlates with poor survival rates.

The team discovered that an enzyme inhibitor drug 'pracinostat', currently in clinical trials for other types of cancer, could be used to reactivate the ATF3 gene in bladder cancer cells, restoring cells to their original non-tumour state.

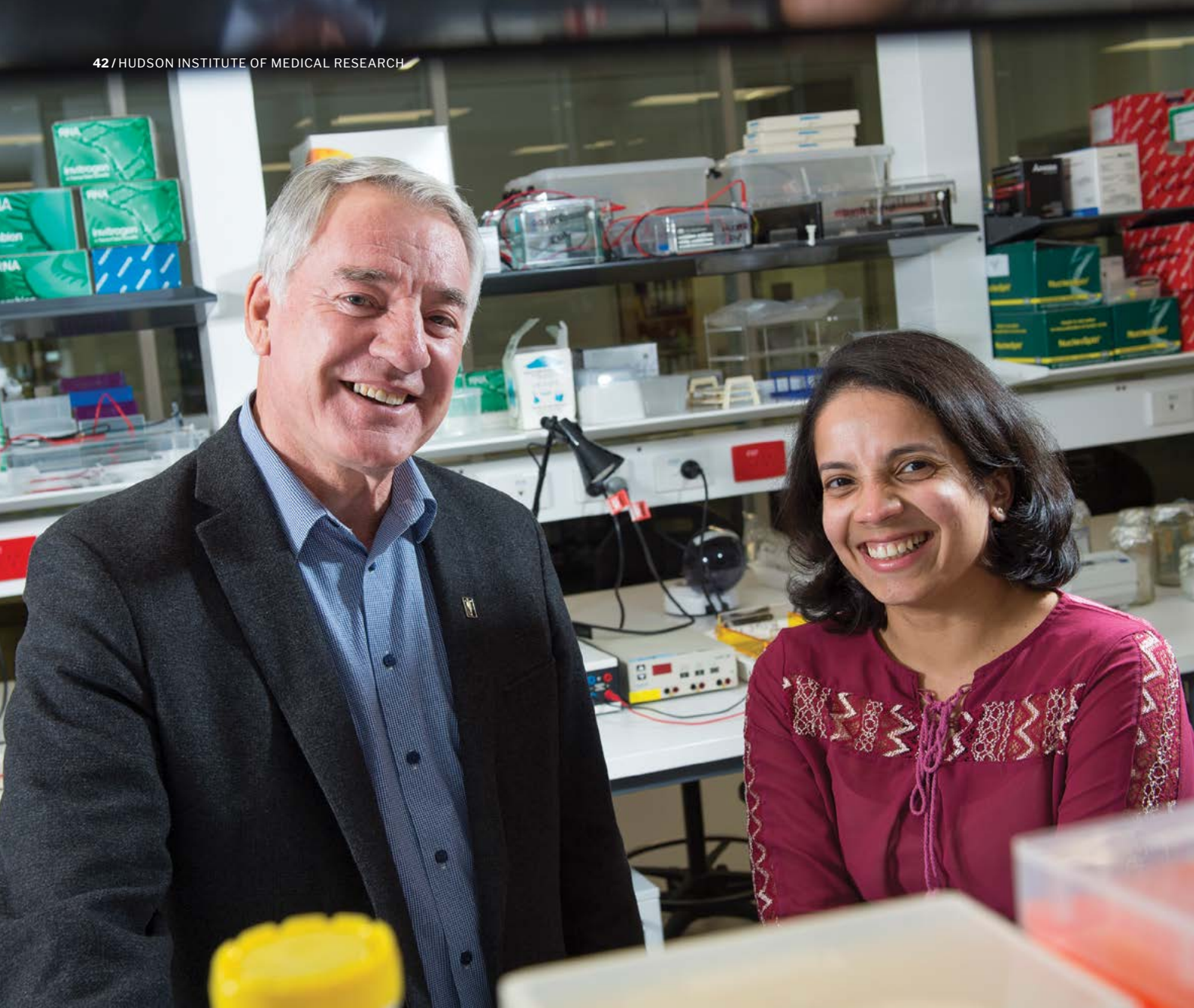
Significantly, they found that once the ATF3 gene was reactivated, tumour sizes reduced, resulting in an improved chance of survival.

"ATF3 is a vital piece of the puzzle in creating the best possible outcomes for advanced bladder cancer patients," Prof Williams said.

"Our results show that a normal functioning ATF3 gene is necessary for standard treatment to be effective. This gene could also be used as a biomarker for monitoring patients' response to treatment. For example, if levels of ATF3 increase, then we may know the treatment is working."

Prof Williams added that when used in combination with chemotherapy,





# ATF3 is a vital piece of the puzzle in creating the best possible outcomes for advanced bladder cancer patients.

pracinostat has the potential to be an effective new treatment approach for the majority of patients.

“By using a more efficient dose of chemotherapy to tackle the tumour, we could ultimately improve patients’ responses to treatment, which in turn improves survival rates and quality of life.”

## Next steps

Work in preclinical models will confirm whether pracinostat can be used in combination with

chemotherapy and emerging immunotherapies to improve treatment responses.

The drug is already in phase II clinical trials for acute myeloid leukaemia and myelofibrosis, with promising results.

The team believes the findings of this study could also be used to improve treatment options for colorectal cancer, a disease in which the expression of the ATF3 gene is also lost.

## Collaborating organisation

MEI Pharma

## Funding partner

NHMRC

## More information

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## Team

Dr Dhanya Sooraj, Dr Dakang Xu, Dr Jason Cain, Prof Bryan Williams





THE RITCHIE CENTRE (TRC)

## World first—a way forward for a hidden condition

[ DISCOVERY IMPACTS PELVIC ORGAN PROLAPSE ]

**The impact of birth leaves one in four women with a lifelong hidden medical condition, but help is on the way thanks to research taking place at The Ritchie Centre.**

Pelvic organ prolapse (POP) occurs when the tissues, pelvic floor muscles and ligaments that support the pelvic organs (bladder, uterus and bowel) are damaged, usually in childbirth, causing the organs to herniate or shift.

POP causes debilitating symptoms, including poor bladder or bowel control and pain during sex.

### PELVIC ORGAN PROLAPSE FACTS

One in four women are affected by POP. In postmenopausal women who have had children, this figure increases to one in two.

- Every year in Australia around 22 000 women undergo surgery for POP.
- Around one in five women with POP will require surgical intervention. A third of these will require multiple operations.
- About half of all women who have had a child have some level of prolapse, but only one in five women seek medical help.

Associate Professor Caroline Gargett's research group in The Ritchie Centre have discovered a way to extract and purify stem cells taken from the human endometrium, which could be used to help women with POP.

"Our world-first discovery means that one day we could take stem cells from the lining of a woman's uterus to help repair some of the lifelong damage caused by childbirth," A/Prof Gargett said.

### Progressing help for women

The team are working on combining the stem cells with a specially engineered mesh that mimics the delicate tissues in the vaginal walls.

Around one in five women with POP will require surgical intervention. Current surgeries may involve vaginal insertion of a synthetic mesh to give the pelvic organs permanent support, but this surgery has significant side effects for around one in ten women.

Some women's bodies reject the meshes, leading to internal scarring or exposure of the mesh, requiring more surgeries to then remove them.





# One day we could take stem cells from the lining of a woman's uterus to help repair some of the lifelong damage caused by childbirth.

Work in preclinical models indicates that supplementing new biocompatible meshes with endometrial stem cells may improve the outcomes of surgery.

"The stem cells help the body accept new biocompatible meshes as native rather than foreign. They modify the body's immune response to one of wound healing, rather than of scarring," explains A/Prof Gargett.

The team are also working towards production of endometrial stem cells for use in clinical trials.

"As these stem cells can be extracted in a consulting room environment, without the use of anaesthetic, they represent an attractive and accessible option for development of cell-based therapies," A/Prof Gargett said.

"We believe the endometrium may be a superior source of stem cells that could be used in many health conditions."

#### Collaborating organisations

CSIRO; Monash Health

#### Funding partner

NHMRC

#### More information

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#### Team

A/Prof Caroline Gargett, Dr James Deane, Ms Saeedah Darzi





CENTRE FOR REPRODUCTIVE HEALTH (CRH)

# Non-invasive swab test for endometrial cancer

[ DISCOVERY IMPACTS PELVIC ORGAN PROLAPSE ]

**Endometrial cancer is one of the most common types of cancer affecting postmenopausal women. In 2016, the disease claimed the lives of an estimated 441 women in Australia.**

In a world-first finding, scientists from the Centre for Reproductive Health, led by Associate Professor Guiying Nie, discovered that the proprotein convertase (PC) enzyme activity could be the key to an early detection swab test for endometrial cancer.

## ENDOMETRIAL CANCER FACTS

- In 2013, there were 424 deaths from uterine cancer in Australia. In 2016, it was estimated that this will have increased to 441 deaths.
- Uterine cancer is the sixth most commonly diagnosed cancer among females in Australia and the most commonly diagnosed gynaecological cancer.
- Incidences are increasing in pre-menopausal women.

A/Prof Nie's team found that PC activity is present in elevated levels in endocervical swabs taken from endometrial cancer patients, a finding that could inform a simple

but life-saving and non-invasive early detection swab test for endometrial cancer.

"Early and non-invasive detection of endometrial cancer is critically important but currently not available," A/Prof Nie explained.

"Endometrial cancer is currently only diagnosed by a combination of different tests, which may include an ultrasound, endometrial biopsy, hysteroscopy or MRI scan.

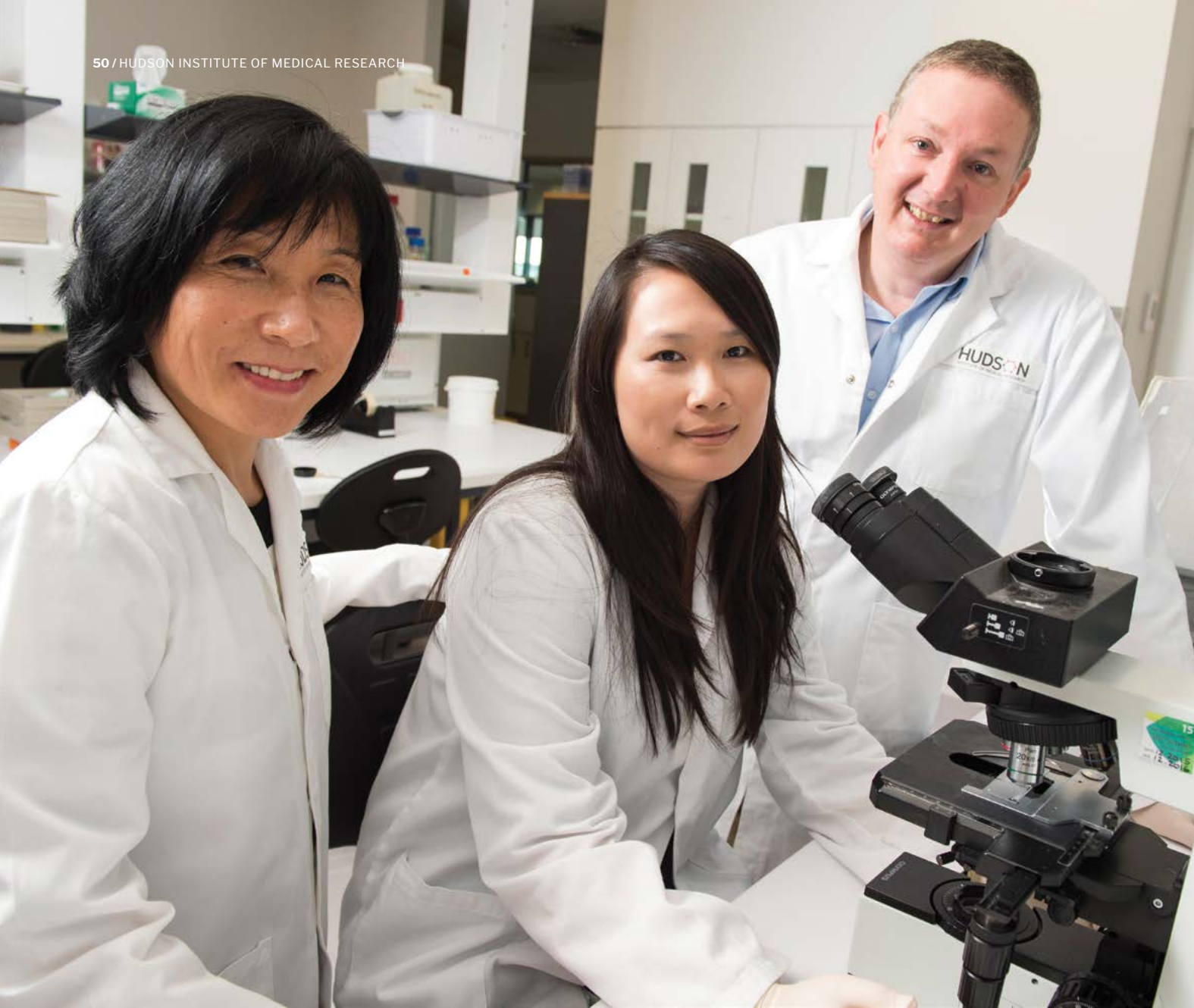
"Vaginal bleeding in postmenopausal women is an indicator that the cancer has already progressed.

"A swab test is a simple and non-invasive method that could easily be performed during a woman's regular check-up."

Previous work by A/Prof Nie's laboratory also demonstrated that PC activity is significantly elevated in the uterine fluid of postmenopausal women with endometrial cancer.

Her team will now look to further develop the two findings into a simple screening tool for endometrial cancer.





PC activity is present in elevated levels in endocervical swabs taken from endometrial cancer patients, a finding that could inform a simple but life-saving and non-invasive early detection swab test for endometrial cancer.

#### Collaborating organisations

Department of Obstetrics and Gynaecology; Monash University and Epworth Research Institute; Epworth HealthCare

#### Funding partners

NHMRC; The CASS Foundation

#### More information

Heng S, Stephens AN, Jobling TW and Nie G (2016) Measuring PC activity in endocervical swab may provide a simple and non-invasive method to detect endometrial cancer in post-menopausal women. *Oncotarget* 7:46573-46578.

#### Team

A/Prof Guiying Nie, Ms Sophea Heng, Dr Andrew Stephens





CENTRE FOR GENETIC DISEASES (CGD)

## Findings may help women struggling with fertility

[ DISCOVERY IMPACTS IVF, FERTILITY, GENETIC DISORDERS, BIRTHS ]



**Women undergoing IVF may soon have a greater chance of achieving a pregnancy, thanks to research from our Centre for Genetic Diseases.**

The study, published in the journal *Scientific Reports* and led by Centre Head, Professor Jus St. John, showed that improving egg quality during fertilisation resulted in an increased chance of fertilisation and development of a healthy embryo.

Prof St. John's discovery revealed that boosting the health of a woman's egg using genetically identical mitochondrial DNA from another of her eggs improved the chance of a healthy embryo developing.

Mitochondrial DNA provides key components for the mitochondria, which are like batteries that supply a cell with energy. Low counts of mitochondrial DNA within an egg are an indicator of poor function, meaning fertilisation is more likely to fail.

### IVF and mitochondrial DNA facts

There is no definitive data on mitochondrial DNA deficiency for women going through IVF. However, the team estimate that around 10 per cent of IVF cycles fail because of mitochondrial DNA deficiency, which equates to 16.2 per cent of cycles for women over the age of 35 years.

### A 'bigger role' for mitochondrial DNA in pregnancy

"It's becoming clear that mitochondrial DNA has a bigger role to play in fertilisation outcome and embryo development than previously thought.

"Failure to have enough mitochondrial DNA can result in fertilisation failure, embryo arrest and other genetic disorders," said Prof St. John.

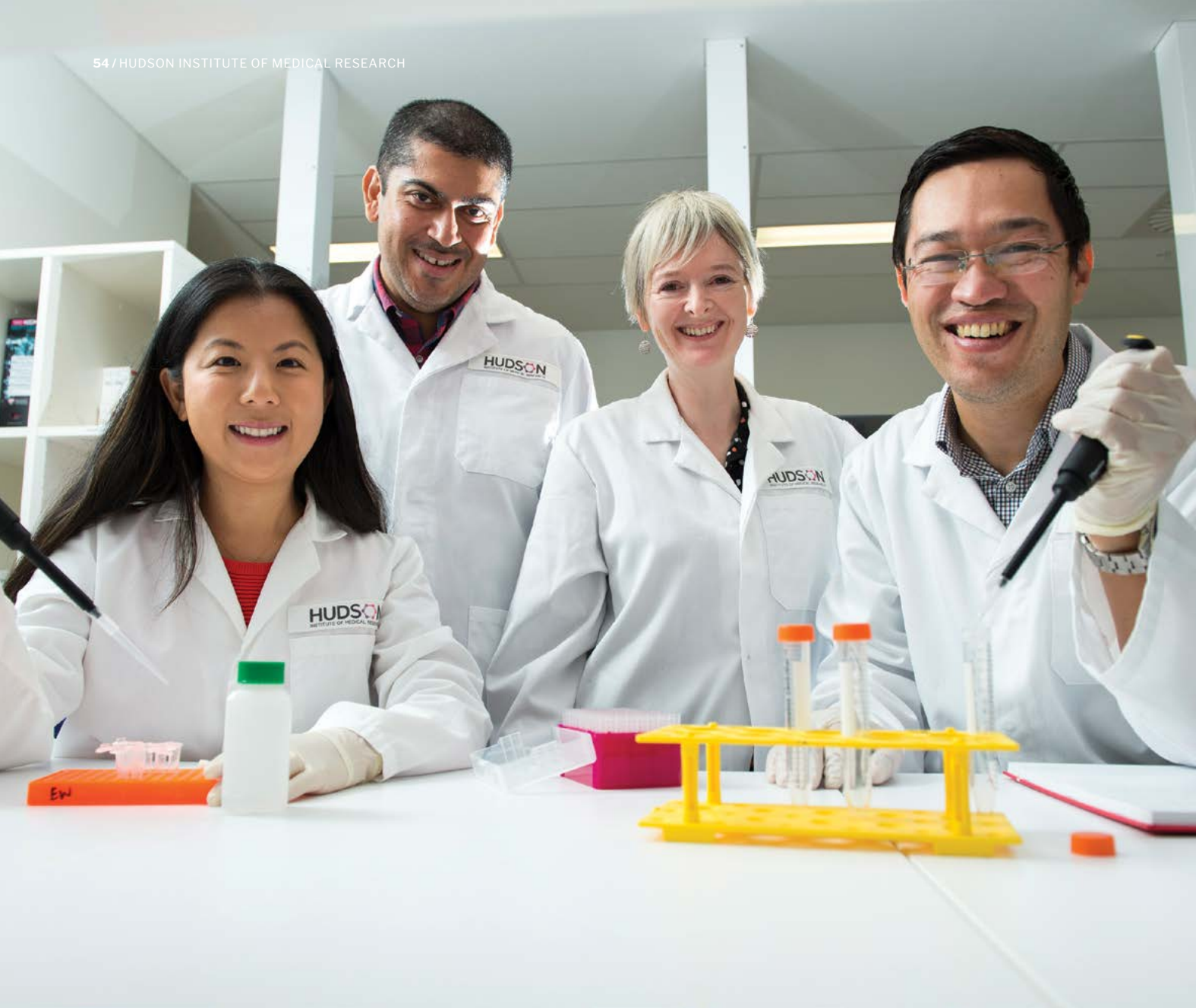
Using preclinical models, Prof St. John's team took a female's eggs that had a low level of mitochondrial DNA, and increased the level by supplementing using mitochondrial DNA with genetically identical information, taken from another of her eggs.

When this supplementation process was carried out at the same time as fertilisation of the egg with sperm, the result was the development of a healthy embryo.

### What's a healthy egg?

A healthy egg normally contains more than 150 000 copies of





# Boosting the health of a woman's egg using genetically identical mitochondrial DNA from another of her eggs improved the chance of a healthy embryo developing.

mitochondrial DNA, which help an egg to develop during and after fertilisation. Some women undergoing IVF have low levels of mitochondrial DNA in their eggs (fewer than 50 000 copies), which often results in these eggs failing to either fertilise or to develop into embryos.

While it was known that other factors including a woman's age, environment (such as exposure to toxins or smoking) and medical issues can affect egg health, Prof St. John's world-first discovery adds another factor to this list.

"Previously, scientists had not realised just how important mitochondrial DNA is to the processes of fertilisation and development. Our results show that it is the amount of mitochondrial DNA that is important for development," Prof St. John said.

## Collaborating organisations

Monash University; Harvard University, USA; University of New South Wales

## Funding partner

OvaScience Inc, USA

## More information

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## Team

Dr Gael Cagnone, Ms Te-Sha Tsai, Dr Yogeshwar Makanji, Ms Pamela Matthews, Ms Jodee Gould, Dr Kirstin Elgass, Dr Matthew McKenzie, Prof Jus St. John



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# Technology platforms

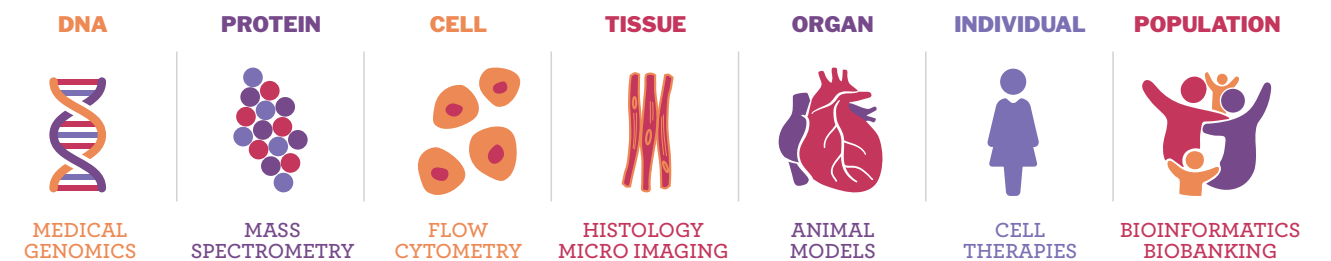
[ MHTP PLATFORM STRATEGIC INITIATIVES MANAGER: MS VIVIEN VASIC ]

Hudson Institute's pursuit of research excellence is underpinned by world-leading capabilities and expertise through our integrated network of Monash Health Translation Precinct (MHTP) technology platforms.

These nine world-leading platforms are co-located on a central floor within the new \$87.5 million Translational Research Facility, providing seamless interaction between research activities and clinical trials.



Our world-leading technology platform facility supports scientists to pursue innovative approaches and advances in medical research by generating evidence and data.



## Highlights

### Medical genomics

During 2016, the medical genomics capability of the technology platform facility supported the processing of 10 675 Sanger sequencing results and 92 genomics projects, as well as 42 projects through our Fluidigm Single Cell Centre of Excellence.

In addition, through our collaboration with Monash Health, medical genomics is supporting the lymphoma flagship project for the Melbourne Genomics Health Alliance (MGHA). MGHA is an alliance of 10 leading healthcare and research organisations that are assessing the use of medical genomics in the clinic. This project will investigate how sequencing genetic variants in lymphoma patients can help guide treatment.

Funding provided in 2016 by our MHTP partner Monash University, enabled a \$1 million advancement to next-generation sequencing instruments within the facility. The new equipment supports larger projects, such as the MGHA lymphoma project, and provides more rapid next-generation sequencing for both research and diagnosis.

### Bioinformatics

Bioinformatics links biology with computer science, statistics and applied mathematics to help interpret and understand biological data.

Governance of the Australian node of the Human Variome Project (HVP) was transferred to Hudson Institute in 2016. Under the guidance of Professor Vincent Harley with support from the bioinformatics platform, the Australian node of the HVP will advance and develop capabilities for national data-sharing, to improve clinical genetic testing services and support medical research.

The team also implemented two new bioinformatics pipelines to support analysis of the large sequencing data cohorts obtained from lymphoma patients as part of the MGHA partnership.

### Histology

The MHTP node of the Monash Histology Platform was officially opened in March, consolidating the provision of histological research services across our precinct. Histology is used by researchers to study the microscopic anatomy of

cells and tissues through staining techniques under light and electron microscopy.

There are already 128 registered users of these new capabilities, with more than 1100 work requests and over 10 600 processing jobs completed by the node during the year.

### Monash Micro Imaging

In 2016, two new staff members joined the Monash microimaging platform: Dr Kirstin Elgass, Platform Manager and Dr Sarah Creed, Optical Microscopy Specialist, an expert in confocal, live cell and multiphoton microscopy techniques.

Technologies used within the platform, including optical, fluorescence 4D and live cell microscopy, are critical to our understanding of cellular and molecular processes during both health and disease.

Two new microscopes were installed within the facility this year. The addition of an Olympus FV1200 confocal microscope, a stereology system and two multiwell plate imaging systems will enable us to meet the increased needs of medical researchers conducting detailed analyses of cell and tissue structure and function.





## Launch of the Cell Therapies Platform and Miltenyi Biotec Cell Therapy Centre of Excellence

[ CELL THERAPY AND REGENERATIVE MEDICINE: PROFESSOR GRAHAM JENKIN ]

## Launch of the Cell Therapies Platform

“The new platform is a major initiative for our precinct, underpinning clinical translation of cell therapies and regenerative medicine,” said Professor Graham Jenkin, Head of the Cell Therapy and Regenerative Medicine research group in The Ritchie Centre.

“We’ve built this platform in response to the undersupply of affordable clean room facilities in Victoria for clinical translation of our research, particularly for the manufacture of biologicals,” Prof Jenkin continued.

“The Cell Therapies Platform will play a vital role in accelerating translational research leading to the development of new treatments for diseases such as bronchopulmonary dysplasia in premature newborns, cerebral palsy and cancer, and tissue replacement with biomimetic materials.

“This will become a core facility of the Victorian Consortium for Cell-based Therapies and will underpin preclinical and early-phase clinical manufacture of tissues and cells for small- to medium-scale clinical trials and therapies.”

Dr Gordon McPhee was appointed as Cell Therapies Platform Manager in mid-2016, bringing his expertise and experience in basic and translational

cell therapies research to the platform.

The facilities available to scientists and commercial users at the Cell Therapies Platform are

- The Biospherix Xvivo Good Manufacturing Practice Isolator, a modular clean room environment for human cell and tissue manipulation, expansion and growth, as well as GMP-compliant manufacture of medical devices
- The MACSQuant Tyto, a GMP-grade cell sorter providing microfluidic chip-based human cell sorting for cell isolation for research and clinical trials
- A GeSim Bioprinter for generation of 3D cell and tissue constructs.

## Centre of Excellence

Miltenyi Biotec, manufacturer of the MACSQuant Tyto, granted the Cell Therapies Platform prestigious Early Adopter Program status for installation and support of the Miltenyi cell sorter. The company will also establish a Miltenyi Biotec Cell Therapy Centre of Excellence within the MHTP to assist and support translation of potential cell therapies to clinical trials.

## Funding partners

Therapeutic Innovation Australia, through the Translating Health Discovery Program of the Australian Government’s National Collaborative Research Infrastructure Strategy Program; Ian Potter Foundation; Miltenyi Biotec





# MHTP research week 2016

The inaugural Monash Health Translation Precinct (MHTP) research week (21–25 November) showcased the excellent and diverse research from Hudson Institute and our precinct partners, Monash University and Monash Health. Covering a wide range of disciplines, the focus of the event was on innovative research areas, sharing knowledge and networking.

The MHTP Translational Research Facility became a centre of activity as hundreds of leading researchers, clinicians, staff and students from across the precinct and all partner sites came together to celebrate the year's research achievements.

Researchers and clinician-scientists from multiple disciplines presented their work in three themes: 'A healthy life span'; 'Best of MHTP research'; and 'Cell products and therapies'.

Keynote speakers, CEO of the National Health and Medical Research Council (NHMRC), Professor Anne Kelso AO and Monash University Chancellor, Mr Simon McKeon AO, addressed standing-room-only audiences.

An early career researchers session and a PhD student showcase symposium highlighted the work of our emerging researchers and PhD students.



Professor Anne Kelso



## Commercialisation and business development

[ CHIEF COMMERCIALISATION OFFICER: MR ROB MERRIEL ]



**Hudson Institute of Medical Research has a strong focus on taking research discoveries to the clinic through commercial partnerships.**

Our Commercialisation and Business Development Office works closely with researchers to assess intellectual property disclosures, establish partnerships with private and public sector companies, set up licensing for patented technology and attract industry funding for discovery projects.

In 2016, Hudson Institute grew its intellectual property portfolio and signed significant deals with major pharmaceutical companies to take our research discoveries closer to patients.

### 2016 highlights

**Creating next-generation medicines: new industry collaboration announced**

This year, Hudson Institute and Monash University announced a collaboration with Switzerland-

based healthcare company Roche, to develop next-generation treatments for autoimmune diseases.

The collaboration is based on research by Associate Professor Marcel Nold and Dr Claudia Nold, co-Heads of the Interventional Immunology in Neonatal Diseases research group in The Ritchie Centre, in conjunction with Professor James Whisstock and Dr Andrew Ellisdon from the Monash Biomedicine Discovery Institute.

The multidisciplinary team is working with Roche to advance and translate their research, which focuses on turning proteins that target novel molecular pathways into new treatments.

Based on their results, Roche has the option to exclusively licence the intellectual property in return for significant development and commercial milestone payments and royalties on product sales.

A/Prof Nold's work was supported by the philanthropic Fielding Innovation Award in 2016, which helps our scientists move their research to the commercial stage.

"This is a shining example of philanthropists, our community, medical researchers and the commercial sector working together to accelerate Australian innovation and advance the impact of discoveries in healthcare," Chief Commercialisation Officer, Mr Rob Merriel said.

### Exosomes, a commercial alternative to stem cell therapy

In October, stem cell researcher Dr Rebecca Lim from The Ritchie Centre was invited, with Mr Merriel, to present her research on amniotic exosomes at the prestigious Stanford University BIO SPARK Showcase in San Francisco.

The BIO SPARK event showcases science discoveries that are ready for partnering. Dr Lim presented a 15-minute pitch entitled, 'Amniotic exosome therapy: a cell-free approach to regenerative medicine for fibrotic diseases', to an audience of investors, venture capitalists and pharmaceutical companies.



Exosomes are nanosized vesicles that contain ‘cargo’ such as proteins and nucleic acid material that are biologically active, and reflect the function of their parent cell. Amniotic exosomes are derived from the human placenta and released by amnion stem cells.

Dr Lim’s research shows that these exosomes released by amnion stem cells could be what drives their regenerative qualities, and that they may have significant clinical potential in fibrotic diseases of the lung, heart and liver.

Dr Lim says exosomes could be manufactured at a low cost and then freeze-dried, transported and administered to patients at the bedside more easily than traditional stem cell therapies.

“Manufacturing stem cells at commercial quantities can be difficult and cost-prohibitive to take to the mass market. We hope to deliver a product that is a fraction of the cost.

“A low-cost, exosome-based therapy could enable patients all over the world, including those in developing countries, to benefit from regenerative medicine,” said Dr Lim.

“Hudson Institute is an attractive partner for venture capital as well as pharmaceutical and biotechnology companies. We have world-leading expertise in cell biology and ‘gold standard’ laboratory tools, plus the resources needed to take this discovery to the next level,” Mr Merriel said.

Finding could help improve IVF success rates

Hudson Institute signed a research sponsorship and licence agreement with global pharmaceutical company Merck, to develop research by Dr Tracey Edgell into a test that may be able to predict a successful IVF outcome.

Dr Edgell’s recent work has identified a panel of prognostic biomarkers for predicting the outcome of IVF treatment.

Stemming from this research is Dr Edgell’s proposal that having a balance of the stimulating factor CSF3 and the receptor it attaches to within the uterus is essential to

creating the perfect environment in which an embryo can implant and form a pregnancy.

“By making the endometrium more responsive to the embryo, we can hopefully work to improve success rates and offer hope to the hundreds of thousands of women undergoing IVF worldwide every year,” Dr Edgell said.

Dr Edgell, a Research Fellow in the Centre for Reproductive Health, was announced as the 2017 Fielding Innovation Award recipient, which provides \$50 000 to support studies to bring research a step closer to commercialisation.

International agreement to take cancer biology to the fore

An international collaborative research agreement was entered into with Ariel University in Israel and

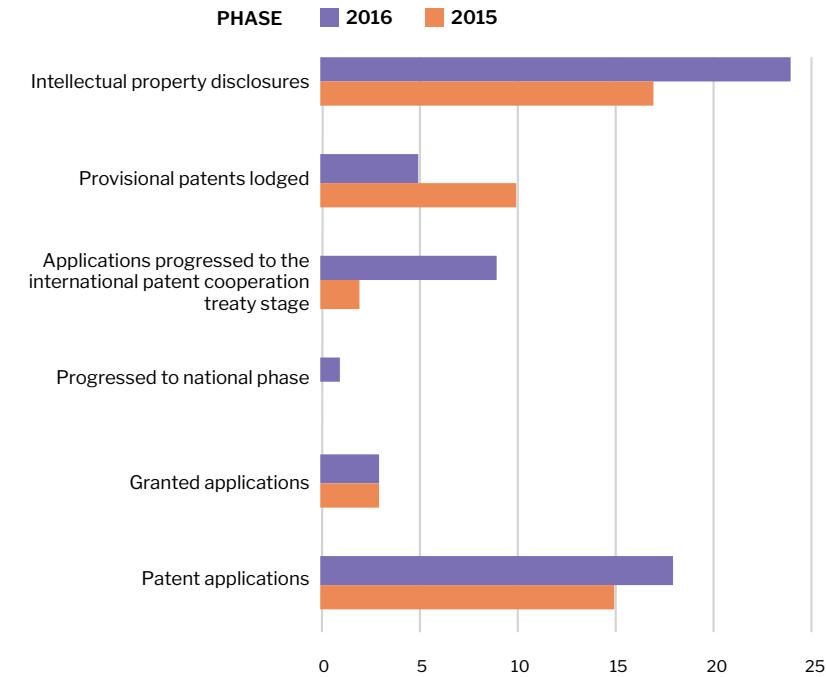
ASCI Pharma Pty Ltd on a cancer biology project aiming to translate research discoveries into patient treatments.

The partnership combines Hudson Institute’s specialist basic and clinical knowledge in cancer research and expertise in technologies, with Ariel University’s knowledge of peptide discovery screening, and research funding from ASCI Pharma Pty Ltd, which will also lead the commercialisation activities arising from the project.

The agreement reflects a strong focus on commercial and scientific partnerships that can propel basic research discoveries into tangible patient treatments.

2016 patent applications

Patents filed, progressing and granted



OUR PEOPLE

Early career researchers

[ COMMITTEE CHAIR: DR COURTNEY MCDONALD ]

Early career researchers (ECRs) are researchers with less than 10 years experience, after receiving their PhD.

The ECR committee promotes professional development and fosters a sense of community among ECRs, through various events and initiatives.

The committee works closely with Monash University’s School of Clinical Sciences, providing support for all ECRs across our precinct.

ECRs mentorship program

Mentoring is vital to the development of young scientists. The ECRs mentorship program pairs established scientists (mentors) with ECRs (mentees), based on their career objectives and challenges.

Each mentorship program runs for 12 months from July and can be continued informally after completion.

The program was a new initiative in July 2015; since commencing, 50 ECRs have taken part in the program.

The first round of mentorships were completed in the first half of the year, with mentees rating the program on average, four out of five. A new round of mentorships are currently underway.

PhD mentoring program

The transition from PhD student to postdoctoral researcher can be difficult to navigate. Based on the success of the ECR mentoring program, in 2016 the committee established a mentoring program for late-stage PhD students to help them navigate their journey into postdoctoral research.

There was an outstanding uptake of this program, with 20 PhD students paired with 20 ECRs, providing one-on-one advice and professional development.

NHMRC funding review workshops

In early 2016, the National Health and Medical Research Council (NHMRC) announced a structural

review of its grants program, which provides a vital source of funding for many career scientists, including ECRs.

The committee hosted a workshop to update ECRs about proposed changes and provided an opportunity for them to contribute to an ECR specific submission on the structural review.



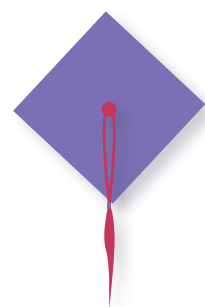
# Students

[ 2016 HUDSON INSTITUTE  
STUDENT SOCIETY (HISS) ]

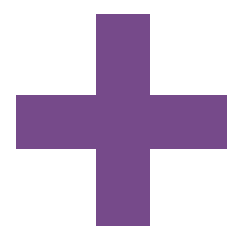
From left: Treasurer, Zoe Marks; Vice-President, Paulo Pinares Garcia; Creative Officer, Mikee Innocencio; President, Kimberley D'Costa; Secretary, Harriet Fitzgerald



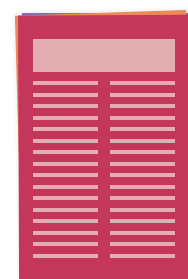
**51**  
PHD AND HONOURS  
GRADUATES



**183**  
STUDENTS



**35**  
STUDENTS WITH  
MEDICAL TRAINING



**75**  
STUDENT FIRST-AUTHOR  
PUBLICATIONS (23 % OF ALL  
INSTITUTE PUBLICATIONS)

## The next generation of scientists

Our large and vibrant student population includes 136 PhD students, 43 Honours students (including Bachelor of Science, Bachelor of Biomedical Sciences and Bachelor of Medical Science), 3 Masters students and 1 Doctor of Medicine.

In 2016, 37 Honours students, 1 Masters student and 1 Doctor of Medicine student completed their degrees, while 12 PhD students completed their candidature and were awarded their doctorate.

Many of our students were published in prestigious scientific journals, including 75 students who were named first authors in journals such as *Cancer Research*, *Cell Death and Disease*, *Nucleic Acids Research* and *Molecular Cancer Therapeutics*. Publication enables our students to make an early mark in their chosen field of research from the beginning of their scientific careers, with the support of their supervisors.

Our learning environment fosters excellence, innovation and collaboration, helping postgraduate research students to develop the confidence and tools they need to succeed in their careers.

Students at Hudson Institute are provided with one-on-one supervision and mentorship from research supervisors. They have access to a range of development opportunities, including workshops, seminars, and national and international conferences, plus scientific resources and state-of-the-art technology platforms with which to conduct their research.

Our students also have access to an onsite multidisciplinary hub of teaching through our precinct partner, Monash University's School of Clinical Sciences at Monash Health.

## Three minute thesis competition

More than 25 of our students competed in the Hudson Institute and School of Clinical Sciences final of the three minute thesis (3MT) competition, hosted by the Hudson Institute Student Society (HISS).

3MT celebrates research conducted by PhD students across Australia. It cultivates communication skills by challenging students to convey the significance of their research to

fellow students, scientists and staff, in just three minutes, while avoiding the use of scientific jargon.

Dr Jonathan Dick (School of Clinical Sciences) and Dr Douglas Blank (The Ritchie Centre) won first and second place in the final respectively, and both went on to compete in the Faculty of Medicine, Nursing and Health Sciences final. Dr Blank was awarded first place at the faculty final, continuing to the Monash University competition, where he won the people's choice award.

## PhD student showcase symposium

Six students from Hudson Institute were invited to present at the PhD student showcase symposium held as part of MHTP research week (November 21–25), based on the excellence of their research.

Ms Zoe Marks, from our Centre for Innate Immunity and Infectious Diseases, was awarded both first prize and the people's choice award for her presentation on novel type I interferon signalling in breast and ovarian cancer.

HISS committee members coordinated the event and participated in a question and answer session with keynote speaker Professor Anne Kelso AO, CEO of the National Health and Medical Research Council.

## Professional development sessions

Our students were given the opportunity to attend a wide variety of professional development sessions throughout 2016, including open forums, expert seminars, inductions, LabArchives training and mentoring breakfasts linking PhD students to clinicians.



3MT competition winners from left: Shreya Rana, Douglas Blank, William Berry, Gregory Ong, Kelli Sorby



Hudson Institute  
Student Society

2016 HISS committee

**President:** Kimberley D’Costa

**Vice-President:** Paulo Pinares Garcia

**Secretary:** Harriet Fitzgerald

**Treasurer:** Zoe Marks

**Creative Officer:** Mikee Innocencio

HISS aims to create a positive environment for all students undertaking graduate research degrees, including Honours, Masters and PhD.

Managed entirely by students and for students, HISS supports our next generation of scientists in their research degrees by offering mentoring, networking and social events, and by promoting a work–life balance.

In 2016, HISS became a fully functional, independent, not-for-profit organisation with a registered ABN and bank account. HISS also received funding from the Monash Postgraduate Association to run social and mentoring events in 2016.

With increased visibility and a focus on student engagement, HISS began to engage students from related disciplines outside of Hudson Institute.

Events

In June, HISS hosted a seminar in conjunction with Hudson Institute ECR committee, titled ‘What can you do with a PhD?’.

The seminar demonstrated the range of career options available to PhD graduates beyond academia. Presenters included a media and communications professional, a pharmaceutical company representative, a secondary school teacher and a patent attorney, as well as scientists who have successfully navigated a more traditional journey as early career scientists.

The primary aim of HISS is to support student connection and wellbeing throughout their studies. To achieve this, HISS hosts many social events, including an International Women’s Day barbecue to raise awareness of and funds for women’s health research, a games night, a ‘Hudson’s hidden Masterchef’ food competition, a student-focused Christmas party, and many ‘time out’ student lunches and morning and afternoon teas.

2016  
graduates

Congratulations to our 2016  
graduates.

Higher degree by research students

DOCTOR OF PHILOSOPHY

**Dr Dimuthu Alankarage**

Core sex determining gene, SOX9, regulates novel target genes during testis development.  
*Prof Vincent Harley, Dr Rowena Lavery, Dr Pascal Bernard*

**Dr Elizabeth Fletcher**

Mechanisms of mineralocorticoids receptor-mediated cardiovascular disease: a role for the peripheral molecular clock.  
*Dr Morag Young, Prof Lea Delbridge*

**Dr William Lee**

Is there bidirectional control of mitochondrial DNA replication?  
*Prof Jus St. John, Dr Matthew McKenzie*

**Dr Kieren Marini**

Mechanisms of platinum chemoresistance in lung cancer.  
*Prof Neil Watkins, Dr Fernando Rossello*

**Dr Anita Pinar**

The role of the inflammasome and interleukin-β in inflammatory disease.  
*A/Prof Ashley Mansell, A/Prof Grant Drummond*

**Dr Thilini Samarasinghe**

Effects of prenatal nicotine and inflammation on respiratory function and structure in the newborn.  
*Dr Claudia Nold, Dr Mandar Joshi, A/Prof Philip Berger*

**Dr Jimmy Shen**

Macrophage mineralocorticoid receptor regulates cardiac remodelling and blood pressure.  
*Dr Morag Young, Prof Peter Fuller*

**Dr Dhanya Sooraj**

ATF3 expression as a marker of response to histone deacetylase inhibition of bladder cancer progression.  
*Prof Bryan Williams, Dr Dakang Xu*

**Dr Rajini Sreenivasan**

Regulation of SOX9 in mammalian sex determination and differentiation.  
*Prof Vincent Harley, A/Prof Robb de Longh*

**Dr Jean Ling Tan**

Human amnion epithelial cells (hAECs) modulate immunological responses to mediate repair of lung injury.  
*Dr Rebecca Lim, Prof Euan Wallace*

**Dr Vijesh Vaghjani**

Functional characterisation of hepatocyte-like cells generated from human amniotic epithelial cells.  
*Prof Jus St. John, Dr Ursula Manuelpillai*

**Dr Amy Winship**

The role of glycoprotein-130 cytokines in female reproduction and reproductive cancer.  
*A/Prof Eva Dimitriadis*

DOCTOR OF MEDICINE

**Dr Muhammad Alamgeer**

Prognostic and predictive significance of the cancer stem cell markers in lung and breast cancers.  
*Prof Neil Watkins, A/Prof Vinod Ganju*

MASTER OF PHILOSOPHY

**Ms Ann Dorothy Winter**

Modelling uterine fibroids.  
*Prof Lois Salamonsen, Dr Jemma Evan*

Honours students

BACHELOR OF BIOMEDICAL  
SCIENCE (HONOURS)

**Ms Bianca Arena**

The long term consequences of intrauterine growth restriction and preterm birth on sleep quality in primary school aged children.  
*Prof Rosemary Horne, Dr Stephanie Yiallourou*

**Ms Karyssa Arendt**

Characterisation of Mitochondria Ubiquitin E3 Ligase 1 (MUL1) in the context of viral infection and inflammation using MUL1 LacZ transgenic mouse model.  
*A/Prof Ashley Mansell, Dr Michelle Tate*

**Ms Yan Yee Chan**

Does erythropoietin protect the brain from ventilation-induced brain injury? A dosage study.  
*A/Prof Graeme Polglase*

**Ms Fiona Gracey**

Genes that resensitize cancer cells to chemotherapy.  
*Dr Andrew Stephens, Dr Maree Bilandzic, A/Prof Ron Firestein*

**Ms Arielle Kogan**

Testing the therapeutic potential of human amniotic epithelial cells in a sheep model of asthma.  
*Dr Rob Bischof, A/Prof Tim Moss*

**Ms Mary Mansilla**

The function of a placenta-specific protease in trophoblast syncytialization.  
*A/Prof Guiying Nie, Dr Sonia Teoh*

**Ms Juliana Matti**

Identifying novel therapeutic targets for granulosa cell tumours (GCT).  
*Dr Simon Chu, A/Prof Peter Fuller*

**Ms Stephanie McLennan**

The effects of miRNAs on trophoblast cell function and embryo implantation.  
*Dr Hong Nguyen, Prof Lois Salamonsen*

**Ms Lara Rijkmans**

Neuropathology of the growth restricted spiny mouse foetus.  
*Dr Hayley Dickinson, Dr Mary Tolcos, A/Prof David Walker*

**Mr Darren Tran**

The role of NOD1 signalling in the production of IL-33 by gastric epithelial cells in response to Helicobacter pylori infection.  
*A/Prof Richard Ferrero, Dr Le Son Tran*

BACHELOR OF SCIENCE (HONOURS)

**Ms Gabriela Antoniotti**

Put down the chocolate! The impact of a high fat diet on uterine function.  
*Dr Jemma Evans, Dr Renea Taylor*

**Mr Brad Bassett**

Metastasis in ovarian tumors.  
*Dr Andrew Stephens*

**Ms Natalie Dasssanayake**

Sleep position and OSA.  
*Prof Rosemary Horne*

**Ms Indya Davies**

Transition at birth following lung hypoplasia.  
*Prof Stuart Hooper, Dr Lauren Kerr*

**Ms Heidi Fettke**

Investigation into the role of myc as a regulator of PD-L1 expression in high grade glioma.  
*Prof Terrance Johns, Dr Daniel Gough*

**Ms Tayla Hogan**

In vitro characterisation of p53 loss in ovarian cancer  
*Dr Andrew Stephens, Dr Maree Bilandzic*

**Mr Nicholas Johnson**

Role of the inflammatory microenvironment in development of colon cancer.  
*Prof Bryan Williams, Dr Afsar Ahmed*

**Ms Laura Moffitt**

Investigating the role of dipeptidyl peptidase IV in high-grade serous ovarian cancer  
*Dr Andrew Stephens, Dr Maree Bilandzic*

**Ms Anna Muccini**

Treatments that protect the structure and function in the developing brain.  
*A/Prof David Walker*

**Ms Merrin Pang**

Preterm immunity and cardiopulmonary disease.  
*Dr Claudia Nold*

**Ms Tayla Rose Penny**

Trading stem cells.  
*Dr Courtney McDonald, Prof Graham Jenkin, Dr Suzie Miller*

**Mr Krishan Singh**

Early life immunisation and cardiovascular disease.  
*A/Prof Tim Moss, Prof David Burgner*

**Ms Swati Swati**

Generation of molecular switches for muscle therapy.  
*Dr Kelly Walton, A/Prof Craig Harrison*

**Ms Madelynne White**

Elucidating the expression and regulation of human IFN-ε.  
*Prof Paul Hertzog, Dr Nollia Bourke*

BACHELOR OF MEDICAL  
SCIENCE (HONOURS)

**Mr Aaron Bagnato**

The epithelial-mesenchymal transition and immunoevasiveness in breast carcinoma.  
*Prof Bryan Williams*

**Mr Joel Fernandez**

Does placental telomere length differ by maternal region of birth: a biological driver of increased adverse outcomes in South Asian born women.  
*Prof Euan Wallace*

**Mr Hugh Gao**

Loss of IFN-ε expression associated with poor prognosis in serous ovarian cancers with low immune cell infiltration.  
*Prof Paul Hertzog*

**Ms Sophie Hoy**

Reducing caesarean section: an in-depth analysis of the care of women undergoing induction of labour.  
*Prof Euan Wallace*

**Ms Hamid Didinny Izzaturrahmi**

Investigating Arg2 as a novel target of the IL-10/MiR-155 signalling pathway in macrophages.  
*Dr Claire McCoy*

**Mr Aidan Kashyap**

Antenatal sildenafil to prevent pulmonary hypertension in congenital diaphragmatic hernia.  
*Dr Kelly Crossley*

**Ms Sophie Kinnear**

Uterine SOX17: a potential target for a novel, non-hormonal contraceptive.  
*Dr Jemma Evans*

**Ms Shagun Narula**

The role of TROP2 in trophoblast invasion.  
*Dr Megan Wallace*

**Ms Clare Nickson**

Impact of mineralocorticoid receptor antagonist therapy upon monocyte gene expression in cardiac failure.  
*Dr Jun Yang*

**Mr Benjamin Nowotny**

Developing a tool to predict medicolegal risk in obstetrics.  
*Prof Euan Wallace*

**Mr Samad Raza**

Induction of nuclear YAP by ERBB4 in high grade glioma.  
*Prof Terrance Johns*

**Ms Genevieve Shandler**

Impact of obstructive sleep apnoea in overweight/obese children on cardiovascular health.  
*Prof Rosemary Horne*

**Ms Sasha Skinner**

Partial amniotic carbon dioxide insufflation for fetoscopic spina bifida repair.  
*Prof Graham Jenkin*



[ HEAD POSTGRADUATE RESEARCH STUDIES:  
PROFESSOR KATE LOVELAND ]



# Gender equity

[ COMMITTEE CHAIR: DR ASHLEY MANSELL ]



Hudson Institute recognises the challenges faced by women to progress their work and careers in biomedical research. While more than 70 per cent of our postdoctoral fellows are women, only 33 per cent of research group heads are women. There is still significant progress needed to address inequity across our institute and the biomedical sector.

As a result, gender equity is a major strategic initiative that supports the future success of Hudson Institute. Only when women are advanced and developed to parity in senior positions can their experience and expertise be fully harnessed in the pursuit of scientific excellence. Formed in 2015, the Gender Equity Committee supports and encourages women and scientists with carer responsibilities to develop their careers, and identifies and addresses barriers that create disparity. Through these changes, we hope to see measurable advances in raising the profile, capacity and career advancement of women in the biomedical sector.

## 2016 highlights

- This year our journey towards gender equity took some major steps forward.
- A number of measures identified in the 2015 enterprise bargaining agreement to address gender equity were implemented, including increased flexibility in work hours, working at home policies, generous and flexible maternity leave entitlements and leave flexibility. These initiatives allow staff to tailor their work entitlements and environment to achieve success.
- A family-friendly workplace policy was adopted in 2016, recognising that staff have important roles outside the workplace. It contains the resources and options available to staff with carer responsibilities, including
- Family-friendly scheduling of laboratory meetings and seminars based on school hours to provide staff the opportunity to fully engage in activities critical to their career and research
  - Assisting staff in locating and sourcing child-care opportunities.

The Hudson Institute Gender Equity Travel Award was established by the committee this year, to support conference participation by those with carer responsibilities. Attendance and participation at national and international conferences is crucial to progressing a scientific career. Conferences give scientists the opportunity to share and promote their research, meet other scientists working in their field and collaborate with peers to develop their work. The inability to travel to conferences is a significant block for scientists with caring responsibilities. The award provides financial support to a number of scientists each year to cover carer responsibilities while they attend a national or international meeting.



# 2016 institute speakers

## HUDSON INSTITUTE SEMINAR SERIES

Date	Topic	Speaker
31 March	Role and regulation of the epigenome during vertebrate development.	Prof Ryan Lister, The University of Western Australia
28 April	Sex, genes and human evolution.	Prof Jennifer Graves, La Trobe University
5 May	Deconstructing systems biology: Towards understanding and targeting the innate immune response in homeostasis and disease.	Prof Paul Hertzog, Hudson Institute of Medical Research
12 May	Molecular regulation of lymphoid cell response at barrier surfaces.	Prof Colby Zaph, Monash University
19 May	The assembly of bacterial surface structures.	Prof Trevor Lithgow, Monash University
26 May	Tackling HIV persistence: Tickle, shock or kill.	Prof Sharon Lewin, The Peter Doherty Institute for Infection and Immunity and The University of Melbourne
2 June	How to guide neurons and control metabolism.	A/Prof Roger Pocock, Monash University
9 June	Epilepsy genetics: The key to precision medicine.	Prof Ingrid Scheffer, The Florey Institute and The University of Melbourne
11 June	What genome wide association studies can tell us about the aetiology of breast cancer.	Prof Georgia Chenevix-Trench, QIMR Berghofer Medical Research Institute
17 June	Approaching an understanding of the complexity of STAT3 in oncogenesis.	Dr Daniel Gough, Hudson Institute of Medical Research
24 June	Unravelling the effects of intrauterine inflammation on lung development.	A/Prof Tim Moss, Hudson Institute of Medical Research
30 June	Fn14: A new player in cancer cachexia.	Prof Nick Hoogenraad AO, La Trobe University
7 July	Evaluating novel therapies for fibrosis.	A/Prof Chrisan Samuel, Monash University
14 July	Genes to big data and consequences for translation in eye disease.	Prof Paul Baird, The University of Melbourne
28 July	Estrogen and the male reproductive tract: Defining new roles in development and disease.	A/Prof Andrew Pask, University of Melbourne
4 August	RNA editing by ADAR1 suppresses innate immune sensing of endogenous RNA.	A/Prof Carl Walkley, St Vincent's Institute of Medical Research
18 August	Sex reversal in dragons: The rapid evolution of new sex determining modes.	Dr Clare Holleley, University of Canberra
1 September	Interventional immunology in diseases of the neonate.	Dr Claudia Nold, Hudson Institute of Medical Research
9 September	Osteocytes: The hidden cells that control strength and structure.	A/Prof Natalie Sims, St Vincent's Institute of Medical Research
15 September	Towards a vaccine for Tasmanian Devil Facial Tumour Disease.	Dr Bruce Lyons, University of Tasmania
18 September	Immune modulation by bacterial pathogens.	Dr Maria Kaparakis-Liaskos, Hudson Institute of Medical Research
22 September	Diet influences the frequency of Drosophila mtDNA haplotypes in laboratory population cages: The incomplete story.	Prof Bill Ballard, University of New South Wales
29 September	Glucocorticoids and fetal heart maturation implications for prematurity and fetal programming.	Prof Karen Chapman, University of Edinburgh, Scotland
6 October	TLR-mediated degradation of cIAP1 triggers cell death and inflammasome activation in the absence of XIAP.	Dr Kate Lawlor, Walter and Eliza Hall Institute of Medical Research
13 October	Obesity, inflammation and the microbiome - partners in breast cancer risk.	Prof Evan Simpson, Monash University
20 October	Role of histone variant H3.3 in telomere maintenance and tumorigenesis.	A/Prof Lee Wong, Monash University
27 October	When the immune system is on (nucleic) acid.	Dr Michael Gantier, Hudson Institute of Medical Research
3 November	Inflammation control by neutrophil inflammasomes.	A/Prof Kate Schroder, University of Queensland
10 November	Characterisation of Innate-like T cells.	Dr Daniel Pellicci, The University of Melbourne
1 December	Muscle stem cell action during growth and regeneration.	Prof Peter Currie, Australian Regenerative Medicine Institute and Monash University
14 December	The new neuroendocrinology of human reproduction.	Prof Richard Anderson, University of Edinburgh, Scotland



CENTRE SEMINAR SERIES

Date	Topic	Speaker	Centre
1 February	Targeting chemokine receptor CXCR4 in T cell acute lymphoblastic leukemia.	Dr Lauren Pitt, New York University School of Medicine, USA	CCR
11 February	Protein abundance-based and proteoform-specific insights into interactions between human respiratory syncytial virus and the host cell reveal pervasive antagonism of multiple antiviral pathways by non-structural protein 1.	Prof Jeffrey Gorman, QIMR Berghofer Medical Research Institute and Proteomics Australia	CCR
18 February	Oestrogen and pulmonary hypertension - sex matters!	Prof Mandy MacLean, University of Glasgow, Scotland	CEM
1 February	Innate immune mechanism for viral dsRNA detection - stories on RIG-I-like receptors.	A/Prof Sun Hur, Harvard Medical School, USA	CiiiD
1 March	Novel regulators of innate immune signalling.	Prof Endre Kiss-Toth, University of Sheffield, England	CiiiD
1 August	CD1-reactive T cells mediate human responses to tuberculosis infection.	Prof Branch Moody, Harvard Medical School and Brigham & Women's Hospital, USA	CiiiD
1 October	Translational funding.	Dr Ronnie Farquhar, Morningside Ventures	CiiiD
21 April	Can fertility be increased by manipulating gestational nutrition?	Dr Peter Smith, AgResearch and University of Otago, New Zealand	CRH
27 January	The sleeping brain and its developmental trajectory on infant cognition.	Dr Elaine Tham, Singapore Institute of Clinical Sciences, Singapore	TRC
10 June	Advances in regenerative medicine approaches for pulmonary diseases and critical illnesses.	Prof Daniel Weiss, University of Vermont, USA	TRC
15 June	Writing workshop.	Prof Kurt Albertine, University of Utah School of Medicine, USA	TRC
4 November	Improving outcomes for women with endometriosis.	A/Prof Louise Hull, The University of Adelaide	TRC
5 November	Creatine and pregnancy health symposium.	Prof Rod Snow, Deakin University	TRC

CENTRE FOR CANCER RESEARCH - 3RD COLLABORATIVE PAEDIATRIC CANCER RESEARCH DAY  
29 JUNE 2016

Speaker	Affiliation
A/Prof Elizabeth Algar	Hudson Institute of Medical Research
Dr Jason Cain	Hudson Institute of Medical Research
Dr Jacqueline Donoghue	University of Melbourne
Prof Peter Downie	Children’s Cancer Centre at Monash Health
A/Prof Paul Ekert	Maternal and Child Health Service and Murdoch Children’s Research Institute
Dr Jordan Handsford	Royal Children’s Hospital
A/Prof Meg Macy MD	University of Colorado and Children’s Hospital Colorado, USA
A/Prof Jeff Mann	Monash University
Dr Suresh Mathivanan	La Trobe University
Mr Todd Waugh	Monash Children’s Hospital Paediatric Cancer Tissue Bank
Dr Christine White	Hudson Institute of Medical Research
A/Prof Lee Wong	Monash University
Dr Elise Young	Murdoch Children’s Research Institute

THE RITCHIE CENTRE COLLOQUIUM - CELL THERAPY AND TRANSLATIONAL RESEARCH - 25-26 AUGUST 2016

Topic	Speaker	Affiliation
Cell therapy and regenerative medicine	Prof Tom Spurling	Swinburne University of Technology
	Dr Shayanti Mukherjee	Hudson Institute of Medical Research
	Dr Abhilasha Tiwari	Hudson Institute of Medical Research
	Mr Michael Chae	Peninsula Health and Monash University
	Dr Jurgen Schmitz	Miltenyi Biotec
Women's and children's health	Prof John Rasko	University of Sydney and Centenary Institute
	Dr Annie McDougall	Hudson Institute of Medical Research
	A/Prof Jerry Chan	Women's and Children's Hospital and Duke-NUS Medical School, Singapore
	Dr Courtney McDonald	Hudson Institute of Medical Research
	Dr Ina Rudloff	Hudson Institute of Medical Research
	Prof David Gardner	University of Melbourne
	A/Prof Eva Dimitriadis	Hudson Institute of Medical Research
	A/Prof Caroline Gargett	Hudson Institute of Medical Research
	Dr Miranda Davies-Tuck	Hudson Institute of Medical Research
	A/Prof Marian Sturm	Cell and Tissue Therapies WA, Royal Perth Hospital
Stem cells in paediatric clinical trials	A/Prof Jerry Chan	Women's and Children's Hospital and Duke-NUS Medical School, Singapore
	Dr Rebecca Lim	Hudson Institute of Medical Research
	Prof Mark Kirkland	Cell Care Australia Pty Ltd
	Prof John Rasko	University of Sydney and Centenary Institute
	A/Prof Daniel Chambers	The Prince Charles Hospital
Regenerative medicine	Prof William Sievert	Monash Health Translation Precinct Clinical Trials Centre
	Prof Richard Macdonell	Austin Health
	Prof Christine Wells	Melbourne Centre for Stem Cell Systems
	Dr Shen Heazlewood	CSIRO
	Dr Christian Nefzger	Australian Regenerative Medicine Institute and Monash University
Biometrics and bioreactors	Prof Justin Cooper-White	University of Queensland
	Dr Jessica Frith	Monash University
	Dr Dayalan Gunasegaram	CSIRO

THE RITCHIE CENTRE PUBLIC FORUMS

Date	Topic	Speaker
11 May 2016	Healthy sleep in school-aged children – the role of commercial sleep trackers: Good or bad?	A/Prof Hawley Montgomery-Downs, West Virginia University, USA A/Prof Margot Davey, Melbourne Children's Sleep Centre A/Prof Gillian Nixon, Melbourne Children's Sleep Centre Dr Sarah Biggs, Hudson Institute of Medical Research
25 August 2016	Stem Cell Therapies: Where are we now and where are we going?	A/Prof Daniel Chambers, The Prince Charles Hospital Prof Iona Novak, Cerebral Palsy Alliance Research Institute Prof John Rasko, University of Sydney and Centenary Institute Prof Richard Boyd, Cartherics Pty Ltd Dr Sherry Kothari, CRC for Cell Therapy Manufacturing (CTM) Dr Rebecca Lim, Hudson Institute of Medical Research Dr Susan Hawes, Australasian Society for Stem Cell Research
5 December 2016	The Ritchie Centre Kaarene Fitzgerald Public Forum - Stillbirth and Sudden Unexpected Death in Infancy Research Update.	Dr Rita Machaalani, University of Sydney and The Children's Hospital at Westmead Dr Miranda Davies-Tuck, Hudson Institute of Medical Research Dr Emily Cohen, Hudson Institute of Medical Research



# Service to the scientific community

MEMBERSHIP OF NATIONAL AND INTERNATIONAL BOARDS AND COMMITTEES

Staff member	Committee, Council, Board, Foundation	Role
Dr Sarah Biggs	International Paediatric Sleep Association Board	Board Member
	Australasian Sleep Association Board	Conference Chair
Dr Maree Bilandzic	Australasian Metastasis Research Society	Secretary
	OZ Metastasis Research Society	Committee Member
Dr Kristy Brown	Victorian Cancer Biobank Board of Governance	Member
	Victorian Cancer Biobank Consortium Committee	Member
	Victorian Cancer Biobank Scientific Advisory Committee	Duty Chair
Prof Henry Burger	Health& Medical Advisory Committee	Member
	Pfizer Pharmaceuticals Advisory Board	Member
	The Endocrine Society (USA) taskforce for clinical practice guideline on the management of primary aldosteronism	Chair
Prof David de Kretser	Academy of Technological Sciences and Engineering, Clunies Ross Awards Committee	Committee Member
	Andrology Australia, Australian Centre of Excellence in Male Reproductive Health	Patron
	Bertarelli Foundation Advisory Committee	Committee member
	Biomedical Research Victoria	Director
	BioMelbourne Network, Committee for Melbourne	Patron
	Congress of Andrology Organising Committee	Committee Member
	Doctors for the Environment	Committee Member
	Faculty of 1000 Medicine, Diabetes & Endocrinology Evaluation Board	Member
	Foundation 49 Men's Health	Committee Member
	Human Variome Project International Ltd	Board Director
	Infertility Treatment Authority of Victoria, Panel of Advisers, Clinical and Scientific Panel	Committee Member
	International Academy of Human Reproduction	Fellow of the Society
	Men's Health Policy Consultation	Ambassador
	Minister's Male Health Policy Reference Group	Committee Member
	Monash Comprehensive Cancer Consortium Management Committee	Member
	Monash IVF Research and Education Foundation Advisory Board	Member
	Monash Partners Academic Health Science Centre	Member
	Monash Vision Bionic Eye Group	Advisory Board Chair
	Paranta Biosciences	Board Director
	Peter MacCallum Cancer Foundation's Governor's Circle	Committee Member
	Southern Melbourne Integrated Cancer Service Joint Advisory Council	Member
	Stem Cells Australia Governance Committee	Chair
	Therapeutic Innovation Australia, Cell and Gene Therapy Committee	Committee Member
	University of Queensland Centre for Clinical Research Advisory Board	Director
	World Health Summit Advisory Committee	Member
	World Health Summit Scientific Committee	Member
Dr Jennifer Dowling	Victorian Infection and Immunity Network Organising Committee	Member

Prof Jock Findlay	Endocrine Society of Australia	Honorary Life Membership
	NHMRC Genomics Targeted Call for Research Grant Advisory Committee	Committee Member
	Robinson Research Institute Advisory Board	Chair
	Society for the Study of Reproduction (USA)	Emeritus Member
A/Prof Ron Firestein	Biogrid Australia Ltd	Member
Ms Harriet Fitzgerald	Society for Reproductive Biology (AUS/NZ)	Student Representative
Prof Peter Fuller	Academic Health Science Centre, Diabetes, Obesity, Men's Health and Endocrinology Theme	Committee Member
	Cabrini Institute Board	Chair
	NHMRC Venture Grants Committee	Deputy Chair
	The Endocrine Society (USA) Publications Committee	Chair
	Victorian Cancer Agency Consultative Council	Chair
Prof John Funder	Alan and Elizabeth Finkel Foundation	Director
	Garnett Passe and Rodney Williams Memorial Research Foundation	Board Member
	Grattan Institute	Director
	Institute of Molecular Biosciences, University of Queensland, Scientific Advisory Board	Member
	Obesity Australia	Executive Chair
	Research Review, Sydney Adventist Hospital	Chair
	Specialist Medical Review Council Executive Committee	Member
	The Endocrine Society, Centenary Taskforce	Member
	The Endocrine Society, International Outreach Taskforce	Member
A/Prof Vinod Ganju	Monash Oncology Research Institute	Member
A/Prof Caroline Gargett	National Stem Cell Foundation of Australia	Non-Executive Director
Prof Vincent Harley	Human Variome Project (Australian node)	National Director
	Lorne Genome Conference Board Inc	President
A/Prof Craig Harrison	Endocrine Society of Australia	Council Member and Assistant Treasurer
	Paranta Biosciences	Scientific Advisor
A/Prof Mark Hedger	Paranta Biosciences	Scientific Advisor
Prof Paul Hertzog	Monash Health Translation Precinct Medical Genomics Committee	Co-convenor
	State Government of Victoria, Platform Technologies Advisory Committee	Member
	Victorian Infection and Immunity Network	Co-convenor
	Victorian Infection and Immunity Network Industry Alliance	Co-convenor
Prof Rosemary Horne	Australasian Sleep Association, Research Committee	Member
	International Paediatric Sleep Association Board	Executive Member and Board Member
	International Society for the Study and Prevention of Infant Death, Physiology Working Group	Executive Member and Chairperson
Prof Brendan Jenkins	SIDS and Kids National Scientific Advisory Group	Chair
	Cancer Council Victoria, Standing Research Subcommittee	Member
	International Cytokine and Interferon Society Council	Member
	International Cytokine and Interferon Society, Meetings Committee	Member
Prof Terrance Johns	Victorian Centre for Functional Genomics, Scientific Advisory Board	Member
	The Cooperative Trials Group for Neuro-Oncology Management Committee	Member
Dr Bryan Leaw	The Cooperative Trials Group for Neuro-Oncology Scientific Advisory Council	Member
	Australasian Society for Stem Cell Research, Junior Investigator Subcommittee	Member
Dr Joohyung Lee	Primetrics Pte Ltd Scientific Review Board	Member and Scientific Consultant
Dr Rebecca Lim	Australasian Society for Stem Cell Research, Policy, Ethics and Translation Subcommittee	Member
Prof Kate Loveland	American Society for Andrology Awards Committee	Member
	Society for Reproductive Biology (AUS/NZ)	Fellow of the Society
	Society for the Study of Reproduction (USA)	Member, Board of Directors
	Women in Reproductive Science	Co-founder and Steering Committee Member



A/Prof Ashley Mansell	Immunology Group of Victoria	Committee Member
	Victorian Infection and Immunity Network Executive Committee	Member
Prof Robert McLachlan	Andrology Australia	Director
	Monash IVF Research and Education Foundation	Chairman
	National Institute of Child Health and Human Development (USA), Data and Safety Monitoring Board	Member
	Victorian Assisted Reproduction Treatment Authority	Scientific Advisor
	World Health Organisation Expert Working Group: Infertility Guidelines	Member
	World Health Organisation Research on Methods for the Regulation of Male Fertility	Member
Dr Sarah Meachem	Australian Society for Medical Research	President
Dr Ellen Menkhorst	Australian and New Zealand Placental Research Association Council	Committee Member
A/Prof Frances Milat	Australian and New Zealand Bone and Mineral Society Therapeutics Committee	Member
	Endocrine Society of Australia	Clinical Chair
Dr Suzanne Miller	Fetal and Neonatal Physiological Society	Board Member
A/Prof Tim Moss	Fetal and Neonatal Physiological Society	Board Member
A/Prof Tim Moss	Perinatal Society of Australia and New Zealand, Victorian Subcommittee	Chair
Dr Claudia Nold	NHMRC Research Translation Faculty	Member
A/Prof Marcel Nold	NHMRC Research Translation Faculty	Member
A/Prof Graeme Polglase	INTubate-RECrut-SURfactant-Extubate (IN-REC-SUR-E) International Randomised Controlled Trial, Advisory Board	Member
Prof Lois Salamonsen	Australian Society of Reproductive Biology	Fellow of the Society, Honorary Life Membership
Prof Lois Salamonsen	Society for the Study of Reproduction (USA), Nominating Committee	Member
Prof Lois Salamonsen	Society for the Study of Reproduction (USA)	Emeritus Member
Prof Jus St. John	MitoStock	Director
	Winston Foundation	Director
Dr Megan Wallace	NHMRC Research Translation Faculty	Member
	Victorian Government Innovation Economy Advisory Board	Member
Prof Bryan Williams	Biogrid Australia Ltd	Chair
	EnGeneIC Ltd, Scientific Advisory Board	Scientific/Clinical Advisor
	Healthier Lives (New Zealand), International Science Advisory Panel	Member
	Hope Funds for Cancer Research (USA)	Member, Board of Trustees and Scientific Advisory Council
	International Cytokine and Interferon Society, Nomination Committee	Member
	International Cytokine and Interferon Society, Publications Committee	Chair
	Malaghan Institute (New Zealand), Scientific Review Panel	Member
	Monash Comprehensive Cancer Consortium Management Committee	Member
	Monash Comprehensive Cancer Consortium Steering Committee	Member
	Monash Partners Academic Health Science Centre	Council
	Pacific Edge Diagnostics Singapore Pte Ltd	Board of Directors
	Pacific Edge Ltd	Board of Directors
	Pacific Edge Pty Ltd	Board of Directors
	Premier's Award for Health and Medical Research Selection Panel	Chair
	Therapeutic Innovation Australia, Biopharmaceuticals Biomaterials and Medical Devices Advisory Committee	Chair
Ms Heba Zahid	Saudi Student Association	Vice President

MEMBERSHIP OF EDITORIAL BOARDS

Staff member	Journal	Board position
Prof Philip Bardin	<i>Respirology</i>	Deputy Editor
Dr Kristy Brown	<i>Frontiers in Endocrinology and Oncology</i>	Editorial Board Member
	<i>Journal of Steroid Biochemistry and Molecular Biology</i>	Editorial Board Member
	<i>Steroids</i>	Editorial Board Member
Prof Henry Burger	<i>Climacteric</i>	Editorial Board Member
	<i>Current Trends in Endocrinology</i>	Editorial Board Member
	<i>Endocrinology</i>	Editorial Board Member
	<i>Gynecological Endocrinology</i>	Editorial Board Member
	<i>Hypertension Research</i>	Editorial Board Member
	<i>Journal of Steroid Biochemistry and Molecular Biology</i>	Corresponding Editor
	<i>Menopause</i>	Editorial Board Member
	<i>Physiological Reports</i>	Editorial Board Member
	<i>Steroids</i>	Editorial Board Member
Dr Simon Chu	<i>Edorium Journal of Gynecology and Obstetrics</i>	Editorial Board Member
A/Prof Colin Clyne	<i>Journal of Steroid Biochemistry and Molecular Biology</i>	Editorial Board Member
	<i>Nuclear Receptor Research</i>	Editorial Board Member
	<i>Steroids</i>	Editorial Board Member
Prof David de Kretser	<i>Faculty of 1000</i>	Member, Reproductive Endocrinology Section
Prof Peter Fuller	<i>Cancer Medicine</i>	Editorial Board Member
	<i>Endocrinology</i>	Editorial Board Member
	<i>Expert Opinion on Investigational Drugs</i>	Section Editor
	<i>Faculty of 1000</i>	Faculty Member
	<i>Molecular Endocrinology</i>	Editorial Board Member
	<i>Steroids</i>	Editorial Board Member
Dr Michael Gantier	<i>Faculty of 1000</i>	Associate Faculty Member, Editorial Board
	<i>MicroRNA</i>	Regional Editor
A/Prof Caroline Gargett	<i>Biology of Reproduction</i>	Member, Editorial Advisory Board
	<i>Reproductive Sciences</i>	Associate Editor, Asia/Pacific
	<i>Scientific Reports</i>	Editorial Board Member, Stem Cells and Regenerative Medicine
A/Prof Mark Hedger	<i>Andrologia</i>	Editorial Board Member
	<i>Journal of Reproductive Immunology</i>	Guest Editor, special theme volume: 'Inflammation in Reproduction, Pregnancy and Development'
Prof Rosemary Horne	<i>Journal of Sleep Research</i>	Member, Editorial Advisory Board
	<i>Sleep</i>	Member, Editorial Advisory Board
	<i>Sleep Medicine</i>	Member, Editorial Advisory Board
Prof Brendan Jenkins	<i>Cytokine</i>	Editorial Board Member
Dr Maria Kaparakis-Liaskos	<i>PLoS One</i>	Academic Editor
Dr Joohyung Lee	<i>PLoS One</i>	Editorial Board Member
Dr Rebecca Lim	<i>Frontiers in Cellular Neuroscience</i>	Research Topic Editor
Prof Kate Loveland	<i>Andrologia</i>	Associate Editor
	<i>Andrology</i>	Associate Editor
	<i>Faculty of 1000</i>	Member, Reproductive Endocrinology Section
	<i>Journal of Assisted Reproduction and Genetics</i>	Editorial Board Member
	<i>Spermatogenesis</i>	Editorial Board Member
Dr Yogeshwar Makanji	<i>Repropedia</i>	Editorial Board Member



A/Prof Ashley Mansell	<i>Frontiers in Immunology - Molecular Innate Immunity</i>	Editorial Board Member
Prof Robert McLachlan	<i>Endotext</i>	Associate Editor
	<i>Journal of Andrology</i>	Associate Editor
A/Prof Tim Moss	<i>Frontiers in Integrative Physiology</i>	Member, Editorial Board and Advisory Committee
	<i>Frontiers in Neonatology</i>	Member, Editorial Board and Advisory Committee
A/Prof Guiying Nie	<i>Frontiers in Bioscience</i>	Managing Editorial Board
	<i>Reproductive Biology and Endocrinology</i>	Reviewing Board Member
	<i>Reproductive Sciences</i>	Editorial Board Member
Dr Liza O'Donnell	<i>Spermatogenesis</i>	Editorial Board Member
	<i>Tissue Cell</i>	Editorial Board Member
A/Prof Graeme Polglase	<i>Frontiers in Paediatrics - Neonatology</i>	Associate Editor
A/Prof David Robertson	<i>Future Medicine - Women's Health</i>	Editorial Advisory Board
Prof Lois Salamonsen	<i>Reproduction, Fertility and Development</i>	International Advisory Panel
	<i>Repropedia</i>	Editorial Board Member
Dr Peter Stanton	<i>Tissue Barriers</i>	Editorial Board Member
Dr Michelle Tate	<i>Journal of Virology</i>	Editorial Board Member
	<i>Virology Journal</i>	Associate Editor
Prof Bryan Williams	<i>Cytokine &amp; Growth Factor Reviews</i>	Editorial Board Member
	<i>Faculty of 1000</i>	Member
	<i>Frontiers in Cancer Genetics</i>	Editorial Board Member
	<i>Journal of Interferon and Cytokine Research</i>	Editorial Board Member
	<i>Journal of Virology</i>	Editor
Dr Dakang Xu	<i>Viral Immunology</i>	Editorial Board Member
	<i>Clinical and Experimental Pharmacology and Physiology</i>	Associate Editor
Dr Morag Young	<i>Endocrinology</i>	Editorial Board Member
	<i>Journal of Endocrinology</i>	Senior Editor, Cardiovascular
	<i>Journal of Molecular Endocrinology</i>	Receiving Editor
	<i>Journal of Steroid Biochemistry and Molecular Biology</i>	Receiving Editor

MEMBERSHIP OF CONFERENCE ORGANISING COMMITTEES

Staff member	Conference	Location	Date	Role on committee
A/Prof Frances Milat	Medical Journal of Australia Continuing Professional Development Seminar in Endocrinology	Melbourne, VIC	February 2016	Clinical Co-ordinator
Dr Daniel Gough	Lorne Cancer Conference	Lorne, VIC	11-14 February 2016	Organiser
A/Prof Ashley Mansell	Lorne Infection and Immunity Conference	Lorne, VIC	17-19 February 2016	Conference Co-convenor
Prof Robert McLachlan	Young Men's Health Stakeholder Forum	Canberra, ACT	3-4 March 2016	Director
A/Prof Vinod Ganju	Secondary Breast Cancer, Enhancing Multidisciplinary Care Conference	Glen Waverley, VIC	18-19 March 2016	Organiser
Dr Kristy Brown	ENDO2016 - Annual Scientific Meeting of the US Endocrine Society	Boston, MA, USA	1-4 April 2016	Annual Meeting Steering Committee Member
Yogeshwar Makanji	ENDO2016 - Annual Scientific Meeting of the US Endocrine Society	Boston, MA, USA	1-4 April 2016	Annual Meeting Steering Committee Member
Richard Ferrero	American Gastroenterological Association Digestive Disease Week	San Diego, CA, USA	21-25 May 2016	Chair, Abstract Review Panel
A/Prof Tim Moss	The Perinatal Society of Australia and New Zealand 20th Annual Congress	Townsville, QLD	22-25 May 2016	Conference Organising Committee
A/Prof Mark Hedger	Society for the Study of Reproduction (USA)	San Diego, CA, USA	16-20 July 2016	Program Committee Co-chair
	Inflammation in Reproduction, Pregnancy and Development - Satellite Symposium to the International Congress of Immunology	Palm Cove, QLD	17-20 August 2016	Convenor
A/Prof Tim Moss	Inflammation in Reproduction, Pregnancy and Development - Satellite Symposium to the International Congress of Immunology	Palm Cove, QLD	17-20 August 2016	Conference Organising Committee
A/Prof Ashley Mansell	International Congress of Immunology	Melbourne, VIC	21-26 August 2016	Program Organising Committee Member
A/Prof Frances Milat	Endocrine Society of Australia Annual Scientific Meeting	Gold Coast, QLD	21-24 August 2016	Clinical Chair
Dr Patrick Western	Society for Reproductive Biology Annual Conference	Gold Coast, QLD	21-24 August 2016	Chair of Sponsorship Committee
A/Prof Caroline Gargett	The Ritchie Centre Colloquium	Clayton, VIC	25-26 August 2016	Conference Organising Committee
Prof Graham Jenkin	The Ritchie Centre Colloquium and Public Forum	Clayton, VIC	25-26 August 2016	Conference Organising Committee
Dr Rebecca Lim	The Ritchie Centre Colloquium and Public Forum	Clayton, VIC	25-26 August 2016	Conference Organising Committee
Dr Yennie Pham	The Ritchie Centre Colloquium and Public Forum	Clayton, VIC	25-26 August 2016	Conference Organising Committee
Prof Rosemary Horne	International Conference on Stillbirth, SIDS and Baby Survival	Montevideo, Uruguay	8-10 September 2016	Conference Committee Member
Dr Davina Dadley-Moore	Second Annual Brain Cancer Discovery Collaborative Conference	Sydney, NSW	14-15 September 2016	Co-convenor
Prof Terrance Johns	Second Annual Brain Cancer Discovery Collaborative Conference	Sydney, NSW	14-15 September 2016	Co-convenor
Dr Jennifer Dowling	Victorian Infection and Immunity Network Young Investigator Symposium	Melbourne, VIC	14 October 2016	Member
Prof Kate Loveland	Monash Health Translation Precinct Research Week	Clayton, VIC	21-25 November 2016	Organising Committee
Prof Lois Salamonsen	Monash Health Translation Precinct Research Week	Clayton, VIC	21-25 November 2016	Organising Committee



## Our community

We share our research and discoveries with our community and the general public, to teach and inspire the next generation about the wonders of science, and give back to our supporters to reward their interest and investment in groundbreaking science.

In 2016, we held public forums on stem cells and fetal and neonatal health, hosted aspiring scientists at the institute, and our researchers joined their communities at forums and fundraising events.

### Public forums on sleep, stem cells and SIDS

The Ritchie Centre hosted three public forums in 2016, engaging the public in fetal, neonatal and women's health research on topics ranging from sleep apps to SIDS and stem cells.

A public forum in August on the topic 'Stem cell therapies: where are we now and where are we heading?' gave our community an opportunity to hear about and discuss cutting-edge developments in stem cell therapies.

The forum was chaired by obstetrician and researcher Professor Euan Wallace, with a panel including stem cell pioneer Professor Alan Trounson and clinical haematologist Professor John Rasko from the University of Sydney.

The forum explored topics including current and potential stem cell treatments and trials, as well as the regulatory environment of this growing area, in which clinicians currently operate.

### Partnership with John Monash Science School

DNA screening, sterile surgery and PhD career seminars were part of year 10 work experience at The Ritchie Centre.

The students, from John Monash Science School, had a taste of all aspects of life in the laboratory, including observing experiments and visiting sleep laboratories.

Researchers from The Ritchie Centre also visited John Monash Science School to present careers seminars and ran a booth at the school's careers expo. Postdoctoral researcher Dr Stacey Ellery and PhD student Mikee Innocencio presented to a group of around 100 students from years 10 to 12.

"Science is not just about staring down a microscope, there is so much

more that you can do," Mr Innocencio said.

"Research is something we're passionate about. I wanted to show the students what a science degree can lead to. It's also a way of giving back to the community by encouraging increased participation in science and hopefully one day I'll be working beside them."

### Professor Robert McLachlan receives Queen's Birthday Honours

Renowned Hudson Institute researcher, clinical andrologist and men's health advocate Professor Robert McLachlan, was made a Member of the Order of Australia in the 2016 Queen's Birthday Honours List for his service to medicine in the field of endocrinology, particularly to men's reproductive health and to medical research.

Prof McLachlan is a physician-scientist who has made significant contributions to translational research in men's reproductive health.



Head of our Centre for Endocrinology and Metabolism, Professor Peter Fuller, said that Prof McLachlan has been a significant influence on men's health in Australia, not just as a clinician and researcher, but also in public advocacy.

Prof McLachlan has a long history of linking basic research on the regulation of male fertility to clinical outcomes. This research has resulted in major contributions to methods of evaluating spermatogenesis, its endocrine regulation and to developing male hormonal contraception.

"Prof McLachlan is Australia's leading clinical andrologist and is internationally recognised for his work on men's reproductive health. He is an enthusiastic and articulate advocate for community awareness of men's health issues," Prof Fuller said.

### Day of Immunology discovery tour

Students from John Monash Science School experienced the future of science during a discovery tour at Hudson Institute to celebrate the International Day of Immunology.

The year 10 students went into the laboratory to determine the cause of a simulated disease outbreak and participated in activities such as using a UV light to learn how well they really wash their hands.

The students also toured the Monash Health Translation Precinct Translational Research Facility and spoke with leading immunity researchers and PhD students about their work and careers.

Professor Paul Hertzog, Head of the Centre for Innate Immunity and Infectious Diseases, says the immune system is crucial to both basic human health and fighting disease.

"The immune system has relevance to everyday life, including the importance of immunisation, and the role of diet and our microbiome in maintaining a healthy immune system.

"It's an exciting area for future study and work in medicine, in research and in the biotechnology and pharmaceutical industries. Infection and immunity research and development is one of Victoria's strengths, employing upwards of

5000 people," he added.

"This was a great opportunity for students to see real research applications firsthand, and this will assist students with their future subject and career choices," Kirstine Carter, Career Pathways Coordinator at John Monash Science School said.

Event organiser and scientist in the Centre for Innate Immunity and Infectious Diseases, Dr Jennifer Dowling, says Day of Immunology activities foster a greater appreciation of the importance of our immune system.

"We hope that we can build students' knowledge about the crucial role the immune system plays in helping us to understand and treat diseases, from lupus to Alzheimer's disease and cancer."

### Breast cancer researcher offers community insight at NBCF event

Dr Kristy Brown offered the community an insight into her research exploring the links between obesity and breast cancer during a Pink Ribbon Breakfast in the Yarra Ranges.

A National Breast Cancer Foundation (NBCF)-funded researcher, Dr Brown was invited to speak at the event about her research into the role of obesity factors and other hormones in oestrogen-dependent breast cancer.

Around 150 guests attended the annual event, hosted by long-time NBCF supporter Karen Webb. It has raised more than \$135 000 in 10 years.



Dr Kristy Brown and long-term NBCF supporter, Karen Webb.

### Endometriosis panel

Hudson Institute women's health researchers joined a panel of experts at a public forum to share their research and discuss issues facing women with endometriosis.

The forum, hosted by Endometriosis Australia, was part of a film screening of *Endo What?*, a feature-length documentary on endometriosis.

Associate Professor Caroline Gargett and Dr Jemma Evans joined a clinician and surgeon after the film to field questions from the audience.

A/Prof Gargett spoke about her research into endometrial mesenchymal stem cells, and their role in the disease, while Dr Evans spoke about the role of proteins and the potential for an early diagnostic test for endometriosis.

Dr Brown spoke about her personal connection to the disease through her aunt, a breast cancer survivor, and how her research into metabolic pathways could be translated into novel and less invasive breast cancer therapies.

Funding from NBCF has also allowed Dr Brown to supervise a PhD student, Cherie Au, to undertake breast cancer research projects in her laboratory.

"Not only have funds from NBCF enabled my laboratory to examine the links between obesity and breast cancer in the hope of finding new treatments, but they have also given a head start to the next generation of young researchers investigating the disease," Dr Brown said.

## OUR SUPPORTERS

# Fielding Foundation

[ MR PETER FIELDING  
WITH DR REBECCA LIM ]



### Fielding Fellowship and Innovation Award

Melbourne businessperson and philanthropist, Mr Peter Fielding, made a life-changing \$1 million donation in 2014 through his Fielding Foundation in support of our brightest researchers' work.

This donation enabled the establishment of the Fielding Fellowship, which provides funding for an early- to mid-career researcher during a crucial stage of their career development. In addition, the Fielding Innovation Award was established to support a researcher to take an innovative research discovery to the commercial stage. These awards were announced in December, to provide support for some of our best researchers over the coming year.

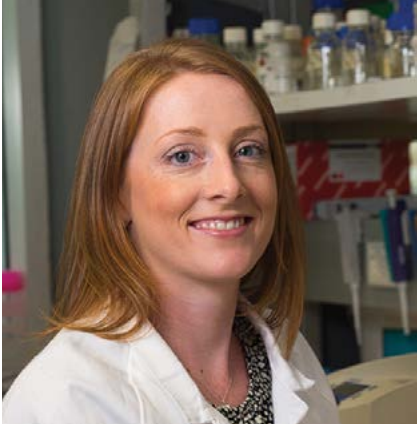
### Fielding Fellowship

The Fielding Fellowship for 2017 was jointly awarded to two outstanding immunology researchers at Hudson Institute: Dr Niamh Mangan from

the Centre for Innate Immunity and Infectious Diseases and Associate Professor Marcel Nold from The Ritchie Centre.

Dr Mangan is an emerging expert in the immunology of infection and inflammation, who seeks to understand the role of the mucosal immune system in disease. Dr Mangan's work focuses on interferon epsilon, an important naturally occurring cytokine in the female reproductive tract, and its clinical potential in infectious and inflammatory diseases and cancer.

A/Prof Nold is a neonatologist and paediatrician, who, alongside Dr Claudia Nold, is co-Head of the Interventional Immunology in Neonatal Diseases research group. A/Prof Nold is working to reduce the burden of inflammatory diseases, including chronic lung diseases affecting premature babies and necrotising enterocolitis, a devastating disease that causes the bowel tissue of newborn babies to die, which has a mortality rate of up to 65 per cent.



Dr Niamh Mangan



Associate Professor Marcel Nold



## Fielding Innovation Award

The Fielding Innovation Award for 2017 was awarded to Dr Tracey Edgell from the Centre for Reproductive Health, to help develop her discovery on stimulating factor CSF3 and its role in promoting fertility. This award is designed to bridge the widening funding gap facing young scientists who are working to take a research discovery from the laboratory to clinical trials and then to patients.

Dr Edgell's recent work, sponsored and licensed by global pharmaceutical company Merck, identified a panel of prognostic biomarkers that may predict the outcome of each round of IVF. She proposes that targeting CSF3 and its receptor within the uterus may improve success rates for IVF in Australia and around the world.

"The Fielding Innovation Award will allow me to look at new ways to make the endometrium more responsive to the embryo, to hopefully improve success rates and offer hope to the hundreds of thousands of women undergoing IVF worldwide every year," Dr Edgell said.

"We are indebted to Mr Fielding for his foresight and commitment to groundbreaking medical research and to developing the rich potential of our brightest young scientists. On behalf of Hudson Institute, I thank Mr Fielding for his generous contribution to science," said Hudson Institute Director, Professor Bryan Williams.

**For further enquiries about philanthropy, please contact Ms Kay Blandthorn on t: +61 3 8572 2701 or e: [hudson.foundation@hudson.org.au](mailto:hudson.foundation@hudson.org.au)**



Dr Tracey Edgell

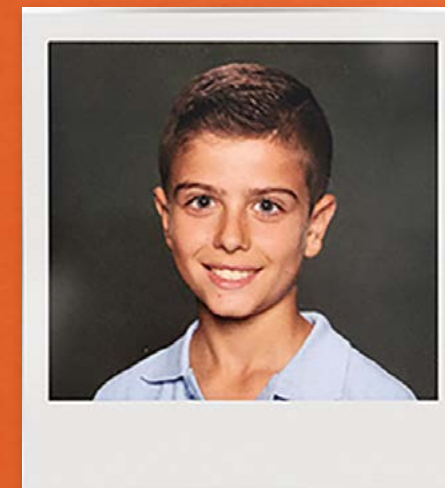
## Leaps and bounds: achievements of our inaugural Fielding Foundation award recipients

The inaugural Fielding Fellowship and Fielding Innovation Award recipients have significantly progressed their research discoveries to commercial partnerships and clinical trials, thanks to the funding support of Mr Fielding.

Dr Rebecca Lim, the 2016 Fielding Fellowship recipient, progressed three major projects

- Together with neonatologist Dr Atul Malhotra, she commenced a safety trial into the use of amnion stem cells in the treatment of a premature lung disease, bronchopulmonary dysplasia
- In November, Dr Lim secured funding from the NHMRC to commence a clinical trial for end-stage liver disease using amnion cells, in conjunction with Professor William Sievert from Monash Health
- Dr Lim was chosen to present her work on amniotic exosomes to venture capitalists at Stanford University's BIO SPARK Showcase in San Francisco, which provides selected researchers opportunities to engage with industry.

The work of 2016 Fielding Innovation Award recipient, A/Prof Nold, has led to a partnership between Hudson Institute, the Switzerland-based health company Roche and Monash University to translate their discoveries into next-generation treatments for autoimmune diseases.



## Julian's story

In June, we conducted a fundraising appeal focused on Julian, who is now a healthy 10-year-old boy, thanks to treatment he received for severe obstructive sleep apnoea at the Melbourne Children's Sleep Centre.

Julian is a happy and active child, who loves footy, soccer and computers. However, when he was at kindergarten, Julian was often irritable and exhausted.

He also snored loudly, sweated a lot and made strange noises in his sleep. Sometimes, Julian even seemed to stop breathing. During the day, he was tired and grumpy.

His mother Natalie was so worried that she took Julian to their family GP, who referred him to the Melbourne Children's Sleep Centre. Here, Julian took part in an overnight diagnostic sleep study, conducted by world-leading researchers from

Hudson Institute's The Ritchie Centre.

The Melbourne Children's Sleep Centre is Australia's largest childhood sleep centre and is recognised internationally for the high quality of its life-changing research.

At the sleep centre, Julian was diagnosed with severe obstructive sleep apnoea, a condition caused by enlarged tonsils or adenoids that block the airways during sleep, causing long pauses in breathing called apnoea.

Our researchers have shown that children with obstructive sleep apnoea often have trouble concentrating at school, which may lead them to being disruptive in class. At just three years of age, Julian underwent surgery to help relieve his condition.

Three years after his surgery, Julian was a happy and healthy boy. His daytime behaviour and concentration had improved dramatically. He returned to the sleep centre for a second overnight study, which confirmed that his breathing during sleep had returned to normal.

Almost 40 per cent of children have some type of problem with their sleep and many disorders like Julian's go undiagnosed. The Melbourne Children's Sleep Centre is working to help diagnose these children, and thanks to our generous donors, researchers at The Ritchie Centre are now pioneering important research into the long-term effects of this surgical treatment so they can help more children.



# Thank you to our supporters

**Hudson Institute of Medical Research is grateful for the gifts received from individuals, trusts, foundations and organisations during the year. We also acknowledge the support of the Victorian State Government through its Operational Infrastructure Support Program, and the Australian Government through its funding bodies, including the National Health and Medical Research Council. These valuable contributions assist the Hudson Institute to continue its important research.**

## FUNDING BODY

Alliance for Lupus Research (USA)

Andrea Joy Logan Trust Fund

Angior Family Foundation

Australian Academy of Science and Japan Society for the Promotion of Science

Australian Chinese Medical Association of Victoria

Australian Communities Foundation

Australian Lions Childhood Cancer Research Foundation

Australian Mitochondrial Disease Foundation

Australian Nuclear Science and Technology Organisation

Australian Pork Ltd

Australian Research Council

Bailey's Day

Bethlehem Griffiths Research Foundation

Bill & Melinda Gates Foundation (USA)

Cancer Australia

Cancer Council Victoria

CASS Foundation

Cerebral Palsy Alliance

Children's Cancer Foundation

Coopers Brewery Foundation

Cure Brain Cancer Foundation

Davies Collison Cave

Endocrine Society of Australia

Estate of Robert Clarence Cummings

Estate of Blair Campbell Ritchie

European Society of Human Reproduction and Embryology

Evans Family Foundation

Ferring Research Institute, Ferring Pharmaceuticals (USA)

Fielding Foundation

Fluidigm

Gandel Philanthropy

Harold Mitchell Foundation

H & K Johnson Family Foundation

Ian Potter Foundation

Inner Wheel Australia

Lettisier Foundation

LEW Carty Charitable Fund

Lord Mayor's Charitable Foundation

Lung Cancer Research Foundation (USA)

Merck Serono Grant for Fertility Innovation (Germany)

Miltenyi Biotec

Monash Comprehensive Cancer Consortium

Monash IVF Pty Ltd

Monash Partners Academic Health Science Centre

Monash University

National Breast Cancer Foundation

National Health and Medical Research Council

National Heart Foundation

National Institutes of Health (USA)

Osteoporosis Australia

Ovarian Cancer Research Foundation

P & M Harbig Holdings

Perpetual Trustees

Rebecca L Cooper Medical Research Foundation

Rivkin Center for Ovarian Cancer Research (USA)

Robert Connor Dawes Foundation

Rotary Club of Balwyn

Royal Australasian College of Surgeons

Science and Industry Endowment Fund

SIDS and Kids

Sleep Research Society Foundation (USA)

Society for the Study of Reproduction

State Government of Victoria

Stillbirth Foundation Australia

Sylvia and Charles Viertel Charitable Foundation

Telethon Kids Institute

The Creswick Foundation

The Royal Australasian College of Physicians

The Royal Australian and New Zealand College of Obstetricians and Gynaecologists

Therapeutic Innovation Australia

Uniting Church Adult Fellowship

United States Department of Defense

veski (Victorian Endowment for Science Knowledge and Innovation)

VicSuper

Victoria Prize for Science & Innovation

Victorian Cancer Agency

Wilrene Pty Ltd

Windemere Foundation

Worldwide Cancer Research (UK)

Zouki

## INDIVIDUALS

Mr Donald Abell

Professor Henry Burger

Professor Arthur Clark

Mr Andrew Cummins

Mrs Joan Donaldson

Mrs Patricia Donges

Mr Greg and Mrs Robyn Eagle

Mrs Andrea Evans

Mr Peter Fielding

Associate Professor Ron Firestein

Mrs Winifred Gould

Mr Peter Laver

Mr Rob Liddle

Ms Margaret Lothian

Mr Neville Marriott

Mr Lance Matheson

Mr Andrew McCallum

Mr John Prescott

Mr & Mrs Keith Richards

Mrs Jill Ross-Perrier

Professor Lois Salamonsen

Mrs Janette Smith

Mrs Jean Thomas

Professor Bryan Williams

Mr Mark Williams

Ms Denise Young

# Cycling for vital equipment



**For each of the past 11 years, a team of dedicated riders has cycled a challenging 520 km across the length of Victoria in 24 hours to raise funds for vital equipment used by our scientists.**

This year was no exception to the tradition. In April, a team of 11 riders cycled from Echuca to Port Fairy, with assistance from a support crew, for Hudson Institute's Ride for Research.

The ride is part of the Murray to Moyne Cycle Relay, which raises funds for health services across Victoria.

Thanks to the valiant efforts of the riders and their support crew, and the generosity of donors and our sponsors Davies Collison Cave, Zouki Café and VicSuper, this year the Ride for Research raised \$26 000 for new scientific equipment.

Combined with a generous \$25 000 grant received from the Rebecca L. Cooper Medical Research Foundation, these funds enabled

the purchase of a new Clariostar Multimodal Microplate Reader.

This state-of-the-art piece of equipment includes eight different modes to detect almost any wavelength on the UV-visible range. Researchers across Hudson Institute can use the plate reader to discover new diagnostic tests and new treatments.

Hudson Institute Director, Professor Bryan Williams, who volunteered as a support crew member, thanked all our valued donors, sponsors, supporters, riders and crew for their efforts in raising funds.

Prof Williams also thanked Mr Andrew McCallum, who has been a driving force and supporter of the Ride for Research for the past 11 years.

## Our supporters

Davies Collison Cave, VicSuper, Zouki.





# Board of directors

The directors of Hudson Institute of Medical Research Board, 31 December 2016



**Dr Robert (Bob) Edgar**  
BEcon (Hons), PhD (Ohio State), FAICD

**Appointed:** April 2009

Dr Edgar has extensive experience in financial services, including 25 years at ANZ Bank where he retired as Deputy Chief Executive Officer in 2009. He is also a director on the boards of Djerriwarh Securities, Linfox Armaguard Pty Ltd and Transurban Ltd.

**Special responsibilities:** Board chair



**Professor Christina Mitchell**  
MBBS, PhD, FRACP

**Appointed:** September 2011

Prof Mitchell is the Academic Vice-President and Dean of the Faculty of Medicine, Nursing and Health Sciences at Monash University. Prof Mitchell trained as a physician-scientist specialising in clinical haematology. In September 2011, she was promoted to the position of Dean. She was the first woman to be appointed Dean of Medicine in any of the group of eight universities in Australia. In March 2015, Prof Mitchell was inducted into the Victorian Honour Roll of Women for her leadership as the Dean. In April 2015, she received the Lemberg Medal, which is awarded annually to a distinguished biochemist in Australia. She is also a member of the Australian Academy of Health and Medical Sciences.



**Professor Warwick Anderson AM**  
BS (Hons) UNE, PhD (Adelaide), DUniv (Adelaide), FAHA (Int), FRCPA (Hon), FAAHMS, DH (Newcastle)

**Appointed:** July 2015

Prof Anderson is the Secretary-General of the Human Frontier Science Program, which funds international cooperation in research into the complex mechanisms of living organisms. He was previously CEO of the National Health and Medical Research Council and has been a member of numerous international medical research bodies. Professor Anderson is a Vice-Chancellor's Professorial Fellow at Monash University and has previously held academic and research positions at Monash University, Baker Medical Research Institute, University of Sydney and Harvard Medical School. He was made a Member of the Order of Australia in 2005. Prof Anderson's research focuses on the renal causes of hypertension, including humoral, neural and vascular remodelling aspects, resulting in 170 peer-reviewed articles.



**Mr Andrew Leyden**  
BComm

**Appointed:** March 2016

Mr Leyden has been a Managing Director of Lazard Corporate Advisory and its predecessors since 2003. He has also worked for Credit Suisse Group, ANZ McCaughan Dyson and Arthur Andersen.

**Special responsibilities:** Chair, Investment Committee; Hudson Foundation member



**Mr Nigel Garrard**  
Ecomm, AICD, CA FAMI

**Appointed:** March 2016

Mr Garrard has been the Managing Director and CEO of Orora Limited since 2013 when it was listed on the Australian Stock Exchange. Since starting his career at KPMG, Mr Garrard has held a number of senior executive postings including the Managing Director of SPC Ardmona, Coca Cola Amatil's food and service division, Chiquita Brands South Pacific Ltd, and Amcor Australasia and Packaging Distribution. He is the former Chairperson of the Australian Government's National Food Industry Strategy Ltd and has been a director of a number of industry and not-for-profit organisations. Mr Garrard is a director of the Packaging Council of Australia.

**Special responsibilities:** Chair, Hudson Foundation; Investment Committee member



**Professor Pauline Nestor**  
BA(Hons), MPhil, DPhil

**Appointed:** November 2013

Prof Nestor is Vice-Provost (Research) at Monash University. Her previous appointments at Monash University have included Associate Dean (Research) in the Faculty of Arts, and Academic Adviser to the Office of the Deputy Vice-Chancellor (Research). A highly published expert in nineteenth-century English literature and culture, Prof Nestor completed a BA (Hons) at Melbourne University, before attending Oxford University as a Rhodes Scholar.



**Ms Zita Peach**  
BSc, GAICD, FAMI

**Appointed:** May 2016

Ms Peach has been the Principal of Zita Peach Business Development Services since 2015. She has also worked in senior leadership roles as Executive Vice-President and Managing Director of Fresenius Kabi, Vice-President of Business Development at CSL Limited and Commercial Director at Merck Sharp Dohme. Ms Peach has extensive experience in commercialising technologies, licensing, mergers and acquisitions. Ms Peach is a graduate of the Australian Institute of Company Directors and a Fellow of the Australian Marketing Institute. She is a director of Starpharma Holdings, Vision Eye Institute Limited, AirXpanders Inc, Monash IVF, Bionic Vision Technologies and Mt Buller, Mt Stirling Alpine Resorts Management Board.

**Special responsibilities:** Chair, Intellectual Property and Commercialisation Committee



**Mr John Weste**  
BSc, MBA

**Appointed:** March 2009  
**Departed:** March 2016



**Ms Maria Trinci**  
BA/BComm, CA

**Appointed:** March 2015

Ms Trinci has worked with KPMG, specialising in financial services since 2000, and was admitted to the partnership in 2012. Ms Trinci is currently the engagement partner for ANZ. She has worked in the banking industry in London, Edinburgh, Glasgow and New York with clients including Mellon, Deutsche Bank and Citigroup. Ms Trinci is also a volunteer board member and pro bono audit provider. She is Deputy Chair of the Cancer Council Victoria board and chairs their Finance, Risk and Audit Committee. She is involved in a variety of community service groups including the Ovarian Cancer Research Foundation, Crime Stoppers, Gay and Lesbian Switchboard Victoria and the Committee for Melbourne – Future Focus Group.

**Special responsibilities:** Chair, Finance and Audit Committee



**Ms Jennifer Joiner**  
BEcon, CPA

**Appointed:** March 2009  
**Departed:** March 2016



**Mr Graeme Wise**  
B.Ec (Monash), FAICD

**Appointed:** November 2013

Mr Wise began his career in sales and marketing, including 15 years at Alcoa, based in both Australia and the United Kingdom. In 1981, he moved to retailing with Myer before founding Adidem Pty Ltd to build and operate the Australian branch of The Body Shop chain of retail stores. Mr Wise is now Chair of the Adidem Group, which comprises companies in property, publishing and water purification. Mr Wise is also involved in philanthropic activities as founder and patron of The Big Issue magazine and Chair of the Wise Foundation.



**Ms Jane Bell**  
BEC, LLB, LLM (Lon), FAICD

**Appointed:** March 2009  
**Departed:** March 2016





BOARD OBSERVER

**Professor Erwin Loh**  
MBBS, LLB(Hons), MBA, MHSM, PhD, FAIM,  
FCMI, FAICD, FACLM, FCHSM, FRACMA  
**Appointed:** May 2016

Prof Loh is Chief Medical Officer and Executive Director of Innovation, Patient Safety and Experience at Monash Health, Victoria's largest health service. Prior to this he was the Deputy Chief Medical Officer at the Peter MacCallum Cancer Centre. He is a barrister and solicitor of the Supreme Court of Victoria and High Court of Australia. Prof Loh has a medical degree from the University of Melbourne and a law degree with honours from Monash University. He also has a Master of Business Administration, Master of Health Service Management and a PhD that examined doctors in senior hospital management. He is fellow of the Royal Australasian College of Medical Administrators, Australasian College of Health Service Management, Australian Institute of Company Directors and Australasian College of Legal Medicine.

Prof Loh is also on the board of MHRP Pty Ltd and the Australasian College of Legal Medicine (where he is also Vice-President). He has previously been on the board of the Australian Medical Association (Victoria), the Law Institute of Victoria and the Royal Australasian College of Medical Administrators. He is an adjunct Clinical Professor at Monash University where he teaches health law and health services management. He is the chair of the Victorian State Committee of the Royal Australasian College of Administrators. Prof Loh has spoken at local and international conferences, published articles and book chapters on health law and medical management, and supervises doctoral students.



COMPANY SECRETARY

**Mr Rob Merriel**  
BA, Grad Dip (Psych), Grad Dip (Accounting), CPA  
**Appointed:** May 2014

Mr Merriel is a Certified Practicing Accountant with more than 35 years' experience working in medical research (Baker IDI and Hudson Institute), healthcare (Melbourne Health and Southern Health) and commercial organisations (Pacific Dunlop and Deloitte Consulting). The current Chief Financial Officer and Chief Commercialisation Officer of Hudson Institute, Mr Merriel is a Director of MHRP Pty Ltd and was previously the director and company secretary of several biotechnology-focused companies, including BioGrid Australia, Biocomm, the Australian Technology Fund and Evivar.

Board committees

FINANCE AND AUDIT COMMITTEE

This committee assists the board in internal control and compliance, accounting and financial reporting, and risk management processes of Hudson Institute.

**Members:** Ms Maria Trinci (Chair since 2015), Ms Carmel Mortell and Secretary Mr Rob Merriel. Hudson Institute's CEO, Prof Bryan Williams, attends meetings of this board committee.

INVESTMENT COMMITTEE

This committee advises the board and director on the effectiveness of investment policies, and approves the engagement of investment managers and investment transactions.

**Members:** Mr Andrew Leyden (Chair since November 2016), Mr Nigel Garrard (since November 2016) and Secretary Mr Rob Merriel. Hudson Institute's Financial Accountant, Mrs Jessie Wo, attends meetings of this board committee.

INTELLECTUAL PROPERTY AND COMMERCIALISATION COMMITTEE

This committee advises the board and director on statutory requirements for corporate governance and commercialisation of Hudson Institute's intellectual property and related issues.

**Members:** Ms Zita Peach (Chair since August 2016), Mr Grant Fisher, Dr Michael Pannacio, Dr Andrew Gearing, Dr Rob Klupacs and Secretary Mr Rob Merriel. Hudson Institute's CEO, Prof Bryan Williams, attends meetings of this board committee.

Organisational structure



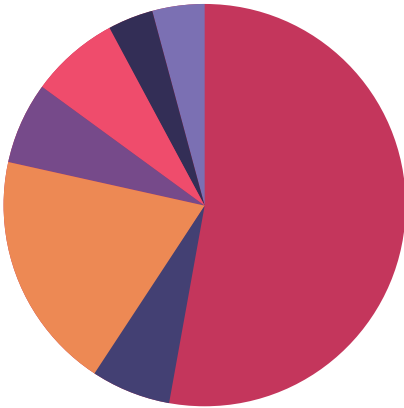
MANAGEMENT COMMITTEES

- Early Career Researcher Committee
- Gender Equity Committee
- Histology Advisory Committee
- Imaging Committee
- MHTP Genomics Advisory Committee
- MHTP Postgraduate Administration
- OHSE Committee
- Purchasing Committee
- Recruitment Committee
- Seminar Committee
- Social Club Committee
- EBA Committee
- Equipment Committee
- Hudson Institute Student Society Committee (HISS)



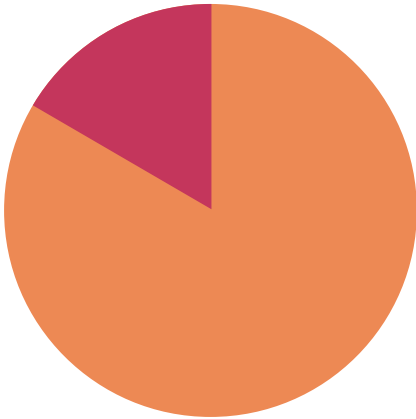
# Financial snapshot

INCOME



- Infrastructure Monash University 7%
- Commercial research 7%
- Philanthropic grants 19%
- Victorian Government 6%
- Australian Government 53%
- Investment income 4%
- Other income 4%

EXPENDITURE



- Administration expenses 16%
- Scientific and laboratory 84%

REVENUE	PROPORTION	2016 (\$)	2015 (\$)
Australian Government	53%	22 389 405	24 959 532
Victorian Government*	6%	2 672 867	2 351 561
Philanthropic grants	19%	8 225 532	7 328 738
Commercial research	7%	2 819 941	2 626 143
Infrastructure Monash University	7%	3 131 004	4 327 451
Other income	4%	1 610 163	1 697 061
Investment income	4%	1 625 163	823 495
Total		42 474 076	44 113 981
Expenditure			
Scientific and laboratory	84%	36 076 745	38 549 915
Administration expenses	16%	7 077 068	6 503 248
Total		43 153 813	45 053 163
Total surplus		-679 737	-939 182

\*Includes the Operational Infrastructure Support Program





