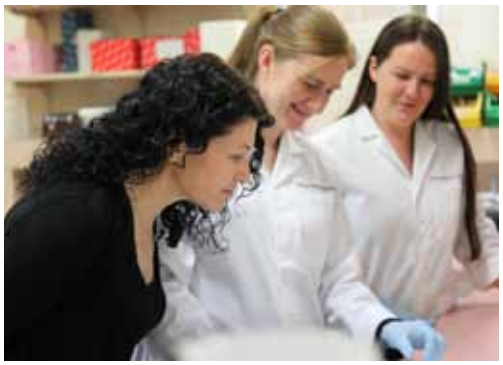

prince henry's institute
2012 scientific report

prince henry's institute
science for better life®

OUR VISION

To improve health through hormone research.

OUR MISSION

To improve quality of life through the investigation of hormones in the fields of reproductive health, cancer, obesity, bone health, and cardiovascular disease.

OUR VALUES

- Quality and integrity in our research
- Empathy for those we help
- Leadership and excellence

WE AIM TO:

- Improve early detection, diagnosis, prevention and treatment of disease
- Contribute to national and international health priorities
- Lead in the publication of new scientific knowledge
- Enhance scientific education through innovative research
- Increase community awareness through the promotion of research
- Foster partnerships with others that support PHI's vision, mission, values and aims

CONTENTS

ABOUT US

Prince Henry's Institute (PHI) is Australia's leading not-for-profit centre for translational reproductive health and hormone research.

Our research team is working to improve understanding of the role of hormones in fertility and the diagnosis, treatment and prevention of disease. We believe that translational research is the most effective way to link the laboratory to the bedside and make a real and lasting difference for patients and their families. This is why our team uses innovative fundamental and clinical research approaches to actively shape the future of clinical practice and improve healthcare both in Australia and throughout the world.

Our insights into the role of hormones in fertility and disease are helping to address key health challenges both in Australia and throughout the world. Our research aims to understand and address the following:

- Cancer
- Cardiovascular Disease
- Reproductive health and fertility
- Obesity
- Bone Health and Osteoporosis
- Parkinson's disease

Our history

Established in 1960 under the leadership of Professor Bryan Hudson and later Professor Henry Burger, our first research laboratories were located at Prince Henry's Hospital in South Melbourne. In the early 1980s, Prince Henry's Hospital amalgamated with Queen Victoria Medical Centre and Moorabbin Hospital to form Monash Medical Centre. Research continued at the South Melbourne site until 1991, when the laboratories relocated to Monash Medical Centre in Clayton to form Prince Henry's Institute of Medical Research.

Building a reputation for research excellence and innovation, our researchers have been working for over fifty years to drive world leading research programs and actively shape clinical practice to improve patient outcomes both within Australia and throughout the world.

phi
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Research highlights:

- The development of technologies to improve the detection of common hormone deficiencies
- A key role in the discovery and isolation of reproductive hormone inhibin
- Application of inhibin discovery to produce diagnostic blood test for the detection of some ovarian tumours
- A key role in the development of a new class of drugs for breast cancer treatment - aromatase inhibitors
- Successful completion of studies showing the essential role of the aromatase gene in breast cancer development, sperm formation and the metabolism of body fat
- Joint development and commercialisation of a biochemical test for the detection of endometrial cancer
- Innovative studies to progress development of novel hormonal contraceptives for men
- Established key role of male only gene, SRY, in regulation of dopamine in the male brain
- A key role the identification of key targets for the preservation of fertility in female cancer patients and women in early menopause

CHAIRMAN'S & DIRECTOR'S REPORT

Our researchers are committed to making a difference for patients by combining innovative fundamental and clinical research approaches to actively shape clinical practice and patient care and improve the diagnosis, treatment, and prevention of disease.

One of Australia's leading independent medical research institutes, Prince Henry's Institute specialises in the role of hormones in reproductive health and fertility, as well as key health challenges such as breast and ovarian cancer, cardiovascular disease, obesity, osteoporosis, and Parkinson's disease. Our researchers are committed to making a difference for patients by combining innovative fundamental and clinical research approaches to actively shape clinical practice and patient care and improve the diagnosis, treatment, and prevention of disease.

In a year of achievement and excellence, the Institute has further strengthened its position as a leading centre for women's health research.

Researchers in the Ovarian Biology Laboratory co-published findings from a research collaboration with **Walter Eliza Hall Research Institute** and **Monash University** in the journal Molecular Cell, that identified two key proteins linked to egg-cell death, that when blocked could offer fertility protection for female cancer patients and women going through early menopause.

Fertility has been also been a key focus for Professor Lois Salamonsen and the Endometrial Remodelling Laboratory. Her team in collaborationwith PHI Fellow andAssociate Professor Luk Rombauts and his team at **Monash IVF** continued in their quest to identify uterine receptivity biomarkers for the development of a test to determine the optimal time to implant embryos during fertility treatments such as IVF. In July, Professor Salamonsen was awarded a **Merck Serono Grant for Fertility Innovation** 2012. This was the first occasion that non-European researchers were recognised in the awards, and the team received a share of the € 4 million in grant funding distributed by Merck Serono.

The Brain and Gender Laboratory collaborating with researchers from the **Florey Neurosciences Institute** (Melbourne) and the **University of California** (USA) reported on the role of the sex-determining male-only gene, SRY, in the brain. In a world-first, the study demonstrated that the SRY protein is located in the substantia nigra in the male brain, the region that regulates dopamine production. Published by the Journal of Neurochemistry, these findings may provide a biological explanation for differences between men and women and male susceptibility to dopamine related disorders such as Parkinson's, Alzheimer's, and Schizophrenia and may pave the way to gender specific treatments.

The **National Health and Medical Research Council** (NHMRC) recognised several of our researchers. Associate Professor Guiying Nie, was appointed as a Senior Research Fellowship of the NHMRC to continue her research on Implantation and Placental Development. Dr Karla Hutt, a senior researcher with the Ovarian Biology Laboratory, received an NHMRC Early Career Fellowship, while emerging PHI researchers Dr Peter Nicholls and Dr Jacqueline Hewitt received NHMRC Career Development Fellowships.

Dr Jyothsna Rao received an Australia-India Early Career Fellowship from the **Australian Academy of Science**, and was the only receipt of this award at an Australian medical research institute.

Community and philanthropic investment remains vital to ensure our researchers have the capacity to drive innovative and cutting-edge research projects to enable the understanding of hormones in human biology. Philanthropic support has enabled our researchers to remain competitive on the world stage by assisting to fund travel costs to attend and present research at key international research conferences and meetings; such funding has been provided through the **Harold Mitchell Foundation** Travel Fellowship and the **CASS Foundation**.

This support plays a vital role in strengthening our engagement with the international research community, as well as helping attract research talent and establish vital collaborations with leading research centres across the globe. We have also received financial support for early stage projects (**CASS Foundation, Cancer Research Trust** and **Collier Foundation** and **National Breast Cancer Foundation**) and for equipment purchases (Fielding Foundation, The Marian and E.H. Flack Trust and Ted Billson).

Partnerships within the **Monash Health Translation Precinct,** particularly with **Southern Health** and **Monash University** continue to be instrumental to our capacity to translate our findings to improve patient care and reduce the economic and social burden of disease on the Australian community. Capital development is a key focus on the Precinct, with progress well underway towards the building of the new Translation Research Facility to enable co-location of partners to strengthen collaborative capabilities and capacity for translation of research knowledge to drive improved clinical practice and patient care.

In 2012, the **PHI Foundation** consolidated its efforts to strengthen corporate and donor engagement through scientific presentations at the Institute's Discovery Dinners, and the development of its own website with corporate engagement and fundraising portals.

Scientific innovation is only possible in a creative, innovative research environment supported by a strong funding mix. Our team is extremely grateful for the ongoing financial support provided to the Instituted by the Australian **(the Independent Research Institute Infrastructure Support Scheme, NHMRC)** and Victorian **(Operational Infrastructure Support Program)** governments, philanthropic organisations and the wider community. We acknowledge and appreciate this investment in our work and the future of health in Australia.

Finally, thank you to the Prince Henry's Institute leadership team, research and administrative staff and students who work so tirelessly to support the Institute and our vision to improve health through hormone research. Without your talents, commitment and passion this would be impossible.

Dr Bob Edgar,
Chairman

Professor Matthew Gillespie,
Director/CEO

THE BOARD

Board of Prince Henry's Institute of Medical Research Inc
ABN 48 132 025 024

Chairman
Dr Robert (Bob) Edgar
BEcon(Hons) PhD(Econ) FAICD

Deputy Chief Executive Officer of the ANZ Banking Group Limited Banking Group Limited until April 2009, Bob brings extensive financial services experience to his role as Chair of the PHI Board.

He currently also serves on the boards of a number of organisations, including Asciano Group, Centro Retail Group, Linfox Armaguard Pty Ltd, Nufarm Limited, Transurban Ltd, AMMB Holdings Berhad. *Special responsibilities:* Chair of the Investment Committee; member of the Finance and Audit Committee.

Chief Executive Officer
Professor Matthew Gillespie
BSc (Hons) PhD

Matthew has been Director of Prince Henry's Institute since 2008 and also leads the Bone, Joint and Cancer laboratory. He serves on a number of scientific boards and is a member of the Research Committee of the National Health and Medical Research Council (NHMRC).

Special responsibilities: Chief Executive Officer, Member of Intellectual Property and Commercialisation Committee, Investment Committee and of the Foundation.

Mrs Jane Bell B Ec LLB LLM FAICD

Board member of the Company's predecessor since 2002, Jane has practised as a financial lawyer for 22 years and worked in legal roles in corporate treasury and financial services operations both in Australia and internationally.

She also serves on the boards of Melbourne Health, Worksafe Victoria and Westernport Water. *Special responsibilities:* Chair of Intellectual Property and Commercialisation Committee and member of the Finance and Audit Committee.

Ms Jennifer Joiner BEcon CPA

Jennifer has an extensive background in Australian and global life sciences business sector including senior executive positions at Idexx Labs, Bayer AG and GE Medical Systems Australia Pty Ltd.

Special responsibilities: Member of Intellectual Property and Commercialisation Committee.

Professor Christina Mitchell
MBBS PhD

A Member of the Board since 2011, Christina is currently the Dean of the Faculty of Medicine, Nursing and Health Sciences, Monash University.
She has extensive management experience including roles heading up the Department of Biochemistry and Molecular Biology, which quadrupled its size and research budget under her leadership, and the School of Biomedical Sciences.
A trained physician and researcher, Christina specialises in clinical haematology.

Associate Professor Wayne Ramsey AM CSC MBBS MHA FRACMA

A member of the Company's predecessor since 2007, Wayne has a strong background in health and management. Following a successful military career, including the role of Director General Defence Health Service, Wayne moved into research, clinical and medical services and is currently Executive Director of Medical Services and Quality for Southern Health. He currently also serves on the Kitya Board responsible for Jesse McPherson Hospital.

Mr John Weste BSc MBA

John is a business executive with over 25 years global experience working with leading management consulting firms. He joined the Board of Directors in April 2009. John is Director of The Richelieu Group, a corporate advisory firm that focuses on building high-performance teams during major business transformation programs.
He also serves on the board of Hocking Stuart Pty Ltd.
Special responsibilities: Chair of Prince Henry's Institute Foundation.

PHI Foundation

In 2012, the Foundation continued to drive corporate engagement through the Discovery Dinner series with events held in March and June. Sponsored by Tata Consultancy Services – Australia and New Zealand, the 2012 dinners followed on from the successful 2011 launch event with a shift of focus from Men's health to Women's health and female fertility.

In addition to their successful Discovery Dinner series, the Foundation has been working to develop a broad corporate engagement and marketing strategy to increase PHI's fundraising capacity in 2013. With the launch of the Monash Health Translation Precinct and building project, the committeewill also focus on a capital campaign.

In April 2012, the Foundation farewelled long-time member Mr Ronnie Atlas who used his communications and marketing expertise to help drive many Foundation initiatives and events, including the 50th celebrations and the first two Discovery dinners. The Foundation welcomed several new members in 2012, and is currently seeking new members to assist with driving several marketing and research awareness programs in 2013. If you are interested in please contact Professor Matthew Gillespie, Director of Prince Henry's Institute on 9594 4372.

Mr John Weste
BSc, MBA
Chair, PHI Foundation

Ms Georgia Beattie
Founder and Director, Lupé Wines

Ms Fiona Le Brocq
Marketing Director, Seek Limited

Professor Matthew Gillespie BSc (Hons) PhD
Director, PHI

Mr David English
Head, Stratety & Advisory Services, Aperium

Mr Dylan Simmons
Consultant, Business Advisory Services, Rees Group

Ms Natalie Allan
Operations Manager, hockingstuart Franchise Group

Mr Graeme Goldman
Co-Founder, H & G Partners

Mr Ronnie Atlas
(until April 2012)

Managing Director, Word of Mouth Communications

1 RESEARCH REPORT: CARDIOVASCULAR HEALTH

Cardiovascular Endocrinology Laboratory

Steroid Receptor Biology Laboratory

CARDIOVASCULAR ENDOCRINOLOGY LABORATORY

Patients diagnosed with heart failure experience significant benefits when treated with a combination of traditional medications and a drug to block a hormone receptor in the heart. Focusing on specific cell types in the heart where this receptor is critical for heart disease we aim to identify new ways to develop targeted therapies while avoiding side-effects associated with existing drugs.

Laboratory Head: Dr Morag Young

Heart disease remains the leading cause of death and disability throughout the world. Drugs that block the action of the mineralocorticoid receptor (MR) have been shown to offer significant benefits for the treatment of heart failure, however, the risk of side-effects limit their widespread use.

Our research has shown that the MR plays an important role in cardiovascular disease, particularly in the development of cardiac tissue inflammation and fibrosis. We have identified unique and fundamental roles for the MR in heart muscle cells and immune cells (macrophages) in driving fibrosis and inflammation.

We are now working to determine how the MR acts in cells critical in the development of heart failureand hypertension. These findings will be translated to aid the development of drugs that exploit the characteristics of these cells to act specifically on the heart without the side-effects associated with MR blockade in other tissues such as the kidney.

MR activation in immune cells in heart disease

Previously we have shown that inflammatory cells are key sites of MR action in the development of heart disease. Using an independent model of heart disease that is not reliant on mineralocorticoid hormones (aldosterone), we have also shown that the MR in macrophages playsa key role in other forms of heart disease. These studies have also confirmed the importance of the MR in driving the macrophage to develop a full inflammatory response.

Our data provides insight into earlier clinical studies that show that MR antagonists are equally effective in patients without high levels of aldosterone. We now know it is possible for the MR to play a role in heart disease in these circumstances because cortisol, a closely related hormone, can also activate the MR and cause disease.

Results from our studies of mice that cannot recruit immune cells have validated our provocative findings that MR in macrophages is essential for the development of heart disease and high blood pressure. This has provided novel insights into the mechanisms by which the immune cells control the disease process.

MR activation in heart muscle cells in heart disease

The MR also plays a key role in the function of the heart muscle cells (cardiomyocytes). We have established that when activated, the MR in these cells regulates the expression of specific inflammatory molecules and recruits immune cells to the heart to increase the tissue inflammatory response. We have now shown that the MR in heart muscle cells plays an important role in regulating both positive and negative fibrotic factors to determine the overall level of fibrosis in the heart.

Our most recent data also shows that the MR plays an important role in the heart cell response to injury. If the MR is blocked or deleted in these cells, the heart experiences significantly less injury in situations like ischemia. Through the support of philanthropic funding from ANZ Charitable Trust we have established echocardiography for mice to enhance the suite of *in vivo* testing available in the institute to enable the determination of molecular mechanisms with functional outcomes.

Identification of heart-selective MR antagonists

The MR is a unique receptor in that it can bind to two types of hormone, mineralocorticoids (aldosterone) and glucocorticoids (cortisol).

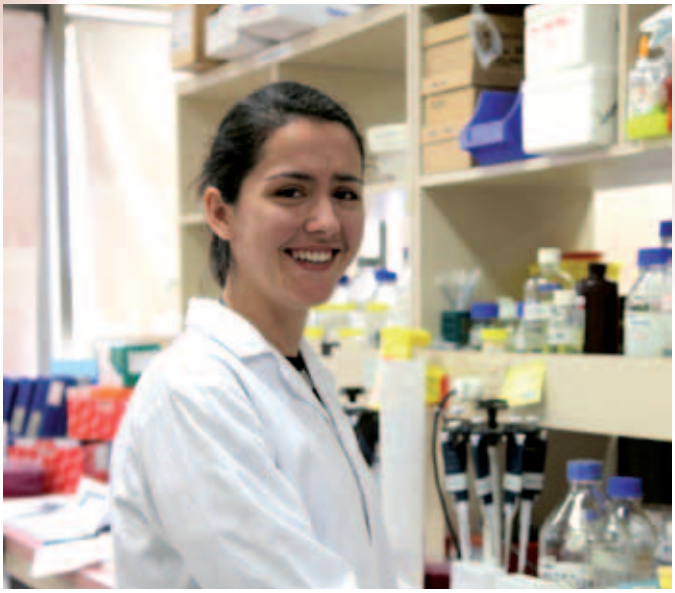
Subtle differences in the structure of the MR, when it is bound by either aldosterone or cortisol, suggest that regulation of the MR by the ligand bound may be 'fine-tuned' by the overall shape of the receptor and thus its potential for binding other proteins.

As a result of these subtle differences, different subsets of accessory proteins bind to the MR with each hormone. This can be translated into differences in gene expression. Our most recent work to identify novel proteins that interact with the MR in a ligand selective manner, has identified a novel sequence on many of the proteins that bind to the MR. Our studies have also attempted to identify tissue-specific proteins that interact with and regulate the MR. We now have several new candidate proteins from the heart and kidney that are currently being characterised with early results showing some cell-selective activity.

Cardiovascular Endocrinology Laboratory (L): Laura Bienvenu, Elizabeth Fletcher, Dr Jun Yang, James Morgan, Dr Jimmy Shen, Dr Morag Young

Our overall aim is to use these novel proteins to screen and develop new, selective drugs for the treatment of hypertension and heart disease.

Yizhou (Vicky) Yao



Medina Taletovic

Steroid Receptor Laboratory (top): Dr Jimmy Shen; **(left L - R):** Dr Simon Chu, Professor Peter Fuller, Francine Brennan; **(right L - R):** Daniel Heathcock, Maria Alexiadis

1. CARDIOVASCULAR HEALTH

STEROID RECEPTOR BIOLOGY

Steroid hormones such as cortisol, aldosterone and estrogen mediate their effects via cellular receptors. These receptors are one of the most important therapeutic targets in medicine. Research into this molecular interaction has revealed new avenues for tackling a range of diseases, including cardiovascular disease and endocrine cancers.

Laboratory Head: Professor Peter Fuller

Steroid hormones are the messengers of the body's complex endocrine system, which controls many essential physiological functions. By interacting with gene expression regulators known as intracellular nuclear receptors, these hormones play akey role in the pathogenesis of cardiovascular disease and cancers of the prostate and breast.

Our research focuses primarily on the investigation of the molecular complexity of the action of these receptors, in particular those associated with the adrenal hormones aldosterone and cortisol. We are also interested in the reproductive hormones secreted in the ovary. As is so often the case in the world of biology, "the devil is in the detail" when investigating these systems. However, a full understanding of the specificity of these receptors at both a tissue and hormonal level is vital to enable development of novel therapeutic agents.

Understanding the mineralocorticoid receptor

The mineralocorticoid receptor (MR) is a nuclear receptor for the steroid hormone aldosterone. Pathological activation of the MR promotes cardiac fibrosis and heart failure.

Diuretic drugs such as eplerenone and spironolactone, often administered to patients after a heart attack, have been found to be effective in inhibiting inflammation triggered by MR, however, these drugs also elevate potassium levels dangerously in some patients and can cause renal failure.

We have been working with researchers from PHI's Cardiovascular Endocrinology Laboratory to identify proteins that act as potent MR co-regulating proteins. We have also developed novel approaches to exploring the molecular mechanisms that enable blockade of the MR.

The MR is expressed in a range of other tissues in which its role is unknown. Recent data from a large NBCF funded multi-centre study including PHI researchers, suggests a role for the MR as a tumour suppressor gene in breast cancer. This finding is the subject of intense investigation at present. We are also using the laboratory's combined expertise to explore the role of the MR in the ovary.

Granulosa cell tumours of the ovary

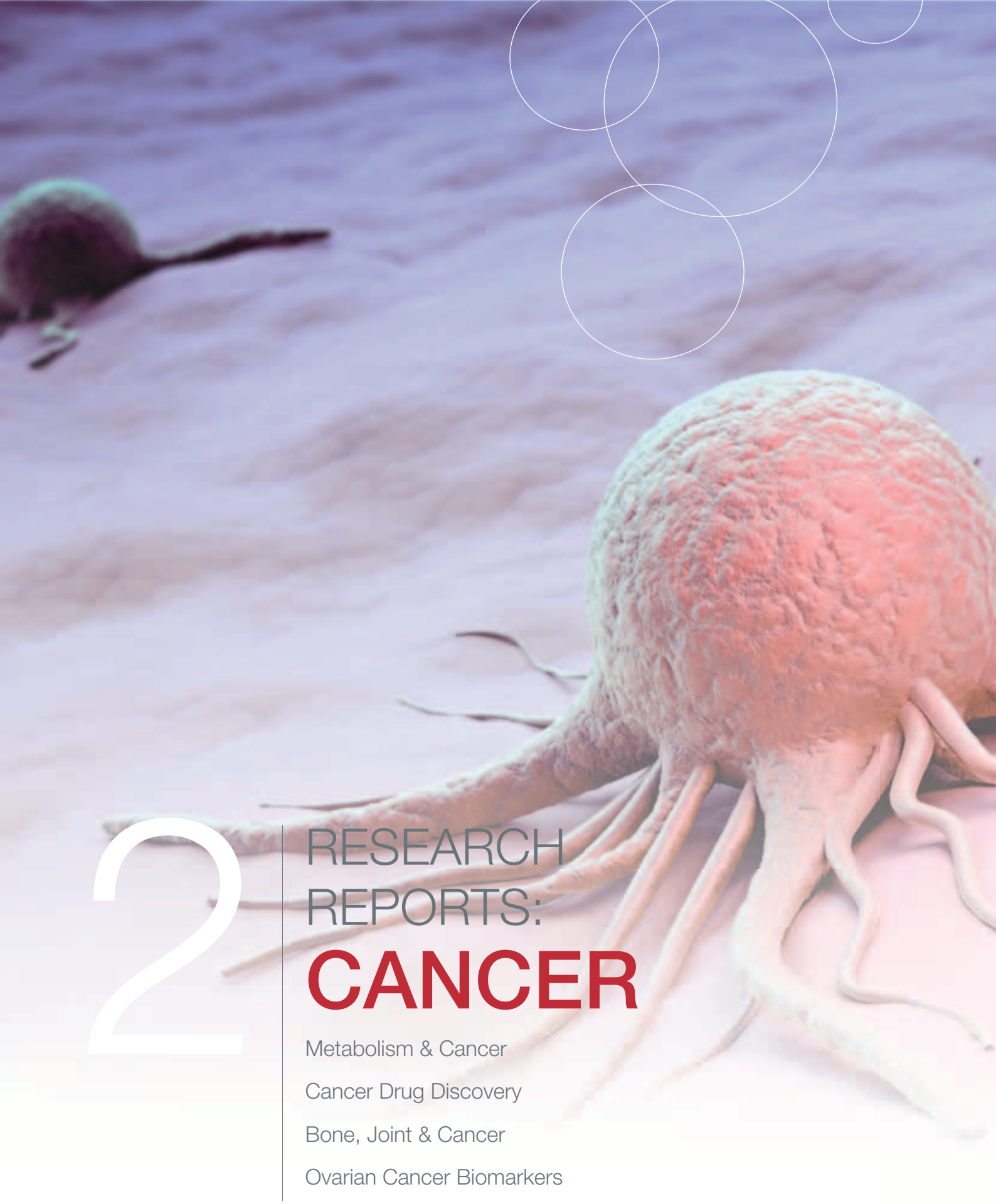
Granulosa cell tumours of the ovary, which make up about five per cent of all malignant ovarian cancers, are hormone-dependent tumours that produce, convert and respond to steroid hormones. Recent research indicates that the adult form of the granulosa cell tumour (GCT) arises from a unique mutation in FOXL2, a gene with a key role in the growth and maintenance of the ovary. We have characterised this mutation in several cohorts of GCT. L'Oréal Paris OCRF Research Fellow, Dr Simon Chu, has been investigating the role of nuclear receptors and other signalling pathways in the development of GCT and their possible relevance as therapeutic targets.

Ovarian phenotype of the IKKβ null mouse

A family of transcription factors known as nuclear factor κ-B (NFκ-B) has been implicated in the initiation and progress of various cancers including GCT. To investigate the role of NFκ-B signalling in the ovary, Senior Postdoctoral Fellow, Dr Ann Drummond, has created a transgenic mouse model known as the IKKβ conditional knockout mouse, in which NFκ-B signalling has been deactivated in the ovary. This model has demonstrated a key role for this signalling pathway in ovulation.

Nuclear receptors in thyroid cancer

We are currently working with Professor Chris Gilfillan, a former PhD student at PHI, now Head of Box Hill Hospital's Endocrinology Unit, in a collaborative research program addressing key issues in thyroid cancer. This is occurring in parallel with an enhancement of the clinical service provided within the Endocrinology Unit of Southern Health. PhD student and Clinician, Dr Michael Mond has identified novel aspects of the role of nuclear receptors in the pathogenesis of thyroid cancer. He has also identified an unexpected role for a transcription factor, related to FOXL2 (discussed above), in the common form of thyroid cancer.



2

RESEARCH REPORTS: CANCER

Metabolism & Cancer

Cancer Drug Discovery

Bone, Joint & Cancer

Ovarian Cancer Biomarkers

2. CANCER RESEARCH

METABOLISM & CANCER

Post-menopausal women who are obese are twice as likely to develop breast cancer as those who maintain a normal weight. Researchers at Prince Henry's Institute have identified a number of molecular pathways linking normal metabolic processes within the body to breast cancer. We are now investigating how these findings may be translated to develop novel breast cancer treatments and preventative measures.

Laboratory Heads:
Professor Evan Simpson and Dr Kristy Brown

With a focus on several metabolic pathways associated with obesity and the production of estrogens, we are continuing to explore opportunities to develop and assess potential new treatments for breast cancer.

In 2012, we used a combination of fundamental science and clinical trials to further our investigations to understand key metabolic pathways affecting estrogen production in postmenopausal women and how this impacts their risk of breast cancer. To progress clinical translation of these findings, we have also been recruiting participants for clinical trials stemming from earlier research outcomes in this area. As the most common cancer among Australian women, breast cancer affects one in nine women under 85.

Obesity is recognised as a major risk factor for breast cancer, due in part to molecular pathways that stimulate expression of the enzyme aromatase in body fat. This enzyme converts androgens such as testosterone into estrogens, which are known to promote cancer cell proliferation in most cases of breast cancer. This means that postmenopausal women who are obese are twice as likely to develop breast cancer as other postmenopausal women.

In previous research we identified the LKB1/AMPK pathway as an important inhibitor of aromatase expression. LKB1 and AMPK are kinases associated with tumour suppression and carbohydrate and fat metabolism, respectively.

AMPK is already a therapeutic target for treating diabetes, its biochemical linkage with LKB1 suggests that diabetes drugs may also be useful for treating some forms of cancer, including tumours in the breast.

Based on these findings, we are investigating several AMPK-activating drugs as candidates for the treatment and prevention of estrogen-dependent breast cancer. One such drug has proved successful in an *in vitro* study and we have commenced a clinical trial involving women with breast cancer.

LKB1/AMPK-related pathways and aromatase

We are also examining several LKB1/AMPK-related pathways, including the p53 pathway. This pathway has been found to regulate the cell cycle while inhibiting both cancer cells and the hypoxia-inducible factor (HIF) signalling pathways, specifically HIF-1α. This is important, as most human cancers contain tumour cells with a genetic mutation or deletion that has caused loss of activity of the p53 protein or over-expression of HIF-1α.

Our current research aims to determine how the p53 and HIF-1α pathways regulate estrogen production in the breast adipose stromal cells of postmenopausal women and whether this is critical for the expression of aromatase. In 2012, we discovered that HIF-1α stimulates aromatase and hence estrogen biosynthesis in adipose stromal cells. Using clinical breast cancer samples we demonstrated that there is a positive association between HIF-1α and aromatase expression in breast tissue. These findings suggest that therapies that target HIF-1α would also inhibit aromatase and may be useful for the treatment of estrogen-dependent tumours.

Treatment or prevention of postmenopausal breast cancer

We have successfully demonstrated in vitro that the AMPK-activating drug, metformin, widely prescribed for type-2 diabetes, is a significant inhibitor of aromatase expression in adipose stromal cells (fatty tissue).

We are continuing to progress our collaborative study with Professor Susan Davis at the Alfred Hospital. Initiated by Prince Henry's Institute in 2010, this study will examine the effects of metformin on basal aromatase expression within the breast of postmenopausal women.

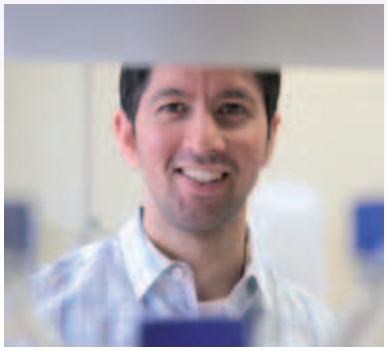
Recruitment for this study will focus on women undergoing elective breast reduction surgery for unrelated reasons.

To measure metformin's impact on estrogens within the breast, participants will be given metformin for four weeks prior to their breast reduction and will donate a small portion of their breast tissue at surgery. Recruitment is currently underway for the study, which researchers hope will assist in determining whether metformin could be used as a targeted treatment to decrease estrogens within the breast and help prevent the occurrence of breast cancer.

A separate collaborative neo-adjuvant study with Southern Health involving 60 Victorian women diagnosed with breast cancer is also progressing and has now been registered. The study will be used to determine metformin's effectiveness as a therapy to stop tumour cell growth to enable less invasive surgical intervention.

Designed in 2011, the study will see participants given a two-week course of metformin to be taken orally followed by another two week course of aromatase inhibitor prior to surgery.

It is hoped that metformin will arrest tumour growth in these patients enabling less evasive surgical treatment.



Regulation of estrogen in obesity

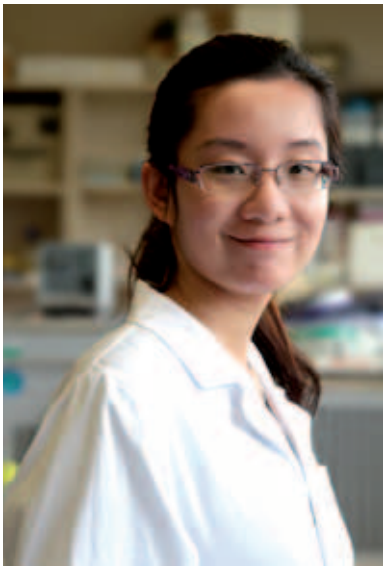
Fat-derived factors such as adipokines (a cell to cell signalling protein secreted by adipose tissue) and inflammatory factors, including prostaglandin E2 (PGE_2) are altered in obesity and cancer.

Previously we demonstrated that the adipokine leptin, which is elevated in obese people, and PGE2 both inhibit the LKB1/AMPK pathway increasing the expression of aromatase and as a result estrogen production.

Conversely we also found that the adipokine adiponectin, which is elevated in lean people, inhibits aromatase expression and lowers estrogens. We are now progressing further investigations to understand the mechanisms by which these and other factors influence aromatase expression.

• PHI researchers Dr Kristy Brown and Professor Evan Simpson from the metabolism and cancer team, and their University of Melbourne collaborator Professor Stephen Fox, were awarded a National Health and Medical Research Council (NHMRC) project grant for 2011-13. Dr Brown was also the recipient of a Victorian Cancer Agency Early Career Seed Grant to pursue her studies. The Metabolism & Cancer Laboratory will continue to investigate the regulation of estrogen production with the aim of developing breast-specific estrogen inhibitors.

Cancer & Metabolism Laboratory (top): Dr Kevin Knower **(L - R):** Maria Docanto, Dr Olivier Latchoumanin, Lixian Wang, Prof Evan Simpson, Dr Kristy Brown, Nirukshi Samarajeewa, Rahini Ragavan



Zhe (Kimmy) Zhao

2. CANCER RESEARCH

CANCER DRUG DISCOVERY

The incidence of breast cancer is steadily increasing with more than 10,000 Australians diagnosed each year. Despite significant advances in diagnosis and treatment, many challenges remain.

Laboratory Head: Dr Colin Clyne

Our research aims to address key issues in the diagnosis and treatment of breast cancer including the development of resistance to current hormonal therapies, side effects of these treatments, and the lack of effective treatments for hormone-independent breast tumours. By understanding how hormones such as estrogen are produced and regulated in the breast, we hope to identify new targets for treatment of tumours that do not respond to current therapies.

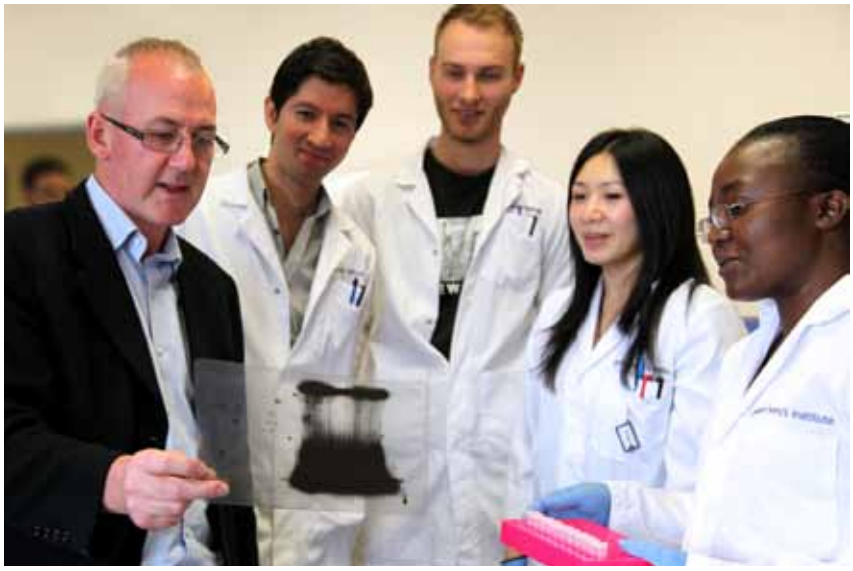
Regulation of estrogen production in breast cancer

Improved understanding of the mechanisms that regulate estrogen production in the breast is essential for the development of tissue-specific strategies to inhibit this process. We have shown that key proteins involved in estrogen synthesis – aromatase and the prostaglandin E_2 receptor, are regulated by epigenetic mechanisms in normal breast tissue.

This provides a link between environmental factors and local estrogen production that could influence breast cancer risk. We have also shown that these processes become altered in cells from breast cancer patients. In a second finding from this work, we were also able to establish that melatonin, a hormone produced by the pineal gland, suppresses estrogen production in the breast. Since melatonin levels decrease with ageing, loss of this protective effect may increase breast cancer risk in older people.

Nuclear receptors as novel therapeutic targets

New targets are urgently required for patients whose tumours do not express the estrogen receptor. We are also investigating proteins that are structurally related to the estrogen receptor to determine if they are present in breast cancer tissue and their potential role in driving cancer progression. We have linked one such orphan receptor (LRH-1) to the stimulation of breast cancer cell proliferation and invasion, and more recently we uncovered its mechanism of action. As we identify genes regulated by LRH-1 in the breast, we are increasing our understanding of how it promotes breast cancer progression and how we might disrupt these processes. As part of this research, we are also working to identify small molecule inhibitors of LRH-1 and to determine their inhibitory effects on breast cancer growth and development through testing using human cells and mouse models of breast cancer.



Cancer Drug Discovery Laboratory (L - R): Dr Colin Clyne, Dr Kevin Knower, Jakob Buhen, Dr Vanessa Cheung, Dr Chantal Magne Nde

With an ageing population, bone health is becoming an increasing priority in Australia. A common side-effect of diseases such as osteoporosis and rheumatoid arthritis and bone invading cancers, bone loss can result in skeletal damage causing severe pain and fractures. Over the past ten years, an increased understanding of how cells build up or destroy bone has lead to the development of a number of excellent new therapies. However, despite these advances there is still a great deal to be done in this growing area with new treatments to arrest bone loss and, more particularly, to replace lost bone urgently needed.

Laboratory Head:
Professor Matthew Gillespie

Bone is a tough material. Its composition of collagen proteins and calcium-rich minerals means it is strong enough to support the body but has enough yield to absorb shocks without cracking. Bone is also a dynamic material, constantly being remodelled and renewed in response to forces placed upon it. Vital to skeletal health, this process of renewal and repair is performed by specialised cells called osteoclasts, which work to break down old bone while other cells then form new bone in its place. In diseases such as osteoporosis, too much bone is removed and not enough new bone produced causing the bones to become thin and fragile over time. While current treatments allow us to arrest or slow bone loss, the close links between the loss and formation of bone mean that bone formation is also reduced causing additional complications. We are currently investigating the processes of bone forming cells, which produce hormones that act to stimulate their own bone formation. We hope to use our findings to identify new ways to increase bone production.

Unlike osteoporosis, diseases such as rheumatoid arthritis and invading cancers are caused by highly localised stimulation of bone destruction which results in pain, fractures and other severe problems. Bone loss is caused by an oversupply of osteoclast cells; these cells secrete acid and enzymes and break down bone releasing calcium and other minerals into the blood. To effectively treat these diseases we need better methods to rapidly and effectively block bone loss.

The team at PHI are studying a range of factors that influence bone formation and destruction with the aim of translating these findings to aid development of much needed clinical applications. The group's previous studies detailed the underlying mechanisms by which the hormone, IL-33, both inhibits and promotes bone loss. In addition, we have been studying ways in which some new cancer therapies may actually damage bone and why this occurs.

Preventing bone loss and building new bone

Our earlier work established that the impacts of IL-33 (a hormone originally identified in the immune system but is also made by bone forming cells) on bone formation look to be potentially useful. We found that IL-33 assists bone formation by acting on osteocytes, cells which are buried away inside the bone but which are interconnected through tiny channels. Osteocytes make a factor called sclerostin that inhibits bone formation, and this sclerostin production is reduced by IL-33 stimulation. IL-33 can also boost the production of other factors that directly stimulate bone forming cells and assist bone formation by acting on osteoblasts to promote their maturation. Our work to date suggests that IL-33 may be produced locally to promote healing rather than controlling the everyday activities of bone cells. Indeed, investigations at PHI have found that IL-33 levels rise in bone undergoing fracture repair.

In another key finding, we found that IL-33 can block the formation of osteoclasts potentially reducing bone loss.

This appears to be a useful combination – enabling bone loss to be blocked while stimulating new bone formation. However, a highly controversial report suggested that IL-33 may under some circumstances increase osteoclast numbers. We have investigated this in some detail and it appears that indeed under some circumstances there can be a small stimulation of osteoclast formation. We are currently determining how these properties can be used to therapeutic advantage.

We are examining transcriptional targets of PTH to identify how this agent works to promote bone formation at the expense of fat deposition.

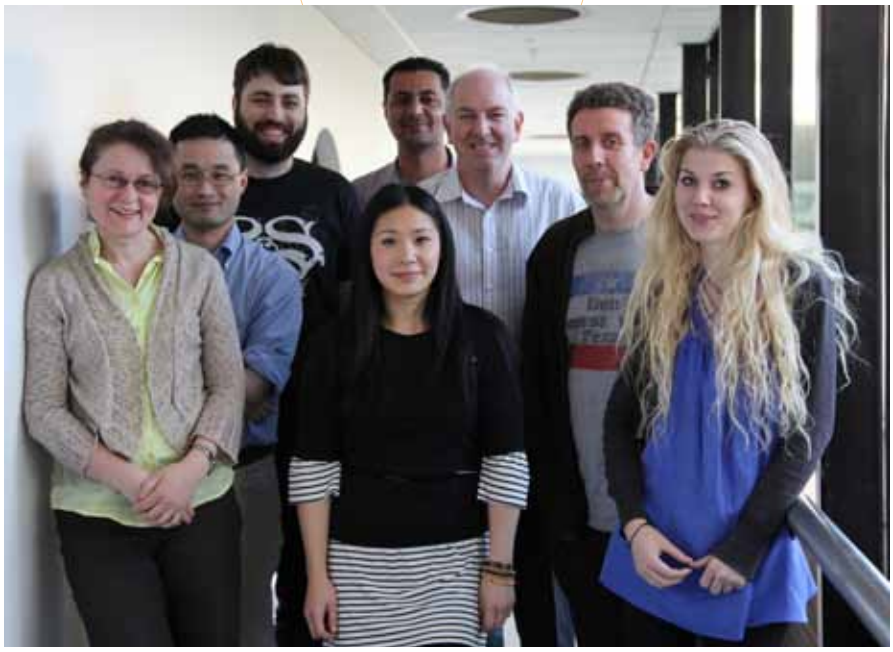
Osteoprotegerin and breast cancer

A strong inhibitor of osteoclast production, the protein, Osteoprotegerin, reduces bone destruction. However, our team made a striking finding, discovering that Osteoprotegerin produced by breast cancers enhances cancer growth both in the breast and (after the cancer has spread) in bone.

Hormonal factors such as Osteoprotegerin normally act on the cell surface, but in this case we have found that Osteoprotegerin is acting inside the cancer cells to stimulate the cancer to grow. Interestingly, this increased growth appears to only occur when the cancer cells are sitting close to certain stromal cells (these are normal cells that produce collagen proteins), which is usually how the tumour cells are found in the body. We are currently investigating the interaction between tumour cells and stromal cells to understand why osteoprotegerin encourages it.

Regulation of cell death in cancer cells

Also known as programmed cell death or sometimes even 'cell suicide', apoptosis is a normal biological process that causes cells to die when they are old or unhealthy. Cancer cells do not properly undergo apoptosis and as a result continue to multiply unchecked. One of the proteins responsible for regulating apoptosis is called TRAIL (TNF-related apoptosis-inducing ligand). We have found that some breast cancer-derived factors modulate the way that tumours respond to TRAIL. We are currently investigating TRAIL responsive genes to better understand how they help regulate cancer cell death and determine whether it is possible to enhance the effect of TRAIL on cancers.



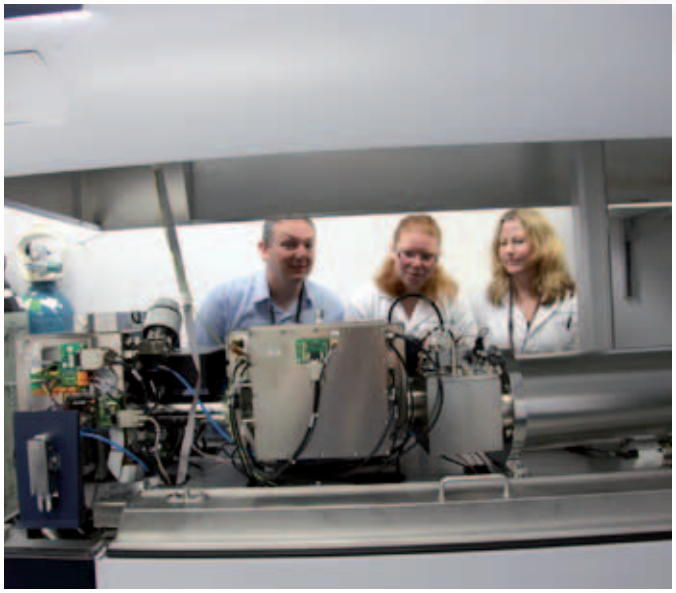
Bone, Joint & Cancer Laboratory (L - R): Dr Vicky Kartsogiannis, Dr Phillip Wong, Damien Eeles, Dr Vanessa Cheung, Dr Preetinder Singh, Professor Matthew Gillespie, Dr Julian Quinn, Gabrielle van der Kraan

Anti-cancer drug 17-AAG

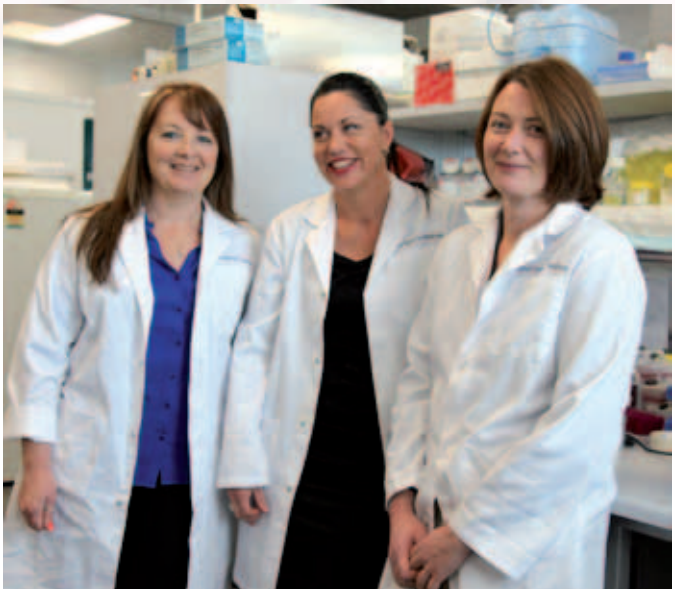
A new anti-cancer drug, 17-AAG, has been found to be very effective at shrinking tumours in mice and is currently being trialled in humans. Our studies have linked this drug with bone loss and even, surprisingly, increased growth of breast cancer cells that have spread to bone. This year we believe we have identified why and how this occurs. We found that 17-AAG induces a stress response – this is how cells react to unpleasant conditions and helps them survive until conditions improve. We have found that 17-AAG increases osteoclast formation (consistent with its ability to damage bone) but this effect is reduced if the stress response is blocked. We have identified a number of targets of the stress response that appear to enhance osteoclast formation. The wider implication is that drugs and disease processes that induce a stress response will (like 17-AAG) cause bone loss.

We are now working to translate these laboratory-based studies into preclinical models.

Ovarian Cancer Biomarkers Laboratory (L - R): Dr Adam Rainczuk, Dr Jyosthna Rao, Dr Andrew Stephens, Josie Lawrence, Jess Gathercole



(L - R): Dr Andrew Stephens, Jess Gathercole Josie Lawrence



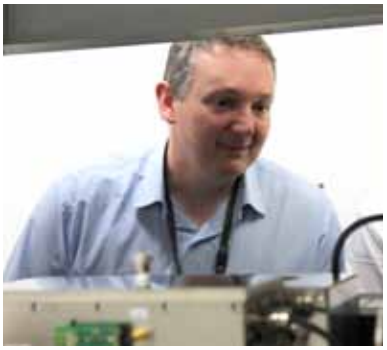
Research Nurses (L - R): Dionne Sroczynski, Nicole Fairweather, Anne Paterson

2. CANCER RESEARCH

OVARIAN CANCER BIOMARKERS

Ovarian cancer is a challenging gynaecological cancer with few recognisable symptoms. With no screening test currently available, diagnosis often only occurs in the late stages of the disease after the tumour has spread making treatment difficult.

Laboratory Head:
Dr Andrew Stephens



Our team is working to develop an urgently needed accurate screening test to identify early or pre-cancerous ovarian disease. We are using proteomics and mass spectrometry technologies to identify early tumour-specific changes.

In 2012, the discovery of a new mechanism by which tumours are able to ease the anti-tumour immune response, leading to enhanced tumour growth and progression was a major highlight for our group. We are investigating this mechanism further, to understand how and why it arises and whether it may be a useful target for therapeutic intervention. We are also examining whether testing for the presence of particular molecules involved in this pathway might be added to our existing three-marker panel for screening and detection of early stage tumours.

New mechanisms of ovarian cancer progression
We have identified what we believe to be a previously unrecognised pathway contributing to the progression and spread of high grade ovarian tumours, and the correspondingly poor prognosis experienced by patients with this disease. Inactivation of a key molecule involved in the immune response appears to impair the patient's own immune cells, leading directly to unchecked tumour growth and spread. Therapies targeting this pathway may provide another mechanism for better treatment of these tumours.

Proteomic analysis of ovarian cancer samples
We are also continuing our proteomics research program with ongoing analyses for a number of proteins identified as dysregulated in ovarian tumours. Their relevance to ovarian tumour progression, as well as their potential to contribute to new diagnostic, prognostic or therapeutic approaches, continues to be a focus for the group.

Clinical collection program
Our clinical tissue collection program continues to grow. Since the program's inception, almost 1000 women with ovarian disease have provided blood or tissue samples both in Melbourne program and through our sister program in Sydney. These samples are critical for our ongoing research and have been instrumental in our success to date.

Josie Lawrence

Dr Jyosthna Rao

3 RESEARCH REPORTS: WOMEN'S HEALTH

Endometrial Remodelling

Implantation & Placental Development

Embryo Implantation

Ovarian Biology

Reproductive Hormones

Reproductive Development & Cancer

3. WOMEN'S HEALTH

ENDOMETRIAL REMODELLING

Our research addresses two major questions in women's health: what are the critical factors that drive endometrial repair following menstruation and how does the uterus become receptive for embryo implantation?

Laboratory Head:
Professor Lois Salamonsen

The lining of the uterus (womb), known as the endometrium, is completely shed at menstruation and rebuilt during the next menstrual cycle. Approximately 20 days following the onset of menstruation, the endometrium becomes 'receptive' to an embryo. Lasting roughly four days, this receptive period is the only time at which the embryo can implant into the womb to allow development of the placenta and successful establishment of pregnancy. If these processes fail, consequences can include infertility or early miscarriage.

In menstrual cycles in which there is no conception, the endometrium is shed at menstruation, to re-grow in the next cycle. Menstruation leaves a 'wounded' surface, which normally repairs very rapidly. If this repair does not occur appropriately, the women may suffer abnormal uterine bleeding.

We currently are studying the underlying molecular mechanisms of endometrial repair and embryo implantation to identify key targets for the development of treatments for abnormal uterine bleeding and new methods to assess uterine receptivity for implantation.

This research aims to improve the success rates of fertility treatments such as IVF, as well as the long-term health outcomes of the children conceived. It will also help us develop treatments for abnormal uterine bleeding.In the broader context we also expect to translate our understanding of endometrial repair to find ways to help wounds heal without scarring.

Endometrial and epithelial repair

The endometrium is the only adult tissue to undergo rapid cyclic repair without scarring. A better understanding of endometrial repair mechanisms will lead to new treatments for uterine bleeding problems in women, including those using progesterone based contraceptives and hormone therapy for menopause, both of which can cause bleeding problems.

We conceptualised, that since endometrial repair occurs in the presence of menstrual blood, menstrual fluid would contain unique 'repair factors'. We have identified a number of these and demonstrated that they influence proliferation and migration of endometrial epithelial cells in real-time. Furthermore, they can affect junctional complexes between the cells, that form during repair and that are essential for the barrier function of the epithelial cell layer.

Importantly, this research may also lead to the identification of factors useful in the development of improved treatments for skin wounds to reduce healing time and minimise scarring. We are extending this work by examining the influence of these menstrual fluid factorson skin wound healing, with a longer term goal of reducing scarring in wounds. Already, we have shown that menstrual fluid and factors derived from it can enhance wound repair *in vitro.*

Uterine receptivity

Prior to implantation, the embryo is bathed in uterine fluid which contains many molecular mediators, secreted by the receptive endometrium. For embryo implantation to occur, both the endometrium and the embryo must be in synchrony. Since 2010 we have published a series of papers detailing results from proteomic analysis of uterine fluid includingsamples from fertile women and infertile women undergoing fertility treatment such as IVF, showing differences in protein profiles. A number of these proteins can act on both the endometrium itself and/or on the pre-implantation embryo, to enhance the potential for implantation.This is important since uterine fluid provides the microenvironment for implantation, a key step in initiation of pregnancy.

Our aim is to understand how the different factors work so that we can stimulate local production of appropriate proteins or possibly administer the required factors at the appropriate time to improve implantation. Some of the proteins that we have found in very small quantities in uterine fluid have strong potential as markers for infertility or endometrial receptivity. No good test for uterine receptivity is currently available.

We are continuing to use new proteomic approaches, such as the identification of glycoproteins associated with endometrial receptivity in uterine fluid. Dr Tracey Edgell has already demonstrated that some progesterone regulated glycoprotein forms alterduring different stages of the menstrual cycle.

In 2012, Professor Lois Salamonsen, protein biochemist Dr Tracey Edgell and their collaborative team with Monash IVF (A/Prof Luk Rombauts, Research Director) were the first non-Europeans recognised in Merck Serono's Grant for Fertility Innovation. The team received €200,000 to continue this unique work on glycoproteins as biomarkers of uterine receptivity.

How the embryo influences the endometrium

One of the first embryonic products, human chorionic gonadotrophin (hCG) is secreted by the embryo prior to implantation. Our earlier work showed thatthe hormone hCG (secreted by the pre-implantation embryo within the uterine cavity), enhances secretion of a range of cytokines by adjacent endometrial epithelial cells, which are important for the initiation of embryonic implantation. However, in IVF cycles,hCG is used to trigger ovulation. Dr Jemma Evans has now clearly demonstrated that such precocious exposure to hCG detrimentally affects the endometrium by rendering it incapable of responding appropriately to subsequent embryonic hCGand reducing the chances of successful implantation.

The endometrium in IVF cycles

Dr Jemma Evans and Dr Natalie Hannan examined many morphological and functional markers in endometrial samples from women in IVF cycles. The results of this study showed marked disturbances of the endometrium in all the women tested. Critically, the women who became pregnant in the cycle under examination were those found to have the least disturbance. This study confirms at a cellular level what has been shown clinically: that improvements to treatment protocols or transfer of embryos in natural cycles, have the potential to improve success rates in IVF.

Exosomal transfer: A new paradigm for embryo-endometrial cross-talk at implantation

As part of our ongoing research to identify uterine receptivity bio-markers, we have initiated a study on exosomes. These minute particles (30-150mm) which are released from cell surfaces can transfer their contents (mRNA, miRNA, proteins) to non-adjacent cells. We proposed that the endometrial epithelium may release exosomes into the uterine cavity where they could carry signals to the pre-implantation blastocyst. Investigating this hypothesis, Dr York Ng isolated and positively identified exosomes from cultured endometrial epithelial cells. Of particular physiological relevance, he also identified exosomes within uterine fluid: some were trapped in the mucus that coats the epithelial surface. Collaborative investigations identified the miRNA content of these exosomes: importantly there is selectivity /sorting of miRNA. The pathways identified as being regulated by the exosome-specific miRNA included many vital for implantation.

In 2012, the Endometrial Remodelling Laboratory was awarded NHMRC funding (2013-2015) to continue researching uterine receptivity biomarkers and the regulation of progestin mediated endometrial bleeding.

Endometrial Remodelling Laboratory (L - R): Cassie Hincks, Angela Morgan, Heba Zahid, Professor Lois Salamonsen, Dr Jemma Evans, Dr Tracey Edgell, Dianne Arnold

Key External Collaborations in 2012

A/Prof Luk Rombauts, A/Prof Beverley Vollenhoven and other doctors at Monash IVF.

Dr Sophie Rome, Lyon, France.

Dr Ov Slayden, Oregon Regional Primate Centre, Portland, Oregon, USA.

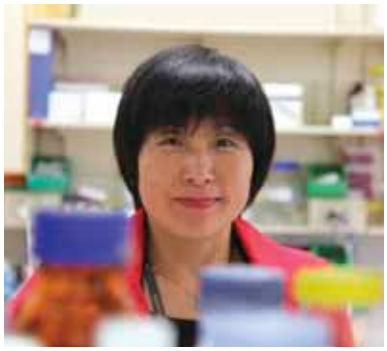
Professor Robert Norman (Robinson Institute), Professor Tanya Munro and Dr Stephen Warren-Smith, the Institute for Photonics & Advanced Sensing (IPAS), University of Adelaide.

3. WOMEN'S HEALTH

IMPLANTATION & PLACENTAL DEVELOPMENT

Through previous studies we have been able to gain insight into the underlying action of a key enzyme involved in controlling the uterus during receptivity preparations, which we believe may be useful both as a uterine receptivity biomarker and novel contraceptive target. We are now investigating the clinical translation of these findings to enable accurate receptivity testing to determine the optimal time for embryo implantation, as well as development of alternative contraceptive options for women. Our laboratory is also interested in the role of placental development in healthy pregnancy, with new information about a gene involved in placental development offers hope of early detection of preeclampsia.

Laboratory Head: Dr Guiying Nie



Uterine incompetence is a major factor in female infertility, preventing healthy embryos from implanting in the uterus. However, as there is currently no biochemical test that can reliably distinguish between a receptive and non-receptive uterus it is difficult to diagnose.

Role of PC6 in uterine receptivity for embryo implantation and fertility

Our research has shown that the enzyme proprotein convertase 5/6 (PC6) is tightly controlled in the uterus during preparation for receptivity, making it critical for implantation success. We have been continuing to study PC6's mechanisms of action in the uterus, to better understand their clinical implications in the evaluation of uterine receptivity and fertility.

In 2012, we continued investigate PC6 as a marker for uterine receptivity. Our previous research demonstrated the close association between PC6 activity in uterine fluid and uterine receptivity, with PC6 activity levels shown to be significantly reduced in women with unexplained infertility. Based on these findings we believe that detection of PC6 in uterine fluid may form the basis for a minimally invasive rapid receptivity test. This year we took further steps towards the development of such a test with the production of highly specific monoclonal antibodies against PC6. We are now in the process of developing a high-throughput assay to further this investigation.

This investigation has also established that PC6 regulates several key cytoskeletal proteins (such as EBP50 and ezrin) and their cellular localization to alter the uterine environment required for implantation. In 2012, we discovered that PC6 also processes a group of glycoproteins fundamental to endometrial receptivity - the integrins. This further demonstrates that PC6 is a 'master-switch' for the establishment of receptivity. The high quality of our work has been acknowledged with further funding from the NHMRC and Monash IVF.

PC6 in prevention of pregnancy and HIV infection

Our group is currently working to identify potential targets for the development of new options to protect women against both pregnancy and sexually transmitted infections. We are currently investigating PC6 as a potential target for the development of a new dual purpose female contraceptive to simultaneously protect against pregnancy and HIV infection. In 2012, we proved this concept using an animal model, and we have substantially modified a peptide inhibitor suitable for *in vivo* use. We have also published an *in vitro* model of human embryo attachment.

This model is important for sensitive and high-throughput screening for implantation inhibitors. This work has been supported by the Gates Foundation.

PC family proteins in endometrial cancer

Endometrial cancer is one of the most commonly diagnosed gynaecological cancers in Australia. Early detection is the most important tool for improving long-term prognosis for women diagnosed, making development of a simple early detection test critical.

As part of our search for a useful biomarker to form the basis of such a test, we have extended our investigation to include the PC family of enzymes and their role in endometrial cancer. This research has shown that total PC activity in the uterine washings is significantly increased in endometrial cancer patients. These findings suggest that monitoring the total PC activity in uterine fluid may provide a rapid and non-invasive method for the diagnosis of endometrial cancer. Supported by the CASS foundation, we are now further simplifying the method of uterine fluid retrieval towards the development of a screening test for endometrial cancer that is as easy as a Pap smear.

Implantation & Placental Development Laboratory (L - R): Ying Li, Sophea Heng, Huiting Ho, Dr Kemperly Dynon, A/Professor Guiying Nie, Dr Harmeet Singh, Dr Sarah Paule

HtrA3 in placentation and pregnancy disorders

Our previous studies had identified the gene, *HtrA3,* as important for placentation. The HtrA3 protein, a serine protease closely linked to placentation and the menstrual cycle, is significantly elevated in the first-trimester of pregnancy. Our current research in this area aims to elucidate the mechanisms of action of HtrA3 and its clinical implications.

In particular, we are investigating the role of HtrA3 in pregnancy-related disorders such as pre-eclampsia and intra-uterine growth restrictions. Pre-eclampsia accounts for almost one in twelve maternal and perinatal deaths in industrialised nations. Despite these figures, diagnosis is not yet normally possible until late in pregnancy.

We recently published the finding that HtrA3 levels in maternal blood during early pregnancy (at 13-14 weeks of gestation) were abnormally high in women who subsequently developed pre-eclampsia. To progress clinical translation of these findings, we produced HtrA3-specific monoclonal antibodies and developed a sensitive, high-throughput assay to measure HtrA3 in blood. We will use this to determine whether HtrA3 levels in the blood during early pregnancy can predict pre-eclampsia. This work has also been recognised with a grant from the Gates Foundation.

HtrA3 in cancer and ageing

In addition to its role in placentation, the *HtrA3* gene is known to be down-regulated in a number of cancers, including endometrial, ovarian and lung cancers. Evidence suggests that HtrA3 is a tumour-suppressor gene. Our research indicates that the involvement of HtrA3 in cancer is linked with the process of ageing.

We are also continuing our study of the biochemical properties of the HtrA3 protein and investigating its role in cancer, both generally and in the context of ageing.

(L - R): A/Professor Guiying Nie, Sophea Heng

(L - R): A/Professor Eva Dimitriadis, Dr Michelle Van Sinderen, Amy Winship

3. WOMEN'S HEALTH

EMBRYO IMPLANTATION

New insights into the role of factors critical for embryo implantation and placenta formation are assisting ongoing efforts to enhance pregnancy outcomes and devise non-hormonal contraceptives. Additionally, the identification of endometrial factors that stimulate carcinogenesis will allow us to investigate new treatment options for endometrial cancer.

Laboratory Head: Dr Eva Dimitriadis

Women experience a high percentage of failures in both natural and assisted conception mainly due to the complexities of embryo implantation. After attaching to the lining of the uterus, the embryo must grow through the endometrial tissue until the placenta is fully formed. For this to succeed, close contact is required between the embryo trophoblast cells and the mother's blood supply to ensure provision of nourishment and oxygen for the developing foetus. This trophoblast invasion of the womb can be likened to the way white blood cells move from the blood into tissues to counter infection.

Our team has identified a number of regulatory molecules important during early implantation, as well as the trophoblast invasion. We have previously investigated how varied levels of these proteins in the presence of placenta abnormalities could lead to complications later in pregnancy.

Endometrial-placental interactions

Impairment of embryo implantation can affect placental development and may lead to miscarriage, preeclampsia or maternal death. In earlier work we studied the interaction of endometrial proteins with placental trophoblast cells and how this restricts trophoblast invasion.

We used a proteomics approach to identify some of the protein molecules important in these interactions and in determining the function of these proteins in placental development

Pre-implantation-endometrial interactions critical for implantation and IVF success

Many unsuccessful IVF attempts are due to the embryo failing to implant even though the endometrium is adequately receptive. At this stage there is no available clinical method for diagnosing such endometrial infertility.

An embryo spends up to 72 hours in the uterus prior to implantation, during this period we believe the embryo produces factors that influence successful endometrial implantation. During IVF, embryos that are destined to not implant may be missing crucial factors and we believe this impacts endometrial receptivity and results in implantation failure and infertility. In collaboration with Monash IVF we are studying how IVF embryo interacts with endometrial cells to facilitate implantation and in particular pregnancy success.

Non-hormonal contraceptives

Our work has been the first to demonstrate that pharmacologically targeting endometrial factors offers total prevention of pregnancy. We are working with US collaborators to conduct preclinical trials of a vaginally-applied, non-hormonal contraceptive based on two molecules identified by our team as capable of preventing pregnancy in mice. Compared to delivery by injection, vaginal delivery reduces non-uterine side effects. We are now investigating methodologies to further minimise any potential side effects.

New treatments for endometrial cancer

Endometrial cancer is the most common gynaecological malignancy. While it typically affects postmenopausal women, women over the age of 40 also face a significantly increased risk. Current treatment options for advanced endometrial cancer are inadequate. We have continued testing a potential therapeutic produced by collaborators at CSL to see if it can inhibit one particular protein that we had previously found to be important in the progress of endometrial cancer.

Embryo Implantation Laboratory (L - R): Amy Winship, Carly Cuman, A/Professor Eva Dimitriadis, Dr Michelle Van Sinderen

OVARIAN BIOLOGY

Greater understanding of the establishment of the primordial follicle pool and how and when the ovary produces hormones and eggs is assisting the development of clinical treatments for infertility associated with premature menopause, ovulation induction, polycystic ovarian disease and ovarian cancer. This research is also providing avenues to control cardiovascular disease, osteoporosis and dementia.

Laboratory Head:
Professor Jock Findlay

In 2012, the publication of research findings resulting from a major collaboration with Walter Eliza Hall Institute (WEHI) and Monash University proved a significant highlight for the Ovarian Biology Laboratory. Published in prestigious international journal, Molecular Cell, the paper identified genes that may hold the key to controlling the number of eggs maintained within the ovary and the protection of eggs from damage during cancer treatments such as chemotherapy and radiotherapy.

We know that the number of eggs in a woman's ovary, also known as the primordial follicle pool, is set during embryonic development. This gradually declines until egg-supply is exhausted triggering menopause. Despite their important contribution to female fertility, the regulatory factors that control the growth, maturation and subsequent death of the follicles that support the eggs are not well understood. PHI is continuing to work with researchers at Monash University and the WEHI to investigate these factors and identify new ways to regulate egg supply to extend fertility and delay the onset of menopause.

The team is also conducting research to assist development of new options to prevent infertility in cancer patients treated with chemotherapy and radiation therapy. These therapies can destroy the ovarian egg pool, potentially leading to infertility in girls and young women undergoing treatment for cancer. Our research in this area focuses on the establishment and maintenance of the primordial follicles.

Hormonal regulation of follicle production

Findings from previous research to understand the roles of estrogen and the TGF-β family showed that both activin and TGF-β could influence follicular growth processes. This research has also confirmed that local growth factors were important in the early development of follicles in the ovary. We believe that disrupting these factors could lead to abnormal or inappropriate development, including cancer. Working in collaboration with colleagues at the Monash Institute of Medical Research, we are now examining the role of follistatin, an endogenous inhibitor of activin, in follicle development in genetically modified mice.

Developmental origins of infertility disorders and ovarian disease

Little is understood about the factors involved in the extensive wave of egg proliferation and death in the foetus that determines the size of the primordial egg pool. We have previously observed the involvement of BH3-only genes, which can initiate the process of apoptosis or cell death in response to particular types of stress. In 2012, we extended studies on two genes that act to limit the size of the primordial pool before birth. We are now exploring how and when these genes are involved and whether generating extra eggs, by preventing egg death at this early stage, can prolong fertility.

The same genes are implicated in egg death following chemotherapy or radiotherapy. 'Knocking out' these genes in mice significantly reduces radiation damage to eggs and the mice remain fertile, highlighting the potential for protecting eggs from chemotherapy or radiotherapy damage in women and young girls. The team, including collaborators from Monash University and WEHI, has taken out a patent to protect the intellectual property in this area and will continue to pursue the development of therapies to protect eggs against chemotherapy or radiotherapy treatment for any form of cancer.

Ovarian Biology Laboratory (L - R): Nadeen Zerafa, Dr Jason Liew, Dr Karla Hutt, Kavitha Vaithiyanathan, Thilini Gamage

3. WOMEN'S HEALTH

REPRODUCTIVE HORMONES

Our laboratory is interested in how reproductive hormones regulate processes within the body, particularly the impact of interactions between the pituitary and ovary on reproduction.

Laboratory Head:
Associate Professor David Robertson

Characterising inhibins forms and bioactivities in women

Each month the ovary releases eggs. This process, known as ovulation, is coordinated by pituitary- and ovarian-derived hormones. Despite there being over 20 follicles available for ovulation, only a single egg is selected for release in a normal menstrual cycle. This process is tightly controlled by two pituitary hormones; follicle stimulating hormone and luteinizing hormone. The amounts of these pituitary derived-hormones produced are in turn regulated by hormones produced by the ovary to ensure that multiple ovulations do not occur. The ovarian hormone primarily responsible for regulating the pituitary control of ovulation is called inhibin.

Inhibin is produced as a series of molecular weight forms which until recently were believed to be all biologically active. However recent studies by Drs Kelly Walton and Craig Harrison at PHI investigating related hormones, suggest that the larger inhibin forms are unlikely to be biologically active.

The findings predict that the larger inhibin forms would have shielded active sites, rendering them bio-inactive.

Characterisation of a naturally occurring inhibin Pro protein
The decreased biological activity associated with the large inhibin forms is attributed to the influence of a fragment (Pro-region) of the inhibin molecule, which is normally lost. The large inhibin molecule is cut at specific locations to enable release of the smaller biologically active inhibin form. During this cutting process, a small 'Pro' protein is released. Our studies to date predict that this Pro protein would be capable of disrupting inhibin biological activity.

In this study, we have shown that the naturally-occurring Pro protein can bind to the active inhibin form, and suppress the biological activity of inhibin at the pituitary. Complementary studies have shown that the release of this Pro-protein during the inhibin cutting process is essential for the production of the smaller active inhibin form. The Pro-protein is predicted to shield the active sites on inhibin, thereby blocking inhibin biologically activity. Supporting experiments have shown that this Pro protein is evident in human ovarian follicular fluid, and thus has the potential to hinder inhibin's reproductive functions.

Significantly, the identified inhibin Pro protein is also found in numerous related hormones, called transforming growth factors (TGF-β). Importantly, disrupted TGF-β activity is frequently associated with human reproductive disorders. Future studies will use the inhibin Pro protein model to facilitate the design of TGF-β inhibitors, which will aid our current understanding of these proteins in reproductive biology and other human disease pathologies.

(L - R): Guy Harris, Dr Kelly Walton, Karen Chan, A/Professor David Robertson, Enid Pruysers

REPRODUCTIVE DEVELOPMENT & CANCER

The processes underlying ovary and testis formation during foetal life are poorly understood. Further investigation of these processes will provide a better understanding of fertility and enable the development of new therapies for ovarian and testicular cancer.

Laboratory Head: Dr Kaye Stenvers

Our research focuses on identifying key factors governing the formation and maintenance of healthy ovaries and testes. We aim to apply these discoveries to improve the treatment of disorders of the reproductive organs. Proper formation of the adult ovary and testis requires precise regulation at the molecular and cellular levels. The adult capacity for reproduction is determined during foetal and neonatal development with the establishment of populations of primitive sperm and egg cells and essential supporting cells.

Gonad development is influenced by a family of multifunctional growth factors known as transforming growth factor-β (TGF-β). As part of our research, we are studying betaglycan, a cell-surface receptor protein that facilitates the actions of several members of the TGF-β family. We have previously demonstrated that betaglycan and the factors that interact with it are essential for successful development of the foetal gonads and kidneys. Current research is providing insights into how betaglycan regulates cell growth, survival and migration during foetal development. We are also interested in understanding how this impacts on the health of the gonads and fertility in adulthood. Our aim is to improve our knowledge of the causes of urogenital birth defects and their impact on human health.

Ovarian cancer is one of the deadliest reproductive cancers in women and remains a major area of focus for our group. We are continuing to investigate the underlying mechanisms involved in the emergence and progression of ovarian cancer. Most deaths by cancer result from metastasis, a process by which malignant cancer cells move away from the primary tumour site and spread to distant parts of the body.

In 2009, we found that loss of betaglycan expression could result in normal ovarian cells becoming cancerous and metastatic. We believe that the reintroduction of betaglycan to ovarian cancer cells may be able to halt or prevent metastasis. We are currently investigating the detailed mechanisms underlying betaglycan's actions in normal and cancerous ovarian cells. By determining the clinical importance of betaglycan in human reproductive cancers, we hope to be able to develop therapeutic strategies based on this key protein.

Treating advanced ovarian cancers

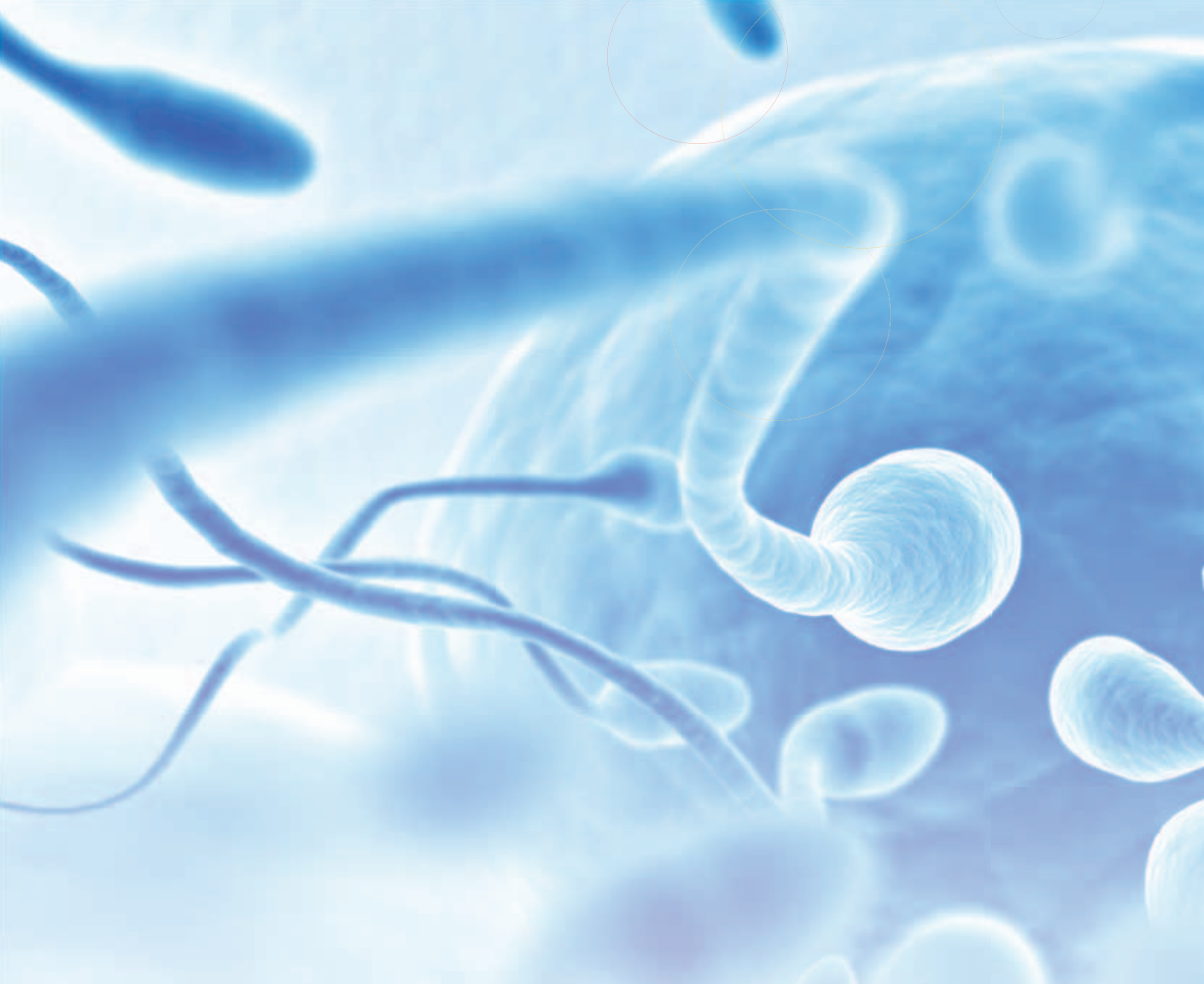
Over 75 per cent of ovarian cancers are diagnosed at an advanced stage, with five-year survival rates of only 30-40 per cent. Advanced ovarian cancer is associated with several clinical challenges, including metastasis (spreading of the disease), poor response to chemotherapeutic treatments, and high risk of recurrence after remission.

Our research focuses on these problems of advanced disease.

In 2012, we developed a culture system to better model the way ovarian cancers spread. Using this culture system, we have discovered at which stages of the metastatic process that manipulating the expression of betaglycan is most effective at blocking the disease. We have also identified signalling molecules which mediate the enhanced survival of late stage ovarian cancers. Specifically, we have identified pathways which allow particularly aggressive cancer cells to escape treatment (by becoming 'chemoresistant') and continue to grow.

We are also working in collaboration with the Royal Women's Hospital to examine the common types of ovarian cancers and assist the development of clinical applications. In 2012, our collaboration characterised the molecular profile of specific populations of metastasising ovarian cancer cells, which increased our understanding of these advanced cancers and identified novel regulators of the disease.Ongoing studies will exploit these findings to improve the effectiveness of existing chemotherapies and investigate new methods of treating advanced ovarian cancer.

Ovarian Biology & Reproductive Development & Cancer Laboratories (L - R): Nadeen Zerafa, Ruth Escalona, Dr Mai Sarraj, Yao Wang, Dr Kaye Stenvers, Dr Karla Hutt, Dr Jason Liew, Dr Maree Bilandzic, Kavitha Vaithiyanathan, Thilini Gamage



4 RESEARCH REPORTS: MEN'S HEALTH

Male Fertility Regulation

Clinical Andrology

4. MEN'S HEALTH

MALE FERTILITY REGULATION

Identifying the hormonal mechanisms that control sperm production in the testis will improve our understanding of the causes of male infertility. Translation of these findings will assist the future development of treatments to regulate fertility in men.

Laboratory Head: Dr Peter Stanton

Our overall aim is to identify how hormones control sperm production, or spermatogenesis. We have discovered that micro-RNAs in the testis are regulated by the reproductive hormones follicle-stimulating hormone and androgen, and are critical for the release of mature sperm. Our research continues to focus on how micro-RNAs control sperm release and how the blood-testis barrier works. We are also seeking to identify protein markers to enable development of a blood test for certain types of male infertility to reduce the need for current invasive diagnostic techniques. This research is central to finding new mechanisms of contraception in men and also in understanding causes of male infertility.

Hormonal regulation of micro-RNA expression

We now know that micro-RNAs — small non-coding RNAs that regulate protein translation — are themselves regulated by FSH and androgen in the testis. Our research has demonstrated that these micro-RNAs in turn control key cell junction proteins involved in cell adhesion pathways necessary for the release of mature sperm from Sertoli cells. In addition, we have found that a different set of Sertoli cell micro-RNAs is altered under conditions which emulate changes in the function of the blood-testis barrier. Our view is that regulation of these micro-RNAs provides a means by which Sertoli cells can control multiple cell junction events at the same time. If correct, the control of micro-RNA transcription offers a new model for understanding the hormonal dependence of spermatogenesis and provides new targets for inhibiting or restoring male fertility.

Regulation of Sertoli cell junctions

Animal studies in our laboratory have shown conclusively that the blood-testis barrier, which involves the tight junctions between Sertoli cells, is controlled by FSH and androgen. In 2012, we published new data showing that activin, a growth factor produced in the testis as well as in other tissues in the body, is able to dramatically change Sertoli cell tight junctions.

When activin concentrations are increased above normal levels, the ability of Sertoli cells to support developing germ cells is also altered.

Based on these findings, we believe that the actions of activin within the normal healthy testis must be very tightly controlled. As the blood-testis barrier is essential for the production of viable sperm, we have focussed our efforts on determining if the tight junctions are regulated in a similar way in humans.

Proteomic discovery in male reproduction

In earlier research, we identified several serum proteins that vary between men with normal sperm production and men whose sperm production is impaired. In 2012, we initiated a new proteomic study using human testicular interstitial fluid to identify protein markers useful for the prediction of male fertility. If we can find such a marker, it may offer potential as a simple diagnostic test for testicular function, providing a less invasive alternative to biopsy.

(L - R): Katarzyna Rainczuk, Liza O'Donnell, Dr Peter Stanton, Caroline Foo, Jenna Haverfield, Peter Nicholls, Justine Olcorn, Courtney Simpson

4. MEN'S HEALTH

CLINICAL ANDROLOGY

Understanding the factors regulating sperm production will provide insights useful to the development of novel male contraceptives and treatments for infertility. Our laboratory is also interested in understanding the important role of testosterone in the management of health and disease in men, as well as its impacts during ageing.

Laboratory Head: Professor Rob McLachlan

This laboratory undertakes both basic and clinical research activities in male reproductive health. We aim to understand the factors regulating sperm production, why this process fails (infertility) and how it can be reversibly and reliably suppressed (contraception). With an ageing population the management of health and disease associated with age remains a research priority. Testosterone plays an important role in maintaining male health and wellbeing throughout all stages of life, our team is working to understand its role in ageing, disease and other settings.

Genetics of male infertility

We are continuing to investigate the importance of DNA changes, genetic instability and epigenetic imprinting as causes of male factor infertility. With few answers and specific treatments available, many couples now utilise ART techniques to have a family. The genetic basis of male infertility, the possible transmission of infertility and other defects to their offspring, and of the de novo appearance of genetic defects are matters of concern. In collaboration with colleagues at Monash University, Monash IVF and with international partners, we are conducting a series of studies on the genetic basis of male infertility. To date we have collected a repository of genomic DNA and clinical information from over 2,000 infertile men, their partners and ART-conceived offspring for use in these studies. Translation of findings may lead to development of diagnostic tests and treatments for infertile couples, as well as improved information for couples undertaking ART.

Developing new reversible male contraceptives

Men currently play a major role in contraception through natural family planning, condom use and sterilisation but new effective, reversible and acceptable options are needed. Sex hormone treatment is a potential reversible contraceptive that acts by stopping the pituitary hormone drive needed for sperm production. We have previously studied its effects in human trials and continue to assess its effects on sperm production. In particular we are examining potential target for non-hormonal methods, such as the disruption of cell junctions within the seminiferous epithelium. Interruption of these junctions may prevent normal maturation of developing sperm cells and/or the release of mature sperm from the supporting Sertoli cell in the wall of the seminiferous tubule (spermiation). We are focussing on the mechanism of spermiation failure including the gene and proteins involved in cell remodelling and cell-cell junction.

Testosterone and cardio-metabolic health

As men age they experience a small but progressive fall in serum testosterone levels, this is particularly observed in obese men. Increasingly, clinicians are encountering ageing men with symptoms suggestive of testosterone deficiency.

Our previous studies have shown that Testosterone Replacement Therapy (TRT) causes modest reductions in body fat, in particular abdominal fat. This reduction in body fat may prevent the onset of cardiovascular disease through changes in several risk markers, such as cholesterol levels, insulin resistance and blood clotting factors.

It is suggested that TRT may be most effective in obese men with diagnosed testosterone deficiency but supportive evidence in this group is very limited. Importantly, obesity is associated with an increased risk of diabetes and cardiovascular disease.

In a major expansion of this research, we are now preparing to participate in an Australian multi-centre double-blind, randomised, placebo-controlled trial to be supervised by the University of Adelaide. This study aims to determine the effectiveness of testosterone treatment combined with a healthy lifestyle program in the prevention of type 2 Diabetes Mellitus in men with pre-diabetes and low testosterone levels in comparison to a lifestyle program alone (T4DM). The study is scheduled to begin enrolling subjects in early 2013 and will take five years to complete. 250 men will be recruited at the PHI site.

Other study sites include The Keogh Institute WA, Fremantle Hospital WA, The Austin Hospital Vic, and the Anzac Institute/Concord Hospital, NSW.

Our laboratory also continues its involvement in the delivery of clinical services through Southern Health, with the increased demand for Androgen replacement leading to an expansion of services to include specialised clinics. In 2012, Dr Matthiesson worked with Southern Health to open a specialised clinic to care for men undergoing testosterone withdrawal therapy for prostate cancer.

5

RESEARCH REPORTS:

GENETICS & DEVELOPMENT

Sex Determination & Gonadal Development

Brain & Gender

Growth Factor Signalling

5. GENETICS & DEVELOPMENT

SEX DETERMINATION & GONADAL DEVELOPMENT

As many as one in 100 babies are born with a disorder of sexual development (DSD) each year.

Laboratory Head:
Professor Vincent Harley

Disorders of sexual development (DSDs) encompass a wide range of abnormalities, including hypospadias (abnormal urinary opening in males), gonadal dysgenesis (underdeveloped or imperfectly formed gonads), ambiguous genitalia and sex reversal (XX males, XY female.

We are using molecular genetics, as well as cell and developmental biology approaches to identify genes associated with these disorders. The aim of this research is to improve the diagnosis of DSDs and provide insights into the underlying molecular mechanisms of testis and ovary formation in the developing embryo.

The molecular battle between the sexes – 'anti-testis' actions of DAX1 and β-catenin

In females, the Wnt/β-catenin canonical pathway blocks testicular differentiation by repressing SOX9 by an unknown mechanism. To work out how, we turned Wnt/β-catenin on in developing testes, turning them into ovaries, by preventing SF1 from turning on SOX9. Our data supports a model in ovary development where activation of β-catenin prevents SF1 binding to the SOX9 enhancer, thereby inhibiting SOX9 expression and Sertoli cell differentiation.

Human DAX1 duplications cause dosage-sensitive sex reversal (DSS) whereby chromosomally XY individuals can develop as females due to gonadal dysgenesis. However, the mechanism of DAX1 action in the fetal testis was unknown. We showed that in fetal testes from XY Dax1-overexpressing transgenic mice, the expression of the key testis-promoting gene sex-determining region on Y (SRY)-box-9 (SOX9) is reduced. Moreover, in XY SOX9 heterozygotes, in which testis development is usually normal, Dax1 overexpression results in ovotestes. The ovarian portion of the XY ovotestes was characterized by expression of the granulosa cell marker, FoxL2, with complete loss of the testicular Sertoli cell markers, SOX9 and AMH. Using reporter mice, Dax1 overexpression reduced activation of TES, the testis enhancer of SOX9, indicating that DAX1 might repress SOX9 expression via TES. In cultured cells, increasing levels of DAX1 antagonized SF1-, SF1/SRY-, and SF1/SOX9-mediated activation of TES, due to reduced binding of SF1 to TES, providing a likely mechanism for DSS.

Novel cause of DSD identified

In most 46,XY DSD cases it is not possible to identify a causative mutation, making genetic counselling difficult and potentially hindering optimal treatment. Whole-genome analysis of a 46,XY DSD patient with ambiguous genitaliaconducted in collaboration with Professor A. Sinclair from Murdoch Childrens Research Institute, revealed a heterozygous deletion within the WWOX gene, inherited from the mother. This supports a role for WWOX in human gonad development.

Multigenic cause of DSD with testicular cancer

DSD patients are at increased risk of developing malignant type II germ cell tumors/cancer with either carcinoma in situ or gonadoblastoma (GB) as the precursor lesion. In collaboration with Leendert Looijenga from Erasmus University, The Netherlands, we reported a 22 year old female presenting with primary amenorrhoea and 46,XY gonadal dygenesis with a novel missense mutation in SRY.

Functional *in vitro* studies showed no convincing protein malfunctioning. Laparoscopic examination revealed streak ovaries and a normal, but small, uterus. Pathological examination demonstrated bilateral GB and dysgerminoma, confirmed by immunohistochemistry. Occurrence of a delayed progressive kidney failure (focal segmental glomerular sclerosis) triggered analysis of WT1, revealing a pathogenic splice-site mutation in intron 9. Analysis of the *SRY* gene in an additional five Frasier Syndrome (FS) cases did not reveal any mutations. The case presented shows the importance of multi-gene based diagnosis of DSD patients, allowing early diagnosis and treatment, thus preventing putative development of an invasive cancer.

Sex determination in two weird mammals

In most mammals, the Y chromosomal *SRY* gene initiates testis formation within the bipotential gonad, resulting in male development. The sex-determining mechanisms in the SRY-negative species such as *Ellobius*, a mole vole, remain elusive. We have cloned and sequenced the *Ellobius* SRY target sequence in the SOX9 enhancer; called TESCO from several *Ellobius* species- all display a 14-

Sex Determination (L - R): Janelle Ryan, Rajini Sreenivasan, Dr Kate York, Dr Stefan Bagheri-Fam, Dr Pascal Bernard, Professor Vincent Harley, Dr Rowena Lavery, Dr Makoto Ono, Dimithu Alankarage

bp deletion removing a highly conserved SOX/TCF site. This deletion increased both basal activity and SF1-mediated activation in cultured cells. We propose a model whereby the deletion may have triggered up-regulation of SOX9 in XX gonads leading to destabilization of the XY/XX sex-determining mechanism in *Ellobius*.

The basal lineage of monotremes features an extraordinarily complex sex chromosome system which has provided novel insights into the evolution of mammalian sex chromosomes.

In collaboration with Dr Frank Grutznerfrom the Robinson Institute in Adelaide, we have identified a candidate testis-determining gene in monotremes. Crspy is expressed exclusively in males with particularly strong expression in testis. Reporter gene assays to investigate whether Crspy can act on the recently discovered mouse SOX9 testis-specific enhancer element, TESCO and did reveal a modest effect together with mouse SOX9+Sf1. This is the first report of a differentiated functional male-specific gene on platypus Y chromosomes, providing new insights into sex chromosome evolution and a candidate gene for male-specific function in monotremes.

Brain & Gender (L - R): Dr Joohyung Lee, Jeanne Correia, Daniel Czech, Amy Russ, Professor Vincent Harley, Dr Kate York

5. GENETICS & DEVELOPMENT

BRAIN & GENDER

Genetic differences between the male and female brain may hold the key to understanding the causes of neurological disorders more prevalent in men.

Laboratory Heads:
Dr Joohyung Lee and Professor Vincent Harley

In 2012, we continued to investigate the role of gender-specific genes in neurological disorders found to be more prevalent in men, such as Parkinson's disease, schizophrenia, attention deficit hyperactivity disorder (ADHD) and autism. Onset of these diseases is also generally earlier in men, with symptoms shown to be severe, fast progressing and less responsive to medication.

We are particularly interested in the sex-determining region Y gene *(SRY)*, which is responsible for testes development in mammals, and its role in the production of neurotransmitters in the brain such as dopamine, which controls movement and coordination, as well as reward, motivation and the level of mental attention. We are currently testing the hypothesis that SRY is dysregulated in male-biased brain disorders.

Role of the male-specific gene SRY in Parkinson's disease

Parkinson's disease is a relatively common neurological disorder affecting an estimated 70,000 Australians, with men 50 per cent more likely to be diagnosed than women. Onset of the disease is triggered by the death of more than 70 per cent of the dopamine-producing cells in the brain region called the *substantia nigra*.

Post-mortem analysis has shown that SRY is expressed in dopamine-producing cells in the *substantia nigra pars compacta* (SNc) in the human male brain, but not in the female. Our cell and animal research has uncovered strong evidence that the *SRY* gene regulates the dopamine pathway in the brain, therefore influencing the control of movement in males. Using human male cell lines, we found that SRY regulates a number of dopamine synthesis and metabolic enzymes, as well as dopamine receptor 2 (see Czech et al., 2012). These findings provide a molecular explanation for our earlier studies demonstrating that inhibition of the *SRY* gene in the *substantia nigra* leads to an impairment of motor function in males.

Regulation of SRY in models of Parkinson's disease

The unexpected expression and function of SRY within dopamine neurons of the *substantia nigra* region of the brain led us to investigate SRY under conditions of injury. When researchers treated a male dopaminergic cell line with toxin, 6-hydroxydopamine (a toxin which causes Parkinson's disease) SRY mRNA levels became elevated. Up-regulation of SRY was rapid (3 h) and was also induced by the 6-OHDA metabolite p-quinone rather than the peroxide stress pathway. As a result of this research, we believe that inhibiting SRY levels in the *substantia nigra* has the potential to slow the progression of Parkinson's disease in men or reduce their susceptibility to this debilitating disease. We are currently exploring potential avenues towards therapeutic applications.

Y men are more reactive to stress - SRY and the regulation of catecholamines

There are known differences between male and female bio-behavioural responses to stress. Men exhibit a heightened sympathetic response to stress compared with females. Specifically, the classic "fight-or-flight" response to stress is adaptive for males, while women engage in a so-called "tend-and-befriend" response to stress. We propose that the Y-chromosome gene, SRY (sex-determining region on the Y chromosome), provides a genetic basis for the heightened sympathetic reactivity to stress and thus predominance of "fight-flight" response in males (see Lee and Harley, 2012, Bioessays). Our hypothesis has received considerable attention in the wider media, which we hope will stimulate its testing.

Genetics of gender identity disorders

Transsexuals often describe feeling trapped in a body with the wrong gender, a condition that appears linked to how strongly the brain's hypothalamus responds to testosterone. A major genetic study of male-to-female transsexuals undertaken at PHI was the first to identify a small difference in the androgen receptor gene, which is more prevalent among transsexuals. An ongoing investigation, involving the world's largest cohort focussed upon the analysis of genes involved in sex steroid actions and metabolism, will assist our researchers to identify other genes that may be associated with the condition.

GROWTH FACTOR SIGNALLING

The Growth Factor Signalling Laboratory has a long-term interest in understanding how individual members of the TGF-ß family are regulated and how this regulation affects biological activity.

Laboratory Head:
Dr Craig Harrison

Members of the transforming growth factor-β (TGF-β superfamily are key regulators of cellular growth and differentiation, with well documented roles in embryogenesis, reproduction, wound healing, immune function, fibrosis and tumour progression. The Growth Factor Signalling Laboratory has a long-term interest in understanding how individual members of the TGF-β family are regulated and how this regulation affects biological activity.

The role of GDF9 in female fertility
Growth differentiation fact 9 (GDF9) has a profound impact on female fertility. This growth factor is essential for the development, maturationand number of egg cells released during each fertile cycle. GDF9 is produced in the egg in a precursor form, which is processed by enzymes to a mature form. Recently, we showed that mouse GDF9 is processed very efficiently and is, thus, secreted in an "active" form, whereas, human GDF9 is poorly processed and is secreted in an "inactive" precursor form. This is the first observed species difference in the activation status of a TGF-β protein, and it likely contributes to the variation observed in follicular development, ovulation rate and fertility between mammals.

Currently, we are investigating how mutations in GDF9 cause premature ovarian failure (POF), polycystic ovary syndrome and dizygotic twinning. We have generated 14 GDF9 mutants and have characterised their expression and activity. Excitingly, we have identified three activating mutations in GDF9 associated with POF.

The leader of PHI's growth factor signalling team, Dr Craig Harrison, and his collaborators Associate Professor David Robertson (PHI), Dr Robert Gilchrist (the University of Adelaide) and Professor Ken McNatty (Victoria University of Wellington, New Zealand), were awarded a National Health and Medical Research Council (NHMRC) project grant for 2012-14 to understand the mechanism of human GDF9 activation and to develop GDF9 inhibitors to control folliculogenesis.

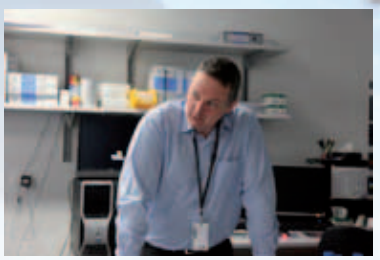
Activins are potent inducers of muscle wasting
In advanced cancers, up to 80 per cent of patients exhibit significant body wasting (cachexia) and remarkably 25 per cent of cancer-related mortalities (1.9 million people world-wide in 2008) derive from cachexia rather than direct tumor burden. Other conditions are also associated with cachexia, including sepsis, renal failure; AIDS and diabetes. Studies have identified activin A and activin B as potential mediators of cancer cachexia.

Recently, we have characterised the mechanisms of activin-induced muscle wasting and have shown activin levels rise in wasting conditions. Future studies will assess the therapeutic potential of blocking activin signaling to reverse cachexia.

Development of specific TGF-β antagonists
TGF-β proteins are synthesised as precursor molecules consisting of pro- and mature domains. Previously,we modified the activin A prodomain to generate a novel therapy that specifically targets activin A. Using cell culture we have shown that this reagent can potently inhibit the biological activity of activin A, but not the closely related proteins, activin B, myostatin and GDF-11. This represents an important finding as currently available activin inhibitors also affect the activity of multiple TGF-β proteins. We will next test the ability of this inhibitor to block activin A-induced muscle wasting and cachexia *in vivo.*

(L - R): Dr Craig Harrison, Justin Chen, Courtney Simpson, Dr Kelly Walton, James Wataszczuk

6 TRANSLATION



Commercialisation

Clinical Services

Enabling Technologies

TRANSLATION

COMMERCIALISING OUR DISCOVERIES

Commercialisation is a vital mechanism for successful translation of research from the lab to the bedside, enabling our researchers to deliver improved treatments and diagnostics to improve quality of life of patients and their families. In 2012, two new patent applications were filed.

The commercialisation of research discoveries delivers products and patents, which can be translated into new drugs, preventative treatment therapies and technologies, positively impacting on innovation within Australia and our ability to lead major global advances in health care.

Royalties received by Prince Henry's Institute from licensed patents help fund future discovery. In 2012, we received approximately $1.2 m in royalties for one patent alone since the execution of the licensing agreement on 26 June 2002. PHI filed two new provisional patent applications in 2012, one pertaining to a diagnostic test for endometrial cancer and the other relating to the treatment of cancer-induced cachexia. One patent, concerning SRY and Parkinson's disease, was abandoned due to the absence of a prospective business partner to support ongoing expenditure required to maintain the patent and ongoing experimental work.

This year we continued liaising with the US-based licensee for PHI's epitopic antibody patent regarding development of a commercial scale diagnostic cancer test, and supply of reagents for our research. As part of this process, our researchers have provided regular reports including new research data and proposals for additional investigations during quarterly meetings with the licensee.

We also continue to pursue opportunities for research collaboration, with the Institute executing 12 new agreements for collaborative research, materials transfer and confidential disclosures in 2012.

Intellectual property (IP) and commercialisation initiatives at PHI are overseen by the Intellectual Property and Commercialisation Committee, a subcommittee of the PHI Board, and monitors and advises with intellectual property and commercialisation activities on behalf of the Institute.

Throughout 2012, members provided expert guidance on issues such as corporate governance of intellectual property-related functions and strategies for managing our licensing relationships. We greatly appreciate the contribution made by members of this committee.

L - R: Ovarian Cancer Biomarkers Laboratory: Dr Andrew Stephens, Jess Gathercole, Josie Lawrence

Prince Henry's Institute has a proud history of engagement with the provision of clinical services. Our senior clinical teams provide endocrinology consulting, teaching and service development leadership in the affiliated Southern Health Department of Endocrinology and in other clinical departments at Southern Health.

Originally headed by Professor Henry Burger, the Southern Health General Endocrinology Clinic continues to provide endocrine care for South-Eastern Melbourne. Under the current leadership of Professor Peter Fuller, the Endocrinology Unit, servesa population approaching 1.6 million. The Unit includes consultants, clinical trainees and endocrinologists conduction research toward a PhD at PHI: Dr Jun Yang, Dr Jimmy Shen, Dr Michael Mond and Dr Philip Wong.

As the demand for this service has increased, so has the evolution of more specialised clinics. The Androgen Replacement Clinic is a joint initiative of Prince Henry's Institute and the Southern Health Endocrinology Unit. Under the leadership of Drs Carolyn Allan and Kati Matthiesson, the clinic advises on the management of men with androgen deficiency, assisting with education of clinicians in this aspect of endocrinology and provides a basis for a number of research studies.

PHI also has strong links with Monash Medical Centre, with Dr Matthiesson providing andrology expertise to the Reproductive Biology Unit Clinic and Dr Allan providing leadership in the hospital's Gestational Diabetes and Endocrinology in Pregnancy Clinics. In 2012, Dr Matthiesson has worked closely with the Department of Urology to establish a clinical service to care for men undergoing testosterone withdrawal therapy for prostate cancer. This service addresses a significant, unmet need in the management of prostate cancer.

Prince Henry's Institute has a proud history of engagement with the provision of clinical services. In the 1970's, Professor Henry Burger worked closely with the late Jean Hailes to establish Australia's first Menopause Clinic.

The clinic is still operating today under the joint management of Southern Health's Endocrinology and Gynaecology Units. The Endocrinology component is jointly headed by Dr. Amanda Vincent who also has several research collaborations with PHI researchers. Dr Fran Milat (the Michael, John and Phoebe Jones Fellow) contributes her expertise in the management of osteoporosis to the menopause clinic. Dr Milat has been instrumental in the establishment of the Metabolic Bone Disease Clinic in collaboration with the Paediatric Endocrinology Unit.

The clinic specialises in the treatment of osteoporosis, but also treats other diseases of the bone in younger patients, many of whom are transitioning from paediatric care. In 2012 she also led the establishment of an Osteoporosis Clinic at Dandenong Hospital, a collaboration between the Orthopaedics Unit of Southern Health (which is based at Dandenong) and the Endocrine Unit. This is staffed currently by Dr Vincent and Dr Philip Wong who is a doctoral research fellow in osteoporosis at PHI.

This has involved service development and the provision of protocols for areas not previously covered by existing management guidelines. Several research studies have arisen from the development of this clinic.

The Multidisciplinary Thyroid Clinic,was established to manage thyroid cancer and is part of the evolution of a full academic service associated with research and teaching across disciplines and centres. The staff of this service included Dr Michael Mond who is also conducting research on the molecular pathogenesis of thyroid cancer in PHI.

Professor Rob McLachlan, head of the Institute's Clinical Andrology service, maintains his active engagement with Monash IVF as the consultant andrologist and Chairman of their research committee that oversees research collaborations with PHI. He also serves as Director of Andrology Australia, a Federally funded research and advocacy organisation for Men's Health. He is assisted by an Andrology Fellow, Dr Bianca St John.

L - R: Yulia Roif, Anna Zamojska, Dr Carolyn Allan, Elise Forbes

ENABLING TECHNOLOGIES

MHTP Medical Genomics Facility

incorporating:

- **ACRF Centre for Cancer Genomic Medicine**
- **The Gandel Charitable Trust Sequencing Centre**
- **MHTP High Content Screening Centre**
- **MHTP Microarray Centre**

The Monash Health Translation Precinct (MHTP) Medical Genomics Facility provides vital services to researchers across Prince Henry's Institute including state-of-the-art DNA sequencing, high content screening, and gene expression comparisons.

Officially launched in 2012, the Australian Cancer Research Foundation (ACRF) Centre for Cancer Genomic Medicine funded by the ACRF ($1.6 million) hosts the latest Next Generation Sequencing technologies. This equipment is essential for the rapid sequencing of entire genomes providing researchers greater insight into the nature of genes involved in cancer and other diseases to assist in the development of therapies targeting specific cancers. The first human genome took over ten years to accomplish, however, with this new technology, the same amount of information takes only a couple of days to generate.

The Gandel Charitable Trust Sequencing Centre has a long tradition of providing access to quality DNA sequencing services. Since 1999, the Centre, named in recognition of the Gandel family's support, has provided services to 500 medical researchers and clinicians within MHTP as well as nationwide. Services at the Centre have continued to expand, with new genomic services developed to support the world-class research undertaken within the Precinct. In 2012, the Centre introduced a Cell Line Identification service through DNA analysis, allowing researchers to authenticate cell lines used for medical research. This is a critical quality control measure to ensure data accuracy and research quality.

The MHTP High Content Screening Centre enables researchers to perform cell biology experiments using automated analysis to detect and quantitate cellular processes. In 2012, researchers used the facility to measure processes including mechanisms of cell death and growth and /or activation of specific intracellular pathways using fluorescent dyes and proteins. These assays used in combination with drug treatment or inhibition ('Knock-down') of individual genes, to determine their effect on cellular functions. Using this approach, researchers have been able to identify novel genes, which contribute to these mechanisms.

The MHTP Microarray Centre provides the technology to compare gene expression levels in thousands of genes simultaneously. More simply, it enables researchers to understand which genes are turned on and off during disease. Used for both diagnostic and medical research applications, this technology provides clinicians with a powerful tool for Molecular Karyotyping -investigating individuals with developmental disabilities or congenital conditions.

These services are vital for the capacity of PHI researchers to progress key research.

In 2012, DNA sequencing enabled researchers to identify a gene mutation present in adult granulosa cell tumours, as well as mutations in a new gene that causes a disorder of sex development in newborn males known as testicular dysgenesis. Researchers also used high content screening to test the effects of novel therapeutic agents for the treatment of ovarian cancer and utilised services at the Microarray Centre to identify differences in gene expression between primary and recurrent granulosa cell tumours.

The MHTP Genomic Facility enabled the Ovarian Cancer Laboratory to determine expression levels of the gene, CXCL10, in cancer patients. They believe this gene may be involved in a process that impairs immune function in some cancer patients.

PUBLICATIONS 2012

1. Aleman-Muench GR, Mendoza V, Stenvers K, Garcia-Zepeda EA, Lopez-Casillas F, Raman C and Soldevila G. Betaglycan (T beta RIII) is expressed in the thymus and regulates T cell development by protecting thymocytes from apoptosis. PLoS One 2012; **7:** e44217.

2. Aljofan M, Singh H, Ho HT, Xie SW, Zhu Y, Sun ZG, Guo XJ, Wang J and Nie GY. Inhibition of proprotein convertase 5/6 activity: potential for nonhormonal women-centered contraception. Contraception 2012; **85:**602-610.

3. Allan CA, Collins VR, Frydenberg M, McLachlan RI and Matthiesson KL. Monitoring cardiovascular health in men with prostate cancer treated with androgen deprivation therapy. International Journal of Urological Nursing 2012; **6:**35-41.

4. Anthoni H, Sucheston LE, Lewis BA, Tapia-Páez I, Fan X, Zucchelli M, Taipale M, Stein CM, Hokkanen ME, Castrén E, Pennington BF, Smith SD, Olson RK, Tomblin JB, Schulte-Körne G, Nöthen M, Schumacher J, Müller-Myhsok B, Hoffmann P, Gilger JW, Hynd GW, Nopola-Hemmi J, Leppanen PH, Lyytinen H, Schoumans J, Nordenskjöld M, Spencer J, Stanic D, Boon WC, Simpson E, Mäkelä S, Gustafsson JÅ, Peyrard-Janvid M, Iyengar S, Kere J. The aromatase gene CYP19A1: Several genetic and functional lines of evidence supporting a role in reading, speech and language. Behavior Genetics 2012; **42:**509-527.

5. Aschenbach LC, Hester KE, McCann NC, Zhang JG, Dimitriadis E and Duffy DM. The LIF receptor antagonist PEGLA is effectively delivered to the uterine endometrium and blocks LIF activity in cynomolgus monkeys. Contraception 2012. Epub Oct 31.

6. Bagheri-Fam S, Sreenivasan R, Bernard P, Knower KC, Sekido R, Lovell-Badge R, Just W and Harley VR. Sox9 gene regulation and the loss of the XY/XX sex-determining mechanism in the mole vole Ellobius lutescens. Chromosome Research 2012; **20:**191-199.

7. Bernard P, Ryan J, Sim H, Czech DP, Sinclair AH, Koopman P and Harley VR. Wnt signaling in ovarian development inhibits Sf1 activation of Sox9 via the Tesco enhancer. Endocrinology 2012; **153:**901-912.

8. Beyer CE, Kayler B, Osborne E, McLachlan R and Osianlis T. Supersensitive fluorescent semen analysis: validation on azoospermic and oligozoospermic samples. Fertility and Sterility 2012; **98:**843-848.

9. Bienvenu LA, Morgan J, Rickard AJ, Tesch GH, Cranston GA, Fletcher EK, Delbridge LM and Young MJ. Macrophage mineralocorticoid receptor signaling plays a key role in aldosterone-independent cardiac fibrosis. Endocrinology 2012; **153:**3416-3425.

10. Bilandzic M and Stenvers KL. Reprint of: Betaglycan: A multifunctional accessory. Molecular and Cellular Endocrinology 2012; **359:**13-22.

11. Brown KA, Samarajeewa NU and Simpson ER. Endocrine-related cancers and the role of AMPK. Molecular and Cellular Endocrinology 2012. Epub Jul 16.

12. Brown KA and Simpson ER. Obesity and breast cancer: mechanisms and therapeutic implications. Frontiers in Bioscience 2012; **4:**2515-2524.

13. Burger H. Testosterone concentrations in ovarian insufficiency: a review. Climacteric 2012; **15:**502-503.

14. Burger HG and Baber RJ. Editor retires to the 19th hole: yours aye, Alastair. Climacteric 2012; **15:**297-298.

15. Burger HG, Maclennan AH, Huang KE and Castelo-Branco C. Evidence-based assessment of the impact of the WHI on women's health. Climacteric 2012; **15:**281-287.

16. Cato ACB and Fuller PJ. What is in a name? Preface. Molecular and Cellular Endocrinology 2012; **350:**145-145.

17. Chand AL, Wijayakumara DD, Knower KC, Herridge KA, Howard TL, Lazarus KA and Clyne CD. The orphan nuclear receptor LRH-1 and ERalpha activate GREB1 expression to induce breast cancer cell proliferation. PLoS One 2012; **7:**e31593.

18. Chow JDY, Price JT, Bills MM, Simpson ER and Boon WC. A doxycycline-inducible, tissue-specific aromatase-expressing transgenic mouse. Transgenic Research 2012; **21:**415-428.

19. Cossigny DA, Findlay JK and Drummond AE. The effects of FSH and activin A on follicle development in vitro. Reproduction 2012; **143:**221-229.

20. Czech DP, Lee J, Sim H, Parish CL, Vilain E and Harley VR. The human testis determining factor SRY localizes in midbrain dopamine neurons and regulates multiple components of catecholamine synthesis and metabolism. Journal of Neurochemistry 2012; **122:**260-271.

21. Donoghue JF, McGavigan CJ, Lederman FL, Cann LM, Fu L, Dimitriadis E, Girling JE and Rogers PAW. Dilated thin-walled blood and lymphatic vessels in human endometrium: a potential role for VEGF-D in progestin-induced break-rhrough bleeding. PLoS One 2012; **7:** e30916.

22. Dowhan DH, Harrison MJ, Eriksson NA, Bailey P, Pearen MA, Fuller PJ, Funder JW, Simpson ER, Leedman PJ, Tilley WD et al. Protein arginine methyltransferase 6-dependent gene expression and splicing: association with breast cancer outcomes. Endocrine-Related Cancer 2012; **19:**509-526.

23. Drummond AE and Fuller PJ. Activin and inhibin, estrogens and NF kappa B, play roles in ovarian tumourigenesis is there crosstalk? Molecular and Cellular Endocrinology 2012; **359:**85-91.

24. Drummond AE and Fuller PJ. Ovarian actions of estrogen receptor-beta: an update. Seminars in Reproductive Medicine 2012; **30:**32-38.

25. Dynon K, Heng S, Puryer M, Li Y, Walton K, Endo Y and Nie G. HtrA3 as an early marker for preeclampsia: specific monoclonal antibodies and sensitive high-throughput sssays for serum screening. PLoS One 2012; **7:**e45956.

26. Evans J, Hannan NJ, Hincks C, Rombauts LJ and Salamonsen LA. Defective soil for a fertile seed? Altered endometrial development is detrimental to pregnancy success. PLoS One 2012; **7:**e53098.

27. Evans J and Salamonsen LA. Inflammation, leukocytes and menstruation. Reviews in Endocrine & Metabolic Disorders 2012; **13:**277-288.

28. Fuller PJ, Yao Y, Yang J and Young MJ. Mechanisms of ligand specificity of the mineralocorticoid receptor. Journal of Endocrinology 2012; **213:**15-24.

29. Funder JW. Aldosterone and mineralocorticoid receptors: a personal reflection. Molecular and Cellular Endocrinology 2012; **350:**146-150.

30. Funder JW. The case against aldosterone: not proven. Endocrine 2012; **42:**464-465.

31. Funder JW. The genetic basis of primary aldosteronism. Current Hypertension Reports 2012; **14:**120-124.

32. Funder JW. The genetics of primary aldosteronism: chapter two. Hypertension 2012; **59:**537-538.

33. Funder JW. Primary aldosteronism: are we missing the wood for the trees? Hormone and Metabolic Research 2012; **44:**251-253.

34. Funder JW. Primary aldosteronism and public health: new definitions, new challenges. Hormone and Metabolic Research 2012; **44:**929.

35. Funder JW. Primary aldosteronism: clinical lateralization and costs. The Journal of Clinical Endocrinology and Metabolism 2012; **97:**3450-3452.

36. Funder JW. Ultimately we are in furious agreement. Journal of Hypertension 2012; **30:**1903-1905.

37. Hannan NJ, Nie G, Rainzcuk A, Rombauts LJ and Salamonsen LA. Uterine lavage or aspirate: Which view of the intrauterine environment? Reproductive Sciences 2012; **19:**1125-1132.

38. Herlihy AS, Halliday JL and Gillam LH. Ethical issues in recruiting prenatally diagnosed adults for research: Klinefelter syndrome as an example. Public Health Genomics 2012; **15:**31-33.

39. Hersmus R, van der Zwan YG, Stoop H, Bernard P, Sreenivasan R, Oosterhuis JW, Bruggenwirth HT, de Boer S, White S, Wolffenbuttel KP et al. A 46,XY Female DSD patient with bilateral gonadoblastoma, a novel SRY missense mutation combined with a WT1 KTS splice-site mutation. PLoS One 2012; **7:**e40858.

40. Hewitson TD, Zhao C, Wigg B, Lee SW, Simpson ER, Boon WC and Samuel CS. Relaxin and castration in male mice protect from, but testosterone exacerbates, age-related cardiac and renal fibrosis, whereas estrogens are an independent determinant of organ size. Endocrinology 2012; **153:**188-199.

41. Ho H, Nero TL, Singh H, Parker MW and Nie G. PEGylation of a proprotein convertase peptide inhibitor for vaginal route of drug delivery: In vitro bioactivity, stability and in vivo pharmacokinetics. Peptides 2012; **38:**266-274.

42. Ho H, Singh H, Aljofan M and Nie G. A high-throughput in vitro model of human embryo attachment. Fertility and Sterility 2012; **97:**974-978.

43. owlett M, Chalinor HV, Buzzelli JN, Nguyen N, van Driel IR, Bell KM, Fox JG, Dimitriadis E, Menheniott TR, Giraud AS, Judd LM. IL-11 is a parietal cell cytokine that induces atrophic gastritis. Gut 2012; **61:**1398-1409.

44. Jamieson S and Fuller PJ. Molecular pathogenesis of granulosa cell tumors of the ovary. Endocrine Reviews 2012; **33:**109-144.

45. Kaitu'u-Lino TJ, Ye L, Salamonsen LA, Girling JE and Gargett CE. Identification of label-retaining perivascular cells in a mouse model of endometrial decidualization, breakdown, and repair. Biology of Reproduction 2012; **86:**184.

46. Kerr JB, Brogan L, Myers M, Hutt KJ, Mladenovska T, Ricardo S, Hamza K, Scott CL, Strasser A and Findlay JK. The primordial follicle reserve is not renewed after chemical or gamma-irradiation mediated depletion. Reproduction 2012; **143:**469-476.

47. Kerr JB, Hutt KJ, Cook M, Speed TP, Strasser A, Findlay JK and Scott CL. Cisplatin-induced primordial follicle oocyte killing and loss of fertility are not prevented by imatinib. Nature Medicine 2012; **18:**1170-1172.

48. Kerr JB, Hutt KJ, Michalak EM, Cook M, Vandenberg CJ, Liew SH, Bouillet P, Mills A, Scott CL, Findlay JK et al. DNA damage-induced primordial follicle oocyte apoptosis and loss of fertility require TAp63-mediated induction of Puma and Noxa. Molecular Cell 2012; **48:**343-352.

49. Knower KC, To SQ, Takagi K, Miki Y, Sasano H, Simpson ER and Clyne CD. Melatonin suppresses aromatase expression and activity in breast cancer associated fibroblasts. Breast Cancer Research and Treatment 2012; **132:**765-771.

50. Kyaw T, Tipping P, Bobik A and Toh BH. Protective role of natural IgM-producing B1a cells in atherosclerosis. Trends in Cardiovascular Medicine 2012; **22:**48-53.

51. Latifi A, Luwor RB, Bilandzic M, Nazaretian S, Stenvers K, Pyman J, Zhu HJ, Thompson EW, Quinn MA, Findlay JK, Ahmed N. Isolation and characterization of tumor cells from the ascites of ovarian cancer patients: molecular phenotype of chemoresistant ovarian tumors. PLoS One 2012; **7:** e46858.

52. Lay V, Yap J, Sonderegger S and Dimitriadis E. Interleukin 11 regulates endometrial cancer cell adhesion and migration via STAT3. International Journal of Oncology 2012; **41:**759-764.

53. Lazarus KA, Wijayakumara D, Chand AL, Simpson ER and Clyne CD. Therapeutic potential of Liver Receptor Homolog-1 modulators. Journal of Steroid Biochemistry and Molecular Biology 2012; **130:**138-146.

54. Lee J and Harley VR. The male fight-flight response: a result of SRY regulation of catecholamines? BioEssays 2012; **34:**454-457.

55. Ludbrook LM, Bernard P, Bagheri-Fam S, Ryan J, Sekido R, Wilhelm D, Lovell-Badge R and Harley VR. Excess DAX1 leads to XY ovotesticular disorder of sex development (DSD) in mice by inhibiting steroidogenic factor-1 (SF1) activation of the testis enhancer of SRY-box-9 (Sox9). Endocrinology 2012; **153:**1948-1958.

56. Magne Nde CB, Njamen D, Tanee Fomum S, Wandji J, Simpson E, Clyne C and Vollmer G. In vitro estrogenic activity of two major compounds from the stem bark of Erythrina lysistemon (Fabaceae). European Journal of Pharmacology 2012; **674:**87-94.

57. McCabe MJ, Allan CM, Foo CF, Nicholls PK, McTavish KJ and Stanton PG. Androgen initiates Sertoli cell tight junction formation in the hypogonadal (hpg) mouse. Biology of Reproduction 2012; **87:**38.

58. McInnes KJ, Brown KA, Hunger NI and Simpson ER. Regulation of LKB1 expression by sex hormones in adipocytes. International Journal of Obesity 2012; **36:**982-985.

59. McLachlan RI. When is azoospermic infertility treatable without intracytoplasmic sperm injection? Clinical Endocrinology 2012. Epub 25 Sept.

60. McLachlan RI, Ishikawa T, Osianlis T, Robinson P, Merriner DJ, Healy D, de Kretser D and O'Bryan MK. Normal live birth after testicular sperm extraction and intracytoplasmic sperm injection in variant primary ciliary dyskinesia with completely immotile sperm and structurally abnormal sperm tails. Fertility and Sterility 2012; **97:**313-318.

61. McLachlan RI and Krausz C. Clinical evaluation of the infertile male: new options, new challenges. Asian Journal of Andrology 2012; **14:**3-5.

62. Menkhorst EM, Lane N, Winship AL, Li P, Yap J, Meehan K, Rainczuk A, Stephens A and Dimitriadis E. Decidual-secreted factors alter invasive trophoblast membrane and secreted proteins implying a role for decidual cell regulation of placentation. PLoS One 2012; **7:**e31418.

63. Milat F, Wong P, Fuller PJ, Johnstone L, Kerr PG, Doery JCG, Strauss BJ and Bowden DK. A case of hypophosphatemic osteomalacia secondary to deferasirox therapy. Journal of Bone and Mineral Research 2012; **27:** 219-222.

64. Morizane S, Mitani F, Ozawa K, Ito K, Matsuhashi T, Katsumata Y, Ito H, Yan XX, Shinmura K, Nishiyama A et al. Biphasic time course of the changes in aldosterone biosynthesis under high-salt conditions in Dahl salt-sensitive rats. Arteriosclerosis Thrombosis and Vascular Biology 2012; **32:**1194-1203.

65. Nejatbakhsh R, Kabir-Salmani M, Dimitriadis E, Hosseini A, Taheripanah R, Sadeghi Y, Akimoto Y and Iwashita M. Subcellular localization of L-selectin ligand in the endometrium implies a novel function for pinopodes in endometrial receptivity. Reproductive Biology and Endocrinology 2012; **10:**46.

66. Nicholls PK, Stanton PG, Chen JL, Olcorn JS, Haverfield JT, Qian H, Walton KL, Gregorevic P and Harrison CA. Activin signaling regulates Sertoli cell differentiation and function. Endocrinology 2012; **153:**6065-6077.

67. Nicholls PK, Stanton PG, Rainczuk KE, Qian H, Gregorevic P and Harrison CA. Lentiviral transduction of rat Sertoli cells as a means to modify gene expression. Spermatogenesis 2012; **2:**279-284.

68. Notini AJ, McClive PJ, Meachem SJ, van den Bergen JA, Western PS, Gustin SE, Harley VR, Koopman P and Sinclair AH. Redd1 Is a novel marker of testis development but is not required for normal male reproduction. Sexual Development 2012; **6:**223-230.

69. O'Bryan MK, Grealy A, Stahl PJ, Schlegel PN, McLachlan RI and Jamsai D. Genetic variants in the ETV5 gene in fertile and infertile men with nonobstructive azoospermia associated with Sertoli cell-only syndrome. Fertility and Sterility 2012; **98:**827-835.

70. O'Donnell L, McLachlan RI. The role of testosterone in spermatogenesis. In: 'Testosterone: action, deficiency, substitution'. 4th Edition. Eds Nieschlag E, Behre H. Cambridge University Press. 2012 pp123-153.

71. O'Donnell L, Rhodes D, Smith SJ, Merriner DJ, Clark BJ, Borg C, Whittle B, O'Connor AE, Smith LB, McNally FJ et al. An essential role for katanin p80 and microtubule severing in male gamete production. PLoS Genetics 2012; **8:**e1002698.

72. Paule S, Aljofan M, Simon C, Rombauts LJ and Nie G. Cleavage of endometrial alpha-integrins into their functional forms is mediated by proprotein convertase 5/6. Human Reproduction 2012; **27:**2766-2774.

73. Rainczuk A, Rao J, Gathercole J and Stephens AN. The emerging role of CXC chemokines in epithelial ovarian cancer. Reproduction 2012; **144:**303-317.

74. Rao JR, Keating DJ, Chen C and Parkington HC. Adiponectin increases insulin content and cell proliferation in MIN6 cells via PPARgamma-dependent and PPARgamma -independent mechanisms. Diabetes, Obesity & Metabolism 2012; **14:**983-989.

75. Reincke M, Funder JW, Zennaro MC and Beuschlein F. Progress in primary aldosteronism 2. Hormone and Metabolic Research 2012; **44:**155-156.

76. Rickard AJ, Morgan J, Bienvenu LA, Fletcher EK, Cranston GA, Shen JZ, Reichelt ME, Delbridge LM and Young MJ. Cardiomyocyte mineralocorticoid receptors are essential for deoxycorticosterone/salt-mediated inflammation and cardiac fibrosis. Hypertension 2012; **60:**1443-1450.

77. Robertson DM. Inhibins and activins in blood: predictors of female reproductive health? Molecular and Cellular Endocrinology 2012; **359:**78-84.

78. Salamonsen LA, Edgell T, Rombauts LJ, Stephens AN, Robertson DM, Rainczuk A, Nie G and Hannan NJ. Proteomics of the human endometrium and uterine fluid: a pathway to biomarker discovery. Fertility and Sterility 2012. Epub Oct 6.

79. Samardzija C, Quinn M, Findlay JK and Ahmed N. Attributes of Oct4 in stem cell biology: perspectives on cancer stem cells of the ovary. Journal of Ovarian Research 2012; **5:**37.

80. Sarraj MA and Drummond AE. Mammalian foetal ovarian development: consequences for health and disease. Reproduction 2012; **143:**151-163.

81. Sartorius G, Spasevska S, Idan A, Turner L, Forbes E, Zamojska A, Allan CA, Ly LP, Conway AJ, McLachlan RI, Handelsman DJ. Serum testosterone, dihydrotestosterone and estradiol concentrations in older men self-reporting very good health: the healthy man study. Clinical Endocrinology 2012; **77:**755-763.

82. Scott NJ, Cameron VA, Raudsepp S, Lewis LK, Simpson ER, Richards AM and Ellmers LJ. Generation and characterization of a mouse model of the metabolic syndrome: apolipoprotein E and aromatase double knockout mice. American Journal of Physiology Endocrinology and Metabolism 2012; **302:**E576-584.

83. Shapiro S, Farmer RDT, Stevenson JC, Burger HG and Mueck A. Does hormone replacement therapy cause breast cancer? An application of causal principles to three studies Part 4. The Million Women Study. Journal of Family Planning and Reproductive Health Care 2012; **38:**102-109.

84. Shen JZ and Young MJ. Corticosteroids, heart failure, and hypertension: a role for immune cells? Endocrinology 2012; **153:**5692-5700.

85. Simpson CM, Stanton PG, Walton KL, Chan KL, Ritter LJ, Gilchrist RB and Harrison CA. Activation of latent human GDF9 by a single residue change (Gly 391 Arg) in the mature domain. Endocrinology 2012; **153:**1301-1310.

86. Singh H, Heng S, Nicholls PK, Li Y, Tai LT, Jobling T, Salamonsen LA and Nie G. Proprotein convertases in post-menopausal endometrial cancer: distinctive regulation and non-invasive diagnosis. Biochemical and Biophysical Research Communications 2012; **419:**809-814.

87. Singh H, Makino S, Endo Y, Li Y, Stephens AN and Nie G. Application of the wheat-germ cell-free translation system to produce high temperature requirement A3 (HtrA3) proteases. BioTechniques 2012; **52:**23-28.

88. Singh PP, van der Kraan AG, Xu J, Gillespie MT and Quinn JM. Membrane-bound receptor activator of NFkappaB ligand (RANKL) activity displayed by osteoblasts is differentially regulated by osteolytic factors. Biochemical and Biophysical Research Communications 2012; **422:**48-53.

89. Smith CL, Brown KA, Simpson, ER. Regulation of estrogen receptor activity and aromatase expression: roles of selective estrogen receptor modulators and metabolic factors. Translational Endocrinology and Metabolism: Breast Cancer Update. 2012; **3,** 45-73.

90. Smith LB, Milne L, Nelson N, Eddie S, Brown P, Atanassova N, O'Bryan MK, O'Donnell L, Rhodes D, Wells S Diane Napper, Nolan P, Lalanne Z, Cheeseman M, Peters J. KATNAL1 regulation of Sertoli cell microtubule dynamics is essential for spermiogenesis and male fertility. PLoS Genetics 2012; **8:**e1002697.

91. Stanton PG, Sluka P, Foo CF, Stephens AN, Smith AI, McLachlan RI and O'Donnell L. Proteomic changes in rat spermatogenesis in response to in vivo androgen manipulation; impact on meiotic cells. PLoS One 2012; **7:**e41718.

92. Stenvers KL and Findlay JK. Inhibins and activins: Towards the future. A tribute to the late Professor Wylie W. Vale. Molecular and Cellular Endocrinology 2012; **359:**1.

93. Stephens AN, Rombauts LJF, Salamonsen LA. Diagnosis of Endometriosis: Proteomics. In 'Endometriosis: Science and Practice'. Eds Giudice LC, Evers JLH, Healy DL. Wiley-Blackwell, Oxford 2012 pp324-335.

94. Stewart ZA, Wallace E and Allan C. Weight gain in pregnancy: a survey of current practices in a teaching hospital. Australian & New Zealand Journal of Obstetrics & Gynaecology 2012; **52:**208-210.

95. Tarulli GA, Stanton PG and Meachem SJ. Is the adult Sertoli cell terminally differentiated? Biology of Reproduction 2012; **87:**13,1-11.

96. Thi YLL, Mardini M, Howell VM, Funder JW, Ashton AW and Mihailidou AS. Low-dose spironolactone prevents apoptosis repressor with caspase recruitment domain degradation during myocardial infarction. Hypertension 2012; **59:**1164-1169.

97. To SQ, Takagi K, Miki Y, Suzuki K, Abe E, Yang Y, Sasano H, Simpson ER, Knower KC and Clyne CD. Epigenetic mechanisms regulate the prostaglandin E receptor 2 in breast cancer. The Journal of Steroid Biochemistry and Molecular Biology 2012; **132:**331-338.

98. Tsend-Ayush E, Kortschak RD, Bernard P, Lim SL, Ryan J, Rosenkranz R, Borodina T, Dohm JC, Himmelbauer H, Harley VR, Grützner F. Identification of mediator complex 26 (Crsp7) gametologs on platypus X1 and Y5 sex chromosomes: a candidate testis-determining gene in monotremes? Chromosome Research 2012; **20:**127-138.

99. Van Sinderen M, Menkhorst EM, Winship A , Cuman C, Dimitriadis E. Pre-implantation human blastocyst-endometrial interactions: the role of inflammatory mediators. American Journal of Reproductive Immunology 2012 Epub Nov 26.

100. Walker KA, Cai XC, Caruana G, Thomas MC, Bertram JF and Kett MM. High nephron endowment protects against salt-induced hypertension. American Journal of Physiology-Renal Physiology 2012; **303:**F253-F258.

101. Walton KL, Makanji Y and Harrison CA. New insights into the mechanisms of activin action and inhibition. Molecular and Cellular Endocrinology 2012; **359:**2-12.

102. Warren-Smith SC, Nie GY, Schartner EP, Salamonsen LA and Monro TM. Enzyme activity assays within microstructured optical fibers enabled by automated alignment. Biomedical Optics Express 2012; **3:**3304-3313.

103. Whiley PAF, Miyamoto Y, McLachlan RI, Jans DA and Loveland KL. Changing subcellular localization of nuclear transport factors during human spermatogenesis. International Journal of Andrology 2012; **35:**158-169.

104. White S, Hewitt J, Turbitt E, van der Zwan Y, Hersmus R, Drop S, Koopman P, Harley V, Cools M, Looijenga L, and Sinclair, A. A multi-exon deletion within WWOX is associated with a 46,XY disorder of sex development. European Journal of Human Genetics 2012; **20:**348-351.

105. Winbanks CE, Weeks KL, Thomson RE, Sepulveda PV, Beyer C, Qian HW, Chen JL, Allen JM, Lancaster GI, Febbraio MA et al. Follistatin-mediated skeletal muscle hypertrophy is regulated by Smad3 and mTOR independently of myostatin. Journal of Cell Biology 2012; **197:**997-1008.

106. Worsley R, Davis SR, Gavrilidis E, Gibbs Z, Lee S, Burger H and Kulkarni J. Hormonal therapies for new onset and relapsed depression during perimenopause. Maturitas 2012; **73:**127-133.

107. Wu H, Wu M, Chen Y, Allan CA, Phillips DJ and Hedger MP. Correlation between blood activin levels and clinical parameters of Type 2 diabetes. Experimental Diabetes Research 2012. Epub Dec 16.

108. Yang J and Fuller PJ. Interactions of the mineralocorticoid receptor - Within and without. Molecular and Cellular Endocrinology 2012; **350:**196-205.

109. Ye L, Evans J and Gargett CE. Lim1/LIM1 is expressed in developing and adult mouse and human endometrium. Histochemistry and Cell Biology 2012; **137:**527-536.

110. Young MJ and Rickard AJ. Mechanisms of mineralocorticoid salt-induced hypertension and cardiac fibrosis. Molecular and Cellular Endocrinology 2012; **350:**248-255.

EDUCATION

STUDENT PROGRAMS

Prince Henry's Institute provides students with an innovative and stimulating learning environment to encourage and develop tomorrow's research talent.

PHI's student program provides a range of supports and resources to emerging researchers enrolled in Honours, Master's, and Doctoral degrees through affiliated universities, to assist in developing their research skills within a world-class laboratory environment. Research education primarily centres on teaching the discipline of laboratory science, ethics, and research communication. Students are required to present their data regularly within the Institute during their candidature, as well as national scientific meetings. PhD students are also required to present their data at an international level at least once during their candidature.

PHI provides students with group learning opportunities and exposure to the latest scientific techniques through regular scientific and technical seminar programs organised by the Education Committee and Student Society. The Institute also offers a stimulating translation focused learning environment for medically qualified post-graduate students with regular and continuing clinical practice in Southern Health clinics, integrated with training in basic science and research technical skills. We recognise scientific and professional mentoring is a vital tool in the education and development of research students and their success as early-career researchers embarking on a path that is both challenging and rewarding.

Education and training support

PHI is committed to fostering the next generation of innovators to help protect the future of medical research in Australia. We provide a research and clinical environment that empowers students and equips them with the confidence, skills, and techniques to become the scientific leaders of tomorrow. We recognise that with the demands of research and study, it is difficult for many PhD students to take on employment to supplement their PhD stipend. That's why PHI recognises research excellence through the provision of support for high achieving post-graduate students. In 2012, PHI announced two awards recognising research excellence, including sponsored funding providing recipients with $5000 per year over three years.

Social and academic support

Prince Henry's Institute provides a strong program of social and academic support for its students, including the Student Society, Higher Degree by Research Committee and Education Committee. Through these groups, students and staff work together to provide student welfare and training support, mentorship and training and development opportunities.

Students 2012:

PhD	24
Masters	6
Honours	6
Total	36

Committees

Prince Henry's Institute Student Society 2012

Committee members:
Jenna Haverfield (President)
Amy Winship (Vice-president)
Sarah To (Secretary)
Justin Chen (Treasurer)
Daniel Heathcock (Honours Rep)

The Prince Henry's Institute Student Society (PHISS) was re-established in 2010 and continues to contribute to providing a positive and engaging academic and social environment at PHI. In 2012, the PHISS received official approval as a club and society of the Monash University's Student Association.

This year, the student society has continued to work closely with the PHI student community, as well as relevant committees and PHI staff as advocates and representatives of its members. The committee is also instrumental in organising social events, and facilitating student education, training and professional development, including the PHISS Abstract Awards implemented in 2012.

PHISS Abstract Awards

In 2012, PHISS provided abstract awards during Southern Health Research Week and at the Student Symposium.

The Southern Health Research Week PHISS Abstract Award winners:

- PhD (2nd, 3rd and 4th years): **Justine Olcorn**
- Honours, Masters, 1st year PhD: **Amy Winship**

PHISS Student Symposium Abstract Award winners:

- Best Honours/Masters Abstract Award: **Kavitha Vaithiyanathan**
- Best First Year PhD Abstract Award: **Amy Winship**
- Best Second to Fourth Year PhD Abstract Award: **Michael Mond** and **Jimmy Shen**

In 2012, PHISS also ran a professional development workshop for students (and ECRs) in conjunction with the PHI postdoctoral association, chaired by Dr Kelly Walton. Run at Monash University, this workshop featured guest speakers who presented on the following topics:

- Career longevity
  – Professor Iain Clarke
- Work/life Balance
  – Professor Lois Salamonsen
- Publications (from an editor's perspective)
  – Professor Kate Lovelan
- Creating a winning CV
  – Dr Sarah Meachem
- ECR applications process: what you need to be competitive
  – Natalie Hannan
- Research funding (including non-NHMRC avenues)
  – Dr Neil Owens
- Job application/interview skills
  – Mr Peter Murray
- Making use of your available resources
  – Dr Jennifer Scott

We had great feedback on this workshop, which has prompted us to plan another workshop targeted at students on 'What you can do with a PhD'. This event will take place at Monash University during April 2013.

PHI also has provides support to students through the Higher Degrees and Education Committees.

Higher Degree by Research Committee

Chaired by Professor Lois Salamonsen, the Higher Degree Committee nurtures the development of all Higher Degree by Research students at PHI, through candidature monitoring and the provision of support and advice to students and their supervisors.

Awards 2012

PHI 3MT Competition

First place
Rajini Sreenivasan

Equal second place
Justin Chen and **Huiting Ho**

19th Annual PHI Student Symposium Awards

Novo Nordisk Presentation Awards

PhD
Justin Chen 'Activins are potent negative regulators of muscle mass'

Commended - **Jenna Haverfield** 'Dynamic regulation of blood-testis barrier function during meiosis'

First Year PhD Award
Heba Zahid
'The role of apolipoprotein E in endometrial receptivity'

Masters
Zhe (Kimmy) Zhao
'Identification of novel LRH-1 target genes in breast cancer cells'

Honours
James Wataszczuk
'Characterisation of the mechanisms that control activin B activity'

Graduate Excellence Awards

Amy Winship
Amanda (Gabrielle) van der Kraan

19th Annual Student Symposium Awards L - R: A/Prof Tim Cole (Adjudicator, Monash University), Kimmy Zhao, Saras Singam (Novo Nordisk Representative), Heba Zahid, Jenna Haverfield, Dr Rowena Lavery (Adjudicator, PHI), Absent: Justin Chen

University affiliations:

Education supporters:

Montgomery Trust

Student List

PhD Graduates:

Peter Nicholls BBiomedSci (Hons)
'Endocrine regulation of Sertoli cell function'
Supervisors: Dr Peter Stanton; Dr Craig Harrison

Jun Yang MBBS
'The mineralocorticoid receptor: identification of ligand and tissue selection coregulators'
Supervisors: Professor Peter Fuller; Dr Morag Young

PhD Students:

Dimuthu Alankarage BBiomedSci (Hons)
'ETV5 and DHH are novel genes in mammalian sex development'
Supervisors: Professor Vincent Harley; Dr Pascal Bernard

Laura Bienvenu BSc (Hons)
'Cardiomyocyte mineralocorticoid receptor signalling plays a critical role in ischema-reperfusion injury and recovery of cardiac function'
Supervisors: Professor Lea Delbridge (University of Melbourne); Dr Morag Young Dr Melissa Reichelt (University of Melbourne)

Justin Chen BSc (Hons) BA
'Targeting activin to conteract muscle wasting and cachexia'
Supervisors: Dr Craig Harrison; Dr Kelly Walton

Daniel Czech BSc (Hons)
'The role of SRY in healthy and diseased midbrain neurons'
Supervisors: Dr Helena Sim; Professor Vincent Harley; Dr Joohyung Lee

Damien Eeles BBMs (Hons)
'The role of IL-33 in bone'
Supervisors: Dr Johannes Schuijers and Dr Brian Grills (La Trobe University); Dr Julian Quinn

Elizabeth Fletcher BSc (Hons)
'Mechanisms of Mineralocorticoid Receptor-Mediated Cardiovascular Disease: a Role for the Peripheral Molecular Clock?'
Supervisor: Professor Leanne Delbridge (University of Melbourne); Dr Morag Young

Jenna Haverfield BSc (Hons)
'Endocrine regulation of Sertoli cell function'
Supervisors: Dr Sarah Meachem; Dr Peter Stanton

Sophea Heng BSc (Hons)
'PCs in embryo implantation and endometrial cancer'
Supervisors: Supervisor: A/Prof Guiying Nie

Hui Ting Ho BSc (Hons)
'Proprotein convertase 6: role in embryo implantation and clincial implications'
Supervisor: A/Prof Guiying Nie

Kyren Lazarus BSc (Hons)
'Role of LRH-1 in breast cancer'
Supervisors: Dr Lara Grollo (Swinburne University); Dr Colin Clyne; Dr Ashwini Chand

Michael Mond MBBS, FRACP
'Defining the genetic pathology of epithelial thyroid tumours'
Supervisors: Associate Professor Chris Gilfillan (Monash University); Professor Peter Fuller

Justine Olcorn BBiomedSci (Hons)
'Regulation of spermatogenesis by TGFβ superfamily members'
Supervisors: Dr Peter Stanton; Dr Craig Harrison

Nirukshi Samarajeewa BBiomedSci (Hons)
'CAMP response element (CRE)-dependent regulation of armoatase in obesity and postmenopausal breast cancer'
Supervisors: Dr Kristy Brown; Professor Evan Simpson

Jimmy Shen MBBS
'Macrophage MR signalling regulates systolic blood pressure and cardiovascular remodelling'
Supervisors: Dr Morag Young; Professor Peter Fuller

Courtney Simpson BSc (Hons)
'Structure and function of growth and differentiation factor-9'
Supervisors: Dr Craig Harrison; Dr Peter Stanton

Rajini Sreenivasan MSc
'Genetic regulatory mechanisms in mammalian sex determination'
Supervisors: Professor Vincent Harley; Dr Robb de Longh (University of Melbourne)

Sarah To BSc (Hons)
'TNFalpha and its role in menopausal ER+ breast cancer'
Supervisors: Dr Colin Clyne; Dr Kevin Knower

Amanda Gabrielle van der Kraan BBiomedSci (Hons)
'The potentiating effects of cell stress on pathological bone loss'
Supervisors: Professor Matthew Gillespie; Dr Julian Quinn; Dr John Price (Monash University)

Xuyi Wang BSc Grad Dip Reprod Sci
'Role of P53 in regulating aromatase in the breast'
Supervisors: Dr Kristy Brown; Professor Evan Simpson

Amy Winship BSc (Hons)
'The role of Interleukin-11 in Endometrial Cancer'
Supervisor: Dr Eva Dimitriadis

Phillip Wong MBBS FRACP
'Thalassemia bone disease and the role of iron overload on bone biology'
Supervisors: Professor Peter Fuller; Professor Matthew Gillespie, Dr Fran Milat

Heba Zahid BSc App Med Sci
'The role of apolipoprotein E in endometrial receptivity'
Supervisors: Professor Lois Salamonsen; Dr Tracey Edgell

Masters Graduates:

Wenxin (Cindy) Chen BBiomedSci
'The role of the Nuclear Factor κB (NFκB) signalling in granulosa cell biology'
Supervisors: Dr Ann Drummond; Dr Simon Chu

Seungmin Ham BSc, Grad Dip Drug Eval Pharm Sc, Grad Dip Rep Sc
'The role of LKBI in regulating aromatase in the healthy and diseased testis'
Supervisors: Dr Kristy Brown; Dr Sarah Meachem

Masters Students:

Rahini Ragavan BBioMedSci
'Role of ghrelin in aromatase regulation in obesity and breast cancer'
Supervisors: Dr Kristy Brown; Dr Zane Andrews (Monash University)

Kavitha Vaithiyanathan BSc
'Bmf regulates germ cell death and determines the size of the primordial follicle pool'
Supervisors: Dr Karla Hutt; Dr Michelle Myers

Zhe (Kimmy) Zhao BSc
'Indentification of novel LRH-1 target genes in breast cancer'
Supervisors: Dr Colin Clyne; Dr Ashwini Chand

Honours Graduates:

Jeanne Correia BSc
'SRY expression in the brain'
Supervisor: Dr Joohyung Lee; Professor Vincent Harley

Nadine Duffield BBiomedSci
'Proteomic analysis of uterine secretions from ovarian cancer patients'
Supervisor: Dr Andrew Stephens

Daniel Heathcock BBiomedSci
'Apoptosis gene expression in granulosa cell tumors'
Supervisors: Dr Simon Chu; Professor Peter Fuller

James Wataszczuk BSc
'Synthesis, Secretion & Activation of Activin B'
Supervisors: Dr Tony Barton (Swinburne University); Dr Craig Harrison

Honours Students:

Katharine Johnson BSc
'Species differences in the metabolic growth factor BMP8B'
Supervisor: Dr Craig Harrison; Dr Kelly Walton

Medina Taletovic
'Mineralocorticoid receptor function'
Supervisor: Dr Ann Drummond

Vacation Students:

Yong Nian (Nicholas) Chee
Jeanne Correia
Nadine Duffield
Rubaiyea (Ruby) Farrukee,
Selen Gursoy,
Ragaa Ilshawish
Phoebe Kipen,
Queenie Lee
Tan (Dilys) Leung
Gina Lithotomos
Moshe Loebenstein
Yih Rue Ong
Charlie Wang
Farzana Zaman

PHI 3 Minute Thesis Competition: L - R: Adjudicators Jacqueline Donoghue (MIMR) and Jason Cain (MIMR) with Rajini Sreenivasan (1st prize), Justin Chen and Hui Ting Ho (Joint 2nd prizes)

EDUCATION

INVITED PRESENTATIONS

Maree Bilandzic

- Invited Speaker, Austin Department of Surgery and Ludwig Cancer Institute Seminar Series
- Poster Presenter, 14th Biennial Conference of the Metastasis Research Society, Brisbane, Queensland

Kristy Brown

International

- Invited Speaker: Dysregulated Metabolism and Aromatase Expression in Breast Cancer, 15th International Congress of Hormonal Steroids and Hormone/Cancer, Kanazawa, Japan
- Invited Speaker: Dysregulated metabolism and aromatase: new links between obesity and breast cancer (2012) XIth International Aromatase Symposium, Houston, TX, USA
- Invited Speaker: Breast Cancer: Obesity & Estrogen Metabolism Endo2012, Houston, TX, USA
- Invited Speaker: The regulation of oestrogens in obesity and breast cancer: New therapies and effects on mammographic density (2012) Why study mammographic density? Kingscliff, Australia
- Invited Speaker: Role of metabolic pathways in the regulation of oestrogen biosynthesis in obesity and breast cancer, Endocrine Society of Australia (ESA) Annual Scientific Meeting, Gold Coast, Australia
- Invited Speaker: Tissue microarrays to explore the link between obesity and breast cancer. (2012) Victorian Cancer Biobank Symposium, Melbourne
- Invited Speaker: The regulation of oestrogens in obesity and breast cancer: New therapies and effects on mammographic density, Centre for MEGA Epidemiology (University of Melbourne)

Colin Clyne

- Invited Speaker, 15th International Congress on Hormonal Steroids and Hormones and Cancer, Kanazawa, Japan

Eva Dimitriadis

- Invited Speaker, Dept of Obstetrics and Gynecology, University of Kyoto
- Invited Speaker, State Key Laboratory of Reproductive Biology Symposia in Reproductive Biology, Chinese Academy of Sciences, Beijing
- Invited Speaker, Australian Society for Medical Research 51st National Scientific Conference, Adelaide
- Invited Speaker, Dept of Obstetrics and Gynecology, Faculty of Medicine, University of Tokyo
- Invited Speaker, Monash University Ritchie Centre Annual Colloquium 'Women's Health – new directions, new treatments'
- Invited Speaker, Women's Health Research Symposium, Mercy Hospital for Women, Melbourne

Jemma Evans

- Invited Speaker, Ritchie Symposium, Monash Medical Centre
- Invited Speaker, Early Career Researcher Symposium, Mercy Hospital, Melbourne

Jock Findlay

- Invited Speaker, Oocyte Symposium, Sydney, NSW
- Invited speaker, Melbourne IVF

Peter Fuller

- Invited Speaker, Carlin-Smith Club, Melbourne
- Co-Convenor, Aldosterone & Salt: heart and Kidney, Satellite Meeting of the International Society of Hypertension, Sydney
- Invited Speaker, Australasian Association of Clinical Biochemists, 50th Annual Scientific Conference, Melbourne,
- Invited Speaker: Victorian Addisons Group: Addisons Disease Awareness Week, Melbourne
- Invited Speaker: Australasian Association of Clinical Biochemists, 50th Annual Scientific Conference, Melbourne

John Funder

- Invited Speaker, Menzies Institute, Hobart
- Invited Speaker, International Congress on Bariatric Surgery, New York
- Invited Speaker, Progress in Primary Aldosteronism 2, Munich
- Invited Speaker, International Aldosterone Forum, Tokyo
- Invited Speaker, Meet the Specialist, Kyoto, Osaka
- Invited Speaker, Symposium Presentations, Padua, Ancona, Udine, Italy
- Invited Speaker, Probus Club of Port Phillip, Melbourne)
- Invited Speaker, Symposium Presentations (Padua, Lecco, Milan)
- Invited Speaker, Symposium Presentation (Translational Research: the Melbourne Summit)
- Invited Speaker, Taiwan primary Aldosterone Group, Taipei
- Invited Speaker, Asia Pacific Congress of Hypertension, Taiwan
- Invited Speaker, Secretaries Committee, Australian Government, Canberra
- Asia Pacific Congress of Cardiology, Taipei (2 plenary lectures)
- Festschrift for John Baxter, San Francisco, USA (plenary lectures)
- Festschrift for Professor Achille Pessina, Padua, Italy (symposium speaker)
- International Aldosterone Forum, Tokyo, Japan (plenary lecture and two other invited lectures)
- Symposium Speaker, The Endocrine Society Annual Meeting, Houston, USA
- Invited Speaker, Aldosterone & Salt: Heart and Kidney, Palm Cove, Queensland: Satellite to the International Society of Hypertension
- First International Congress of the Saudi Society of Endocrinology & Metabolism, Riyadh, Saudi Arabia (2 plenary lectures, and a symposium presentation)

Jessica Gathercole

- Invited Speaker, Proteomics Facility, AgResearch, New Zealand

Vincent Harley

- Invited Speaker - Sixth International Symposium on Vertebrate Sex Determination, Kona, Hawaii
- Invited Speaker - 12th Asian Conference on Transcription, Jeju Island, Korea

Craig Harrison

- Invited Speaker, Gage Muscle Conference, Canberra
- Invited Speaker-Acceleron Pharma, Boston, USA
- Invited Speaker-Harvard Dental School, Boston, USA

Karla Hutt

- Invited Speaker, Melbourne IVF

Kevin Knower

- Invited Speaker, 15th International Congress on Hormonal Steroids and Hormones and Cancer, Kanazawa, Ishikawa, Japan
- Invited Speaker, University of Bergen, Norway

– Invited Speaker, Erasmus MC University Medical Center, Rotterdam, Netherlands
– Invited Speaker, 15th World Congress of Gynecological Endocrinology, Florence, Italy

Rowena Lavery

– Invited Speaker - The role of Sox9 and Rspo1 in gonadal development and sex reversal, Monash Medical Centre Reproduction and Development Symposium, Monash University

Rob McLachlan

– Invited Chair, ESA seminar weekend, Torquay
– Invited Speaker, ESA/SRB Annual Endocrine Society Conference, Gold Coast, Male Infertility and ART GCPE meeting, Brisbane, Queensland
– Invited Speaker, HDA Seminar: 'Tackling Men's Health and Fertility': Evaluation and management of the male partner, University of Adelaide
– Invited Speaker, Monash IVF and Wesley Monash IVF Doctors Risk Management and Update meeting, Wesley Hospital, Brisbane Queensland
– Invited Speaker, 15th International Congress of Endocrinology and 14th European Congress of Endocrinology: Symposium Speaker: Do we know enough about regulation of testicular function? Florence, Italy
– Invited Speaker: FSA 2012 Conference: Merck Serono symposium: Male Fertility: is it all downhill from here?: "Hormonal regulation of spermatogenesis - a clinical perspective", Auckland, New Zealand
– 15th International Congress on Hormonal Steroids and Hormones & Cancer. Symposium: Reproductive endocrinology. Presentation title: Endocrine and genetic aspects of male infertility and IVF approaches. November 16, Japan

Guiying Nie

– Invited Speaker, International Federation of Placenta Associations meeting, Hiroshima, Japan
– Invited Speaker, The 10th Matsuyama International Conference on Cell-Free Sciences, Japan
– Invited Speaker, Endometrial and Cervical Cancer Symposium, Victorian Comprehensive Cancer Centre, Melbourne
– Invited Speaker, Women's Health Research Symposium, Mercy Hospital for Women, Melbourne
– Invited Speaker, Women's Health – New Directions and New Treatments, Ritchie Centre Annual Colloquium, Melbourne
– Invited Speaker, MMC Reproduction and Development Symposium, Melbourne
– Invited Speaker, Department of Obstetrics and Gynecology, Yamaguchi University Graduate School of Medicine, Ube, Japan
– Invited Speaker, Research Centre for Reproductive Health, Robinson Institute, Adelaide

Sarah Paule

– Invited Speaker, Novartis, Hasanuddin University Hospital, Makassar, Indonesia

Julian Quinn

– Invited seminar: "Cell Stress, Osteoclasts and Bone Destruction", Botnar Research Centre (Oxford University Institute of Musculoskeletal Sciences), Headington, Oxford, UK.

Adam Rainczuk

– Invited Speaker – OCRF speaker for the National Australian Bank
– Invited Speaker, Commonwealth Gold Club Charity Event, South Oakleigh, Melbourne

David Robertson

– Invited Speaker, TGF-β Down Under Conference, Melbourne
– Invited Speaker, Proceedings of the STRAW+10 Symposium: Addressing the Unfinished Agenda of Staging Reproduction Aging, USA

Lois Salamonsen

– Invited Speaker, 1st Biomarker Meeting in Reproductive Medicine: Emerging of a New Field. Valencia, Spain
– Invited Speaker, SGI/WiRS New Investigator Roundtable Event, "Life as a Basic Clinical Scientist", Society for Gynecologic Investigation Annual Meeting, San Diego
– Invited Speaker and 'Mentor Workshop' Speaker. Endocrine Society of Australia Basic Science Weekend, Torquay, Victoria
– Invited Speaker, Women's Health Research Symposium, Mercy Hospital for Women, Melbourne

Nirukshi Samarajeewa

– Invited Speaker, Tohoku Medical Society Invited Lectures, Sendai, Japan
– Invited speaker, Monash Obesity and Diabetes Institute (MODI), Monash University

Mai Sarraj

– Invited Speaker - Monash Medical Centre Reproduction and Development symposia, Monash University, Australia
– Invited speaker, 43rd Annual Meeting of the Society of Reproductive Biology National, Australia
– Poster Presenter, 45th Annual Meeting of the Society for the Study of Reproduction, State College, Pennsylvania, USA

Evan Simpson

– Invited Speaker, Breast Cancer Symposium "Think Tank" Jamaica
– Invited Panel Member, National Toxicology Program Workshop, Northern Carolina, USA
– Seminar Speaker, Biochemistry Department, Vanderbilt University, USA
– Symposium Speaker, Congress on Steroid Hormone Research, Chicago
– Dale Medal Lecture, Society for Endocrinology, UK
– Seminar Speaker, University of Edinburgh, Queen's Medical Research Institute, UK
– Invited Speaker, 17th International Conference on Cytochrome p450, Manchester UK
– Plenary Lecturer, 15th International Congress on Hormonal Steroids and Hormones and Cancer, Kanazawa, Japan

Harmeet Singh

– Invited Speaker, Women's Health Research Symposium, Mercy Hospital for Women, Melbourne

Rajini Sreenivasan

– Invited Speaker: 'Mechanisms of SOX9 regulation in mammalian sex determination', Anatomy and Neuroscience Seminar Series, University of Melbourne

Peter Stanton

– Invited Speaker: 43rd Annual Meeting of the Australian Society for Reproductive Biology

Kaye Stenvers

– Invited Speaker - Monash Medical Centre Reproduction and Development symposia, Monash University, Australia
– Invited Chair - "Oozoa Awards" session, 43rd Annual meeting of the Society for Reproductive Biology, Gold Coast, Australia
– Selected Speaker, 43rd Annual Meeting of the Society of Reproductive Biology National, Australia
– Poster Presenter, 14th Biennial Conference of the Metastasis Research Society, Brisbane, Australia.
– Poster Presenter, 45th Annual Meeting of the Society for the Study of Reproduction, State College, Pennsylvania, USA

Sarah To

– Invited Speaker, Tohoku Medical Society at Tohoku University, Japan

Kelly Walton

– Invited Speaker - Baylor College of Medicine, Texas Medical Center, Texas, USA

Lixian Wang

– Invited Seminar Speaker, Tohoku Medical Society, Tohoku University, Japan

Morag Young

– Invited Speaker, 15th International Congress on Hormonal Steroids and Hormones and Cancer, Fukuoka, Japan
– Invited Speaker, Cardiac Society of Aust & NZ with the International Society for Heart Research, Brisbane
– Invited Sessional Chair, Aldosterone 2012, Satellite to the ISH Meeting, Palm Cove
– Invited Speaker, Department of Endocrinology, San Raffaele, Pisana, Rome
– Invited Speaker, The Murdoch Childrens Research Institute, Melbourne

EDUCATION

SEMINARS IN 2012

MHTP Seminars

Dr Helen Abud
Monash University
"Genetic analysis of transcriptional repressors in intestinal stem cells and tumours"

Dr Charles Allan
ANZAC Research Institute & University of Sydney
"Genetic models dissecting the endocrine control of testicular development"

Professor Peter Currie
Australian Regenerative Medicine Institute
"Modelling muscle disease and regeneration in Zebrafish"

Professor Christian Doerig
Head of the Department of Microbiology, Monash University
"Functional kinomics of malaria parasites"

Professor Geoff Farrell
Professor of Hepatic Medicine, Australian National University Medical School, Canberra, ACT
"Not all fat sits easily in the liver: how is inflammation recruited in non-alcoholic steatohepatitis (NASH)?"

Dr Vinod Ganju
Peninsula Oncology Centre, Frankston Private
"Neoadjuvant therapy for breast cancer: A platform for translational research"

Professor Alistair Gunn
Head of Department, Dept of Physiology, University of Auckland
"The clinical advent of hypothermia in the NICU: trials,tribulations, and triumphs"

Dr Reza Haffari
Lecturer, Faculty of IT, Monash University
"DriverNet: Uncovering the impact of somatic driver mutations on transcriptional networks in cancer"

Professor Phil Hansbro
University of Newcastle
"Respiratory infections and respiratory disease"

Dr Ricky Johnstone
Peter MacCallum Cancer Centre
"Epigenetic Therapies for the treatment of cancer"

A/Prof Martin Lackmann
Monash University
"Development of a therapeutic antibody targeting oncogenic EphA3"

Professor Geoff Lindeman
Walter & Eliza Hall Institute
"Mammary stem cells and breast cancer - taking cues from steroid hormones"

Professor Robin Lovell-Badge
MRC National Institute for Medical Research, United Kingdom
"Pituitary development and stem cells"

Dr Julie McMullen
Baker IDI, Head, Cardiac Hypertrophy Laboratory
"PI3K(p110α)-based therapies improve function of the failing heart"

Professor Grant Montgomery
Department Co-ordinator, Genetics and Computational Biology, Queensland Institute of Medical Research
"Endometriosis susceptibility genes"

Dr Elissa Osborne
Monash IVF
"Preimplantation Genetic Diagnosis at Monash IVF"

Professor Sarah Robertson
University of Adelaide
"Sperm-borne microRNA and regulation of endometrial immune function at conception"

Professor Philippe Sansonetti
Institut Pasteur
"Pathogens and commensals: War and Peace at mucosal surfaces"

A/Prof Chris Sobey
Vascular Pharmacology, School of Biomedical Sciences, Monash University
"New Insights into Mechanisms of Inflammation in Hypertension and Stroke"

A/Prof Amanda Spurdle
Head of Department, Molecular Cancer Epidemiology Laboratory, Genetics and Population Health Division, QIMR
"The lows and high of endometrial cancer genetics"

Dr Alex Swarbrick
Senior Research Officer & Group Leader, Tumour Progression Group, Cancer Program, Garvan Institute of Medical Research, & Conjoint Lecturer, UNSW
"Transcriptional networks controlling breast cancer heterogeneity"

A/Prof Mimi Tang
Murdoch Children's Research Institute/Royal Children's Hospital
"Oral tolerance induction for the treatment of food allergy"

Dr Naotsugu Tsuchiya
School of Psychology and Psychiatry, Monash University
"Visual consciousness tracked with direct intracranial recording from early and high-level visual cortices in humans and monkeys"

Dr Sampsa Vanhatolo
Head of Department, Pediatric Neurophysiology, Helsinki University Hospital
"Preterm development of brain pathways and their function: from histology to clinical neurophysiology"

Awards and Prizes

Dimuthi Alankarge
- 6th International Symposium on Vertebrate Sex Determination Travel Award
- Image chosen for the Monash University Dept. of Biochemistry home page

Justin Chen
- Best Overall PhD Presentation, PHI Student Symposium

Daniel Czech
- Southern Health Research Week Poster Prize

Eva Dimitriadis
- Adjunct Associate Professorship, Department of Anatomy and Developmental Biology, Monash University

Jemma Evans
- Young Investigator Poster Award, Society for Gynecologic Investigation annual meeting
- Southern Health Research Week Poster Prize

Vincent Harley
- Adjunct Professor, Department of Anatomy & Developmental Biology and Department of Biochemistry & Molecular Biology, Monash University

Jenna Haverfield
- Monash University Anthony Koelmeyer Travel Award to attend Society for the Study of Reproduction, USA
- Trainee Research Award (Oral Presentation), Society for the Study of Reproduction, USA
- Larry Ewing Memorial Trainee Travel Fund grant, Society for the Study of Reproduction, Pennsylvania, USA
- Regional Abstract Award, Society for the Study of Reproduction, Pennsylvania, USA
- Lalor Foundation Merit Award, Society for the Study of Reproduction, Pennsylvania, USA
- Southern Health Research Week Poster Prize (3rd place)

Sophea Heng
- Australian Postgraduate Award

Karla Hutt
- Society for Reproductive Biology, Newcastle, New Investigator Award
- NHMRC Career Development Fellowship
- Friends of IVF Grant Award [joint]

Kevin Knower
- Winner, Under 34 Scientific Competition, 15th World Congress of Gynecological Endocrinology, Florence, Italy

Chantal Magne
- German Academic Exchange Service Travel Award (for oral presentation), 1st Symposium on Bioactive principles of Medicinal Plants and Diet, Dresden, Germany

Michelle Myers
- Friends of IVF Grant Award [joint]

Peter Nicholls
- Doctor of Philosophy (Department of Biochemistry and Molecular Biology, Monash University) conferred
- Burroughs-Wellcome Scholarship to attend "Frontiers in Reproduction" training course (Woods Hole, MA, USA
- CJ Martin Early Career Training Fellowship Award

Quynh Nhu
- Pfizer Research Grant Award
- Australian Postgraduate Scholarship

Guiying Nie
- Adjunct Associate Professorship, Department of Biochemistry and Molecular Biology, Monash University
- Fellow, Society for Reproductive Biology, Australia

Lois Salamonsen
- Honorary Fellow, The Royal Australian and New Zealand College of Obstetricians and gynaecologists
- Honorary Life Membership, Society for Reproductive Biology

Nirukshi Samarajeewa
- Novartis Junior Scientist Award finalist, Endocrine Society of Australia Meeting, Gold Coast, Australia
- Early Career Investigator Award Finalist and Poster Award, Cancer Research (3rd prize), Southern Health Research Week, Melbourne
- Prime Minister's Education Assistance Program for Japan to visit Tohoku University, School of Medicine, Department of Pathology in Japan

Mai Sarraj
- Finalist, SRB Newcastle Award for Emerging Research Leaders

Courtney Simpson
- Larry Ewing Memorial Trainee Travel Fund, Society for the Study of Reproduction, State College, PA, USA
- Postgraduate Research Travel Grant, Monash University

Evan Simpson
- Fellow, The Royal Society of Edinburgh
- Honorary Life Member, The Endocrine Society of Australia

Rajini Sreenivasan
- Southern Health Research Week 2nd Prize, Poster Competition (Cardiovascular/Endocrinology/Diabetes category)
- PHI 3 Minute Thesis Competition, 1st Prize

Sarah To
- International Society of Endocrinology Travel Award
- Japanese Cancer Association, Annual Meeting Travel Grant
- Fresh Science: Science Communication State Finalist
- ESA/IPSEN International Travel Grant – Endocrine Society of Australia

Kelly Walton
- Endocrine Society of Australia Travel Grant
- Harold Mitchell Foundation Travel Award to attend ENDO 2012, Texas, USA
- Australian Women in Endocrinology, Travel Support Award

Lixian Wang
- The 71st Annual Meeting of the Japanese Cancer Association Travel Grant
- Endocrine Society of Australia Annual Meeting Travel Grant
- Monash Comprehensive Cancer Consortium Travel Grant

James Watasczcuk
- Best Overall Honours Presentation, PHI Student Symposium

Heba Zahid
- Best First Year PhD Presentation, PHI Student Symposium

Service to the Scientific Community

Anthony Argentaro
- Member, US Endocrine Society
- Member, Australian Society of Biochemistry & Molecular Biology
- Member, Australian & New Zealand Society for Cell Development Biology

Stefan Bagheri-Fam
- Member of the Monash Medical Centre Animal Ethics Committee B
- Member of Australian & New Zealand Society for Cell Development Biology
- Member, Australian Society of Biochemistry and Molecular Biology
- Member, Society of Developmental Biology
- Member, Endocrine Society of Australia

Kristy Brown
- Member, US Endocrine Society
- Member, Endocrine Society of Australia
- Member, American Association for Cancer Research
- Member, Monash Obesity and Diabetes Institute
- Member, Monash Comprehensive Cancer Consortium
- Member, National Health and Medical Research Council Research Translation Faculty
- Editorial board member, Journal of Steroid Biochemistry and Molecular Biology

Maree Bilandzic
- Member, Program Organisation Committee, Monash Medical Centre, Reproduction and Development Symposium
- Coordinator, Deakin University Professional Placement
- Member, Australian Society for Medical Research
- Member, Endocrine Society of Australia
- Member, Society for the Study of Reproduction, USA
- Member, Society for Reproductive Biology, Australia
- Member, Society for Reproductive Biology Early Career

Vanessa Cheung
- Member, Cancer Therapeutic CRC
- Member, American Association for Cancer Research

Daniel Czech
- Member, Australian Neuroscience Society

Evdokia Dimitriadis
- Member, Editorial Board, *World Journal of Translational Medicine*
- Member, Reviewing Board, *Journal of Reproductive Immunology*
- Member, Editorial Board, *Reproductive Biology and Endocrinology*
- Member, Editorial Board, *American Cancer Research Journal*
- Elected Council member and Awards Chair, Society for Reproductive Biology
- Conference Convenor, Society for Reproductive Biology Annual Meeting, Gold Coast
- Member, European Society for Human Reproduction and Embryology
- Member, Society for the Study of Reproduction (USA)

Kemperly Dynon
- Member, Society for Reproductive Biology
- Member, Australian Society for Medical Research
- Member, Australia and New Zealand Placental Research Association

Tracey Edgell
- Member, Society for Reproductive Biology

Jemma Evans
- Member, Fertility Society of Australia
- Member, Australian Society for Medical Research
- Member, Society for Reproductive Biology
- Member, Society for the Study of Reproduction
- Member, Society for Reproduction and Fertility (UK)
- Member, Australian Wound and Tissue Repair Society

Nicole Fairweather
- Member, Victorian Association of Research Nurses
- Reviewer, Southern Health Research and Ethics Committee Low Risk Projects

Jock Findlay
- Member & President, Board of the Victorian Breast Cancer Research Consortium Inc.
- Member, Hospital Research Directors' Forum, Bio21 Cluster
- Director of Research, Royal Women's Hospital, Parkville, Victoria
- Chair, Scientific Advisory Council, Bio21 Cluster
- Member, Bio21 Cluster Board
- Member, Management Committee, Biogrid
- Member, Melbourne Health Biobank Management Committee
- Member, Board of the Robinson Institute, University of Adelaide
- Director & Vice President, Society for Study of Reproduction (USA)
- Chair, Embryo Research Licensing Committee of the NHMRC (the NHMRC Licensing Committee)
- Chair, Grant Review Panel, NHMRC, Canberra
- Life Member of Society for Reproductive Biology
- Member of Endocrine Society of Australia, Fertility Society of Australia, Endocrine Society, USA, Society for the Study of Reproduction, USA, Endocrine Society, UK, Society for Reproduction & Fertility, UK., & Australian Society for Medical Research.

Peter Fuller
- Member, Executive Committee, Cancer Council, Victoria
- Member, Venture Grants Committee, Cancer Council Victoria
- Deputy Chair, Consultative Council, Victorian Cancer Agency, Department of Human Services (Victoria)
- Member, Council, Cabrini Clinical Education and Research Institute, Cabrini Hospital, Melbourne
- Member, Council of Governors, Florey Neurosciences Institutes, Melbourne
- Chair, Career Advancement Award Committee, Murdoch and Children's Research Institute, Melbourne
- Co-Editor, Hormone and Metabolic Research
- Editor, Endocrine and Metabolic Section, Expert Opinion on Investigational Drugs
- Member, Editorial Board, Steroids
- Member, Faculty of 1000, Medicine
- Associate Editor, Endocrinology
- Member, Southern Health Tissue Bank Steering Committee
- Member, Research Affairs Core Committee of the Endocrine Society (USA)
- Member, Platform Planning Group, MHTP
- Member, Capital Planning Group, Monash Health Translational Precinct
- Member, Steering Committee, Monash Partners Academic Health Science Centre
- Member, Diabetes, Obesity, Men's Health and Endocrinology Theme Committee, Monash Partners Academic Health Science Centre
- Member, NHMRC Academy
- Member, Editorial Board, Journal of Molecular Endocrinology
- Member, Editorial Board, Cancer Medicine
- Member, NHMRC Grant Review Panel
- Member, Nominations Committee of the Endocrine Society (USA)

Jessica Gathercole
- Member, Royal Australian Chemistry Institute
- Member, Australasian Proteomics Society

Matthew Gillespie
- President, Australian and New Zealand Bone and Mineral Society
- Member, Science Advisory Committee, Cancer Council Victoria
- Member, Victorian Breast Cancer Research Consortium
- Member, Research Committee, National Health and Medical Research Council, Australia
- Member, Audit Committee, National Health and Medical Research Council, Australia
- Member, Advisory Council, Monash Comprehensive Cancer Council

- Member, Board, Ovarian Cancer Research Foundation
- Member, Board of Directors, Australian and New Zealand Bone and Mineral Society
- Member, Board of Directors, Monash Health Research, Precinct Pty Ltd
- Member of Board of Prince Henry's Institute
- Member, Program Committee, Australian and New Zealand Bone and Mineral Society Annual Scientific Meetings, Perth
- Member, Research Committee, Faculty of Medicine, Nursing and Health Science, Monash University
- Member, Australian Synchrotron Clinical Advisory Panel
- Member, Australian Synchrotron Monash University, Therapeutic Beamline Implementation Committee
- Member, Science Policy Committee of the American Society for Bone and Mineral Society
- Member, Advisory Board Centre for Physical Activity and Nutrition Research, Deakin University
- Member, RGMS User Group, National Health and Medical Research Council
- Chair, Grant Review Panel National Health and Medical Research Council (x4)
- Member, Program Committee and abstract reviewer Annual Meeting of the Australian & New Zealand Bone & Mineral Society, Perth, 2012
- Member, Southern Health Research Advisory Committee
- Member, Monash Health Translation Precinct – Executive, Operations, Strategic Communications Committees
- Member, Editorial Board, *Arthritis and Rheumatism*
- Member, Editorial Board, *Bone*
- Member, Editorial Board, *BoneKey*
- Member, Editorial Board, *Endocrinology*
- Member, Editorial Board, *Journal of Bone and Mineral Research*

Craig Harrison
- Member, Editorial Board, *Endocrinology*
- Member, US Endocrine Society
- Member, The Endocrine Society of Australia
- Scientific Advisory Board, Paranta Biosciences
- Deputy chair, National Health and Medical Research Council Grant Review Panel

Vincent Harley
- Member, Editorial Board, *International Journal of Biochemistry and Cell Biology*
- Member, Editorial Board, *Sexual Development*
- Vice President, Lorne Genome Conference
- Judge of Abstracts, 94th Annual Meeting of The Endocrine Society, ENDO 2012
- Member, National Health and Medical Research Council Molecular Biology Grant Review Panel
- Medical Research Council review of the MRC NIMR Genetics & Development Group, Mill Hill [London], UK
- Co-convenor: APEG Satellite meeting on DSD, Perth
- Member, American Society for Biochemistry and Molecular Biology
- Member, Australian Neuroscience Society
- Member, The American Society of Human Genetics
- Member, US Endocrine Society
- Member, Lorne Genome Conference Inc. (Vice president)
- Member, Human Genetics Society of Australasia
- Member, Victorian Society for Developmental Biology Society
- Member, Australian Society of Medical Research
- Member, Australian & New Zealand Society for Cell and Developmental Biology
- Member, Australian Society for Biochemistry and Molecular Biology
- Member, National Association of Research Fellows of National Health and Medical Research Council Inc
- Member, Human Genome Variation Society
- Member, Organization for the Study of Sex Differences
- Member, American Society for Cell Biology
- Member, The Endocrine Society of Australia
- Member, National Health and Medical Research Council Research Translation Faculty
- Member, Australasian Paediatric Endocrine Group

Karla Hutt
- Member of Society for Reproductive Biology (AUS)
- Member of Society for the Study of Reproduction (USA)
- Editorial board member for Reprodedia

Vicky Kartsogiannis
- Member Australian Society of Medical Research
- Member Australian and New Zealand Bone and Mineral Society
- Member American Society of Bone and Mineral Research
- Member International Bone and Mineral Society

Rowena Lavery
- Member, Australian and New Zealand Society for Cell and Developmental
- Member, Office of the Gene Technology Regulators
- Member, Monash University Institute of Graduate Research Level 1
- Member, Editorial Board, *Journal of Molecular Histology*

Joohyung Lee
- Member, Society for Neurosciences
- Member, Australian Neuroscience Society
- Member, Editorial Board, *PLoS One*
- Member, International Basal Ganglia Society

Jason Liew
- Member of Society for Reproductive Biology (AUS)
- Member of Society for the Study of Reproduction (USA)

Rob McLachlan
- Member, Royal Australasian College of Physicians
- Member, Endocrine Society of Australia
- Member, Fertility Society of Australia
- Member, US Endocrine Society
- Member, American Society of Andrology
- Member, National Association of Research Fellows
- Member, Editorial Board, *International J Andrology*
- Member, Editorial Board, *J Andrology*
- Invited Reviewer, *Up-to-Date,* USA
- Section Editor, *Male Reproduction,* www.ENDOTEXT.org (Chief Ed. L de Groot)
- Chairman, Program Organising Committee, International Society of Andrology Congress 2013

Ellen Menkhorst
- Member and Early Career Representative, Society for Reproductive Biology
- Member, Australian and New Zealand Placental Research Association
- Member, Australian Society for Medical Research
- Member, Southern Health Research Week Program Committee

Frances Milat
- Member, Endocrine Society of Australia
- Member, Australian and New Zealand Bone and Mineral Society
- Member, American Society for Bone and Mineral Research
- Chair, Bone and Calcium Session, Annual Endocrine Society of Australia Seminar
- Reviewer, *Internal Medicine Journal (Endocrinology)*

Michelle Myers
- Member of Society for Reproduction & Fertility (UK)
- Member of Society for Reproductive Biology (AUS)
- Member of Society for Endocrinology (USA)
- Member of Society for Study of Reproduction (USA)
- Member of Australian Society for Medical Research

Guiying Nie
- Managing Editorial Board, *Frontiers in Bioscience*
- Member, Reviewing Board, *Reproductive Biology and Endocrinology*
- Member, Editorial Board, *Endocrinology*

- Member, Research Translation Faculty, National Health and Medical Research Council
- Member, Australian Society for Medical Research
- Member, International Federation of Placenta Associations
- Member, Society for Reproductive Biology

Devi Ngo
- Member, American College of Rheumatology

Makoto Ono
- Member, Councillor, Japanese Society for Paediatric Endocrinology
- Member, European Society for Paediatric Endocrinology
- Judge of Abstracts, 51st Annual Meeting of the European Society for Paediatric Endocrinology
- Member, Japan Paediatric Society
- Member, Japan Endocrine Society
- Member, Japanese Society for Mass-screening
- Member, Japan Diabetes Society

Sarah Paule
- Member, Society for Reproductive Biology

Julian Quinn
- Member, Editorial Board, *Bone*
- Member, Australian and New Zealand Bone and Mineral Society
- Member, International Bone and Mineral Society
- Member, American Society of Bone and Mineral Research
- Member, Australian Society for Medical Research
- Member, National Health and Medical Research Council Grant Review Panel

David Robertson
- Member, Editorial Board, *Women's Health*

Lois Salamonsen
- Member, Editorial Board, *Endocrinology*
- Member, International Advisory Panel, Reproduction, Fertility and Development
- Associate Editor, *Biology of Reproduction*
- Associate Editor (Pacific region), *Reproductive Sciences*
- Faculty member, Faculty of 1000 Medicine
- Member, Editorial Board, *Repropedia*
- Fellow and Life Member, Society for Reproductive Biology
- Honorary Fellow, The Royal Australian and New Zealand College of Obstetricians and Gynaecologists
- Member, Australian Society for Medical Research
- Member, Society for the Study of Reproduction (USA)
- Member, Society for Gynecological Investigation (USA)
- Member, Global Women in Reproductive Science

Mai Sarraj
- Member, Prince Henry's Institute Education Committee
- Member, Australian Society for Medical Research
- Member, Society for the Study of Reproduction, USA
- Member, Society for Reproductive Biology, Australia
- Member, Society for Reproductive Biology Early Career

Harmeet Singh
- Member, Society for Reproductive Biology
- Member, International Society for Extracellular Vesicles, Europe
- Member, Australia and New Zealand Placental Research Association
- Life member, The Indian Society for Technical Education

Preetinder Singh
- Member, Australian and New Zealand Bone and Mineral Society

Rajini Sreenivasan
- Member, Endocrine Society of Australia

Dionne Sroczynski
- Member Victorian Association of Research Nurses

Peter Stanton
- Co-chair, Data Audit Committee, PHI
- Member of Research Degrees Committee, Monash University
- Member, Endocrine Society of Australia
- Member, Society for the Study of Reproduction
- Member, US Endocrine Society
- Member, Society for the Study of Reproduction (US)

Kaye Stenvers
- Member, Program Organisation Committee, 2012 Society for Reproductive Biology (AUS) Annual Meeting
- Co-chair, Program Organisation Committee, 2013-2015 Society for Reproductive Biology (AUS) Annual Meetings
- Member, Program Committee, 2013 Society for the Study of Reproduction (USA) Annual Meeting
- Co-Opted Member, Society for Reproductive Biology (AUS) Council
- Guest editor, *Molecular and Cellular Endocrinology, Special Issue on 'Inhibins & Activins: New Models and Mechanisms'*
- Adjunct Lecturer, Dept. of Anatomy & Developmental Biology, Monash University
- Member, PhD thesis advisory committees (3), University of Melbourne
- Member, Institutional Biosafety Committee, Ludwig Institute for Cancer Research
- Member, Australia and New Zealand Society for Cell and Developmental Biology
- Member, American Association for Cancer Research (USA)
- Member, Australian Society for Medical Research
- Member, Society for Reproductive Biology (AUS)
- Member, Society for the Study of Reproduction (USA)
- Member, Metastasis Research Society (International) & Metastasis Research Society (Australia)

Andrew Stephens
- Associate Member, American Association for Cancer Research
- Member, Australian Society for Biochemistry and Molecular Biology
- Member, Australasian Proteomics Society
- Associate Editor, Journal of Integrated Omics

Michelle Van Sinderen
- Member, Society for Reproductive Biology
- Member, Australian Society for Medical Research
- Member, American Association for Cancer Research
- Member, Women in Cancer Research

Dr Kelly Walton
- Member, US Endocrine Society
- Member, Australian Society for Medical Research
- Member, Endocrine Society of Australia

Phillip Wong
- Member, Australian and New Zealand Bone and Mineral Society
- Member, Endocrine Society of Australia

GRANT FUNDING

Announced in 2012

Research Support

National Health and Medical Research Council of Australia (NHMRC)

- Guiying Nie, Luk Rombauts, Sarah Paule. Project Grant: Endometrial receptivity for embryo implantation: Proprotein convertase 6 and plasma membrane remodeling. $609,639 (2013-2015)
- Lois Salamonsen, Tracey Edgell, Luk Rombauts. Project Grant: Changes in protein glycosylation promote endometrial receptivity leading to successful implantation. $472,314 (2013-2015)
- Lois Salmonsen, Jemma Evans. Project Grant: Menstrual fluid factors in the control of progestin mediated endometrial bleeding. $366,735 (2013-2015)
- Jane Fisher, Maggie Kirkman, Karin Hammarberg, Robert McLachlan, Catharyn Stern, Beverley Vollenhoven, Luk Rombauts, Debra Gook. Project Grant: Banking on the future: Establishing evidence for policy, protocols, and patient care relating to storage of reproductive material before treatment for cancer. In partnership with Monash University. $566,713 (2013-2015)

Merck Serono SA

- Lois Salamonsen. Uterine Receptivity: the final hurdle in IVF. €189,640 (2012-2014)

National Breast Cancer Foundation

- Colin Clyne. Novel Concept Award: A novel oestrogen receptor co-activator associated with tamoxifen resistance. $199,102 (2013-2014)

Monash IVF Pty Ltd

- Lois Salamonsen. Uterine Receptivity: the final hurdle in IVF. $69,997 (2012)
- Guiying Nie, Luk Rombauts, Beverly Vollenhoven. Diagnostics for endometrial receptivity: harnessing a promising biomarker and exploiting a non-invasive method of sampling. $35,000 (2012-2013)

The CASS Foundation Limited

- Maree Bilandzic, Ellen Menkhorst. Lessons from regulated & unregulated invasion: Proof for a technique to examine the 'invasive front'. $50,000 (2013)
- Guiying Nie. Development of a test for endometrial cancer that is as easy as a Pap smear. $50,000 (2013)

Pfizer Australia

- Quynh-Nh Nguyen. Australian Paediatric Endocrine Care (APEC) Grant. $55,000 (2012-215)

Cancer Research Trusts

- Andrew Stephens. A test to detect newly identified ovarian cancer diagnostic markers captured during Pap smear. $49,920 (2013)

Collier Charitable Fund

- Joohyung Lee. Why Are Men More Susceptible to Parkinson's disease? A Study of SRY Expression in Parkinson's disease Patient Brains. $30,000 (2013)

Ovarian Cancer Research Foundation (OCRF)

- Simon Chu. Peroxisome proliferator-activated receptor-gamma and x-linked inhibitor of apoptosis protein modulation in high grade serous epithelial cancers of the ovary. $25,000 (2012)
- Andrew Stephens. Operation of the OCRF Ovarian Cancer Tissue Bank $150,000 (2012)
- Andrew Stephens. Discovery and Development of Screening Markers for the Early Detection of Ovarian Cancer $521,000 (2012)

People Support

National Health and Medical Research Council of Australia (NHMRC)

- Guiying Nie. Research Fellowship. $652,765 (2013-2017)
- Karla Hutt. Career Development Fellowship. $397,724 (2013-2016)
- Peter Nicholls. Early Career Research Fellowship. $323,164 (2013-2016)
- Jacqueline Hewitt. Early Career Research Fellowship. $448,612 (2013-2016)

Australian Academy of Science

- Jyothsna Rao. Australia-India Early Career Fellowship. $20,500. (2013)

Cancer Council Victoria

- Yong Chuan Chee. Cancer Research Vacation Studentship. $1,500 (2012)
- Farzana Zaman. Cancer Research Vacation Studentship. $1,500 (2012)

High Blood Pressure Research Council

- John Funder. Travel Award. $2,500 (2012)

Monash Comprehensive Cancer Consortium

- Lixian Wang. Travel Award. $2,000 (2012)

Philanthropic Trusts and Foundations

We gratefully acknowledge the generous support received from philanthropic trusts and foundations. Their funding assists the progress of research projects, as well as providing laboratory and travel support to staff and enabling the purchase of essential equipment. We sincerely thank all trusts and foundations for their generous support.

We also thank the following learned societies for their support: Endocrine Society of Australia and the Society for Reproductive Biology.

Fielding Foundation

– Equipment funding. Hypoxia Facility. $90,000

The Marian and E.H. Flack Trust

– Equipment Grant. Protein Purification. $21,502

Harold Mitchell Foundation

– Huiting Ho. Health Travelling Scholarship. $5,000
– Kelly Walton. Health Travelling Scholarship. $5,000

Donor - Ted Billson

– Equipment for Gene Cloning - Orbital Mixer Incubator. $6,000

CASS Foundation

– Mai Sarraj. Travel Award. $4,000

Prince Henry's Institute Awards

PHI Career Enhancement Award

As part of the PHI Career Development Program, the Institute grants on a competitive basis, a limited number of these awards each year to early (Level 1) to mid career (Level 2) researchers. The aim of this program is to provide additional support and resources that will enhance opportunities and advance research careers.

– Ashwini Chand. CEA Level 2 $5,000 (2013-2014)
– Kelly Walton. CEA Level 1 $2,500 (2013-2014)

PHI Graduate Excellence Award

Additional financial support for outstanding PhD students.

– Elizabeth Fletcher. PhD Stipend Top-Up. $5,000pa

John Donges Award

This award is funded annually in memory of the late Mr John Donges. It is awarded to a member of the Scientific Support Group in recognition of service excellence and demonstration of the values espoused by John Donges including, courtesy, timeliness and organisational knowledge.

– Henry Wos. $1,000 (2013)

Infrastructure support

These funds support costs associated with infrastructure – from utilities, to support services, through to commercial and clinical translation of the institute's research endeavours, and equipment maintenance. Such support is not directly provided for by competitive grants.

Department of Business and Innovation

– The Victorian Government's Operational Infrastructure Support Program (OIS)
– OIS provides infrastructure support for the 13 independent medical research institutes based in Victoria. Funds are allocated on a performance basis that is tied to research funding investment attracted into Victoria as well as a range of commercial, clinical and international excellence outcomes.

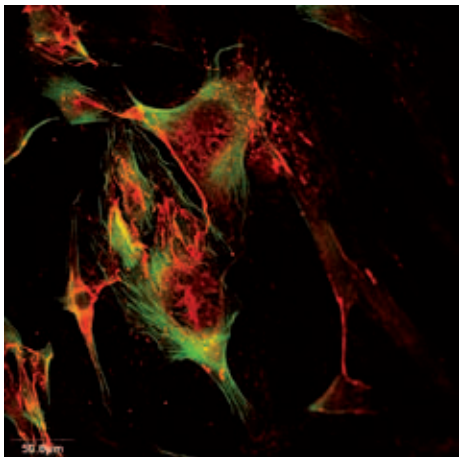


Image: Confocal microscopy, Cancer cells (Ashwini Chand, Rhiannon Coulston)

National Health and Medical Research Council (NHMRC)

– Independent Research Institute Infrastructure Support Scheme:

  Funds are provided annually to NHMRC accredited institutes for overhead infrastructure costs based on a proportion of competitive research funding awarded by the NHMRC.
– Equipment Grant: Funding is allocated on a pro rata basis to NHMRC administering institutions according to their share of the total funding awarded by the NHMRC for research each year.

STAFF LIST

1/1/2012 - 31/12/2012

Director
Matthew Gillespie BSc (Hons) PhD

Associate Director
Peter Fuller BMedSci MBBS PhD FRACP
NHMRC Senior Principal Research Fellow

Senior Research Fellow, Emeritus Director
Henry Burger AO FAA MD BS FRCP FRACP FCP (SA) FRCOG FRANZCOG

Senior Research Fellow
John Funder AO MD BS PhD FRACP FRCP LL D(Hon)

Research Advisory Group
Evdokia Dimitriadis PhD
NHMRC Senor Research Fellow

Jock Findlay AO PhD DSc
NHMRC Senior Principal Research Fellow

Peter Fuller BMedSci MBBS PhD FRACP
NHMRC Senior Principal Research Fellow

Matthew Gillespie BSc (Hons) PhD

Vincent Harley PhD NHMRC Senior Research Fellow

Rob McLachlan MBBS FRACP PhD
NHMRC Principal Research Fellow

Guiying Nie PhD
NHMRC Senior Research Fellow

David Robertson PhD NHMRC Principal Research Fellow

Lois Salamonsen PhD NHMRC Senior Principal Research Fellow

Evan Simpson BSc (Hons) PhD FAA
NHMRC Senior Principal Research Fellow

Laboratory Heads
Colin Clyne PhD - Cancer Drug Discovery

Evdokia Dimitriadis PhD - Embryo Implantation

Jock Findlay AO PhD DSc - Ovarian Biology

Peter Fuller BMedSci MBBS PhD FRACP - Steroid Receptor Biology

Matthew Gillespie PhD
- Bone, Joint & Cancer

Vincent Harley PhD
- Sex Determination and Gonadal Development / Brain & Gender Co-head

Craig Harrison PhD
- Growth Factor Signalling

Joohyung Lee PhD
- Brain & Gender

Rob McLachlan MBBS FRACP PhD
- Clinical Andrology

Guiying Nie PhD
- Implantation & Placental Development

David Robertson PhD
- Reproductive Hormones

Lois Salamonsen PhD
- Endometrial Remodelling

Evan Simpson PhD FAA
- Metabolism & Cancer Co-head

Peter Stanton PhD
- Male Fertility Regulation

Kaye Stenvers PhD
- Reproductive Development & Cancer

Andrew Stephens PhD
- Ovarian Cancer Biomarkers

Morag Young PhD
- Cardiovascular Endocrinology

Laboratory Co-Heads
Kristy Brown PhD
- Metabolism & Cancer

Joohyung Lee PhD
- Brain & Gender

L'Oréal Paris Research Fellow
Simon Chu BSc (Hons) PhD

NHMRC Career Development Awardees
Craig Harrison PhD

Kristy Brown PhD

US Department of Defense Fellows
Kevin Knower PhD

Ashwini Chand PhD

The Michael, John and Phoebe Jones Fellow
Frances Milat MBBS (Hons) FRACP MD

NAB OCRF Research Fellow
Andrew Stephens PhD

Clinical Research Fellows
Carolyn Allan MBBS (Hons) PhD DRCOG(UK) FRACP PhD

Kati Matthiesson MBBS FRACP PhD

Andrology Fellows
Le-Wen Sim MBBS (Hons), BMedSc (until 5/2/2012)

Bianca St John MD (from 9/2/2012)

NHMRC Post-Doctoral Fellow
Karla Hutt PhD

Ellen Menkhorst PhD

Clinical Research Nurses
Nicole Fairweather RN

Elise Forbes RN

Judi Hocking RN

Anne Paterson RN (from 3/9/2012)

Yulia Roif RN BSN MPA (from 9/7/2012)

Anna Zamojska RN

Dionne Sroczynski RN

Senior Research Officers
Anthony Argentaro PhD

Stefan Bagheri-Fam PhD

Pascal Bernard PhD

Maree Bilandzic PhD

Ashwini Chand PhD

Anne Corbould MBBS (Hons) PhD FRACP

Ann Drummond PhD

Vicky Kartsogiannis PhD

Sarah Meachem PhD

Michelle Myers BSc (Hons) PhD

Liza O'Donnell PhD

Julian Quinn DPhil MSc

Adam Rainczuk PhD

Mai Sarraj MSc PhD

Harmeet Singh MSc PhD

Helena Sim PhD

Kelly Walton PhD

Research Officers
Sara Al-Musawi BSc (Hons) PhD

Vanessa Cheung BSc (Hons) / BA PhD

Kemperley Dynon BSc (Hons) BA PhD

Tracey Edgell BSc (Hons) PhD

Jemma Evans PhD

Stacey Jamieson BA/BSc (Hons) PhD (until 3/2/2012)

Olivier Latchoumanin PhD

Rowena Lavery PhD (from 2/4/2012)

Jason Liew BBiomedSc (Hons) PhD

Chantal Magne Nde PhD

Yogeshwar Makanji BAppSci (Hons) PhD

York Ng PhD (until 31/8/2012)

Makoto Ono MD PhD

Sarah Paule PhD

Jyothsna Rao MSc PhD

Preetinder Singh PhD

Michelle van Sinderen PhD (from 28/5/2012)

Katherine York PhD (Research Officer/PA, Sex Determination & Gonadal Devt. Laboratory, from 21/3/2012)

Senior Research Assistants
Maria Alexiadis BSc (Hons)

Francine Brennan BSc (Hons)

Denis Cleven BSc (from 30/3/2012)

Maria Docanto BSc (Hons)

Ruth Escalona BSc (Hons) MSc

Caroline Foo BAppSc

Cassandra Hincks BSc (Hons)

Ileana Kapic BAppSc (Hons) (until 30/6/2012)

Ying Li BSc GDipMicroBio

James Morgan BSc (Hons)

Yao Wang BSc (Hons)

Yizhou Yao MD

Research Assistants

Georgia Balourdos BSc (Hons) (until 30/10/2012)

Karen Chan BAppSc

Rhiannon Coulson BSc (Hons) (from 5/3/2012)

Carly Cuman BBioMedSc (Hons)

Nadine Duffield BBiomedSci (from 9/1/2012)

Thilini Gamage MSc(Biotech)

Jessica Gathercole BSc (Hons)

Seungmin Ham GradDipRepSc, Grad Dip Drug Eval Pharm Sc, BSc (Hons)

Guy Harris MSc

Sophy Heng BSc

Kerrie Herridge BSc (Hons) (until 15/6/2012)

Tamara Howard BA/BSc (Hons)

Yanqiu Hu PhD (from 28/5/2012)

Emily Kelly BSc (Hons)

Josie Lawrence DipAppSci (until 10/2/2012)

Angela Morgan BSc (Hons) (from 15/6/2012)

Peter Nicholls BBiomedSc (Hons)

Devi Ngo BSc (Hons)

Enid Pruysers

Belinda Quenette BSc (Hons) (until 6/6/2012)

Katarzyna (Kate) Rainczuk MSc (from 9/1/2012)

Amy Russ BSc (Hons) (from 26/3/2012)

Janelle Ryan BSc MSc

Wendy Yang MBioMedSci (until 30/7/2012)

Joanne Yap BSc (Hons) MCE (until 26/7/2012)

Nadeen Zerafa BSc (Hons) Grad Dip

Laboratory Technicians

Robin Leuba BA Dip Ed

Susan Taleh BA

Administrative Support

Chief Financial Officer

Peter Murray FCA BSc (Econ) (Hons)

Laboratory & Technical Services Manager

Steve Bouralexis PhD BSc B Hlth Sci (Hons) B Comp Sci

IP & Commercialisation Manager

Andrew McCallum BE (Met) MEngSc GAICD

Grants & Commercialisation Manager

Neil Owens PhD

Biomedical Engineer/ Laboratory Technician

Leon Moussa BSc (Med Sci) Hons, PhD

Finance Officer

Jennifer Watson

Grants Officer

Belinda Kelly BSc (Hons) (from 26/3/2012)

Graphic Communications

Sue Panckridge DipArt

Human Resources Officer

Christina Matisons Prof Dip HR MAHRI

HR/Payroll Officer

Lesley Bowyer

Laboratory Support Officer/Technician

Hsien Teh BSc (Hons)

Laboratory Technician

Tan (Dilys) Leung B Psych (Hons)

Marketing and Communications Officer

Laura Watson BA Prof Writing

OH&S Officer

Ganeema Tokhi MPhil

Purchasing and Facilities Officer

Henry Wos

Sequencing Manager, Monash Health Translation Precinct Vivien Vasic BSc

Executive Assistant

Roseline Acker

Personal Assistants / Administrative Officers

Dianne Arnold BSc

Jeanette Birtles BSc (Hons) (until 21/1/2012)

Sue Elger

Jacqueline Harrison RN

Claudette Thiedeman

Jeana Thomas

HONORARY APPOINTMENTS & COMMITTEES

PHI Fellows

Prince Henry's Institute has a longstanding history of research delivery, academic mentoring and community engagement.

In recognition of their substantial the following individuals have been appointed as PHI Fellows:

Dr Nuzhat Ahmed
Royal Women's Hospital, Melbourne, Victoria

Professor John Aitken
University of Newcastle, New South Wales

Professor John Bertram
Faculty of Medicine, Nursing & Health Sciences, Monash University

Associate Professor Timothy Cole
Faculty of Medicine, Nursing & Health Sciences, Monash University

Professor David de Kretser AC
Centre for Reproduction and Development, Monash Institute of Medical Research

Associate Professor Mark Frydenberg
Australian Urology Associates, Cabrini Medical Centre, Victoria

Professor David Gardner
The University of Melbourne

Professor Martha Hickey
Royal Women's Hospital, Melbourne

Associate Professor Tom Jobling
Chairman, Ovarian Cancer Research Foundation

Associate Professor Jeff Kerr
Faculty of Medicine, Nursing & Health Sciences, Monash University,

Professor Gab Kovacs AM
Monash IVF, Victoria

Associate Professor Kate Loveland
Faculty of Medicine, Nursing & Health Sciences, Monash University

Dr David Nikolic-Paterson
Department of Nephrology, Monash Medical Centre, Monash University

Associate Professor Moira O'Bryan
Faculty of Medicine, Nursing & Health Science, Monash University

Professor Gail Risbridger
Faculty of Medicine, Nursing & Health Sciences, Monash University

Dr Luk Rombauts
Monash IVF, Victoria

Professor Ian Smith
Deputy Dean, Research, Monash University

Associate Professor Peter Temple-Smith
Monash Institute of Medical Research, Victoria

Dr Greg Tesch
Faculty of Medicine, Nursing & Health Sciences, Monash Medical Centre

Honorary Senior Research Associates
Dr Sarah Meachem
(Metabolism and Cancer Laboratory

Dr Helena Sim
(Sex Determination and Gonadal Development Laboratory)

Honorary Research Associates
Davina Cossigny
(Ovarian Biology)

Natalie Hannan
(Endometrial Remodelling)

PHI Board Committees

PHI Foundation

The role of this committee is to provide the Institute with strategic advice and direction for fundraising, and building public and corporate awareness of PHI and its research.

Members:
Mr John Weste (Chair)
Ms Natalie Allan
Ms Georgia Beattie
Mr David English
Professor Matthew Gillespie
Mr Graeme Goldman
Mr Dylan Simmons
Miss Laura Watson (Secretary)

Finance and Audit Committee

The role of this committee is to assist the board in its oversight of the internal control and compliance, accounting and financial reporting, and risk management processes of PHI.

Members:
Mr Stuart Alford (Chair)
Ms Jane Bell
Dr Bob Edgar
Mrs Carmel Mortell
Mr Peter Murray (Secretary)

Investment Committee

The Investment Committee provides advice to the Board for investment policies, and within the Delegation of Executive Authorities to approve investments and engage investment managers, and to determine the effectiveness of investments.

Members:
Dr Bob Edgar (Chair)
Mr Martin O'Meara
Mr Richard Condon
Professor Jock Findlay
Professor Matthew Gillespie
Peter Murray (Secretary)

Intellectual Property and Commercialisation Committee

The role of this committee is to advise the Board and Director on statutory requirements for corporate governance and commercialisation of the institute's intellectual property and related issues.

Members:
Mrs Jane Bell (Chair)
Ms Jennifer Joiner
Mr Grant Fisher
Dr Neil Owens
Dr Michael Pannacio
Professor Matthew Gillespie
Assoc. Professor David Robertson
Professor Lois Salamonsen
Mr Andrew McCallum (Secretary)

Internal PHI Committees

Authorship & Publications Committee

This committee exists to set down guidelines to ensure sound scientific practice, to maintain a system of peer group review of all publications prior to submission to scientific journals and to maintain a complete and readily accessible bibliography of publications by Institute members.

Members:
Dr Peter Stanton (Chair)
Ms Dianne Arnold
Dr Neil Owens
Ms Claudette Thiedeman

Education Committee

The Education Committee oversees the implementation of seminars and educational programs for the Institute to permit knowledge transfer and skill acquisition.

Members:
Dr Kevin Knower (Chair)
Dr Mai Sarraj
Dr Neil Owens
Dr Sara Al-Musawi
Dr Michelle Van Sinderen
Mr Kyren Lazarus
Professor Evan Simpson

Equipment Committee

The Equipment Committee assesses applications from Institute staff for equipment purchases which are considered on the basis of their suitability for proposed use, strategic intent of PHI, and applicability across PHI

Members:
Dr Julian Quinn (Chair)
Mrs Roseline Acker (Secretary)
Dr Steve Bouralexis
Dr Colin Clyne
Dr Tracy Edgell
Dr Peter Fuller
Ms Belinda Kelly
Dr Joohyung Lee
Dr Neil Owens
Dr Adam Rainczuk
Dr Kaye Stenvers
Mr Pete Murray

Student Open Day Committee

This committee liaises with MHTP partners in the planning and organising of the event.

Members:
Dr Peter Stanton (Chair)
Mr Daniel Czech
Ms Sue Panckridge
Ms Sarah Paule
Mrs Kelly Walton

Institute Scientific Group

The Scientific Group provides a forum to foster collaboration and information sharing within the Institute, permitting the opportunity for advice and implementation of the vision of the Institute. All other committees report at ISG.

Members:
Craig Harrison (Chair), Roseline Acker (Secretary) Stefan Bagheri-Fam, Pascal Bernard, Marie Bilandzic, Steve Bouralexis, Kristy Brown, Henry Burger, Simon Chu, Colin Clyne, Ann Drummond, Jock Findlay, Peter Fuller, Matthew Gillespie, Vince Harley, Karla Hutt, Vicky Kartsogiannis, Belinda Kelly, Kevin Knower, Joohyung Lee, Rob McLachlan, Sarah Meachem, Ellen Menkhorst, Guiying Nie, Liza O'Donnell, Julian Quinn, Adam Rainczuk, David Robertson, Lois Salamonsen, Mai Sarraj, Peter Stanton, Kaye Stenvers, Andrew Stephens, Ganeema Tokhi, Kelly Walton, Morag Young

Higher Degrees Committee

HDC is responsible for:

- Reviewing the status of HDRs
- Conducting a confirmation of candidature review
- Ensuring that students participate in the PHI induction program
- Ensuring students have a Mentor at the commencement of their candidature
- Providing advice to students
- Completion of HDR candidature

Members:
Prof. Lois Salamonsen (Chair)
Prof Matthew Gillespie
Peter Stanton
Kelly Walton (Student Welfare Rep)
Neil Owens

Occupational Health and Safety Committee

The OH&S Committee provides a forum for consultation, ensuring that the Institute meets legislative compliance, and forms a pivotal role in implementing the Institute's OH&S management system.

Members:
Professor Matthew Gillespie (Chair)
Ms Francine Brennan
Ms Maria Docanto
Ms Cassie Hincks
Ms Emily Kelly
Ms Janelle Ryan
Ms Ganeema Tokhi
Mrs Roseline Acker (Secretary)

Institutional Biosafety Committee

This committee provides liaison between Prince Henry's Institute and Monash University's Biosafety Committee to ensure all PHI research and facilities using genetically modified materials complies with regulations as outlined within framework of the Gene Technology Act 2000.

Members:
Professor Vince Harley (Chair)
Dr Anthony Argentaro
Ms Jeanette Birtles (Secretary)
Dr Ashwini Chand
Mrs Ruth Escalona
Dr Craig Harrison
Dr David Nickolic-Patterson (Monash University)
Dr Harmeet Singh
Ms Yizhou (Vicky) Yao

PHI Post Graduate Association (PHIPA)

PHIPA was established in Oct 2012

Members:
Kelly Walton (Chair)
Mai Sarraj (Deputy Chair)
Jessica Gathercole (Secretary)
Sara Al-Musawi/Kevin Knower (ECR Education)
Jyothsna Rao/Michelle Van Sinderen (Networking Reps)

Promotions & Classifications Committee

This committee assess the requirement for the classification of new and re-classified positions, the suitability of employees for promotion and in some cases, for progression.

Members:
Professor Lois Salamonsen (Chair)
Dr Colin Clyne
Mr John Gibson (Monash University)
Dr Peter Stanton

Research Advisory Group

This group advises and assists the Director on matters of policy to be recommended to the Board of the Institute.

Members:
Professor Matthew Gillespie (Director)
Professor Peter Fuller (Associate Director)

Lab Heads: A/Prof Eva Dimitriadis, Prof Jock Findlay, Prof Vincent Harley, Prof Robert McLachlan, Prof Guiying Nie A/Prof David Robertson, ProfLois Salamonsen, Prof Evan Simpson

External Committees

The responsible conduct of research underpins all activities undertaken by Prince Henry's Institute. We comply with the NHMRC Australian Code for the Responsible Conduct of Research, and we have also adopted our own Code of Research Conduct. Our active promotion of these codes establishes the ethos at PHI which guides all areas of the Institute from governance, through to the conduct, management and reporting of our research.
Prince Henry's Institute complies with all legislative and regulatory requirements for the safe and ethical conduct of research. Institutional biosafety and Ethics committees are external, and our researchers apply to these committees for approval to conduct their nominated research.
The external committees used by Prince Henry's Institute are:
Southern Health
– Human Research Ethics (HREC)
Monash University
– Animal Ethics Committee A and B (AEC)
Monash University
– Institutional Biosafety Committee (IBC)

Ongoing support and investment is critical to the future of Institute's such as PHI.

Community and corporate engagement is an important tool in building wider awareness and understanding of translational medical research and its role in shaping future health and clinical practice, as well as the long-term benefits of continued investment in science. Throughout 2012, the Institute has continued to drive a strong community and corporate engagement agenda, including events such as the Discovery Dinner series, media engagement and participation in awareness and education programs.

Engaging with the business community

Completing the launch series, the 2012 Discovery Dinners provided an intimate and engaging platform for the PHI Foundation to raise corporate awareness of PHI's research and achievements, as well as increase the Institute's fundraising capacity.

Partnering with official Discovery Dinner sponsors, Tata Consultancy Services – Australia and New Zealand, the Foundation hosted two further dinners March and June focusing women's health and female fertility research. Keeping to the format used for the 2011 launch event, both dinners featured a scientific and corporate speaker. The March dinner featured presentations from Dr Kristy Brown, co-head of PHI's Metabolism and Cancer Laboratory and Ms Patrizia Torelli, Founder of Spheres of influence International and President of Asia Pacific World Sport and Women Inc. The final Discovery dinner for 2012, featured senior PHI researcher and fertility expert, Dr Jemma Evans, and Ms Jane Harvey, a former executive who serves on the boards of a number of key companies.

The series will continue as part of the Foundation's broader engagement strategy in 2013.

PHI Rides for Research in 2012

After an intense training schedule and with a new strategy in place, team PHI participated in their sixth Murray to Moyne Cycle Relay at the end of March 2012. With Mr Andrew McCallum once again at the helm, the team joined forces with executives from Davies Collison Cave to complete the 520km relay in just 24 hours and raise over $31,000 towards the purchase of an Olympus BX53 microscope to enable researchers to detect proteins associated with cancer, heart disease and infertility. One of the state's premier cycling and fundraising events, the relay attracted thousands of participants from the medical research and health sectors and general community with a shared love of cycling and the desire to deliver a healthy future for all Australians. A fixture on the Institute's fundraising calendar since 2006, the event has contributed more than $172,000 in funding towards new equipment purchases.

PHI launched its Facebook page in October, 2012

Raising awareness and public support for ovarian cancer

PHI's Ovarian Cancer research program is funded by the Ovarian Cancer Research Fund. During 2012, our researchers have continued to work closely with the OCRF to build awareness of ovarian cancer and need for investment in this area of research to help progress efforts to develop an early diagnostic test and improved treatments. Throughout the year, members of the Ovarian Cancer Biomarkers Laboratory provided scientific expertise key community, business and education functions, as well as assisting with key OCRF driven fundraising campaigns.

Media engagement

As part of its ongoing commitment to widely communicate its research outcomes, PHI has continued to build a strong local, national and international media presence in 2012.

PHI has received extensive radio, newspaper and television coverage of its research excellence throughout 2012, including extensive media coverage of findings from the Institute's collaborative fertility research with Walter Eliza Hall Institute and Monash University, as well as coverage of the recognition of Professor Salamonsen and her collaborative research team as the first non-Europeans

honoured in Merck Serono's Grant For Fertility Innovation. We also received extensive international coverage following release of findings by the Brain and Gender Laboratory's showing that the male only gene, SRY, is involved in the regulation of dopamine in the male brain.

Utilising social media for science and medical research

As new and innovative technology platforms continue to shape how we connect to each other and the world, Australians are increasingly turning to social media as a key source of news and information. PHI recognises the importance of harnessing existing and emerging communication platforms to maximise community engagement. Throughout 2012, PHI has continued its efforts to integrate social media with existing communication tools such as our website and newsletters.

Community support of clinical research

Prince Henry's Institute has a wealth of research talent and knowledge. Without community investment our researchers would not have access to the resources, equipment and support needed to progress vital research and protect future health and wellbeing. It is only with the support of a strong individual and corporate donor base that Prince Henry's Institute can continue to translate its research into improved health care and treatments. The willingness of community members to participate in our clinical studies and trials is also vital to the success of our research initiatives. Prince Henry's Institute continues to build its tissue donation program, with 1150 women in both Melbourne and Sydney having generously donated vital clinical tissue samples since its inception. This program plays a vital role in helping to expedite our ongoing efforts to develop an early detection test for ovarian cancer.

Researchers in the community

In 2012, PHI researchers have played an active role in school education initiatives to engage students with basic scientific concepts and encourage students to consider a career in medical research and innovation. Some researchers have been matched through the CSIRO's Scientists in Schools scheme, and other researchers have visited schools throughout regional Victoria as part of the Australian Society for Medical Research education program.

Ms Georgia Beattie launches the June Discovery Dinner

June Discovery Dinner: Mr David English, Ms Georgia Beattie, Mr John Weste (Chair), Professor Matthew Gillespie, Ms Fiona Le Brocq, Mr Graeme Goldman, Mr Dylan Simmons

Researchers in the community in 2012

Dr Sara AL-Musawi
– Ashwood School

Ms Jenna Haverfield
– Albany Rise Primary School

Dr Kevin Knower
– Mossgiel Park Primary School

Dr Ellen Menkhorst
– Ruyton Girls' School

Dr Mai Sarraj
– Clayton South Primary School

Ms Sarah To
– Presbyterian Ladies' College

By supporting PHI, you bring us closer to securing future health and wellbeing for generations to come.

The team at PHI appreciates the support of all those who have given so generously during 2012. We also wish to thank our alumni for their continued support and loyalty. Thank you.

No matter the size, no matter the reason your gifts have made an enormous and lasting difference to the future of health and patient care in Australia and beyond.

Community investment is vital to ensuring we have the funding and resources needed to continue our vital research. This year donor support has continued to strengthen through our regular appeals including Ride 4 PHI and the June Tax Appeal, as well as the continuation of the Foundation's Discovery Dinner series. Funding from these appeals has assisted us to progress vital research, as well as purchase major technology platforms and invest in the development of emerging research talent to ensure our work continues into the future.

Your generosity and loyalty is instrumental to protecting our capacity to improve the diagnosis, treatment, and prevention of diseases such as cancer, cardiovascular disease, obesity, osteoporosis, and Parkinson's disease. Without you, we would be unable to continue this vital work.

Thank you.

Major donors

Aperium Pty Ltd
Mrs (Eva) Jean Armstrong
Mr John Bate
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Mr Edward Billson
Mr Bob Boucaut
Miss Margaret Bowman
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Mr Nicholas Davies
Mrs Joan Donaldson
Mr Geoffrey Eastmure
Mr Kurt Eppinger
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Ms Upeksha (Thilini) Gamage
Professor Matthew Gillespie
Mrs Winnifred Gould
Ms Anthea Hill
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Davies Collison Cave
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Zouki

Discovery Dinner Sponsors

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Prince Henry's Institute acknowledges the support of the following organisations

Affiliated Partners

Southern Health

MONASH University

MHTP Monash Health Translation Precinct

MHTP Monash Health Translation Precinct

A partnership between Southern Health, Monash University, Prince Henry's Institute and Monash Institute of Medical Research translating scientific discoveries into world's best healthcare.

Southern Health

MONASH University

phi science for better life

MONASH INSTITUTE OF MEDICAL RESEARCH

Research Funding Partners

Australian Government
National Health & Medical Research Council

Victoria

The Institute is supported by the Victorian Government Operational Infrastructure Support Program (OIS)

Victorian Breast Cancer Research Consortium

Cancer Council Victoria

CASS

Bill & Melinda Gates Foundation

Harold Mitchell Foundation

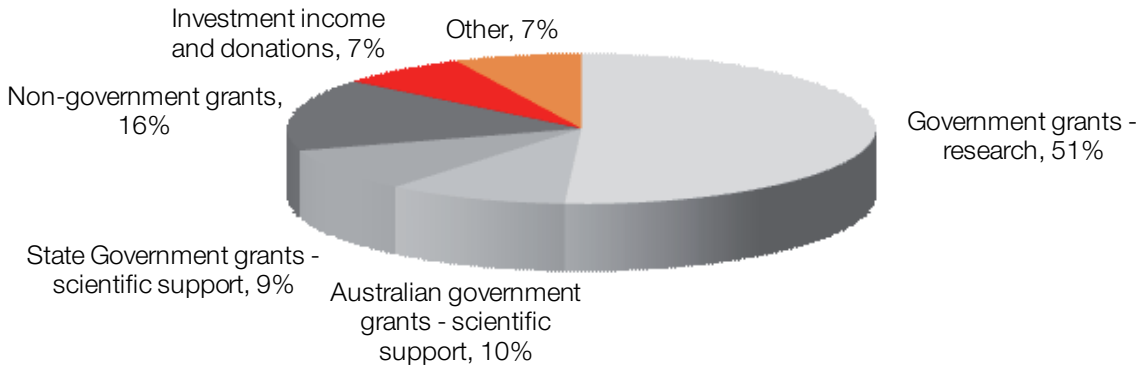
National Breast Cancer Foundation
Funding Research for Prevention and Cure

ovarian cancer research foundation
www.ocrf.com.au

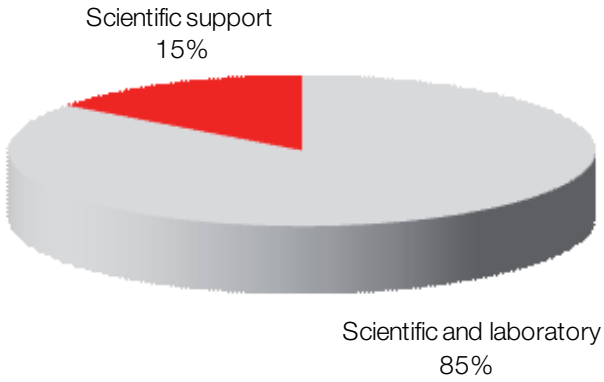
The Gandel Charitable Trust
Harold and Cora Brennen Benevolent Trust
The Marian and E.H. Flack Trust
Montgomery Trust

FINANCIAL YEAR AT A GLANCE

Income



Expenditure



The year in brief	2012	2011
Government grants - research	7,753,211	6,824,187
Australian Government grants - scientific support	1,516,686	1,447,657
State Government grants - scientific support[1]	1,426,771	1,400,517
Non-government grants	2,375,336	2,451,007
Investment income and donations	1,081,446	1,005,781
Other income	1,073,067	983,831
Expenditure on research	12,015,604	11,115,69
Expenditure on scientific support	2,085,581	2,348,821
Total surplus	1,125,332	648,46
Number of NHMRC fellows	9	9
Number of staff	157	170
Number of students	32	43
Number of PhD students	19	24
Capital expenditure	384,141	214,124

[1]The Institute is supported by the Victorian Government Operational Infrastructure Support Program (OIS)

SUPPORT US

Family is everything. We know you would do anything in your power to protect those you love. At PHI, we believe there is nothing more precious or important than the gift of good health. Don't wait until serious disease strikes you or your family - Act now!

Donations

Turning your dollars into vital discoveries is as easy as donating to PHI. Every dollar you give brings our researchers closer to delivering vital insights and discoveries to cure and prevent serious disease and infertility. Become a regular donor and help fund vital research equipment, education support, and capital development.

Donate today!

Donate online at **princehenrysfoundation.org/support-us/donations** or complete the attached form and return to Prince Henry's Institute, PO Box 5152, Clayton Vic 3168. For more information contact us on 9594 4372 or email **info@princehenrys.org**

The Australian Tax Office endorses Prince Henry's Institute as a Deductible Gift Recipient (DGR). As a health promotion charity, gifts to Prince Henry's Institute qualify for a tax deduction under item 1 in section 30.15 of the Income Tax Assessment Act 1997.

Named funds

Create a lasting tribute to a loved one by donating in their memory.

Looking for the perfect gift, not sure what to get for a person who has everything? Why not donate to Prince Henry's Institute and give them the most precious gift of all – good health?

Corporate

Corporate support and sponsorship is vital to the delivery and success of the Foundation's fundraising and community engagement program. By supporting PHI, you can help raise vital funds to improve health and wellbeing for all Australians today, tomorrow and well into the future. Associate your company with one of Australia's leading and most trusted centres for translational research centres and take corporate responsibility to the next level with PHI. Become champions for Australian health today.

Making dollars and cents into discoveries and cures

When you give to PHI, you can be sure that your donation goes straight to research to make the difference you intended. We guarantee that 100 per cent of every donation helps fund vital research, equipment, resources and education to foster emerging research talent. Donate to PHI today and be sure you really are making a difference.

For more information please contact:

Prince Henry's Institute
PO Box 5152
Clayton VIC 3168 Australia
Tel: 61 3 9594 4372
Fax: 61 3 9594 6125
Email: info@princehenrys.org

Yes, I would like to support research at Prince Henry's Institute

Mr/Mrs/Ms/Miss/Dr/Prof Please circle

First Name

Surname

Address

Postcode

Phone Mobile

Email

Date of Birth

Donation Amount

☐ $20 ☐ $50 ☐ $100 ☐ $200 ☐ $ _____ (Other)

☐ Cheque (*please make payable to Prince Henry's Institute of Medical Research)*
Donations over $2 are tax deductable. ABN 48 132 025 024

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Cardholder's Name

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Prince Henry's Institute is a health promotion charity. Donations $2 and over are tax deductible. Prince Henry's Institute respects your privacy and complies with the Privacy Act, 1988 (Cth) and amendments. Your details remain confidential and we do not pass on any data to third parties.

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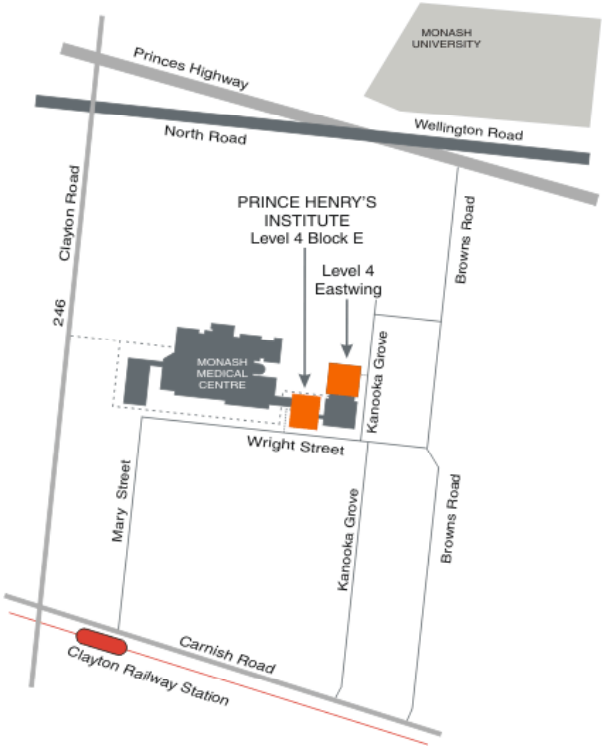

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