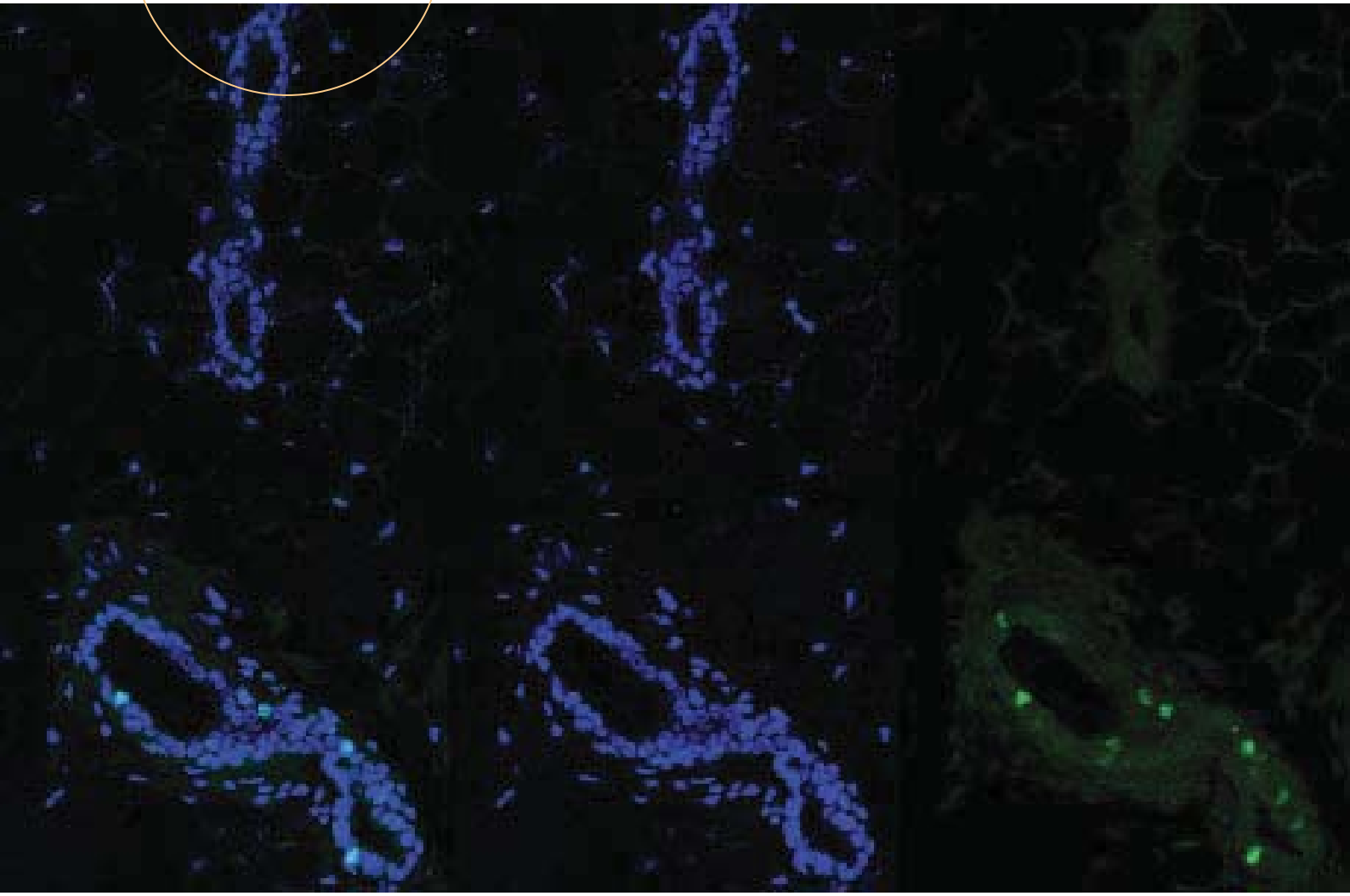

PRINCE HENRY'S INSTITUTE
2011 SCIENTIFIC REPORT

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Cover: Immunofluorescent images showing rapidly proliferating cells in the mammary glands of mice in which LRH-1 is activated (image: Dr Colin Clyne)

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 is Australia's leading centre for translational medical research in the areas of reproductive health and hormones. Our researchers are at the forefront of global efforts to understand the role of hormones in the diagnosis, treatment and prevention of diseases such as cancer, osteoporosis, Parkinson's disease, obesity and cardiovascular disease.

Combining traditional laboratory research with clinical trials and studies, we aim to ensure laboratory knowledge is translated from the lab to bedside, resulting in improved outcomes for patients and their families.

Our research impacts on the following key areas:

- Cancer
- Cardiovascular Disease
- Bone health
- Genetics and Development
- Men's Health
- Women's Health

Our history

In 2010, the Institute celebrated 50 years of research excellence, a milestone which reflects the strength of the Institute's reputation for innovation, as well as its collaborations within national and international research networks.

Since its inception in the 1960s, Prince Henry's Institute has contributed to a number of significant international discoveries leading to improved patient outcomes and quality of life.

Research highlights:

- The development of new technologies to detect common hormone deficiencies
- The discovery of reproductive hormone inhibin after several decades of intensive research. This hormone was later used by PHI researchers to produce the first blood test for ovarian cancer.
- A key role in the development of a brand new class of drugs to treat breast cancer - aromatase inhibitors.
- PHI studies have shown how the aromatase gene plays an essential role 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.

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CHAIRMAN & DIRECTOR'S REPORT

Prince Henry's Institute is an independent medical research institute specialising in reproductive health and hormones. Our programs aim to bring the laboratory to the bedside, combining traditional laboratory research with clinical studies, to improve the diagnosis, treatment and prevention of disease.

During 2011, our scientists continued to progress research into the role of hormones in fertility and disease. Targeting some of Australia's biggest health challenges, PHI has continued investigations into diseases such as cancer, cardiovascular disease, obesity, osteoporosis and infertility. This year the Ovarian Cancer Biomarkers Laboratory has continued to progress critical research to identify suitable ovarian disease markers, which will be used to develop an early detection test. PHI's investigation into the use of diabetes drug, Metformin, as an alternative to existing estrogen blockers in the treatment of estrogen sensitive breast tumours has attracted strong international interest. Researchers from both the UK and the Netherlands are currently working with the Metabolism and Cancer Laboratory to develop collaborative research projects.

The social trend to delay parenthood has an effect on fertility which declines with age. This year, our researchers published the first in a series of papers exploring the critical 'window of receptivity' for the establishment of a successful pregnancy. Our discoveries aim to guide clinical practice for diagnosing infertility and for improving success rates of reproductive technologies. They could also lead to wider contraceptive options for women. We also have promising hopes for new options to prevent serious infertility problems for girls and young women undergoing chemo- and radiation therapies during treatment for cancer. New studies are underway to address the health needs and clinical care for women in mid life.

We are collaborating with a Canadian research team to investigate how blood hormones change as women approach menopause. Thirty women have participated in this two-year study which combines our expertise in blood hormone analyses and Canadian ultra-sound technology. Women are at greater risk of osteoporosis once they have reached menopause. Patients are receiving a drug used to treat osteoporosis, and its effects beyond the skeleton are being measured to determine whether it provides more far-reaching, general well-being effects for women in mid life.

Men are 1.5 times more likely to be diagnosed with Parkinson's disease than women. PHI's Brain and Gender Laboratory's research aims to increase understanding of the underlying link between a male determining gene, SRY, and Parkinson's disease. They hope this research will lead to improved therapies to reduce male susceptibility to Parkinson's disease and slow its progression in diagnosed patients. The Clinical Andrology Laboratory also continue to partner with Southern Health to deliver clinical research service to assist men with medically-induced testosterone deficiency.

Utilising proteomic techniques, our researchers progressed toward producing a blood test for certain types of male fertility as an alternative to the current intrusive test.

Our continued success in securing competitive grant support is reflective of the calibre of PHI's research and our continued capacity to attract and foster emerging research talent.

In 2011 PHI secured over $6.65 million in funding through the National Health and Medical Research Council for research and development over the next three to five years. This consolidates the funding increases achieved in 2010 with our 35 per cent project grant success rate still well over the 21 per cent national average. Following last year's trend, many of the awardees were early career researchers. The appointment of Dr Eva Dimitradis, head of the Embryo Implantation Laboratory, to the NHMRC Fellowship scheme reflects the high standard of leadership at the Institute. She is joined by Professors Rob McLachlan, Vincent Harley, Jock Findlay and Associate Professor Peter Tipping who were reappointed as Fellows.

Increased philanthropic support has enabled our researchers to explore bold ideas in the laboratory, and to travel and present their research in international settings. Significantly, we have utilised philanthropic support and donations to attract talented medical researchers to

take up new employment opportunities with us on their return to Australia.

We continue to foster a strong partnership with Southern Health, to facilitate the translation and integration of our research discoveries to deliver clinical and economical benefits by reducing the burden and cost of disease on our health system. Our ongoing partnership with Monash University plays a vital role in sustaining our scientific workforce through the education and training of future research leaders. Our innovative collaboration - the Monash Health Translation Precinct (MHTP) - was consolidated in 2010 with active seminar programs and equipment allocations. We continue to work together to realise the potential of this partnership, with co-location of MHTP in a new capital development.

As a member of the newly formed multi-site Monash Comprehensive Cancer Consortium (MCCC) with Monash University, Southern Health, Alfred Health, Peninsular Health and Cabrini Health, our collaborative goal is to interconnect research and clinical strengths in ways that benefit Victoria's cancer patients. This year saw the official launch of the MCCC's website, which marks a significant step in bringing together these partnering organisations.

The Institute's corporate profile also came under the spotlight this year with the launch of the Foundation's Discovery Dinner series. This initiative aims to provide corporate engagement opportunities through a series of themed dinners. These events will continue in 2012 and form part of an ongoing corporate engagement strategy to boost fundraising capacity for the Institute.

We also extend our gratitude to the service provided by Professor Steve Wesselingh and Ms Jay Bonington who retired from the PHI Board this year. Steve was instrumental in continuing the Institute's relationships with Monash University and the development of an Academic Health Science Centre, and we are sure that these will continue to develop with Professor Christina Mitchell. A member of the PHI Board for five years, Jay provided strong financial and risk management support for the Institute.

The ongoing financial support of the Australian and Victorian Governments, major gifts from philanthropic organisations and many individuals are greatly valued and appreciated. To the leadership team, staff and students, we acknowledge your many talents and dedication in striving for our vision of improved health through hormone research.

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.

Treasurer (until Nov 2011)
Ms Jay Bonnington BCom MBA FCPA FAICD

Jay served on the PHI Board from April 2009 to November 2011, most recently in the role of Treasurer. Jay has an accounting background with strong leadership experience, including roles as CFO/ Finance Director of Yallourn Energy and the CEO of the Make-A-Wish Foundation Australia until 2005. She serves on a number of boards, including HESTA Supperannuation Fund, Superannuation St John of God Health Care Group, Port of Melbourne Corporation, Ag Services Victoria, Metropolitan Fire and Emergency Services, the Royal Botanic Gardens. Jay is a Trustee of the Queen's Fund and the Lord Mayor's Charitable Foundation, and a member of the Deakin University Council. *Special responsibilities:* Jay served as Treasurer on the PHI Board until November 2011, she also served as a member of the Finance and Audit and Investment Committees.

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 *(from Nov 2011)*

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.

Professor Steve Wesselingh
BMBS PhD FRACP
(until Nov 2011)

Professor Wesselingh is an internationally recognised expert in viruses affecting the brain. A member of the PHI Board from November 2009 to November 2011, he has a strong background in management roles, including Dean of the Faculty of Medicine, Nursing and Health Sciences, Monash University until 2011 and Director of the Burnet Institute. He has also served on the boards for Anex, Australian Centre for Health Innovation, Baker IDI, Centre of Excellence in Intervention and Prevention Science, Lucid.

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

The Foundation Committee assists PHI by driving key fundraising, marketing and engagement activities within the Institute and providing strategic advice and direction to raise the Institute's profile and increase fundraising capacity.

In 2011, the PHI Foundation worked to enhance the Institute's corporate and community engagement through the launch of their Discovery Dinner series. The series, sponsored by Tata Consultancy Solutions (Australia and New Zealand), aims to increase the Institute's profile by capitalising on PHI's research excellence in the areas of endocrinology and reproductive health and raising awareness of the long-term benefits of investment in translational research.

The series was launched in August with a men's health dinner, featuring key note presentations from Mr Tim Mathieson, the partner of the Honourable, the Prime Minister Julia Gillard, ABC Journalist Barrie Cassidy and PHI Clinical Research Fellow and Andrologist Dr Carolyn Allan. The evening was used to highlight the challenges of men's health and the role of translational medical research in addressing key health issues such as, cancer, cardiovascular disease, fertility and the impacts of ageing on male health.

The Discovery Dinner series will continue with events planned throughout 2012.

The Foundation also continues to build its membership with, Mr David English joining the committee in 2011. Recruitment of members will continue through 2012.

Mr John Weste

Mr Ronnie Atlas
Managing Director, Word of Mouth Communications

Mr David English
Head, Stratety & Advisory Services, Aperium.

Mr Graeme Goldman
Co-Founder, H & G Partners.

Mr Dylan Simmons
Consultant, Business Advisory Services, Rees Group

VICTORIAN PREMIER'S AWARD COMMENDATION 2011: DR AMANDA RICKARD

Dr Rickard demonstrated that removal of MR from inflammatory cells or cardiac muscle cells offered the heart significant protection from inflammation, fibrosis and hypertension linked to high levels of aldosterone and salt.

AMANDA RICKARD

PHI Researcher Commended in 2011 Premier's Award

Prince Henry's Institute's excellence in Cardiovascular Endocrinology was highlighted with the commendation of Post-doctoral researcher, Dr Amanda Rickard's research in the 2011 Premier's Award for Health and Medical Research, which recognises the achievements of early-career health and medical researchers in Victoria.

Dr Rickard was recognised for her PhD research on the role of a steroid hormone receptor, the mineralocorticoid receptor (MR) in heart failure and high blood pressure. She completed her PhD with PHI's Cardiovascular Endocrinology Laboratory under the supervision of Dr Morag Young.

Through her research, Dr Rickard demonstrated that removal of MR from inflammatory cells or cardiac muscle cells offered the heart significant protection from inflammation, fibrosis and hypertension linked to high levels of aldosterone and salt. Trials later showed that combining traditional therapies with an MR inhibitor significantly improved outcomes for patients with heart failure.

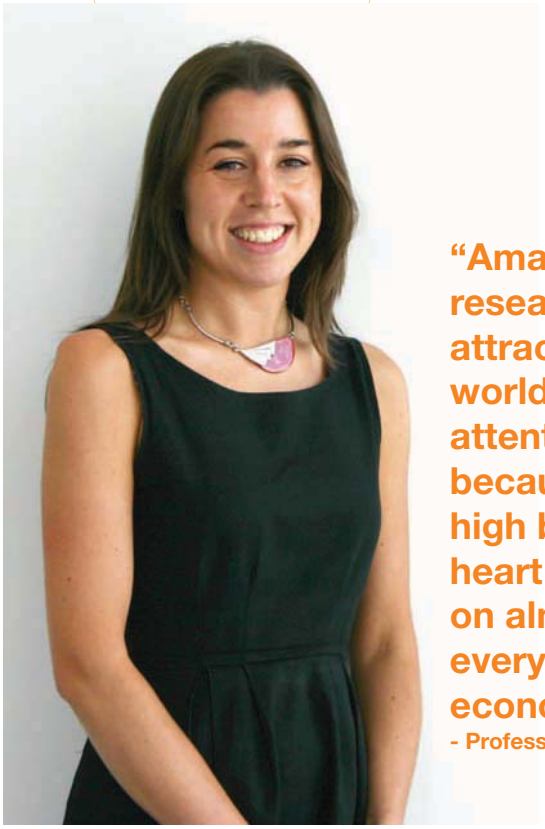
Professor Matthew Gillespie, Director of Prince Henry's Institute congratulated Dr Rickard on her award.

"This truly is an accolade for Dr Rickard. Her research has attracted worldwide attention because of the high burden of heart disease on almost every country's economy," Professor Gillespie said.

Amanda's PhD supervisor, Dr Morag Young said that this award (a first for PHI) was a superb outcome for Amanda and the group after many years of hard work.

Currently in Paris completing an NHMRC Overseas Biomedical Training Fellowship with INSERM Paris Cardiovascular Research Centre, Amanda travelled to Melbourne to accept her award, as well as $8,000 and a certificate for her work from the Premier of Victoria at a ceremony held at Government House in June 2011.

Professor Gillespie said Dr Rickard's research with the Cardiovascular Endocrinology Laboratory, highlighted the benefits of translational research and its role in improving clinical practice and outcomes for patients.



"Amanda's research has attracted worldwide attention because of the high burden of heart disease on almost every country's economy,"
- Professor Gillespie

"These discoveries have received international attention because they more clearly define the role of MR in different cells, and show potential for new high blood pressure and heart disease treatments." Professor Gillespie said.

RESEARCH REPORT: CARDIOVASCULAR HEALTH

Almost 1 in 5 Australians have a long term cardiovascular condition. While death rates have fallen with the positive impact of public health campaigns, cardiovascular disease remains the leading cause of death in Australia. Hormones play a key role in the healthy functioning of the cardiovascular system. PHI researchers are focusing on fundamental molecular understandings as well as clinical applications.

Cardiovascular Endocrinology Laboratory | Steroid Receptor Biology Laboratory

CARDIOVASCULAR ENDOCRINOLOGY

Focusing on specific cell types, we are using our current understanding of how a hormone receptor contributes to heart failure and high blood pressure to identify new ways to develop targeted therapies that act on the heart while avoiding side-effects associated with existing drugs.

Laboratory Head: Dr Morag Young

Heart disease is the leading cause of death and disability in Australia. Drugs that block the action of the mineralocorticoid receptor (MR) have shown significant benefits for the treatment of heart failure. However, these benefits are often accompanied by side-effects that limit their widespread use.

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

Through our research we are working to determine both the particular cell types in the heart in which the MR is critical for the development of heart failure, as well as characterize the way the MR acts in these cells. Using this knowledge we can then develop drugs that exploit the characteristics of these cells and 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

We have previously shown that inflammatory cells are key sites of MR action in the development of heart disease. Using an independent model of heart disease that does not rely on mineralocorticoid hormones (aldosterone) we have now shown that MR in macrophages also play a key role in other forms of heart disease.

Our data provides insight into earlier clinical studies that show that MR antagonists are equally effective in patients without high levels of aldosterone. 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

We have now studied mice that cannot recruit immune cells and, using this independent model, validated our provocative findings that show the MR in macrophages are essential for the development of heart disease and high blood pressure.

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 shown that upon activation 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. Fibrosis in the heart is regulated by a balance between profibrotic and antifibrotic factors. When there is an imbalance in these factors fibrosis increases in the heart tissue, which results in a stiffer heart with reduced function. 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.

Identification of hormone-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 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.

Importantly, these subtle differences 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 overall aim is to use these novel proteins to screen and develop new drugs for the treatment of hypertension and heart disease.
Our studies have also attempted to identify tissue specific proteins that interact with and regulate the MR.
We now have several new candidate proteins currently being characterised.

- Dr Morag Young has been awarded an ANZ Trustees Equipment Grant for 2012 to purchase a Doppler echocardiograph for the determine heart function in experimental models.

- Dr Jun Yang was the recipient of the Novartis Junior Investigator Award at the Endocrine Society of Australia annual meeting in 2011.

- Laura Bienvenu, Australian Post-graduate Award Scholarship.

STEROID RECEPTOR BIOLOGY

Research into the molecular interaction between steroidal hormones such as aldosterone and their cellular receptors offers new avenues for tackling a range of diseases, including heart failure 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. Through their interactions with intracellular nuclear receptors, which regulate gene expression, these hormones play a role in the pathogenesis of cardiovascular disease and cancers of the prostate and breast.

Our research primarily focuses on the investigation of the activating mechanisms of nuclear receptors, especially those associated with the adrenal hormones aldosterone and cortisol and the reproductive hormones secreted in the ovary. Studying these nuclear receptors is generating new therapeutic targets for the treatment of life-threatening diseases.

We recently identified a novel mechanism for inhibiting the action of the mineralocorticoid receptor and confirmed an important genetic marker for a particular ovarian cancer.

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.

In an internal collaboration with Dr Morag Young's PHI team 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.

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 been investigating the role of various signalling pathways in the development of GCT and their possible relevance as therapeutic targets. This has included studies to systematically examine patterns of gene expression in these tumours.

Ovarian phenotype of the IKKβ null mouse

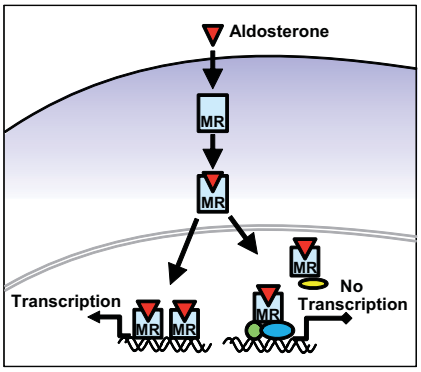
A family of transcription factors known as nuclear factor κ-B (NFκ-B) has been implicated in the initiation and progress of various cancers.

Our studies in GCT cell lines indicate that the NFκ-B signalling pathway is involved in the inhibition of apoptosis (cell death) in granulosa cells. Its precise role in the development of the follicles in response to steroid hormones is yet to be clarified.

To investigate the role of NFκ-B signalling in the ovary we have created a transgenic mouse model, the IKKβ conditional knockout mouse, in which NFκ-B signalling has been deactivated in the ovary. This has demonstrated a key role for this signalling pathway in ovulation.

Nuclear receptors in Thyroid Cancer

The group is collaborating with Professor Chris Gilfillen at Box Hill Hospital to develop a research program addressing key issues in thyroid cancer in parallel with an enhancement of the clinical service provided within the Endocrinology Unit of Southern Health. One component of this work explores the role of nuclear receptors in the pathogenesis of thyroid cancer.



Schematic showing the classical response element mode of signalling and putative transrepression (tethering) which involves interactions with other transcription factors.

RESEARCH REPORT
CANCER

More than 88,000 Australians are diagnosed with cancer every year. PHI has a strong cancer research program focussing on the relationship between hormones and reproductive cancers. Research teams are working collaboratively to understand underlying causes of cancer development, as well as develop early detection methods for ovarian cancer and towards new targeted treatments for breast cancers of the bone.

Metabolism & Cancer | Cancer Drug Discovery | Bone, Joint & Cancer

Ovarian Cancer Biomarkers

Identification of the molecular pathways linking normal metabolic processes within the body with breast cancer, is leading to potential new treatments and preventative measures.

Laboratory Heads:
Professor Evan Simpson and Dr Kristy Brown

We are studying several metabolic pathways associated with obesity and the production of the sex hormone estrogen and using this knowledge to develop and assess potential new treatments for breast cancer.

In 2011, we used a combination of fundamental science and clinical trials to further our research into breast cancer in post-menopausal women. We continue to investigate the metabolic pathways affecting estrogen production in postmenopausal women and 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.

We have previously 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 breast.

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, which regulates the cell cycle and inhibits cancer cells and the hypoxia-inducible factor (HIF) signalling pathways, specifically HIF-1α. 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 estrogen production in the breast adipose stromal cells of postmenopausal women is regulated by the p53 and HIF-1α pathways and whether this is critical for the expression of aromatase.

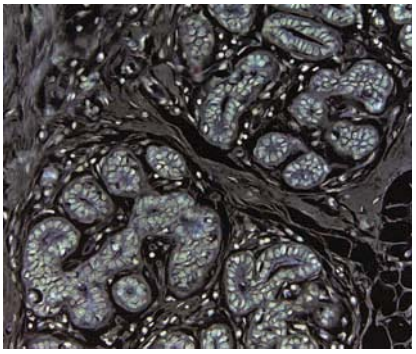
Treatment or prevention of postmenopausal breast cancer

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).

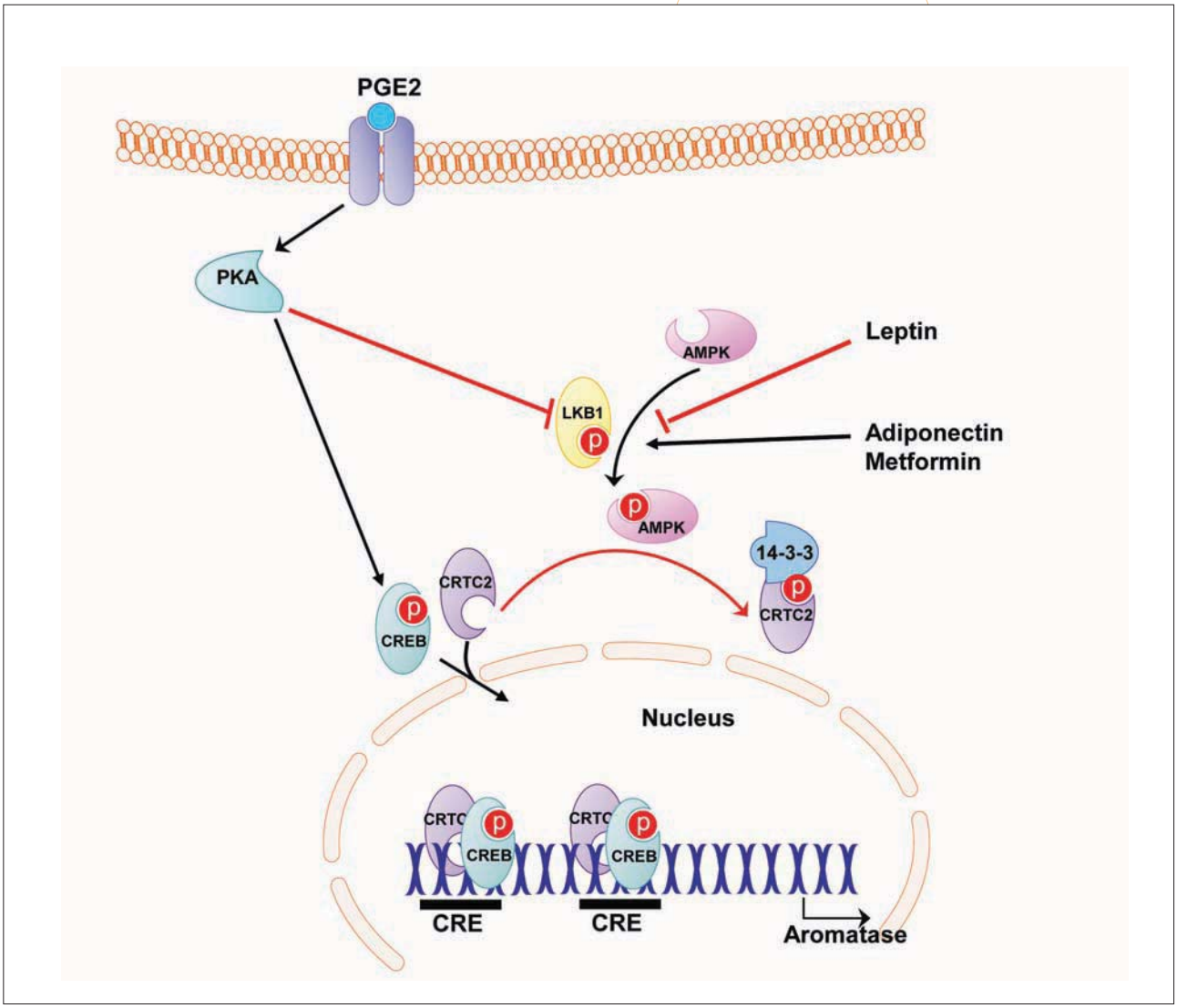
In 2010, in collaboration with Professor Susan Davis at the Alfred Hospital, we initiated a clinical study to examine the effects of metformin on basal aromatase expression within the breast of postmenopausal women.

Women, who chose to undergo breast reduction surgery for unrelated reasons, are offered to take part in the study whereby they are given metformin for four weeks and asked to donate a small portion of their breast tissue at surgery. This study will determine whether metformin treatment could be used to decrease estrogen within the breast and help prevent the occurrence of breast cancer.

In 2011, in collaboration with clinical colleagues at Southern Health, we commenced design of a neo-adjuvant study of metformin involving 60 Victorian women scheduled to have surgery for breast cancer. The participants will take metformin orally for a couple of weeks prior to aromatase inhibitor treatment for a further two weeks prior to surgery. It is hoped that the drug may help stop the growth of tumour cells and allow surgery to be less invasive.



Confocal image: immunofluorescence on breast cancer tissue.



The regulation of aromatase by LKB1 - a new link between obesity and breast cancer. Adiponectin, produced in healthy weight individuals and the ant-diabetic metformin inhibit aromatase by stimulating LKB1/AMPK. LKB1, via activation of AMPK and cytoplasmic siguestration of CRTC2, is a new inhibitor of aromatase. Tumour-derived factor prostaglandin E_2 (PGE_2) and obesity-associated leptin stimulated aromatase expression by inhibiting LKB1/AMPK.

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 E_2 (PGE_2), are altered in obesity and cancer. In previous research we demonstrated that the adipokine leptin, which is elevated in obese people, and PGE_2 both inhibit the LKB1/AMPK pathway, and can therefore increase the expression of aromatase and hence estrogen production. Conversely we found that the adipokine adiponectin, which is elevated in lean people, inhibits aromatase expression and lowers estrogens. We are further investigating 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, have been awarded a National Health and Medical Research Council (NHMRC) project grant for 2011-13. They will further investigate the regulation of estrogen production with the aim of developing breast-specific inhibitors of estrogen production.

Current hormone therapy for breast cancer, while very effective only benefits women with hormone-responsive tumours. Many of these women will discontinue treatment because of unacceptable side-effects.

Laboratory Head: Dr Colin Clyne

Our research aims to address issues with current hormone treatments for breast tumours through the development of breast-specific therapies with fewer side effects than current treatments. We aim to identify new targets for the treatment of tumours not responsive to current treatments and develop new therapies that target the key molecules that we identify.

Epigenetic regulation of estrogen production in breast cancer

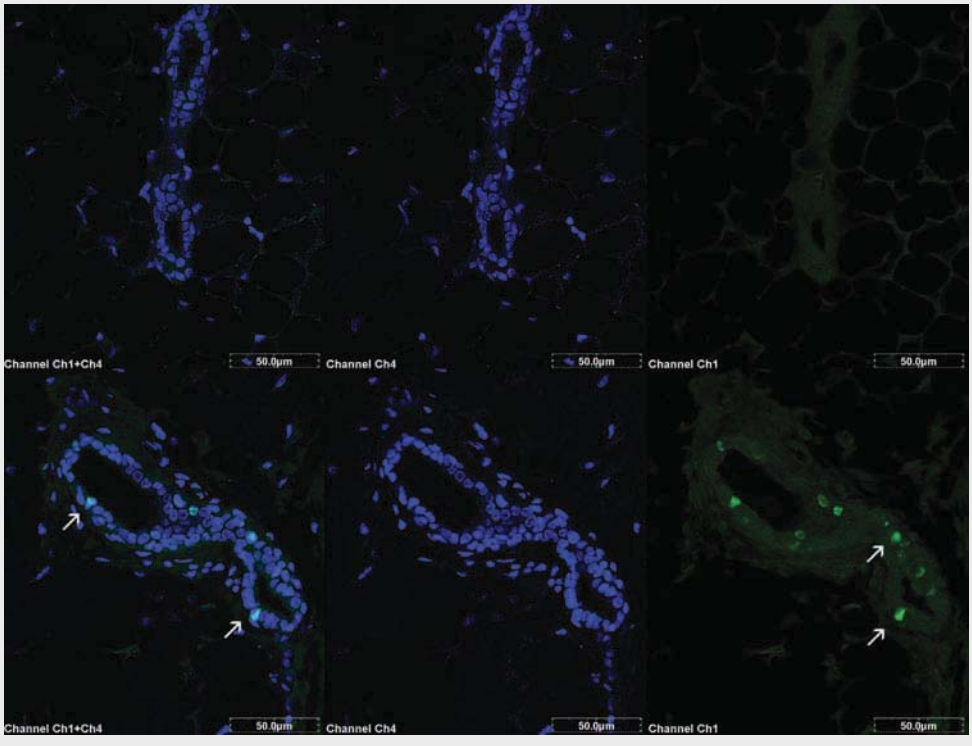
An understanding of the underlying mechanisms that regulate estrogen production in the breast is essential to enable the development of tissue-specific strategies to inhibit this process. We have shown that aromatase is under epigenetic regulation in breast cells and are currently expanding this theme to investigate epigenetic regulation of key genes involved in estrogen synthesis, activity and action. An important aspect of this work will be to show how this epigenetic regulation becomes deregulated in cancer.

Nuclear receptors as novel therapeutic targets

New targets are urgently required for patients whose tumours do not express the estrogen receptor. Our underlying hypothesis is that other receptors related to the estrogen receptor (the orphan receptors) are key regulators of breast cancer progression and potential therapeutic targets. We have shown that one such orphan receptor (LRH-1) stimulates breast cancer cell proliferation and invasion and recently demonstrated that it interacts strongly with the estrogen biosynthetic pathway. To verify these findings we have established a transgenic mouse model in which expression of human LRH-1 is directed to the mammary gland.

This model will aid understanding of the roles of LRH-1 in both normal breast and breast cancer.

We are also actively pursuing a drug discovery program aimed at developing small molecule inhibitors of LRH-1 for breast cancer therapy. We were recently awarded an NHMRC project grant to allow us develop this work further.



Immunofluorescent images showing rapidly proliferating cells in the mammary glands of mice in which LRH-1 is activated.

Loss of bone and the consequent weakening of the skeleton due to osteoporosis, arthritis and bone-invading cancer increases the risk of fracture and the likelihood of serious consequences. A better understanding of the ways that cells can build or destroy bone is helping us identify new treatments to combat these problems.

Laboratory Head:
Professor Matthew Gillespie

Bone consists of two components – tough collagen proteins and calcium-rich minerals. The combination gives both strength (when under compression) and the flexibility to absorb shocks. The repair and renewal of the bones is vital to skeletal health. This is done by specialised cells called osteoclasts, which break down old bone other cells then form new bone in its place. In osteoporosis and related diseases the bone renewal is imperfectly done with too much bone removed and not enough new bone made. While we are able to arrest bone loss, new therapies are needed to generate more bone formation. The bone forming cells produce hormones that act to stimulate their own bone formation, we are continuing to study this process to identify new ways to increase bone production.

In other diseases like rheumatoid arthritis and invading cancers, the problem is not so much a failure of bone formation but of highly localised stimulation of bone destruction which results in pain, fractures and other severe problems. In these cases we need better methods to block bone loss. 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. We need to find ways to prevent this.

With the aim of developing clinical applications, PHI is studying a range of factors that influence bone formation and destruction. In 2011, our studies revealed details of the mechanisms by which a hormone called IL-33 acts to inhibit bone loss on the one hand – and to promote the building of new bone on the other. 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

In previous work we established that IL-33 (which was originally identified in the immune system but is also made by bone forming cells) has effects on bone that look to be potentially useful. Our investigations revealed that IL-33 assists bone formation by acting on osteocytes to suppress sclerostin, a factor that inhibits bone formation. IL-33 is also known to boost the production of other factors that directly stimulate bone forming cells and assist bone formation by acting on osteoblasts to promote their maturation. We are currently investigating reports that mice lacking the ability to respond to IL-33 have been shown to have normal bone formation. There is some evidence to suggest that IL-33 may be more involved in healing than the control of everyday bone cells, with investigations at PHI showing the presence of higher levels of IL-33 in bone undergoing fracture repair.

We have also found that IL-33 can block the formation of osteoclasts therefore reducing bone loss.This appears to be a useful combination – blocking bone loss and stimulating new bone formation. In some circumstances, however, IL-33 has been found to stimulate osteoclasts. We are currently determining how these properties can be used to therapeutic advantage.

Osteoprotegerin and breast cancer

Osteoprotegerin is a protein that strongly inhibits osteoclast production and therefore reduces bone destruction. Osteoprotegerin expression by breast cancers has been found to enhance their growth in both the breast and bone. Hormones normally act on the cell surface, but we have found that osteoprotegerin is acting inside the cancer cells causing the cancer to grow. Interestingly, this increased growth appears to only occur when the cancer cells are in the presence of other normal cells (stromal cells), also found in the body. We are currently investigating the interaction between tumour cells and stromal cells and 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 enables cells to be ‘killed’ when they are old or unhealthy. Cancer cells do not 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 TRAIL responsive genes to identify how they help regulate cancer cell death and determine if it is possible to enhance the effect of TRAIL on cancers.

Anti-cancer drug 17-AAG

A new anti-cancer drug, 17-AAG is very effective at shrinking tumours in mice. Our studies have revealed that this drug can cause bone damage and, surprisingly, increase the growth of breast cancer cells that have spread to bone. In 2011, we found that 17-AAG induces a stress response in the osteoclasts which, when blocked, reduces osteoclast formation. We have identified a number of targets of the stress response that appear to enhance osteoclast formation. We are now working to translate these laboratory-based studies into preclinical models.

CANCER RESEARCH

OVARIAN CANCER BIOMARKERS

Ovarian cancer is a challenging gynaecological cancer with few recognisable symptoms. There is no screening test currently available and ovarian cancer is often only diagnosed after it has spread.

Laboratory Head:
Dr Andrew Stephens

Our research aims to develop an 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.

A highlight of 2011 was the identification and validation of three potential markers of early stage ovarian cancer. These markers have shown high sensitivity and specificity in a cohort of ~160 women, and take us closer to our goal of 100 per cent accuracy for the detection of early or pre-cancerous lesions.

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 disease.

Auto-immune response in cancer patients

Cancer patients may exhibit an immune response to their tumours before other clinical symptoms become apparent. Ongoing work has resulted in the identification of four proteins that are recognised by patient antibodies at an early stage of tumour progression. We are noe working to characterise the nature of these changes to determine the extent to which they are found in individual patients, as well as explore their potential to assist the early detection of tumours.

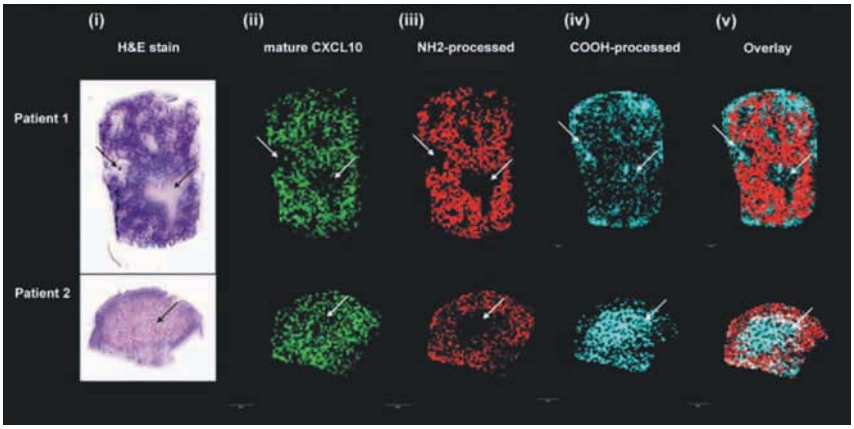
Proteomic analysis of ovarian cancer samples

Our proteomics research continues with an ongoing examination of uterine secretions and their relevance to ovarian tumours. Our existing data suggests that a number of important molecules in tumour progression are also locally elevated in the uterine cavity, providing a less invasive technique for sampling proteins within the proximity of the tumour.

We believe this strategy will allow us to identify molecules at an earlier time point in tumour progression, which can then be tested in plasma.

Clinical collection program

Our clinical tissue collection program continues to grow. Since the program's inception, almost 900 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.



MALDI Imaging Mass Spectrometry identified multiple CXCL10 variants in tumour tissue. CXCL10 may be processed by a number of enzymes with known roles in tumor pathogenesis. Standard immunohistochemicsal techniques are unable to resolve these forms, due to lack of appropriate antibodies. We therefore used MALDI IMS to examine tumour tissue for the presence of truncated CXCL10, corresponding to known processing events.

RESEARCH REPORT: WOMEN'S HEALTH

PHI researchers have a track record of leading and promoting research into female reproductive health. They are working to improve treatments for infertility and pregnancy related disorders.

Endometrial Remodelling | Implantation & Placental Development

Embryo Implantation | Ovarian Biology

Reproductive Hormones | Reproductive Development & Cancer

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 is the uterus prepared for embryo implantation?

Laboratory Head:
Professor Lois Salamonsen

We hope to use our knowledge of endometrial repair and embryo implantation to provide key targets for treatments for uterine bleeding problems and to contribute to improved success rates and long term health outcomes for IVF. In the broader context we also expect to find ways to help wounds heal without scarring.

The lining of the uterus (womb), the endometrium, is completely shed at menstruation and rebuilt during the next menstrual cycle. About 20 days after the onset of menstruation, the endometrium becomes 'receptive' to an embryo for roughly four days. This is the only time at which the embryo can implant into the womb, allowing development of the placenta and successful establishment of pregnancy.

We currently are studying how the endometrium is restored after menstruation and how it becomes receptive to embryo implantation. If these processes fail, consequences can include abnormal uterine bleeding and infertility.

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 progesterine based contraceptives and hormone therapy for menopause. This research may also lead to the identification of factors that can assist wound healing of the skin so that it occurs quickly and without scarring.

We have developed two methods for investigating endometrial repair. These are a wound-healing assay in which we measure how quickly cultured endometrial cells can grow across a wound in the surface, and a method that measures the strength of the junctions between cells.

Using novel new technologies we can also investigate the proliferation and migration of endometrial cells in real time. Our data demonstrates that menstrual fluid contains factors which aid endometrial repair after menstruation by enhancing the proliferation and migration of these cells to cover the wounded surface. We are currently conducting analysis of the protein signature of menstrual fluid.

To improve our understanding of the scar-free aspects of endometrial repair, we are examining the underlying mechanisms that control the actions of several molecules previously identified as enhancing or retarding endometrial repair.

Uterine receptivity

Prior to implantation, the embryo is bathed in uterine fluid secreted by the receptive endometrium. For embryo implantation to occur, both the endometrium and the embryo must be ready. In 2010 and 2011, we published two of a new series of papers we describing a range of proteins present in uterine fluid, that differ between fertile women and those who are infertile and seeking help through assisted reproductive techniques such as IVF. Importantly, we showed that some of these proteins act to alter both the adhesive capacity of the endometrial surface and the development of the embryo immediately prior to implantation, providing a likely explanation for infertility when they are altered. Another protein cleaves inactive proteins to make them biologically active at the embryo-maternal interface.

Our aim is to understand how the different factors work so 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 techniques to identify proteins in uterine fluid that are associated with endometrial receptivity. This work is complemented by immuno-histochemical studies of endometrial tissue that reveal differences in proteins between fertile and infertile women as well as showing that the proteins are produced locally by the endometrial epithelium.

How the embryo influences the endometrium

Human chorionic gonadotrophin (hCG), one of the first embryonic products, is secreted by the embryo prior to implantation. We have demonstrated that hCG induces secretion of a range of cytokines by endometrial epithelial cells which are important for the initiation of embryonic implantation. In IVF cycles where hCG is used to trigger ovulation, precocious exposure to hCG may detrimentally affect the endometrium and inhibit rather than enhance the chances of implantation occurring.

Studies showing how the uterus contributes to embryo implantation have revealed the mechanisms of action of a key enzyme, which may be useful in the development of a test for uterine receptivity to embryo implantation and potentially also a novel contraceptive target. 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, causing the uterus to be unreceptive to implantation by a healthy embryo. There is currently no current biochemical test that can reliably detect a non-receptive uterus.

Role of PC6 in uterine receptivity for embryo implantation and fertility

Our previous research showed that the enzyme proprotein convertase 5/6 (PC6) was tightly controlled in the uterus during preparation for receptivity, making it critical for implantation success. We have been studying PC6's mechanisms of action in the uterus and investigating the clinical implications of these in evaluating uterine receptivity and fertility.

In 2011, we established an even stronger link between PC6 levels and receptivity. In findings published by our group, we showed that PC6 levels in uterine fluid (obtained by lavage) were closely associated with uterine receptivity, and were significantly reduced in women with unexplained infertility. This suggests that detection of PC6 in uterine fluid may form the basis for a rapid test for receptivity requiring only minimal surgical intervention.

We have also found that PC6 regulates several key cytoskeletal proteins (such as EBP50 and ezrin) and their cellular localization, thereby altering the uterine environment required for implantation. This suggests that PC6 is a 'master-switch' for the establishment of receptivity.

PC6 in prevention of pregnancy and HIV infection

We are also continuing our research into PC6 as a potential target for the development of a new female contraceptive to simultaneously protect against pregnancy and HIV infection. In 2011, we established an in vitro model of human embryo implantation. This model is suitable for sensitive and high-throughput screening for implantation inhibitors. The high quality of our work has been acknowledged with funding from the Gates Foundation to further our investigations of this concept in animal and *in vitro* models.

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.

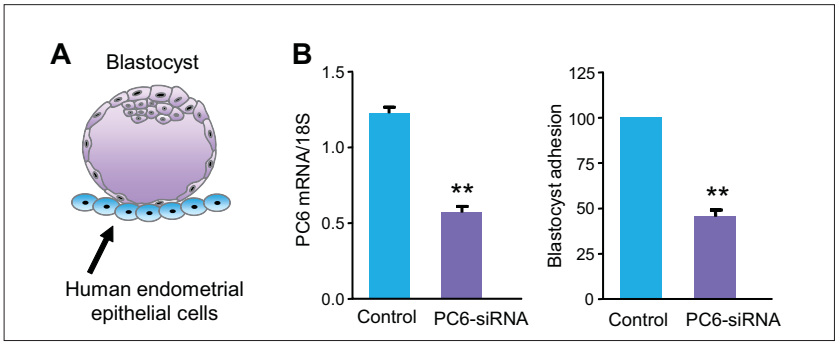
In particular, we are investigating the role of HtrA3 in pregnancy-related disorders such as pre-eclampsia and intra-uterine growth restrictions. Pre-eclampsia accounts for almost one in twelve maternal and perinatal deaths in industrialised nations. Despite these figures, diagnosis is not yet normally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



The embryo attachment model: co-culture of human endometrial epithelial cells and mouse blastocysts, (B) PC6 mRNA is significantly lower in PC6-siRNA cells, (C) Blastocyst adhesion capacity of PC6-siRNA cells is also reduced.

EMBRYO IMPLANTATION

Studies of proteins critical for placenta formation and embryo implantation, are assisting our efforts to enhance pregnancy outcomes and devise non-hormonal contraceptives that can be combined with agents to prevent sexually transmitted diseases such as HIV/AIDS.

Laboratory Head: Dr Eva Dimitriadis

Embryo implantation is an extremely complex process and women experience a high percentage of failures in both natural and assisted conception. After attaching to the lining of the uterus, the embryo must grow through the endometrial tissue until the placenta is fully formed. Close contact is required between the embryo trophoblast cells and the mother's blood supply, which provides nourishment and oxygen for the developing foetus. The 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 two small regulatory molecules important during early implantation, as well as during the trophoblast invasion. In 2011, we investigated how the levels of these proteins varied in the presence of placenta abnormalities that could lead to complications later in pregnancy.

Endometrial-placental interactions

When embryo implantation is impaired, this can affect placental development and may lead to miscarriage, preeclampsia or maternal death. In earlier work we studied how endometrial proteins interact with placental trophoblast cells to restrict 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.

Implantation, fertility and IVF

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 24 hours in the uterus prior to implantation. We believe the embryo secretes factors during this period that influence the endometrium to implant successfully. During IVF these secreted factors are missing and we believe this impacts endometrial receptivity. In collaboration with Monash IVF we are studying how IVF embryo secreted factors interact with endometrial cells to facilitate implantation and in particular pregnancy success.

Non-hormonal contraceptives

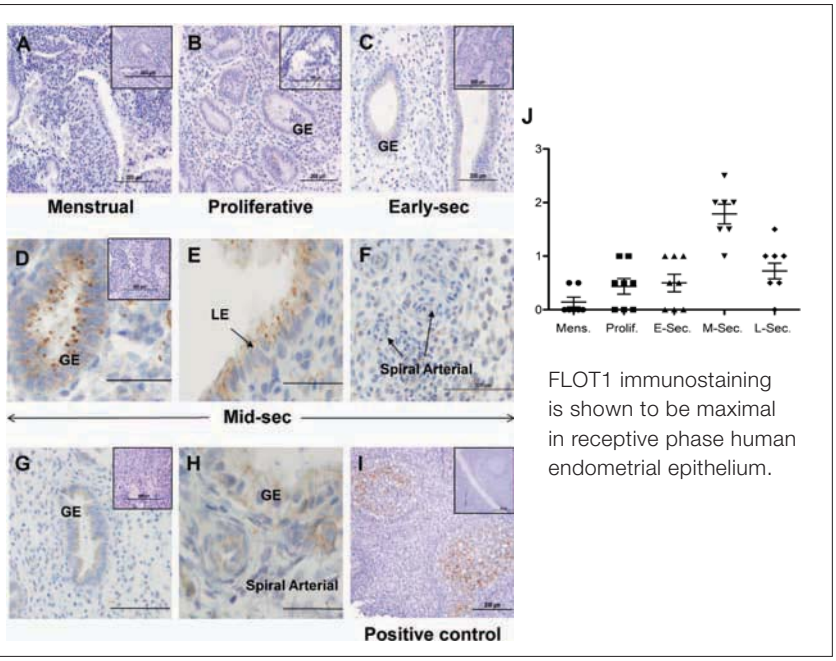
Our work is the first to demonstrate that pharmacologically targeting endometrial factors totally prevents pregnancy. We are working with US collaborators to conduct preclinical trials of a vaginally-applied, non-hormonal contraceptive based on two molecules our team identified as capable of preventing 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.

In 2011, we 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.

• PHI researcher Evdokia Dimitriadis, who leads the Embryo Implantation Research Laboratory, was appointed to the NHMRC Senior Research Fellowship scheme in 2011.



FLOT1 immunostaining is shown to be maximal in receptive phase human endometrial epithelium.

Greater knowledge of the establishment of the primordial 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.

Laboratory Head:
Professor Jock Findlay

In 2011, a major highlight was the identification of 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.

The number of eggs in a woman's ovary, also known as the primordial egg pool, is set during embryonic development. This gradually declines until menopause, the point at which the supply is exhausted. 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 working in collaboration with researchers at Monash University and the Walter & Eliza Hall Institute (WEHI) to investigate these factors and identify new ways to regulate egg supply to extend fertility and delay the onset of menopause.

We are 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 development of immature eggs and the establishment and maintenance of the primordial follicles, which are also formed before birth.

Hormonal regulation of follicle production

Our previous research into the roles played by estrogen and the TGF-β family indicated that both activin and TGF-β could influence follicular growth processes. We have confirmed that local growth factors were important in the early development of follicles in the ovary. Disrupting these factors could lead to abnormal or inappropriate development, including cancer. In collaboration with colleagues at the Monash Institute of Medical Research, we are examining the role of follistatin, an endogenous inhibitor of activin, in follicle development in genetically modified mice.

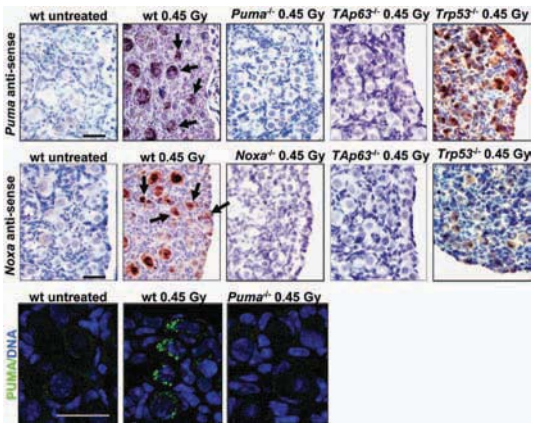
Using a mouse model that lacks estrogen production, called the ArKO mouse, we have established that estrogen's impact on normal follicle production is by direct action on the ovary as well as via other indirect hormonal influences. In particular, we have identified the individual genes and molecular pathways in the ovary influenced by estrogen. This new knowledge will help us to better understand how environmental estrogens such as plant preparations and synthetic chemicals in plastics may lead to infertility, and determine how to influence these important pathways.

Developmental origins of infertility disorders and ovarian disease

The factors involved in the extensive wave of egg proliferation and death in the foetus that determine the size of the primordial egg pool are not well understood.

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 2011, 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 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 women and young girls. We also demonstrated that the clinically available therapeutic, Imatinib®, did not prevent egg death following chemotherapy or radiotherapy, despite earlier claims by an overseas group. Together with our collaborators at Monash University and WEHI, we have 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.



γ-irradiation induces PUMA and Noxa expression. Puma and Noxa mRNA and PUMA protein were detected in primordial follicle oocytes from wt and Trp53-/- mice but not in those from TAp63-/- mice, 3 and 6 h post γ-irradiation.

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

Changes in circulating reproductive hormones approaching menopause

As women age, the ovary loses its complement of egg-containing follicles. This decline causes the interplay between the ovary and the pituitary to become increasingly irregular. This can result in changes to menstrual cycle patterns and symptoms such as hot flushes, excessive bleeding, increased bone breakage and mood swings.

In collaboration with researchers at the University of Saskatchewan, we have investigated the changes in circulating hormone levels, ovarian follicle number and cyclic pattern in menstrual cycles as menopause approaches. We observed that the ovarian and pituitary hormones involved in this interplay become disorganised, for example, with evidence of normal hormone patterns one cycle and abnormal patterns the next. In some cases, irregular hormone activity during the late stages of menstruation was even shown to cause the unusual occurrence of two ovulations in one cycle. These studies are now complete.

We believe that many of the difficulties experienced by women approaching menopause are due to irregular activity by the pituitary and ovary. These studies will provide us with a clearer understanding of this process, which will help in developing better treatments in women experiencing a difficult menopause transition.

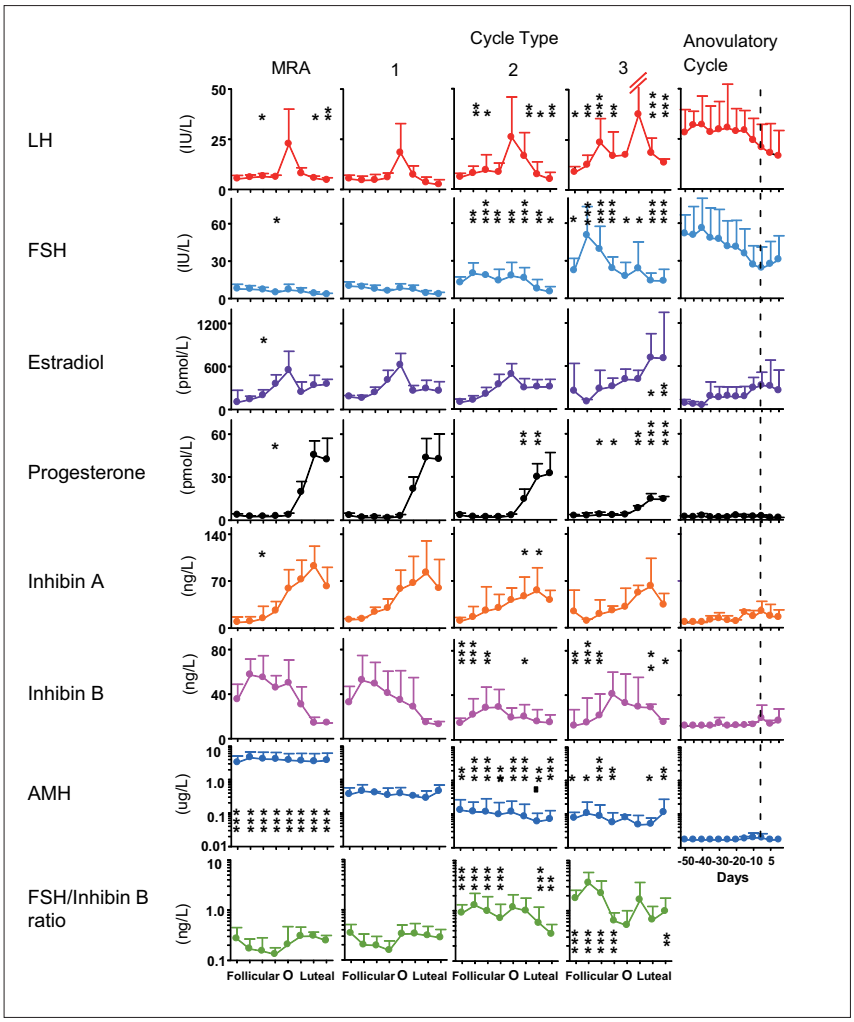
Characterising inhibins forms and bioactivities in women

The release of ovarian follicles containing eggs is regulated by inhibins. Inhibins, produced in the ovary, act at the brain to negatively regulate the actions of pituitary hormones, as well as follicle stimulating and luteinizing hormones. This negative feedback loop intimately controls the reproductive potential of women.

Two major forms of inhibin have been identified in humans, inhibin A and inhibin B. Both inhibin A and B are made from larger 'pro-inhibin' molecules. The large pro-inhibin molecules are differentially processed, which results in a multitude of inhibin A and B forms of different sizes. The nature of these various sized forms of inhibin and their respective roles in reproduction are yet to be determined

Our laboratory is undertaking detailed screening of human serum to characterise the nature of the various inhibin forms.

This will enable us to determine the relative abundance of the individual forms of inhibin in women. Complementary experiments will identify which inhibin forms are biologically active. The findings of this study will re-define the contribution of inhibins to reproductive fates. Importantly, defining the identity and activities of the various inhibin forms in healthy women will provide a platform for comparison in reproductive compromised individuals.



Proposed Classification of Ovulatory Cycles approaching Menopause. Type 1: Normal ovulatory cycle with reduced AMH levels compared with cycles from women in the mid-reproductive age (MRA); Type 2: Ovulatory cycles with raised FSH and reduced inhibin B, normal luteal function; Type 3 : Ovulatory cycles with further increase in FSH, further reduction in AMH, reduction in progesterone, increase in LH. E2 sometimes high in late luteal phase; Anovulatory cycle: increased FSH, LH, low E2, very low AMH and inhibin

The underlying processes of ovary and testis formation during foetal life are poorly understood. Research into 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 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 and 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.

Another major research focus is 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 to determine the clinical importance of betaglycan in human reproductive cancers and develop therapeutic strategies based on this key protein.

Defects in the development of the foetal kidney

In 2011, we established that betaglycan levels must be tightly controlled for optimal kidney formation. A partial or total loss of betaglycan from kidney cells results in changes in foetal kidney structure and function. This may adversely affect adult kidney function and contribute to the development of kidney-related diseases such as renal hypertension.

Abnormal cell behaviours in foetal gonads linked to defective growth

We recently established a culture system in order to further study the role of betaglycan and TGF-β in ovary and testis development.

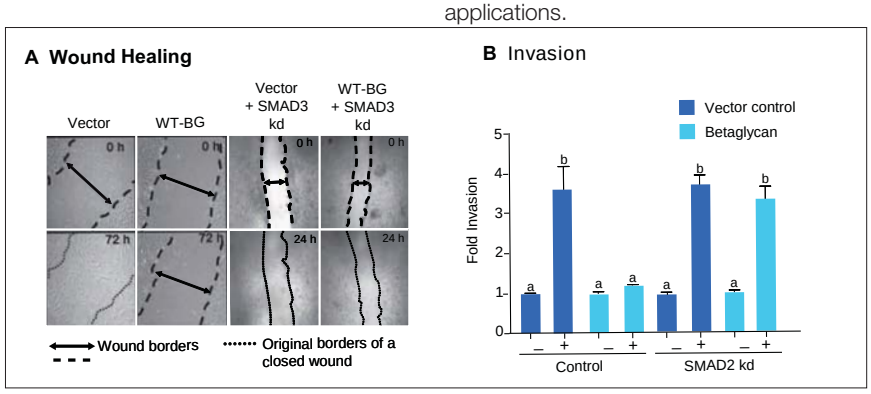
Using this system, we showed that loss of TGF-β / betaglycan function results in abnormal migration (movement) and aggregation (clumping) of the key support cells of the developing sperm and egg. These defects may affect fertility in adulthood in both males and females.

Understanding how to block ovarian cancer metastasis

We have previously shown that betaglycan blocks the motility (mobility) and invasiveness of ovarian cancer cells by reducing the expression of several regulators of tissue remodelling.

In 2011, we identified the signalling molecules which mediate these effects. We are using these findings to develop new ways to block the spread of ovarian cancers by reducing the expression of the matrix metalloproteinases, which are key regulators of tissue remodelling. Ongoing studies will exploit this finding to investigate methods of blocking the spread of ovarian cancer cells.

We are also working in collaboration with the Royal Women's hospital to examine other common types of ovarian cancers and assist the development of clinical applications.



Over-expression of full-length wildtype betaglycan (WT-BG) inhibits (A) wound closure and (B) cell invasion through Matrigel toward a chemoattractant (FBS) in GCT cells. In contrast, knockdown (kd) of SMAD3 or SMAD2 gene expression enhanced GCT cell migration and invasion, respectively, abrogating betaglycan-mediated inhibition. +/- = presence/absence of FBS. Each data point represents the mean ± SD of triplicate measurements within one representative assay, expressed as fold change over basal. Different letters denote means which significantly differ by $p<0.05$.

RESEARCH REPORT
MEN'S HEALTH

PHI researchers are leading laboratory research and clinical studies. They are bridging the gap between basic research and the development of new treatments for male health conditions.

Clinical Andrology | Male Fertility Regulation

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 and assist the future development of treatments to regulate fertility in men.

Laboratory Head: Dr Peter Stanton

Our group discovered that micro-RNAs in the testis are regulated by the reproductive and follicle stimulating hormone and androgen, and are important for the release of mature sperm. In 2011, PhD student Peter Nicholls published his findings on this topic in the prestigious journal Endocrinology, and was also awarded a Lalor Foundation Merit Award by the US-based Society for the Study of Reproduction. This award enabled him to travel to Portland (Oregon), where he presented his research at the 2011 Society for the Study of Reproduction annual conference.

We have taken a two-staged approach in male fertility research to: i) identify the key testicular cell types regulated by hormones, and then ii) find the key genes and proteins within these particular cells.

In previous research, we investigated the processes by which the Sertoli cells in the testis nurture immature sperm cells and release them at the end of their maturation. We have also studied the so-called tight junctions between Sertoli cells. These junctions form part of the blood-testis barrier that protects sperm from the body's immune system.

In 2011, our research has continued to focus on how micro-RNAs control sperm release, a new research area, we have begun studies to investigate how the blood-testis barrier works, which includes the involvement of micro-RNAs at this site.

We are also seeking to identify protein markers that would form the basis of a blood test for certain types of male infertility and would avoid the need for a testis biopsy, which is intrusive and may not produce conclusive results.

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 certain 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, 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

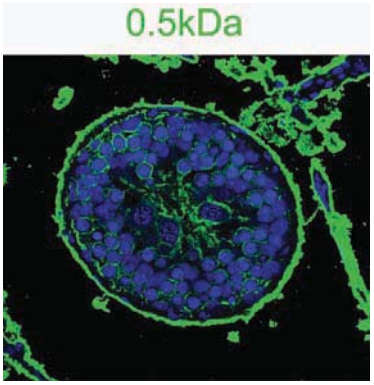
Animal studies in our laboratory have shown conclusively that the blood-testis barrier, which involves the tight junctions between Sertoli cells, is controlled by FSH and androgen. As the blood-testis barrier is essential for the production of viable sperm, we have focussed our efforts on determining 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 2011, we continued using proteomic methods to see if we could identify any protein that could act as a marker for a cellular process in the testes, such as germ cell differentiation.

If we can find such a marker, it may offer potential as a simple diagnostic test for testicular function, providing an alternative to biopsy.

• In 2011, PhD student, Jenna Haverfield, was awarded a Burroughs-Wellcome scholarship to attend 'Frontiers in Reproduction', an annual six week intensive training program attended by only 20 scientists from around the globe. Jenna, whose PhD project seeks to understand how the blood-testis barrier functions, travelled to Woods Hole, Massachusetts, for this workshop, where she attended a series of lectures, discussions, laboratory exercises and demonstrations given by eminent scientists in the field of reproduction. This course is seen as an excellent opportunity for early career scientists, as it provides a broad understanding of current issues in reproductive biology research.



Germ cells (blue) in rat seminiferous tubules are normally sequestered away from harmful substances by a structure known as the blood-testis barrier. This image shows that a permeability tracer (green) is able to access and surround germ cells in tubules from rats when hormones have been suppressed, indicating that the blood-testis barrier is a target of hormone action in the testis.

CLINICAL ANDROLOGY

The Clinical Andrology laboratory continues to provide innovative insights into male reproductive health and the clinical management of infertility and androgen deficiency.

Laboratory Head: Professor Rob McLachlan

The Andrology team's current research program aims to improve understanding of the factors regulating sperm production and why this process fails (infertility). The group has also been involved in investigations to determine how this process may be reversibly and reliably suppressed (contraception). With an ageing population the management of health and disease and the impact of ageing remains a priority for medical researchers in Australia. The team is also continuing its research to determine the role of testosterone in men. Testosterone has important roles across life and researchers hope to better understand its role in many conditions prevalent in ageing men.

Reversible male contraception

PHI researchers continue to participate in a major multicentre clinical trial of a reversible male contraceptive being conducted internationally by the World Health Organisation and CONRAD, a US-based reproductive health organisation.

The phase IIb trial, which involves several hundred couples in seven countries, is studying the safety and efficacy of a two-monthly injection of testosterone and a synthetic hormone, progestin. The formulation lowers production of the pituitary hormones that initiate spermatogenesis in the testis but does not affect the normal testosterone levels in the blood needed for sexual function and general health.

Early in 2011, the trial was brought to a close by the WHO after the enrolment of about 300 couples. The data is currently being assessed.

Our last participants ceased treatment in April and are being followed until sperm production returns to normal in 2012.

We continue to study the mechanisms by which sperm production is interrupted by such contraceptive treatment using animal models and cultured testicular cells and tubules

Genetics of male infertility

Most male infertility is likely to have a genetic basis. Our research involves assessment of candidate infertility genes and chromosomal defects using animal models, correlative data from DNA studies and clinical information from over 2000 infertile men. The importance of DNA and oxidative damage to sperm DNA is also being assessed. This work will aid in the clinical management of infertility.

Testosterone replacement therapy

Testosterone (androgen) deficiency can profoundly affect males at all stages of life, impacting on not only sexual function but also mood and cognition as well as muscle, bone and cardiovascular health. Testosterone replacement has a proven role in testosterone-deficient men but may also ameliorate some of the physical and psychosexual aspects of ageing, and assist the management of diabetes and obesity.

We completed a clinical study of the efficacy and safety of testosterone replacement therapy in obese men in 2010. Analysis of testosterone replacement in 40 middle-aged and older men with obesity showed a reduction in body fat and improved muscle mass, but few other benefits. We are continuing to analyse this data.

In 2011, our researchers worked closely with Southern health to establish a clinical research service for men undergoing androgen deprivation therapy (ADT) for prostrate cancer. This work has culminated in the opening of a new clinic at Southern Health, Moorabbin in early 2012. ADT uses a chemical that drastically reduces blood testosterone levels in order to slow tumour growth, but patients may then suffer the consequences of severe testosterone deficiency. Our service aims to reduce symptomatic and physical problems in ADT patients.

RESEARCH REPORT
GENETICS AND DEVELOPMENT

The genetic factors we inherit from our parents, together with foetal development in the womb, are critical factors in ensuring a healthy start to life. Medical research is increasingly demonstrating examples of where biological events that take place well before we are born can influence our health in much later life. PHI researchers are working to understand the early molecular and cellular events that can have significant consequences on our later health and fertility.

Sex Determination & Gonadal Development | Brain & Gender | Growth Factor Signalling

Each year, as many as one in 100 babies is born with a disorder of sexual development (DSD).

Laboratory Head:
Professor Vincent Harley

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 females.

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

SRY transport into the cell nucleus
Gender is controlled by the chromosomes: males usually XY and females XX. SRY is the key gene on the Y chromosome required to be male. 46,XY DSD individuals with complete gonadal dysgenesis appear as girls who present at clinic during adolescence when they fail to develop secondary sexual characteristics (breasts, pubic hair, menstruation). Some of these individuals carry mutations in the SRY gene which affect the ability of the SRY to transport into the cell nucleus. Normally when SRY is in the nucleus of the foetal testicular cells, it switches on another another gene called SOX9, also critical for testes development. We identified Calmodulin, a protein that interacts with SRY, as a key part of the transport mechanism for SRY during sex determination. In 2011, we showed that if this interaction is blocked in cultured foetal gonads from mice, the cells become ovarian rather than testicular.

A common failure in several forms of 46XY DSD
Human mutations in the SRY (sex determining region on Y), SOX9 (SRY-related HMG box 9) or SF1 (steroidogenic factor 1) genes cause DSDs. We have been able to demonstrate how these three human sex-determining factors are likely to function during gonadal development around SOX9 as a hub gene, with different genetic causes of 46,XY DSD due to a common failure to upregulate SOX9 transcription.

The molecular battle between the sexes
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 SFl 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.

ATRX, an important regulator of spermatogenesis
Infertility affects about one in 20 Australian men, and is a common experience for men with DSDs. Studies of the molecular action of the *ATRX* gene are providing a better understanding of some underlying causes of male infertility. We have discovered that the ATRX protein is an important regulator of androgen actions, as well as playing a key role in the survival of testicular cells. This work was the cover story in the prestigious journal *Human Molecular Genetics*. The cover image (at right) shows that testis tubules degenerate during embryo development.

Three novel causes 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 (with Professor A. Sinclair from Murdoch Childrens Research Institute) of a 46,XY DSD patient that presented at birth with ambiguous genitalia revealed a heterozygous deletion within the WWOX gene, inherited from the mother. This supports a role for WWOX in human gonad development.

In a multicentre study led by Professor P. Thomas (University of Adelaide) and including PHI, *Sox3*, a gene normally found in the brain was accidentally turned on in the gonads leading to xx male mice. Analogously, in three male patients with 46,XX DSD, we also identified genomic rearrangements within the SOX3 regulatory region, a relatively common cause of XX DSD in cases lacking the *SRY* gene.

In a collaboration with Dr. S. Lyonnet (Necker Hospital, Paris) genome wide analysis of DSD patients identified a testis enhancer region of the SOX9 gene located far upstream of the SOX9 promoter that also invoked DSD phenotypes. Gain or loss of this region was associated with 46,DSD or 46, XY DSD, respectively.

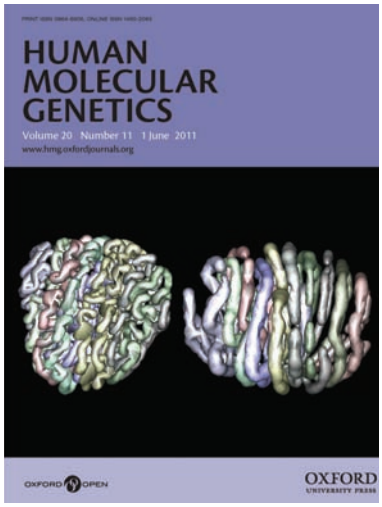


image on cover: Testis from normal and Atrx knockout mice

BRAIN AND GENDER

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

Laboratory Heads:
Dr Joohyung Lee and Professor Vincent Harley

In 2011, 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 in men is also generally earlier, with symptoms shown to be fast progressing and severe and less responsive to medication.

We are particularly interested in the sex-determining region Y gene *(SRY)*, which is responsible for maleness in mammals. The *SRY* gene is involved in the production of neurotransmitters in the brain such as dopamine, which control movement and coordination, as well as reward, motivation and the level of mental attention. We are currently investigating abnormalities in SRY and the regulation of the relevant neurotransmitters to understand their role in susceptibility to male-biased brain diseases.

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

A relatively common neurological disorder, Parkinson's disease affects 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 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 two enzymes: one controls the synthesis of dopamine and the other degrades dopamine. These findings follow animal studies, which enabled us to show that inhibiting the expression of the *SRY* gene in the *substantia nigra* leads to an impairment of motor function in males.

Our recent research has included an investigation into possible impacts on the level of SRY protein. Using an in vitro model of Parkinson's disease, we have shown that human dopamine-producing cells dramatically increase their SRY expression in response to stress or injury. Inhibiting SRY levels in the *substantia nigra* may make it possible to slow the progression of Parkinson's in men or reduce their susceptibility to this debilitating disease. We are currently exploring potential avenues towards therapeutic applications.

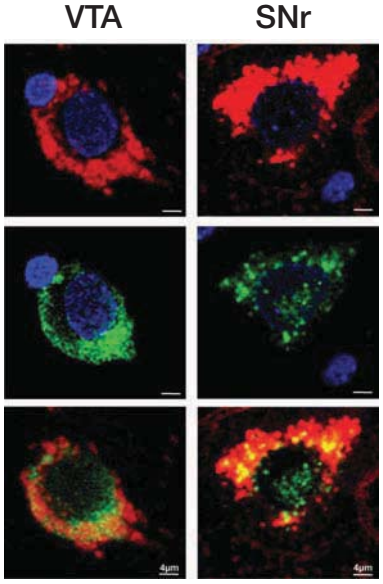
Role of SRY in the human male brain

We have recently has demonstrated that SRY protein also co-localises with dopamine neurons in the ventral tegmental area (VTA) in human males. VTA is crucial for mediating reward and addictive behaviours and the expression of SRY in the male. VTA may explain sex differences in susceptibility to drug addiction. We have also demonstrated that SRY co-localises with GABA producing neurons in the human male *substantia nigra pars reticularta* (SNr), The SNr is controls the final output signal for voluntary movement and the presence of SRY in both the SNc and SNr add further support for the role of SRY in the control of voluntary movement in males.

We are continuing research to better understand the role of SRY in these regions of the male brain.

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, located on the X-chromosome, which is more prevalent among transsexuals. An ongoing investigation, including a study involving the world's largest cohort, will assist our researchers to identify other genes that may be associated with the condition.



Cellular localization of SRY in the male human midbrain. SRY protein (green) is present in the nucleus (blue) and cytoplasm (red, TH+ve) of VTA neurons and in the nucleus (blue) and cytoplasm (red, GAD+ve) of SNr neurons.

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.

Activation of GDF9 controls female fertility

Growth differentiation fact 9 (GDF9) has a profound impact on female fertility. This is essential for development of egg cells, as well as the number and maturation of egg cells released during each fertile cycle.

A member of the TGF-β superfamily, GDF9 is essential for development of the follicle in female mammals. The follicle is the basic unit of female reproductive biology, which contains a single egg surrounded by supporting cells. The level of GDF9 controls both early follicle development and the number of eggs released in each fertile cycle. Mice and sheep deficient in GDF9 are infertile, due to a block in follicle maturation. Together with the recent findings that mutations in GDF9 are observed in both women with premature ovarian failure (POF) and mothers of fraternal twins, it is clear that GDF9 exerts profound effects on ovarian development and female fertility.

GDF9 is produced in the egg in a precursor form, which is processed by enzymes to a mature form. Our studies have shown that mouse GDF9 is processed very efficiently and is, thus, secreted in an "active" form.

In contrast, 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.

• The leader of PHI's growth factor signalling team, Dr Craig Harrison, and his collaborators Associate Professor David Robertson (PHI), Dr Robert Gilchrist (University of Adelaide) and Professor Ken McNatty (Victoria University of Wellington, New Zealand), have been 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.

TGF-β signalling and muscle-wasting

Wasting of skeletal muscle leads to profound weakness, reduced functional independence, and eventually death through respiratory or cardiac failure. Muscle wasting is observed during ageing and disuse, but is also associated with diseases, including muscular dystrophy, sepsis, renal failure, AIDS, diabetes and cancer. In this latter group of conditions, muscle loss occurs as a result of cachexia syndrome, a highly debilitating condition characterized by pronounced weight loss, muscle weakness, anaemia, insulin resistance, and extreme fatigue.

In advanced cancers, up to 80 per cent of patients exhibit cachectic symptoms, 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. Thus, preserving muscle mass is of major importance in determining a patient's survival; however, few therapeutic options are available for cachexia.

Elevated levels of the TGF-β family member, activin A, have recently been shown to cause muscle wasting and cachexia. In 2011, we modified the activin A prodomain to generate a novel therapy that specifically targets activin A. We have shown in cell culture 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*.

TRANSLATION

Commercialising Our Discoveries | Clinical Services | Enabling Technologies

TRANSLATION

COMMERCIALISING OUR DISCOVERIES

Commercialisation is vital to the translation of research from lab to bedside, enabling our researchers to deliver new drugs and diagnostic technologies to improve quality of life of patients and their families. In 2011, two new patients were granted, both relating to our novel serine protease patent.

The commercialisation of research discoveries delivers products and patents, which can be translated into new drugs, preventative treatment therapies and technologies. It positively impacts on Australia's ability to innovate and leads to major global advances in health care.

Importantly, the royalties we receive from licensed patents fund future discovery, and with payments this year we have received over $1m in royalties for one patent alone since the execution of the agreement on 26 June 2002.

Two new patents were granted in 2011. Both patents related to our novel serine protease patent.

We continue 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. Our researchers meet quarterly with the licensee to provide new research data and proposals for additional research.

One new provisional patent application was filed and six divisional patent applications covering four patent families in various jurisdictions are also under examination.

In the past year, we executed 18 new agreements for collaborative research, materials transfer and confidential disclosures.

Our intellectual property (IP) and commercialisation initiatives are overseen by the Intellectual Property and Commercialisation Committee which is a subcommittee of the Board. Members provide expert guidance on issues such as corporate governance of IP-related functions and strategies for managing our licensing relationships. We greatly appreciate the contribution made by members of this committee.

Enhancing our procedures for managing intellectual property and related functions has been a priority for us in 2011. A new protocol has been implemented to assess the suitability of applications for IP protection.

The new IP assessment procedure enables our researchers, Intellectual Property and Commercialisation Committee and external advisors to review whether inventions would comply with the basic requirements of a patent application. It also helps would-be inventors to better understand the patenting process and its costs.

Prince Henry's Institute has a proud history of engagement with the provision of clinical services. Our senior clinical staff 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 the south-east corridor. Under the leadership of Professor Peter Fuller, the General Endocrinology clinical team, including both qualified and trainee consultant endocrinologists, services a population base approaching 1.6 million.

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 Service.

During 2011, Dr Matthiesson also 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 is due to commence in 2012.

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.

Professor Rob McLachlan

The clinic is still operating today under the 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 and Dr Fran Milat (the Michael, John and Phoebe Jones Fellow) who contributes her expertise in the management of osteoporosis. Dr Milat has been instrumental in the establishment of our most recent specialist clinic, 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.

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.

This year has also seen the establishment of a Multidisciplinary Thyroid Clinic to manage thyroid cancer. This is the next step in the evolution of a full academic service associated with research and teaching across disciplines and centres.

Professor Rob McLachlan, head of the Institute's Clinical Andrology Laboratory, maintains his active engagement with Monash IVF heading their Andrology laboratories and andrology services.

ENABLING TECHNOLOGIES

MHTP Medical Genomics Facility
Established in partnership by Prince Henry's Institute and Monash Institute of Medical Research the original Gandel Charitable Trust Sequencing Centre altered its name in 2011 to the MHTP Medical Genomics Facility to reflect its engagement with the four precinct partners - Prince Henry's Institute, Monash Institute of Medical Research, Monash University and Southern Health.

In 2011, the MHTP Medical Genomics Facility both expanded and consolidated genomic services within the Monash Health Translation Precinct by bringing together services at four key centres within in the Precinct. The Centres provide comprehensive, cost-effective and readily accessible genomic services of the highest possible standard to support the clinical practice, medical research and teaching requirements of a major university medical centre, as well as the wider scientific community. Services are used by researchers across Prince Henry's Institute to provide critical insights into the underlying genetic factors involved in the treatment, diagnosis and prevention of cancer and the understanding of gender development. The Facility incorporates:

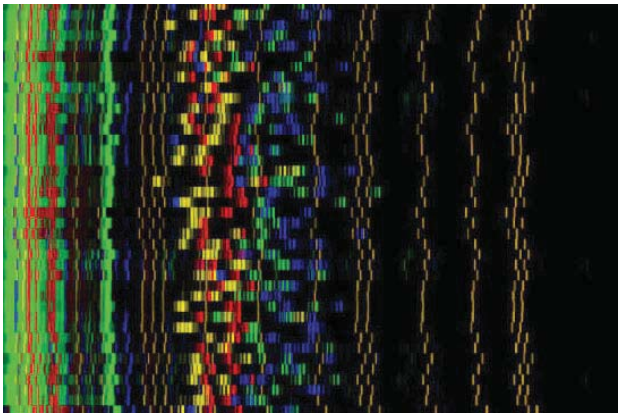
Australian Cancer Research Foundation

Australian Cancer Research Foundation (ACRF) Centre for Cancer Genomic Medicine
2011 saw the establishment of the ACRFCentre for Cancer Genomic Medicine through $1.6 million funding from the ACRF. The centre received $169,000 from the National Health and Medical Research Council equipment grant allocated to Monash University. The funding will enable the introduction of Next-Generation Sequencing for rapid sequencing of whole genomes providing researchers with greater insight into underlying genetic factors involved in cancer. These insights are critical to the development of improved targeted drug therapies for many common cancers.

The Gandel Charitable Trust Sequencing Centre
DNA Sequencing is carried out within the Centre providing researchers with a clearerunderstanding of gene structure and function. Services at the centre also include gene expression and mutation detection using state-of-the-art real-time PCR technologies. During the year a generous donation from the Gandel Charitable Trust enabled the introduction of a microbial (bacterial and fungal) identification system for fast and accurate determination of the causative agent during infection.

MHTP Monash Health Translation Precinct

MHTP High Content Screening Centre
High Content Screening provides a vital link between fluorescent microscopy, genomics and automated analysis. The MHTP's High Content Screening services enable precinct partners to provide critical insight into genetic interactions shown to impact cellular function.



MHTP Microarray Centre
Through Microarray analysis researchers can simultaneously compare expression levels of thousands of genes, as they study the effects between normal and disease states. In 2011, an Agilent Technologies Equipment Grant enabled the centre to upgrade the scanning resolution of their existing Agilent Microarray Scanner.

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EDUCATION

STUDENT PROGRAMS

Prince Henry's Institute is committed to providing an innovative learning environment to help nurture and develop tomorrow's research talent.

Prince Henry's Institute is committed to providing an innovative learning environment to help nurture and develop tomorrow's research talent. PHI's student program offers developing researchers enrolled in Honours, Master's and Doctoral degrees through our affiliated universities the opportunity to build their research skills within a world class laboratory environment. Research education primarily centres on teaching the discipline of laboratory science, ethics and research communication. During their candidature, students are required to participate in regular presentations at an Institute level, as well as at national scientific meetings. PhD students are also required to present on an international level at least once during their candidature.

PHI also provides group learning opportunities and exposure to the latest scientific techniques through regular scientific and technical seminars organised by the Education Committee and Student Society. With a focus on translational outcomes, PHI offers a stimulating learning environment for medically qualified PhD students with regular and continuing clinical practice in Southern Health clinics, integrated with training in basic science and research technical skills. We recognise that education and mentoring across both scientific and professional areas is vital to the success of early-career researchers embarking on a path that is both challenging and rewarding.

Education and training support

Prince Henry's Institute is committed to developing tomorrow's innovators today. We provide a research and clinical environment that empowers students to develop the skills and techniques to drive tomorrow's research. We recognise that the demands of research and study make it difficult for many PhD students to take on employment to supplement their PhD support. To help foster research excellence and build Australia's research capacity, PHI recognises research excellence through the provision of practical support for high achieving post-graduate students. Two awards were announced in 2011 in recognition of research excellence, with sponsored funding providing recipients with $5000 per year for three years.

Social and academic support

The Prince Henry's Institute Student Society was re-established in 2010 and continues to contribute to providing a positive and engaging academic and social environment at PHI.

The society works closely with the PHI student community, as well as working closely with committees and staff across the institute as advocates and representatives of its members. The committee is also instrumental in organising social events, and facilitating student education and training.

Students 2011:

PhD	25
Masters	3
Honours	9
Total	37

Committees

Prince Henry's Institute Student Society 2011

Committee members:
Daniel Czech (President)
Peter Nicholls (Secretary)
Jenna Haverfield (Treasurer)
Kyren Lazarus
Vlad Zubin

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

Higher Degree by Research Committee

The Higher Degree Committee, currently chaired by Professor Lois Salamonsen, functions to provide support to both students and their supervisors by providing advice, monitoring candidature and assisting to develop and nurture all Higher Degree by Research students.

Student Welfare Committee

The Student Welfare Committee, currently chaired by Dr Kelly Walton, functions to monitor student welfare and provide guidance on student matters.

The PHI Student Welfare Committee (SWC) supports students by monitoring and managing their welfare through advocacy, mentorship, and induction and training assistance. The SWC also assists with Open Day activities.

Awards

18th Annual PHI Student Symposium Awards 2011

Novo Nordisk Presentation Awards

PhD
Courtney Simpson
'Activation of latent human GDF9 by a single residue change (Gly391Arg) in the mature domain'

Commended - **Peter Nicholls**
'Activin controls Sertoli cell proliferation and fate'

First Year PhD Award
Jimmy Shen
'Macrophage MR signalling regulates systolic blood pressure and cardiovascular remodelling'

Honours/Masters
Samuel Hawthorne
"The search for novel factors of re-epithelialisation in menstrual fluid: Can "The Curse" become a cure?"

Graduate Excellence Awards 2011

Justin Chen
Jenna Haverfield
Rajini Sreenivasan

18th Annual Student Symposium Awards (Sponsored by Novo Nordisk) Student Symposium.
L - R: Associate Professor Greg Hannigan (Adjudicator, MIMR), Samuel Hawthorne, Dr Sara Al-Musawi (Adjudicator, PHI), Dr Anthony Sadler (Adjudicator, MIMR), Dr Michelle Myers (PHI), Peter Nichols, Courtney Simpson.

University affiliations:

Education supporters:

Montgomery Trust

Student List

PhD Graduates:

Davina Cossigny PhD BSc GradDipRSc
'The role of TGF-β superfamily members TGF-β1 and activin in early folluculogenesis'
Supervisors: Professor Jock Findlay; Dr Ann Drummond

Amy Herlihy BSc GradDipGeneticCounsel
'An exploration of the prevalence of psychosocial aspects of Kleinfelter syndrome in the context of public screening'
Supervisors: Professor Rob McLachlan; Assoc. Professor Jane Halliday (Murdoch Childrens Research Institute); Assoc. Professor Lynn Gillam (University of Melbourne); Dr Megan Cock (Monash University)

Stacey Jamieson BA/ BSc (Hons), PhD, Grad Cert Commercialising Research
'Molecular mechanisms in the pathogenesis of granulosa cell tumours of the ovary'
Supervisor: Professor Peter Fuller

Jason Liew PhD BBiomedSci (Hons)
'The role of estrogen in ovarian function'
Supervisors: Dr Ann Drummond; Professor Jock Findlay

Ken Walker BSc (Hons) PhD
'The development and function of high nephron endowment'
Supervisors: Professor John Bertram (Monash University); Dr Kaye Stenvers; Dr Georgina Caruana (Monash University)

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)
'The role of mineralocorticoid receptor in mediating cardiac inflammation'
Supervisors: Professor Lea Delbridge (University of Melbourne); Dr Morag Young

Justin Chen BSc (Hons) BA
'Targeting the TGF-β signalling pathway to improve muscle growth and development in muscular dystrophy'
Supervisors: Dr Craig Harrison; Dr Kelly Walton

Vanessa Cheung BSc (Hons) BA
'The role of PTHrP/TRAIL in breast cancer'
Supervisors: Professor Matthew Gillespie; Dr Steve Bouralexis

Daniel Czech BSc (Hons)
'The sexually dimorphic brain'
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

Jenna Haverfield BSc(Hons)
'Regulation of Sertoli cell differentiation *in vivo*'
Supervisors: Dr Sarah Meachem; Dr Peter Stanton

Hui Ting Ho BSc(Hons)
'PC6 as a potential target for developing dual-role female contraception by blocking embryo implantation and HIV infection'
Supervisor: Dr 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

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

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

Nirukshi Samarajeewa BBiomedSci (Hons)
'Elucidating of the role of CRTC2 co-activation of CREB in regulating promoter IL-driven aromatase expression in human breast adipose stromal cells'
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)
'TNFα and its role in breast oestrogen biosynthesis'
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)

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

Phillip Wong MBBS FRACP
'Thalassemia and bone disease'
Supervisors: Professor Peter Fuller; Professor Matthew Gillespie, Dr Fran Milat

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

Masters Graduate:

Lorraine Lin BSc
'The role of Leukemia inhibitory factor in endometrial stromacell decidualisation'
Supervisors: Professor Lois Salamonsen; Dr Eva Dimitriadis

Masters Students:

Seungmin Ham BSc Grad Dip Drug Evaluation Pharma Sc, Grad Dip RSc
'The regulation of aromatase by the LKB1/AMPK pathway in the testis'
Supervisors: Dr Kristy Brown; Dr Sarah Meachem

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

Honours Graduates:

Mr Abdul Aziz Al-Helou BSc (Hons)
'Characterisation of the hedgehog pathway in the betaglycan knockout mouse testis'
Supervisor: Dr Mai Sarraj

Ms Carly Cuman BBioMedSc (Hons)
'Human blastocyst secretome regulates endometrial epithelial cell gene expression'
Supervisor: Dr Eva Dimitriadis

Ms Justine Olcorn BBiomedSci (Hons)
'The regulation of sertoli cell miocro-RNAs by TGF-β superfamily members'
Supervisors: Professor Suphioglu (Deakin University); Dr Peter Stanton

Hoi Teng (Victoria) Pun BA/BSc (Hons)
'Identifying the effect of epigenetics and Bisphenol A on intratumoral estrogen production in breast cancer'
Supervisor: Dr Kevin Knower

Maria Zaldivia BSc (Hons)
'The role of mitogen-activated protein kinase (MAPK) pathways in regulating cell death and survival in granulosa cell tumour'
Supervisors: Dr Kaye Stenvers; Dr Maree Bilandzic

Vladimir Zuban BSc(Hons)
'Structural characterization of liver receptor homolog-1 (LRH-1) antagonists'
Supervisors: Dr Sarah Meachem; Dr Morag Young

Honours Students:

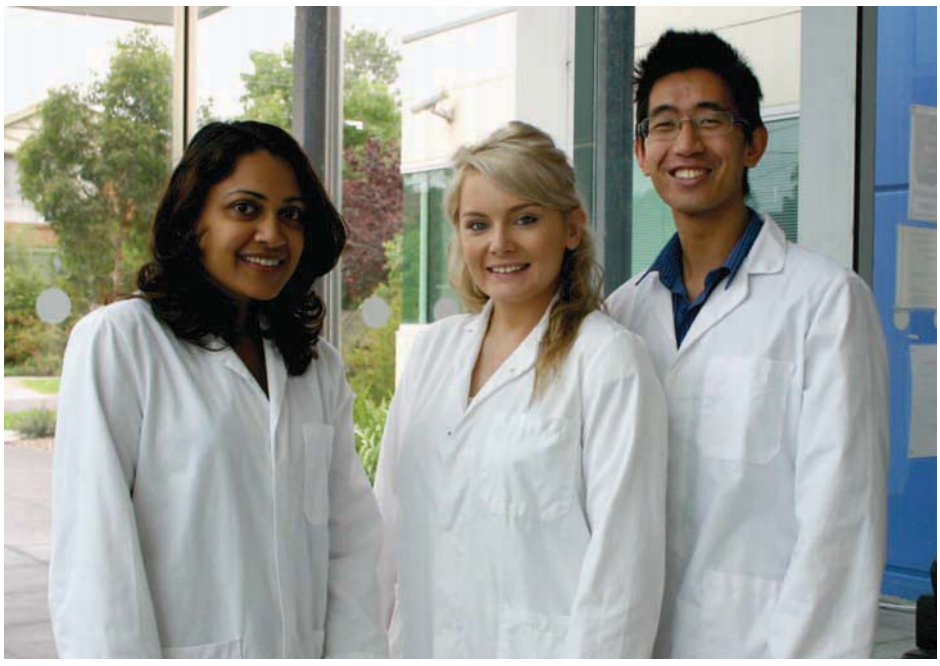
Samuel Hawthorne BSc AdvHons
'The search for novel regulators of re-epithelialisation within menstrual fluid: Can the 'curse' become a cure?'
Supervisors: Dr Jemma Evans; Professor Lois Salamonsen

Tara Krishnan BMedSc (Hons)
'The role of leukemia inhibitory factor in ectopic pregnancies'
Supervisor: Dr Eva Dimitriadis

Belinda Quenette BSc(Hons)
'Cell and germ cell defects in Atrx knockout mouse models'
Supervisors: Dr Stefan Bagheri-Fam; Professor Vincent Harley

Vacation Students:

Abdul Aziz Al-Helou
Hassan Elgizawy
Rubaiyea (Ruby) Farraukee
Samuel Hawthorne
Tan (Dilys) Leung
Eva Moeller
Justine Olcorn
Yih Rue Ong
Hoi Teng (Victoria) Pun
Lixian Wang
Connie Wells



L - R: Graduate Excellence Award winners, Rajini Sreenivasan, Jenna Haverfield and Justin Chen

EDUCATION

INVITED PRESENTATIONS

Sara Al-Musawi
- Invited Speaker, Baker Institute, Melbourne

Stefan Bagheri-Fam
- Invited Speaker, Endocrine Society of Australia Annual Scientific Meeting (ESA/SRB), Perth
- Invited Speaker, Institute of Human Genetics, Germany
- Invited Co-Chair, Endocrine Society of Australia Annual Scientific Meeting (ESA/SRB), Perth

Maree Bilandzic
- Invited speaker, TGF-β Down Under Conference, Melbourne
- Invited speaker, Symposium on Ovarian Cancer, Victorian Comprehensive Cancer Centre and the European Network for Translational Research in Ovarian Cancer (EUTROC), Melbourne
- Poster presentation, 2nd World Congress of Reproductive Biology; Cairns, Queensland

Kristy Brown
- Invited Speaker, Women's Cancer Program Seminar Series, Northwestern University, Chicago, USA
- Invited Speaker, Endocrine Society of Australia (ESA) Annual Scientific Meeting, Perth
- Invited Speaker, MODI (Monash Obesity and Diabetes Institute) Workshop, Melbourne
- Invited Speaker, VBCRC Annual Scientific Meeting, Melbourne

Henry Burger
- Invited Plenary Lecturer: International Menopause Society, June 8 – 12th, Rome, Italy (Title: The unpredictable endocrinology of the menopausal transition)
- Invited Symposium Speaker: International Menopause Society, 13th World Congress of Menopause June, Rome June 8 – 11th, US Endocrine Society Position Statement on Hormones & Breast Cancer
- Invited Speaker: Novonordisk Clinical Endocrine Weekend, Torquay
- Invited Speaker:15th Annual Meeting of Australiasian Menopause Society, Brisbane
- Session chair: International Congress on Human Reproduction, Melbourne

Ashwini Chand
- US Department of Defense Breast Cancer Research Program Era of Hope Meeting, Orlando, USA

Eva Dimitriadis
- Invited Presenter, NHMRC 75th Annual Symposium, Canberra
- Invited Speaker, Ferring workshop in Clinical Embryology and Andrology, Melbourne
- Invited Chair, ANZPRA Symposium, Cairns, Queensland
- Invited Speaker, World Congress on Reproductive Biology, Cairns, Queensland
- Invited Speaker, Mercy Hospital symposium, Melbourne

Ruth Escalona
- Poster presentation, 2nd World Congress of Reproductive Biology, Cairns, Queensland

Jemma Evans
- Invited Speaker, Society for Gynecologic Investigation, San Diego, USA

Jock Findlay
- Invited speaker, Indian Society for the Study of Reproduction & Fertility, Karnal, India

Peter Fuller
- Invited Speaker, British Endocrine Society, Birmingham, UK

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 x 2, Ancona, Udine)
- Invited speaker, Probus Club of Port Philip (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)

Matthew Gillespie
- Invited Speaker, St. Vincent's Medical Research Week, Melbourne
- Invited Speaker, Annual Meeting of the Australian & New Zealand Bone & Mineral Society, Gold Coast, Queensland
- Panel Participant, Professional Development Day, The Australian Society for Medical Research, Melbourne

Vince Harley
- Invited Speaker, Third International Sox Meeting: From Structure to Function, Frainau/Zugspitzdorf, Germany
- Invited Speaker, Service d'Endocrinologie Moleculaire et Maladies Rares, Centre de Biologie et Pathologie Est, Lyon, France
- Invited Speaker, Hopital Necker-Enfants Malades, Paris France
- Invited Speaker, The Weatherall Institute of Molecular Medicine, Oxford University, UK
- Invited Speaker, Department of Genetics, Cambridge University, UK
- Invited Speaker, Temasek Life Sciences Laboratory, Singapore
- Invited Speaker, Fourth Australian Disorders of Sex Development Symposium, Perth
- Invited Speaker x 2, Endocrine Society of Australia Annual Scientific Meeting (ESA/SRB), Perth

Craig Harrison
- Invited Speaker, 29th Japan Endocrine Society Summer Seminar on Endocrinology and Metabolism, Sendai, Japan (postponed due to earthquake)
- Invited Speaker, TGF-β Downunder Meeting, Melbourne

Kevin Knower
- US Department of Defense Breast Cancer Research Program Era of Hope Meeting, Orlando, USA, August 2011

Rob McLachlan
- Invited speaker, Current uses and controversies in testosterone therapy, Uroscience Meeting, Melbourne
- Invited speaker, Malaysian Endocrine and Metabolic Society Annual Congress 3. Plenary Lecture: Controversies in the management of male hypogonadism, Kuala Lumpur

- Invited participant in "Meet the Expert" Sessions on: 1) Addressing fertility issues in male hypopituitary / hypogonadism; 2) Rational approach to female infertility, Rotterdam, The Netherlands
- Invited speaker, The Centre For Reproductive Medicine & Infertility, Guest Lecture Series, New York, USA
- Symposium presentation, "Androgen and spermatogenesis", in association with Prof John Mulhall, Director, Male Sexual and Reproductive Medicine Program, Memorial Sloan Kettering Cancer Centre, and Dr Pat Morris, Population Council, Centre for Biomedical Research, New York, USA
- Invited speaker, Future of Contraception Initiative, Seattle Invited symposium Androgen and Spermatogenesis Washington, USA
- Invited speaker, 4th International Symposium Testosterone: action, deficiency, substitution. Schloss Hohenkammer, Munich, Germany

Sarah Meachem

- Invited Speaker, Andrology Society of America, Houston, TX, USA
- Invited Speaker, Health Summit, Melbourne University, Parkville
- Facilitator, Mid career Professional Development Day, Australian Health and Medical Research Congress, Melbourne
- Invited Speaker, Senior Schools Program, Melbourne Museum, Tall Poppy Campaign, Australian Institute of Policy and Science
- Invited Speaker, Endocrine Society of Australia, Perth

Ellen Menkhorst

- Invited Speaker, Australian and New Zealand Placental Research Association, Cairns, Australia.
- Invited Speaker, The Kolling Institute, Sydney, Australia

Guiying Nie

- Invited speaker, 2nd World Congress on Human Reproduction, Melbourne
- Invited speaker and Chair, Australian and New Zealand Placental Research Associating meeting, Cairns, Queensland
- Invited speaker, Monash Health Translation Precinct, Melbourne
- Invited Chair, 2nd World Congress on Reproductive Biology, Cairns, Queensland
- Invited Chair, Society for Reproductive Biology Annual Scientific Meeting, Cairns, Queensland

Liza O'Donnell

- Invited Speaker, Endocrinology Society Meeting, Boston, USA

Lois Salamonsen

- Invited Speaker, 14th Asia Pacific COGI Congress on Building Consensus in Gynecology, Infertility and Perinatology, Bangkok, Thailand
- Invited Session Chair, 14th World Congress on Human Reproduction, Melbourne
- Invited Speaker, Monash IVF in-clinic SHAPE meeting, Melbourne
- Invited Speaker, Scientists in Reproductive Technology, Melbourne Meeting
- Invited Speaker, Monash Health Translation Precinct Special Seminar, Melbourne
- Invited Speaker, Dept Anatomy and Developmental Biology, Monash University, Melbourne

Mai Sarraj

- Invited speaker, TGF-β Down Under Conference, Melbourne
- Poster presentation, 44th Annual Meeting of the Society for the Study of Reproduction; Portland, Oregon, USA
- Selected speaker, 42nd Annual Meeting of the Society of Reproductive Biology, Cairns, Queensland
- Poster presentation, 2nd World Congress of Reproductive Biology; Cairns, Queensland

Evan Simpson

- Invited Speaker, Breast cancer Think Tank 20, Barbados
- Invited Speaker, 14th International Congress of Endocrinology, Kyoto, Japan
- Invited Speaker, 14th World Congress of Gynecologic Endocrinology, Florence, Italy
- Invited Speaker, Estrogens, SERMS and TSEC Meeting (Pfizer sponsored), Pennsylvania PA, USA

Harmeet Singh

- Invited speaker, Australian and New Zealand Placental Research Associating Meeting, Cairns, Queensland

Peter Stanton

- Plenary Speaker, Kolling Institute Annual Scientific Research Meeting, Royal North Shore Hospital, Sydney

Kaye Stenvers

- Selected speaker, 44th Annual Meeting of the Society for the Study of Reproduction; Portland, Oregon, USA
- Invited chair, TGF-β Down Under Conference, Melbourne
- Invited chair, 42nd Annual Meeting of the Society of Reproductive Biology, Cairns, Queensland

Andrew Stephens

- Invited Speaker, World Human Reproduction Congress, Melbourne

Julian Quinn

- Invited Speaker, "Osteoclasts, bone destruction and breast cancer invasion" Ludwig Institute, Austin Hospital, Melbourne

Adam Rainczuk

- Invited speaker – OCRF speaker for the National Australian Bank Tour of Prince Henry's Institute
- 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

Yao Wang

- Poster presentation, 2nd World Congress of Reproductive Biology; Cairns, Australia

Phillip Wong

- Invited Speaker, The Royal Australian College of Physicians, 2011

Morag Young

- 7th International Symposium on Aldosterone and the ENaC/Degenerin Family of Ion Channels: Molecular Mechanisms and Pathophysiology, American Physiology Society, Pacific Grove, CA, USA
- The RAS Club. New Pathways, New Targets. Baker IDI, Melbourne

EDUCATION

SEMINARS IN 2011

MHTP Seminars

Professor Alberto Avolio
Australian School of Advanced Medicine, Macquarie University
"Cellular and molecular mechanisms of arterial stiffness"

Associate Professor Roslyn Boyd
Scientific Director, Queensland Cerebral Palsy & Rehabilitation Research Centre
"Can training change the brain: neuroscience outcomes of an RCT of constraint induced movement therapy vs bimanual training in congenital hemiplegia"

Dr Ben Croker
Laboratory Head, ARC QEII Fellow, Inflammation Division
The Walter and Eliza Hall Institute of Medical Research
"Genetic analysis of the inflammasome"

Professor Gary Egan
Director, Monash Biomedical Imaging (MBI), Monash University
"Multi-modality biomedical imaging at Monash University: collaborative research opportunities"

Professor James Friend
Department of Mechanical and Aerospace Engineering
Monash University; Co-Director, MicroNanophysics Research Laboratory
"Applications of High-Frequency Ultrasonics in Microfluidics and Microactuation"

Professor Sean Grimmond
Director of the Queensland Centre for Medical Genomics
Institute of Molecular Biology, University of Queensland
"Defining the molecular landscape of cancer genomes"

Dr Mathis Grossmann
Senior Research Fellow, University of Melbourne, Consultant Endocrinologist, Austin Health
"Control of musculoskeletal function and glucose metabolism by androgens in men"

Associate Professor Greg Hannigan
Monash Institute of Medical Research
"From adhesion plaques to primary cilia: Integrin-Linked Kinase is a Hedgehog-Linked Kinase"

Professor Len Harrison
Walter and Eliza Hall Institute of Medical Research
"Immunity, like life, is all about regulation"

Professor Louise Hull
The Robinson Institute, University of Adelaide
"Epigenetics of Endometriosis: the role microRNAs"

Professor Shaun Jackson
Prof. Medicine, Monash University and Adjunct Professor, The Scripps Research Institute, La Jolla, San Diego
"What drags neutrophils to sites of vascular injury?"

Professor Howard Jacob
Director, Medical College of Wisconsin's Human and Molecular Genetics Center, Milwaukee, WI, USA
"Whole Genome Sequencing Just Another Lab Test: The Milwaukee Experience"

Professor Stephen M. Jane
Head, Central Clinical School, Monash University
Director of Research, The Alfred Faculty of Medicine, Nursing and Health Sciences
"Translational research – from the mouse to the bedside"

Professor Ken Korach
National Institute of Environmental Health Sciences – NIH, North Carolina USA
"New mouse models for dissecting estrogen receptor activities"

Professor Leendert Looijenga
Professor of Translational Patho-Oncology, Erasmus MC – University Medical Center Rotterdam, the Netherlands
"Human malignant germ cell tumors: the ultimate stem cell cancer?"

Assistant Professor Tetsuo Maruyama
Department of Obstetrics and Gynaecology, School of Medicine, Keio University, Tokyo, Japan
"Human uterine stem/progenitor cells: implications for uterine physiology and pathology"

Andrew McCallum
Commercialisation Services Manager, Prince Henry's Institute
Technical Seminar "Intellectual Property"

Professor John McNeill
School of Public Health and Preventative Medicine
"ASPREE and the epidemiology of aging"

Professor Andreas Meinhardt
Department of Anatomy and Cell Biology, Justus-Liebig University Giessen, Germany
"Evading the testicular immune response – pathogenic causes of male infertility"

Professor Murray Mitchell
Director, University of Queensland Centre for Clinical Research
"Epigenetics and the next generation"

Dr. Guiying Nie
Prince Henry's Institute of Medical Research
"Proprotein convertase 6: critical role in establishing pregnancy and clinical implications"

Professor Marilyn Renfree
Laureate Professor, Ian Potter Chair of Zoology, Department of Zoology, The University of Melbourne
"Marsupials are placental mammals - and lactation specialists"

Dr Darryl Russell
ARC Future Fellow, Robinson Institute, Research Centre for Reproductive Health, School of Paediatrics and Reproductive Health, The University of Adelaide
"The cumulus oocyte complex: intelligent packaging for delivery of high competence oocytes"

Professor Lois Salamonsen
Head, Endometrial Remodelling Laboratory
Prince Henry's Institute
"Edometrial receptivity: a critical step in establishing pregnancy"

Associate Professor Clare Scott
Walter and Eliza Hall Institute of Medical Research
"Ovarian Cancer & Targeted Therapy"

Professor Evan Simpson
Co-head, Metabolism and Cancer Laboratory
Prince Henry's Institute of Medical Research
"Obesity, aromatase and breast cancer – old wine in new bottles"

Dr Lee Smith
MRC Centre for Reproductive Health, Edinburgh, UK
"Androgen signalling and the machiavellian control of testis function"

Professor Roger Smith
Faculty of Health, University of Newcastle
"Humans Go Viral"

Professor Julie Stout
Director of Research, School of Psychology and Psychiatry, Faculty of Medicine, Nursing and Health Sciences, Monash University
"Driving toward treatments for Huntington's Disease: The story of a research movement"

Professor Axel Themmen
Professor in Experimental Endocrinology and Medical Education, Erasmus University Medical Center Rotterdam, The Netherlands
"Anti-mullerian hormone: both regulator and marker of ovarian function"

Dr. Bernd Timmermann
Roche Applied Science Technology Seminar: Next Generation Sequencing Core Facility, Max Planck Institute for Molecular Genetics
"The Use of Next Generation Sequencing and Sequence Capture to Study Human Genome Variation and Cancer"

Professor Bruce Tonge
School of Pyschology and Psychiatry, Monash University
"Predictors of youth depression"

Professor David Vaux
Head, Cell Signalling and Cell Death
Walter and Eliza Hall Institute of Medical Research
"Ten rules for the presentation and interpretation of data in publications"

Professor Neil Watkins
Senior Scientist and Fellow
Centre for Cancer Research, Monash Institute of Medical Research
"Hedgehog Signalling: From Flies to Clinical Trials"

Professor Wolfgang Weninger
The University of Sydney
"Visualising immune response in real time"

Associate Professor Elizabeth A. Woodcock
NHMRC Principal Research Fellow,
Baker IDI Heart and Diabetes Institute
"Identification of targets for treatment of hypertrophy & heart failure"

Awards and Prizes

Mo Aljofan
- Southern Health Research Week Poster Prize

Stefan Bagheri-Fam
- Endocrine Society of Australia (ESA), Servier Young Investigator Award

Maree Bilandzic
- Finalist, the Victorian Comprehensive Cancer Center, Symposium on Ovarian Cancer oral presentation award

Laura Bienvenu
- APA post graduate scholarship
- First prize in cardiovascular disease category, Southern Health Research Week Poster Presentation
- ISHR/CSANZ student investigator prize for best mini-oral presentation 2011, CSANZ Annual meeting

Kristy Brown
- Career Development Award (CDA1), NHMRC
- ESA/IPSEN International Travel Grant Award
- NIH Young Investigator Travel Award

Ashwini Chand
- National Breast Cancer Foundation Novel Concept Award

Daniel Czech
- Southern Health Research Week Poster Prize

Jemma Evans
- Harold Mitchell Travel Fellowship ($5000)
- Brennan Trust equipment grant ($20000)
- Society for Reproduction and Fertility (UK) travel grant (£750, approximately $1150)

Jock Findlay
- Fellow, Society for Reproductive Biology

Peter Fuller
- Society for Endocrinology Hoffenberg International Medal of the British Endocrine Society
- Excellence in Mentoring Award: Academic and Research, Royal Australasian College of Physicians

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

Craig Harrison:
- Commenced Career Development Fellowship (level 2), NHMRC

Jenna Haverfield
- Burroughs-Wellcome Travelling Award to attend 'Frontiers in Reproduction' (Woods Hole, Massachusetts, 2011)

Kevin Knower
- Endocrine Trainee Day Award, US Endocrine Society, Boston, USA
- Endocrine Society of Australia / ISPEN International Travel Grant Best Poster Presentation (Postdoctoral Category) – Australian Epigenetic Alliance Meeting
- Contributing to Australian Scholarship and Science Early Career Travel Grant Best Poster Presentation (Postdoctoral Category) – U.S. Department of Defense Breast Cancer Era of Hope Meeting, Orlando, Florida, U.S.A.

Stacey Jamieson
- Commercialisation Training Scheme Award, Department of Industry, Innovation, Science, Research and Tertiary Education, Commonwealth Government of Australia
- Young Investigator Award, Women in Endocrinology (June 2011)
- ESA/IPSEN International Travel Grant Award, The Endocrine Society of Australia

Kyren Lazarus
- Travel award to attend Jackson Lab "20th Annual Short Course on Experimental Models of Human Cancer", Maine, USA

Yogesh Makanji:
- Training Fellowship, NHMRC

Michelle Myers
- Ramaciotti Foundation New Investigator Grant
- Society for Reproduction & Fertility Travel Award

York Ng
- Endeavour Research Fellowship

Peter Nicholls
- Lalor Foundation Merit Award – from the Society for the Study of Reproduction to attend the SSR Annual Meeting, Portland, Oregon, USA
- Runner-up, Young Scientist award, SSR Annual Meeting, Portland, Oregon, USA
- Special PhD Recommendation, PHI Student Symposium

Justine Olcorn
- SRB Travel Award to attend 42nd Annual Meeting, Society for Reproduction and Development, Cairns, Queensland

Julian Quinn
- Career Enhancement Award, Prince Henry's Institute

Lois Salamonsen
- Fellowship, Society for Reproductive Biology

Jimmy Shen
- RACP research award
- Best first year PhD presentation, PHI Student Symposium

Courtney Simpson:
- Best overall PhD presentation PHI Student Symposium
- SRB Travel Award to attend 42nd Annual Meeting, Society for Reproduction and Development, Cairns, Queensland

Evan Simpson
- Dale Medal 2011 - Society for Endocrinology (UK)

Rajini Sreenivasan
- Southern Health Research Week Poster Prize

Kaye Stenvers
- 2011 Society for Reproductive Biology (AUS)-Society for the Study of Reproduction (USA) International Scholar Award

Sarah To
- Harold Mitchell Foundation Travel Fellowship
- Monash University Award for outstanding poster presentation - Australian Society for Medical Research student symposium
- Poster award winner, Cancer Research – Southern Health Research Week

Kelly Walton
- Poster Prize, Southern Health Research Week, Melbourne 2011
- Poster Prize, TGF-β Down Under conference, Melbourne

Jun Yang
- Australasian Women in Endocrinology Travel Award
- National Heart Foundation Travel Grant
- Presidential Poster Competition Prize, US Endocrine Society Meeting
- Novartis Young Investigator Award, ESA Annual Meeting

Service to the Scientific Community

Sara Al-Musawi
- Awards judge at PHI Student Symposium
- PHI Education committee
- Student Welfare committee

Anthony Argentaro
- Member, Australian Society of Medical Research (ASMR)
- Member, Australian Society of

Biochemistry and Molecular Biology (ASMR)
- Member, US Endocrine Society
- Committee Member, PHIMR-OGTR
- Committee Member, Monash University Institutional Biosafety Committee (MUIBC)

Stefan Bagheri-Fam
- Member, Endocrine Society of Australia (ESA)
- Member, Australian Society of Medical Research (ASMR)
- Member, Australia and New Zealand Society for Cell and Developmental Biology (ANZSCDB)
- Committee Member, Monash Medical Centre Animal Ethics Committee B (MMCB)
- Judge of Posters, ComBio2011, Cairns

Pascal Bernard
- Independent assessor, NHMRC project Grant
- Committee Member, Monash Medical Centre Human Ethics Committee

Kristy Brown
- Member of Endocrine Society
- Member of Endocrine Society of Australia
- Deputy Chair, NHMRC project grant review panel

Henry Burger
- Member, International Menopause Society
- Member, Australasian Menopause Society
- Member, Endocrine Society of Australia
- Member, U.S. Endocrine Society
- Member, Royal Australasian College of Physicians
- Member, Fertility Society of Australia

Ashwini Chand
- Member, Endocrine Society of Australia
- Member, United States Endocrine Society
- Committee Member, Student Welfare Committee, Prince Henry's Institute (2011)

Colin Clyne
- Member, Editorial Board, Journal of Steroid Biochemistry and Molecular Biology
- Member, Editorial Board, Steroids
- Member, Endocrine Society of Australia
- Member, United States Endocrine Society

Evdokia Dimitriadis
- Editorial Board member, World Journal of Translational Medicine
- Elected Council member, Society for Reproductive Biology
- Member, Reviewing Board, Journal of Reproductive Immunology
- Member, organizing committee, Society for Reproductive Biology Program for Annual Scientific Meeting, Cairns, Queensland
- Member, Program and Local Organising Committee, World Congress on Reproductive Biology, Cairns, Queensland

Jock Findlay
- Chair, Scientific Committee of the Victorian Breast Cancer Research Consortium Inc.
- 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 Elect, Society for Study of Reproduction (USA)
- Chair, Embryo Research Licensing Committee of the NHMRC (the NHMRC Licensing Committee)
- Member & Deputy Chair, Patient Review Panel, Government of Victoria
- 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.

Peter Fuller
- Member, Council; Member, Executive Committee, Cancer Council, Victoria
- Member, Venture Grants Committee, Cancer Council Victoria
- Chair Selection Panel for the 2011 Dunlop Fellowship, 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, Editorial Board, Endocrinology
- 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)

John Funder
- Executive Chair Obesity Australia
- Chair, Scientific Advisory Board, Obesity Australia
- Chair, Schering Plough/Merck Science Alliance
- Chair, Scientific Advisory Board, National Research Centre for Growth and Development, New Zealand
- Chair, Scientific Advisory Committee, Liggins Institute, New Zealand
- Secretary - Treasurer, International Aldosterone Conference
- Founding member, Board of International Aldosterone Forum, Japan
- Member, Finkel Foundation Board
- Member, The Freemasons Foundation Centre for Men's Health, Scientific Advisory Committee
- Member, Garnett Passe and Rodney Williams Memorial Foundation Board
- Member, Harold Mitchell Foundation Board
- Member, CBIO Board
- Member, Grattan Institute Board
- Member, Indigeneous Eye Health Research Advisory Board

Consultancies
- Consultant, University of Sydney : Relations with Medical Research Institutes
- Consultant, University of Sydney : Possible Amalgamation of MRIs
- Member, Dept of Veterans Affairs: Prostate Cancer Review
- Chair, Dept of Veterans Affairs: Systemic Lupus Erythematosis Review

- Chair, Dept of Veterans Affairs: Rheumatoid Arthritis Review
- Invited member, Hospital Research Directors Forum, Melbourne
- Chair, International Advisory Board "Aldosterone and Salt: Heart and Kidney": Satellite Symposium to the International Congress of Hypertension, October 2012

Matthew Gillespie
- President, Australian and New Zealand Bone and Mineral Society
- Member, Council; 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
- Program Committee, ANZBMS Annual Scientific Meetings, Gold Coast 2011
- 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
- Member, RGMS User Group, National Health and Medical Research Council
- Chair, Grant Review Panel National Health and Medical Research Council
- Member, Program Committee and abstract reviewer 33rd Annual Meeting of the American Society for Bone and Mineral Research (San Diego, USA), September, 2011
- Member, Program Committee and abstract reviewer Annual Meeting of the Australian & New Zealand Bone & Mineral Society, Gold Coast October, 2011
- 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
- Advisor, Journal of Oral Biosciences

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, 93rd Annual Meeting of The Endocrine Society, ENDO 2011
- Member, NHMRC 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 (ASBMB)
- Member, Australian Neuroscience Society
- Member, The American Society of Human Genetics (ASHG)
- Member, US Endocrine Society
- Member, Lorne Genome Conference Inc. (Vicepresident)
- Member, Human Genetics Society of Australasia (HGSA)
- Member, Victorian Society for Developmental Biology Society (VSDB)
- Member, Australian Society of Medical Research (ASMR)
- Member, Australian & New Zealand Society for Cell and Developmental Biology (ANZSCDBI)
- Member, Australian Society for Biochemistry and Molecular Biology (ASBMB)
- Member, National Association of Research Fellows of NHMRC Inc (NARF)
- Member, Human Genome Variation Society
- Member, Organization for the Study of Sex Differences (OSSD)
- Member, American Society for Cell Biology (ASCB)
- Member, The Endocrine Society of Australia (ESA)

Craig Harrison
- Education Program in Reproduction and Development, Monash University
- Program Organising Committee, TGF-β Down Under Workshop

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

Kevin Knower
- Member Endocrine Society of Australia
- Member United States Endocrine Society
- Member Australian Society of Medical Research
- Chair, PHI Education Committee

Joohyung Lee
- Member, Australian Neuroscience Society
- Member, Society for Neuroscience

Dr Chantal Magne Ng
- Member, Endocrine Society of Australia
- Member, United States Endocrine Society

Rob McLachlan
- Royal Australasian College of Physicians
- Endocrine Society of Australia
- Fertility Society of Australia
- US Endocrine Society
- American Society of Andrology
- National Association of Research Fellows (NARF)
- Member, Editorial Board, International J Andrology
- Member, Editorial Board, J Andrology
- Member, Editorial Board, J Clin. Endocrinology Metab
- 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

Sarah Meachem
- Chair, Advisory Group to the board, Australian Society for Medical Research
- Ambassador, Victorian Tall Poppy Campaign, Australian Institute of Policy and Science

– Elected council member, Society for Reproductive Biology
– Member, Editorial board, Spermatogenesis

Ellen Menkhorst
– Early Career Representative, Society for Reproductive Biology
– Member of the Australian and New Zealand Placental Research Association
– Member, ASMR
– Member, Awards Committee Society for Reproductive Biology
– Member, Awards Committee World Congress in Reproductive Biology
– Member, Southern Health Research Week Program Committee

Michelle Myers
– Member of Society for Reproduction & Fertility (UK)
– Member of Society for Reproductive Biology (AUS)
– Member of Society for Endocrionology(UK)
– Member of Society for the Study of Reproduction (USA)

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

Liza O'Donnell
– Editor, Spermatogenesis journal

Makoto Ono
– Member, Councilor, Japanese Society for Pediatric Endocrinology
– Judge of Abstracts, 45th Annual Scientific Meeting of the Japanese Society for Pediatric Endocrinology
– Member, European Society for Paediatric Endocrinology (ESPE)
– Member, Japan Pediatric Society
– Member, Japan Endocrine Society
– Member, Japanese Society for Mass-screening
– Member, Japan Diabetes Society

Julian Quinn
– Member, Editorial Board, Bone

Jyothsna Rama Rao
– Member of ASMR

David Robertson
– Member, Editorial Board, Women's Health
– Member, Editorial Board, Endocrine Society of Australia
– Member, Editorial Board, U.S. Endocrine Society

Lois Salamonsen
– Member, Editorial Board, Journal of Reproductive Immunology
– 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

Evan Simpson
– Member, IOC, International Congress of Hormonal Steroids, Edinburgh
– Member, IOC, Aromatase 2010 Meeting, Edinburgh
– Member, Executive Council, International Congress of Endocrinology, Kyoto, Japan
– Member, Committee for Governance Affairs, Endocrine Society (USA)
– Member, Society for Endocrinology (UK) Council
– Chair, Advisory Panel on International Outreach, Endocrine Society (USA)
– Member, Council, Endocrine Society of Australia
– Member Executive Committee, International Congress of Gynecological Endocrinology
– Member Editorial Board, Endocrinology
– Member Editorial Board, J Steroid Biochem Mol Biol

Stefan Sonderegger
– Member of the Society for Reproductive Biology
– Member of the Australian and New Zealand placental research association

Peter Stanton
– Member, Research Degrees Committee, School of Medicine, Nursing and Health Sciences, Monash University
– Member, PHI Higher Degrees Committee

Kaye Stenvers
– 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
– Member, Society for the Study of Reproduction (USA)
– Guest editor, Molecular and Cellular Endocrinology
– Member, Ludwig Institute for Cancer Research Institute
Biosafety Committee
– Thesis Assessor, Honours Degree, Department of Biochemistry, Monash University
– Adjunct lecturer, Dept. of Anatomy, Monash University

Morag Young
– Member of US Society of Endocrinology
– Member of ASMR
– Member of HBPRCA
– Member of International Aldosterone Society

GRANT FUNDING

Commenced / Announced in 2011

Research Support

Announced in 2011

Cancer Council Victoria

– Evan Simpson, Colin Clyne, Kristy Brown. Victorian Breast Cancer Research Consortium (VBCRC). $510,415 (2011) Estrogens and Breast Cancer

National Breast Cancer Foundation (NBCF) - Novel Concept Award

– Kristy Brown. SIRT1 activators to inhibit aromatase in obesity and breast cancer. $55,000

National Health and Medical Research Council of Australia (NHMRC)
Project Grants

– Craig Harrison, David Robertson, Kenneth McNatly, Robert Gilchrist. Activation of GDF9 regulates female fertility. $513,675 (2012-2014)
– Evdokia Dimitriadis, Ellen Menkhorst. Decidual-trophoblast interactions critical for the establishment of pregnancy. $592,245 (2012-2014)
– Colin Clyne, Ashwini Chand, Belinda Michell, Michael Gorman. LRH-1 antagonists for cancer drug discovery. $736,461 (2012-2014)
– Joohyung Lee. SRY in the brain. $496,596 (2012-2014)
– Matthew Gillespie. New factors that build bone. $528,675 (2012-2014)
– Gary Wittert, Matthais Grossman, Carolyn Allan, Rob McLachlan, Ann Conway, Joey Kaye, Alicia Jenkins, Mark David. Testosterone Intervention For The Prevention of Diabetes Mellitus in High Risk Men: A Randomised Trial $4,522,905 (2012-2016).
– Moirya O'Bryan, Liza O'Donnell and David de Krester. Katanin p80 is a key regulator of mictrotubule dynamics and male fertility. $582,350 (2012 - 2014)

Ovarian Cancer Research Foundation (OCRF)

– Andrew Stephens. Operation of the OCRF ovarian cancer tissue bank. $150,000 (2011/12)

Monash IVF Pty Ltd

– Lois Salamonsen. Proteomic analysis of receptive endometrium: identification of discriminative markers. $52,000 (2011)
– Evdokia Dimitriadis. The endometrium is a sense of a blastocyst destined for implantation success or failure. $41,780 (2011)
– Guiying Nie. Dystroglycan in uterine fluid is a potential marker for receptivity. $19,000 (2011)

Raybiotech

– Evdokia Dimitriadis. Biomarker Discovery Pilot Program. $10,000 (2011)

Victorian Cancer Agency (VCA)
Early Career Seed Grant

– Kristy Brown. SIRT1 activators to inhibit aromatase in obesity and breast cancer. $55,000 (2011)

In partnership with:

The University of Melbourne

– Julian Quinn. Australian Research Council (ARC) Linkage Infrastructure Equipment and Facilities (LIEF). Biomaterials Characterisation Facility.

People Support

Montgomery Trust

– Courtney Simpson. Montgomery Scholarship $30,000

National Health and Medical Research Council of Australia (NHMRC)
Research Fellowships

– Robert McLachlan. Principal Research Fellowship. $702,795 (2012-2016)
– Vincent Harley, Senior Research Fellowship. $716,855 (2012-2016)
– Evdokia Dimitriadis. Senior Research Fellowship. $655,910 (2012-2016)
– Peter Tipping. Retiring Fellowship. $140,559 (2012)
– Jock Findlay. Retiring Fellowship. $158,972 (2012)

Ovarian Cancer Research Foundation (OCRF)

– Stacey Jamieson. Post Doctoral Fellowship. Tyrosine Kinase Inhibitors as Potential Therapeutic Agents in the Treatment of Granulosa Cell Tumours of the Ovary. $77,508 (2011)
– Andrew Stephens. Discovery and development of screening markers for the early detection of ovarian cancer. $521,000. (2011/12)
– Andrew Stephens. Tissue bank support (ultrafreezer and staff). $106,662 (2011/12)
– Simon Chu. Molecular Pathogenesis of Granulosa Cell Tumours & Fallopian Fimbria as the Cellular Origin of High Grade Serous Ovarian Cancer Project. $155,000 (2011/12)

Perpetual Trustees - Ramaciotti Foundation

– Michelle Myers. Establishment Gift. Using and losing your eggs; challenges for women in the 21st century. $74,776.57 (2011)

The Royal Australian College of Physicians

– Phillip Wong. Osteoporosis Australia/ RACP Research Entry Scholarship. Thalassaemic bone disease and the role of iron on bone biology. $30,000 (2012)

– Jimmy Shen. Vincent Fairfax Family Foundation Research Entry Scholarship. $30,000 (2012)

Department of Education, Employment and Workplace Relations - Prime Minister's Education Assistance

– Nirukshi Samarageewa. Prime Minister's Education Assistance Program for Japan. $4,000

Heart Foundation

– Jun Yang. Travel Grant. $2,200

Philanthropic Trusts and Foundations

We gratefully acknowledge the generous support received from philanthropic trusts and foundations. Their funding assists to progress 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.

ANZ Trustees Medical Research and Technology in victoria

– Portable echocardiography system. $30,000

L.E.W. CARTY Charitable Fund

– xCELLigence: monitoring cells in real time. $40,000

Flack Trust

– Ethovision video tracking system for remote monitoring rodent behaviour. $30,000

Harold and Cora Brennen Benevolent Trust (Equity Trustees Limited)

– Tissue processing suite. $20,000

Harold Mitchell Foundation Health Travelling Scholarships

– Jemma Evans. $5,000
– Sarah To. $5,000

Donor - Ted Billson

– Discovery of disease markers (Agilent 3100 OFFGEL Fractionator). $15,000

Roche

– Real Time PCR machine.

Prince Henry's Institute Awards

TM Ramsay Fellowship

The TM Ramsay Fellowship was first established in 2007, from a bequest by the late Lady Ramsay as a perpetual memorial to her late husband, Sir Thomas Ramsay. The fellowship is a significant award, and enables us to attract a talented researcher to Australia to build on their career success.

– Dr Michelle Myers (2011-2012)

PHI Career Enhancement Award

– Joohyung Lee, Level 1 ($5,000 over two years)
– Kristy Brown, Level 1 ($5,000 over two years)
– Julian Quinn, Level 2 ($10,000 over two years)

Infrastructure support

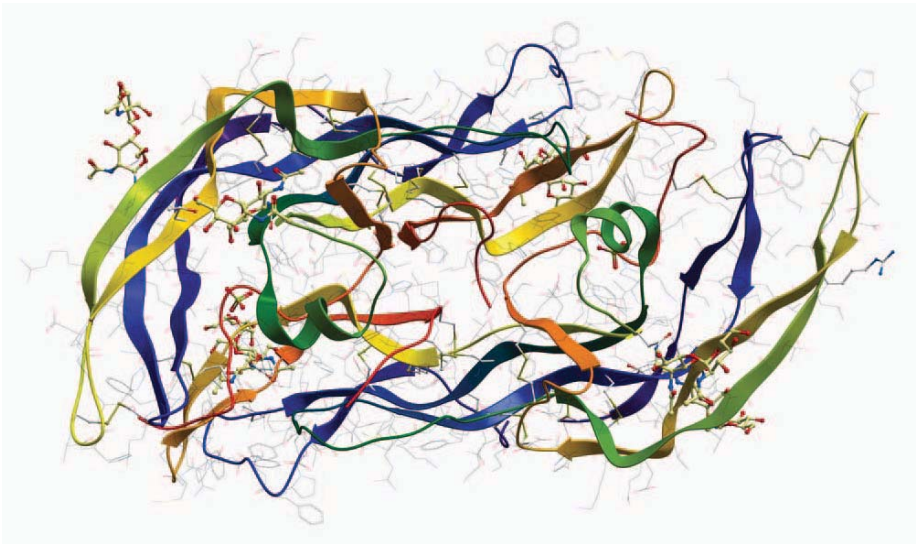
These funds support costs associated with infrastructure – from utilities, to support services, through to commercial and clinical translation of the institute's research endeavours, and equipment maintenance. Such support is not directly provided for by competitive grants.

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.

National Health and Medical Research Council

– 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

1/1/2011 - 31/12/2011

Director
Matthew Gillespie BSc (Hons) PhD

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

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

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

Research Advisory Group
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
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

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

Peter Stanton PhD
- Male Fertility Regulation

Kaye Stenvers PhD
- Reproductive Development & Cancer

Andrew Stephens PhD
- Ovarian Cancer Biomarkers

Morag Young PhD
- Cardiovascular Endocrinology

Co Laboratory 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
Evdokia Dimitriadis PhD

Craig Harrison PhD

Kristy Brown PhD

US Department of Defense Fellows
Kevin Knower PhD

Ashwini Chand PhD

Ramsay Fellow
Michelle Myers BSc (Hons) PhD

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

NAB OCRF Research Fellow
Andrew Stephens PhD

Witchery Research Fellow
Adam Rainczuk PhD

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

Kati Matthiesson MBBS FRACP PhD

Andrology Fellow
Le-Wen Sim MBBS (Hons), BMedSc

NHMRC Post-Doctoral Fellow
Karla Hutt PhD

NHMRC Principal Research Fellow
Peter Tipping BBiomedSc MBBS (Hons) PhD

NHMRC Senior Research Fellow
Guiying Nie PhD

NHMRC Early Career Research Fellow
Ellen Menkhorst PhD

Clinical Research Nurses
Marie Burley RN

Nicole Fairweather RN

Elise Forbes RN

Judi Hocking RN

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

Kati Meehan PhD (Until July)

Ellen Menkhorst PhD

Liza O'Donnell PhD

Julian Quinn DPhil MSc

Mai Sarraj MSc PhD

Helena Sim PhD

Research Officers
Mohamad Aljofan PhD (until June 2011)

Sara Al-Musawi BSc (Hons) PhD

Kemperley Dynon BSc (Hons) PhD

Tracey Edgell BSc Hons PhD

Jemma Evans PhD

Stacey Jamieson BA/BSc (Hons) PhD

Olivier Latchoumanin PhD

Jason Liew BBiomedSc (Hons) PhD

Chantal Magne Nde PhD

Yogeshwar Makanji BAppSci (Hons) PhD (until Jan 2011)

York Ng PhD

Sarah Paule PhD

Jyothsna Rao PhD

Amanda Rickard PhD (until February 2011)

Nana Saleh PhD (until Aug 2011)

Harmeet Singh MSc PhD

Preetinder Singh PhD

Stefan Sonderegger MSc PhD

Kelly Walton PhD

Senior Research Assistants
Maria Alexiadis BSc (Hons)

Francine Brennan BSc (Hons)

Maria Docanto BSc (Hons)

Ruth Escalona BSc (Hons) MSc

Caroline Foo BAppSc

Ileana Kapic BAppSc (Hons)

Ming Yee Lee BBiomedSci BSc(Hons) (until Jan 2011)

Ying Li BSc GDipMicroBio

Yao Wang BSc

Yizhou Yao MD

Senior Technical Assistant

Anthony Sutherland (until June 2011)

Research Assistants

Georgia Balourdos BSc (Hons)
Karen Chan BAppSc
Karen (Ying Jie) Chua BBiomediSci (Hons) (Until October)
Pei Leng Chong BSc (Hons) (until Feb 2011)
Elizabeth Fletcher BSc (Hons)
Jessica Gathercole BSc (Hons)
Lauren Hare BA/BSc (Hons)
Guy Harris MSc
Sophy Heng BSc (Hons)
Kerrie Herridge BSc (Hons) (Until Nov)
Cassandra Hincks BSc (Hons)
Tamara Howard BA/BSc (Hons)
Emily Kelly BSc (Hons)
Natalie Lane BSc (Hons)
Virginia Lay BSc (Hons)
James Morgan BSc (Hons)
Peter Nicholls BBiomedSc (Hons)
Enid Pruysers
Michelle Puryer BSc (Hons)
Janelle Ryan BSc MSc
Maggie Soliman BSc (Hons) (until Dec 2011)
Alex Umbers BSc (Hons)
Amy Winship BSc (Hons)
Wendy Yang MBioMedSci (from Oct)
Joanne Yap BSc (Hons) MCE
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)

Development & Commercialisation Services Manager

Andrew McCallum BE (Met) MEngSc GAICD

Laboratory & Technical Services Manager

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

Marketing & Communications Manager

Lyn Moorfoot EMFIA, Dip. T, Dip. OpMusTh (until July)

Accounts Officer

Jennifer Watson

Biomedical Engineer/ Laboratory Technician

Bruce Watson DipEng (until 22 Aug)
Leon Moussa BSc (Med Sci) Hons, PhD (from Oct 2011)

Grants and Education Officer

Neil Owens PhD

Graphic Communications

Sue Panckridge DipArt

Human Resources Officer

Christina Matisons MAHRI, Prof DipHR

HR/Payroll Officer

Lesley Bowyer

Laboratory Support Officer/Technician

Hsien Teh BSc (Hons)

Marketing and Communications Officer

Laura Watson BA Prof Writing (From May)

OH&S Officer

Ganeema Tokhi MPhil

Purchasing and Facilities Officer

Henry Wos

Sequencing Manager, The Gandel Charitable Trust Sequencing Centre

Vivien Vasic BSc

Executive Assistant

Diane Yallop (until Feb)
Roseline Acker (from March)

Personal Assistants / Administrative Officers

Dianne Arnold BSc
Jeanette Birtles BSc (Hons)
Sue Elger
Jacqueline Harrison
Claudette Thiedeman
Jeana Thomas

HONORARY APPOINTMENTS & COMMITTEES

PHI Fellows

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

Dr Nuzhat Ahmed
Women's Cancer Research Centre, Royal Women's Hospital, Melbourne, Victoria

Professor John Aitken
Director, ARC Centre of Excellence in Biotechnology & Development, University of Newcastle, New South Wales

Professor John Bertram
Head, Department of Anatomy & Developmental Biology, Faculty of Medicine, Nursing & Health Sciences, Monash University, Victoria

Professor Iain Clarke
Chairman, Department of Physiology, Monash University, Victoria

Associate Professor Timothy Cole
Dept of Biochemistry & Molecular Biology, Faculty of Medicine, Nursing & Health Sciences, Monash University, Victoria

Professor David de Kretser AC
The Governor of Victoria (Until 7 April 2011)
Distinguished Professor
Centre for Reproduction and Development, Monash Institute of Medical Research

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

Professor David Healy
Chair, Department of Obstetrics and Gynaecology, Monash University, Victoria

Associate Professor Tom Jobling
Chairman, Ovarian Cancer Research Foundation

Associate Professor Jeff Kerr
Department of Anatomy & Developmental Biology, Faculty of Medicine, Nursing & Health Sciences, Monash University, Victoria

Professor Gab Kovacs AM
International Medical Director, Monash IVF, Victoria

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

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

Associate Professor Moira O'Bryan
Department of Anatomy & Developmental Biology, Faculty of Medicine, Nursing & Health Science, Monash University, Victoria

Dr Luk Rombauts
Monash IVF, Victoria

Professor Ian Smith
Deputy Dean, Research, Monash University, Victoria

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

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

Honorary Research Associates
Dr Wah Chin Boon
Dr Tu'uhevaha Lino
Dr Davina Cossigny
Dr Natalie Hannan
Mrs Jeana Thomas
Ms Vivien Vasic

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)
Professor Matthew Gillespie
Mr Ronnie Atlas
Mr David English
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:
Ms Jay Bonnington (Chair) (until Nov)
Mr Stuart Alford (Chair) (from Nov)
Ms Jane Bell
Dr Bob Edgar
Ms Carmel Mortell
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 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:
Andrew Stephens (Chair)
Ms Stacey Jamieson
Dr Kevin Knower
Dr Neil Owens
Dr Mai Sarraj
Professor Evan Simpson
Ms Vivien Vasic

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)
Dr Steve Bouralexis
Dr Colin Clyne
Dr Peter Fuller
Dr Joohyung Lee
Dr Neil Owens
Dr Adam Rainczuk
Dr Kaye Stenvers

Information Communication Technology Committee

This committee supports PHI in developing and maintaining ICT infrastructure and resources.

Members:
Dr Steve Bouralexis (Chair)
Dr Stefan Bagheri-Fam
Dr Colin Clyne
Ms Stacey Jamieson
Dr Guiying Nie
Ms Sue Panckridge

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:
Kaye Stenvers (Chair), Anthony Argentaro, Stefan Bagheri-Fam, Maree Bilandzic, Pascal Bernard, Steve Bouralexis, Kristy Brown, Henry Burger, Ashwini Chand, Simon Chu, Colin Clyne, Eva Dimitriadis, Ann Drummond, Jock Findlay, Peter Fuller, Matthew Gillespie, Vince Harley, Craig Harrison, Karla Hutt, Vicky Kartsogiannis, Joohyung Lee, Rob McLachlan, Sarah Meachem, Katie Meehan (Secretary), Ellen Menkhorst, Guiying Nie, Liza O'Donnell, Neil Owens, Julian Quinn, Adam Rainczuk, David Robertson, Lois Salamonsen, Mai Sarraj, Evan Simpson, Peter Stanton, Andrew Stephens, 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),
Professor Matthew Gillespie
Dr Peter Stanton

Invitees:
Dr Neil Owens
Dr Kelly Walton

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)
Dr Steve Bouralexis
Ms Francine Brennan
Ms Cassie Hinks
Ms Emily Kelly
Ms Ileana Kuyznierewicz (HSR)
Ms Janelle Ryan
Ms Ganeema Tokhi
Mrs Roseline Acker (Secretary)

OGTR Committee

This committee ensures that the research conducted within, and the facilities of the Institute are within the framework of the Gene Technology Act 2000 that relates to regulations for genetically modified organisms.

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

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 (Chair)
Professor Peter Fuller
Professor Jock Findlay
Professor Vincent Harley
Professor Rob McLachlan
Dr Guiying Nie
Assoc. Professor David Robertson
Professor Lois Salamonsen Professor Evan Simpson

Student Welfare Committee

The role of the Student Welfare Committee is to support students in both research and non-research related matters.

Members:
Dr Kristy Brown (Chair)
Dr Kelly Walton
Dr Neil Owens
Dr Stacey Jamieson
Daniel Czech
Dr Colin Clyne
Professor Vincent Harley

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)

PHI IN THE COMMUNITY

Community engagement is vital to increasing understanding of translational medical research and its role in protecting health and wellbeing through improved diagnosis, treatment and prevention of disease.

Engaging with the business community

PHI's Foundation Committee brought the world of medical science to Melbourne's business community with the launch of their Discovery Dinner series in August, 2011.

Sponsored by Tata Consultancy Solutions (TCS) Australia and New Zealand, the series aims to increase the Institute's corporate profile by introducing PHI and medical research to the world of business. Highlighting PHI's research excellence, the dinners are an opportunity for high profile business executives to learn more about the impact of research on the future of Australia's health and the need for community and corporate investment to deliver much needed clinical breakthroughs.

Focusing on men's health, the launch attracted over fifty high profile corporate guests including, the partner of the Prime Minister Julia Gillard, Mr Tim Mathieson and the Mayor and Deputy Mayor of Monash. PHI Research Fellow and Clinical Andrologist, Dr Carolyn Allan spoke at the dinner, providing an overview of PHI's men's health research program and her own investigation into the benefits of testosterone replacement in obese older men. ABC journalist, Barrie Cassidy's interview with Mr Mathieson about Men's Sheds and life as the 'first bloke' was also a highlight.

The series will continue in 2012, with a women's health dinner to be held in March followed by further dinners throughout the year.

PHI Pedals for Research

In 2011, team PHI participated in their sixth Murray to Moyne Cycle Relay. Under the leadership of Mr Andrew McCallum, a team of PHI staff joined forces with executives from Davies Collison Cave to complete the challenging 520km relay in just 24 hours and raise funds for much needed research equipment. This year, the team raised $23,000 towards the purchase of the xCelligence TDP, which provides real time sequencing and is critical for research at PHI.

The ride is one of the state's premier cycling and fundraising events, with thousands of researchers, health workers and community members united in their quest to improve health care for Australians. Competing since 2006, the event continues to be a successful

During 2011, our researchers worked alongside the PHI Foundation Committee to further build the Institute's profile and increase awareness of our research priorities and achievements.

fundraising platform for PHI, with the team and their sponsors raising more than $150,000 to fund new equipment purchases.

Raising awareness and public support for ovarian cancer

PHI's Ovarian Cancer research program is funded by the Ovarian Cancer Research During 2011, our researchers have continued to work with the OCRF to increase awareness of ovarian cancer and raise much needed funds to ensure this vital research can continue. Throughout the year, members of the Ovarian Cancer Biomarkers Laboratory provided scientific expertise at a range of community, business and education functions, as well as assisting with key fundraising campaigns such as the NAB Silver Ribbon Appeal.

Media engagement

PHI continues to foster a strong relationship with local, national and international media, enabling researchers to promote key discoveries and achievements and further engage with the community.

PHI enjoyed radio, newspaper and television coverage of its research excellence throughout 2011. Media coverage of the Victorian Premier's Award for Research Excellence 2011 included Dr Amanda Rickard's commendation for her research into the underlying causes of cardiovascular disease. A number of major outlets ran stories on the awards, including The Age and local media. PHI's L'Oreal Paris Research Fellow, Dr Simon Chu was featured in the Australian Women's Weekly's follow up to their 2010 feature on Ovarian Cancer and the search for an early detection test. PHI's Ovarian Cancer research also featured on channel 10 news panel program, The Project. PHI had a strong presence on ABC radio, with PHI Research Fellow and Clinical Andrologist, Dr Carolyn Allan, featured in a number of interviews focusing on men's health issues throughout the year.

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 their primary source of news and information. PHI recognises the importance of harnessing existing and emerging communication platforms to maximise community engagement. Throughout 2011, PHI has continued its efforts to integrate social media with existing communication tools such as our website and newsletters.

Community support of clinical research

Community investment is vital to the continuation of vital research programs at Prince Henry's Institute. Without the support of a strong donor base and corporate sponsors, the translation of our research into improved health care and treatments would be impossible. The willingness of community members to join our clinical studies and trials is also vital to the success of our research initiatives. Over 600 women have now donated to our clinical tissue donation programs in Melbourne and Sydney, which play a vital role in our ongoing quest to develop an early detection test for ovarian cancer.

Researchers in the community

PHI researchers remained active in school education initiatives, which 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 (ASMR) education program.

Scientists in the Community

Ashwini Chand
- Victorian Cancer BioBank Access Committee (Southern Health Representative)

Karla Hutt
- Scientists in Schools

Kevin Knower
- CSIRO Scientists in Schools, Mossgiel Park Primary, Endeavour Hills, VIC

Robert McLachlan
- Public lectures, press and TV exposure as director of andrology Australia highlight contemporary issues in male health
- Lecture to trainees and GP about men's health

Ellen Menkhorst
- Scientists in Schools (Ruyton Girls School)

Michelle Myers
- ASMR Career Symposium Panellist

Mai Sarraj
- Scientists in Schools

Andrew Stephens
- OCRF Sponsors Forum, KPMG
- Launch of the 2011 NAB "Silent Card" campaign and NAB TV interview
- Interview, "The 7pm Project"

Morag Young
- Invited Seminar Department of Cardiovascular Medicine, Glasgow University, UK

Discovery Dinner: Guest speakers (L - R): Mr Barrie Cassidy, Dr Carolyn Allan and Tim Mathieson

Ride 4 PHI team, 2011

Our sincere thanks to all those who have and continue to so generously support medical research at Prince Henry's Institute. We also thank the PHI alumni for their ongoing loyalty and support.

PHI acknowledges and thanks the many generous donors who have supported us throughout 2011. Through your gifts, big and small, you have made a significant contribution towards the future health of all Australians.

In 2011, we continued to receive a high level of donor support through our regular appeals, Ride 4 PHI and the launch of the PHI Discovery Dinner series. Funding from these appeals has assisted us to purchase major equipment and accelerate and expand research programs that would otherwise go unfunded. Without continued community investment, we would not be able to progress vital our vital research into the role of hormones in the diagnosis, treatment and prevention of diseases such as cancer, cardiovascular disease, obesity, Parkinson's disease, osteoporosis and reproductive health. By supporting PHI you are making a significant contribution to the future health and wellbeing of all Australians.

Thank you.

Major donors

Mr Harry Anderl
Mrs (Eva) Jean Armstrong
Mrs Alice Barke
Mr John Bate
Mr Peter Best
Mr Edward Billson
Mr Bob Boucaut
Miss Margaret Bowman
Professor Henry Burger
Mrs Florence Clarridge
Professor David Copolov
Mrs Heilala Courtice
Miss Joan Covey
Mrs Joan Cowan
Mr Stephen Cox (Trevillian Signs)
Mrs Joan Donaldson
Mrs Patricia Donges
Dr EH and Mrs S Ehrmann
Mr Kurt Eppinger
Professor Peter Fuller
Mr Russell Fynmore AO
Professor Matthew Gillespie
Mrs Winifred Gould
Mrs Judith Hedstrom
Dr Mark Hurley
Mr Barry Jolley
Mr James Jones
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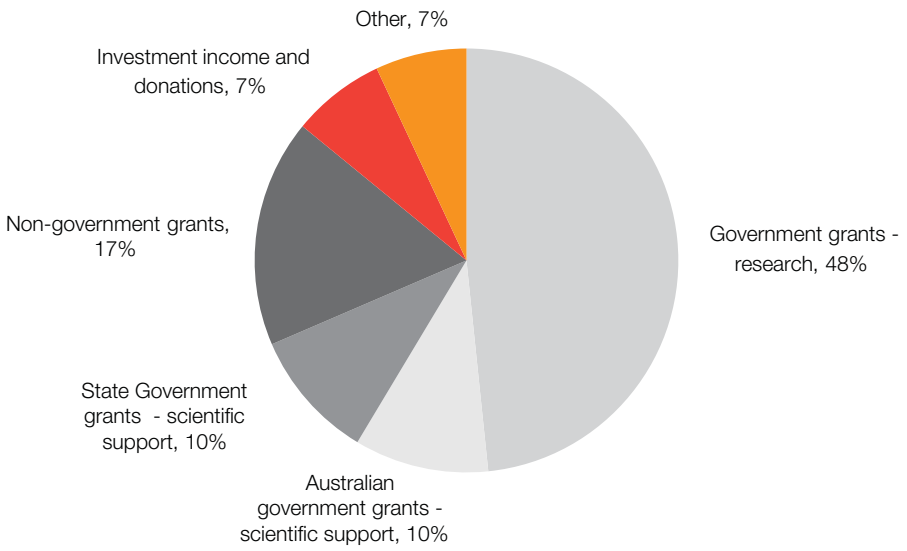
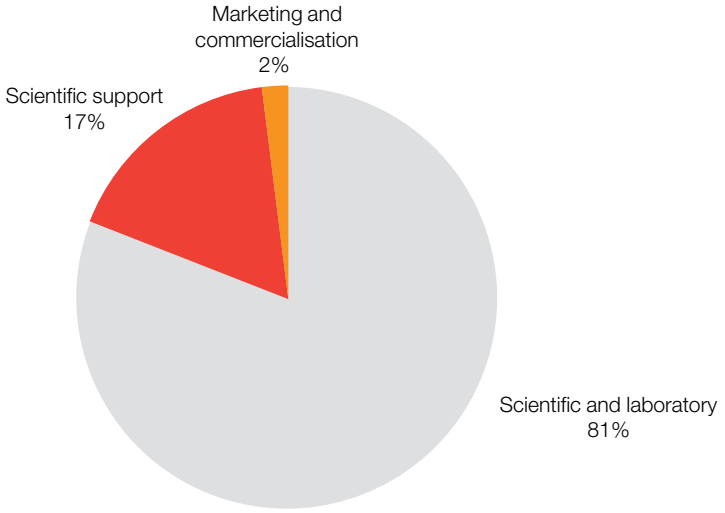
FINANCIAL YEAR AT A GLANCE

Income



Expenditure



The year in brief	2011	2010
Income for research	9,275,194	8,330,958
Income for scientific support	2,848174	2,646,124
Investment income and donations	1,005,781	1,572,491
Other income	983,831	500,987
Expenditure on research	11,115,691	10,202,789
Expenditure on scientific support	2,348,821	1,879,732
Total surplus	648,468	968,039
Number of NHMRC fellows	9	8
Number of staff	170	156
Number of students	43	49
Number of PhD students	24	31
Capital expenditure	214,124	937,196

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

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Invest in a healthy future by becoming a Prince Henry's Institute donor today. The support of individuals, community groups and businesses plays a vital role in ensuring our researchers can continue to access the equipment, resources and support they need to improve quality of life for all.

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Named Funds

Capital donations or named funds are a vital component of the Institute's funding mix. Named funds, such as a fellowship, scholarship or award, are a great way to honour a loved one or gain recognition for a business or community group. For more information or to set up a named fund, contact Prince Henry's Institute on (03) 9594 4372.

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Make a difference beyond your lifetime by making a bequest to Prince Henry's Institute. Bequests can be made in support of a specific area of research, to help fund a fellowship award or to assist with the purchase of research equipment. Call (03) 9594 4372 to request a copy of the Prince Henry's Institute bequests brochure.

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Invest in the future of Australia's health through medical research. PHI welcomes corporate support through donations, sponsorships, probono services and fundraising events. We welcome the opportunity to create a valued relationship that impacts so many lives.

Our Integrity

PHI operates on the mandate of ensuring that 100 per cent of proceeds from donations fund important research discoveries, cutting edge technologies and contribute to the education of our students who are our future. In all we do, we strive to ensure that your support makes the difference you intended.

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: reception@princehenrys.org

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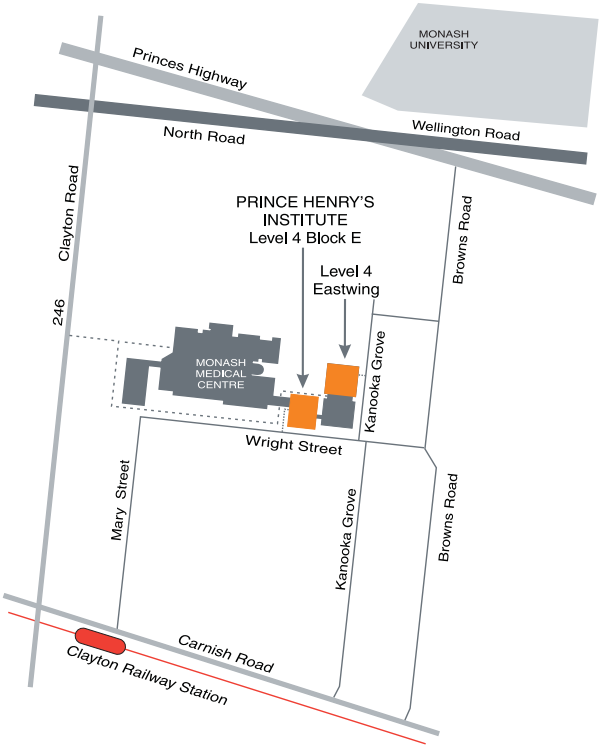

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