

A microscopic view of numerous cells, likely oocytes or sperm, arranged in a grid-like pattern. The cells are circular with a prominent nucleus and are set against a dark blue background. The text is overlaid on the right side of the image.

discovery


ANNUALREPORT06

research

innovation



MONASH INSTITUTE
OF MEDICAL RESEARCH



As a major medical research institute,
MIMR will enhance human health and
the quality of life by major research,

VISION

innovation and discovery in biology,
medicine, biotechnology and health
services research.

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HISTORY

Founding Director, Emeritus Professor David de Kretser AC, established the Monash Institute of Reproduction and Development (as it was originally known) in 1991. This organisation brought together scientists and clinicians undertaking research into conception, birth and development at the Centre for Early Human Development, Monash Medical Centre, with scientists working in the field of male reproductive health at Monash University's Department of Anatomy. With a small team of about 70 and an annual budget around \$4 million, the Institute was initially located in various laboratories throughout the Monash Medical Centre.

Over the years the Monash Institute of Reproduction and Development (MIRD) grew into five key research centres working in a broad range of fields. In 1999 it moved into its first purpose-built facility, enabling thousands of Australians, including infertile young people, parents of premature babies, and men with prostate cancer, to benefit from Institute scientists' research.

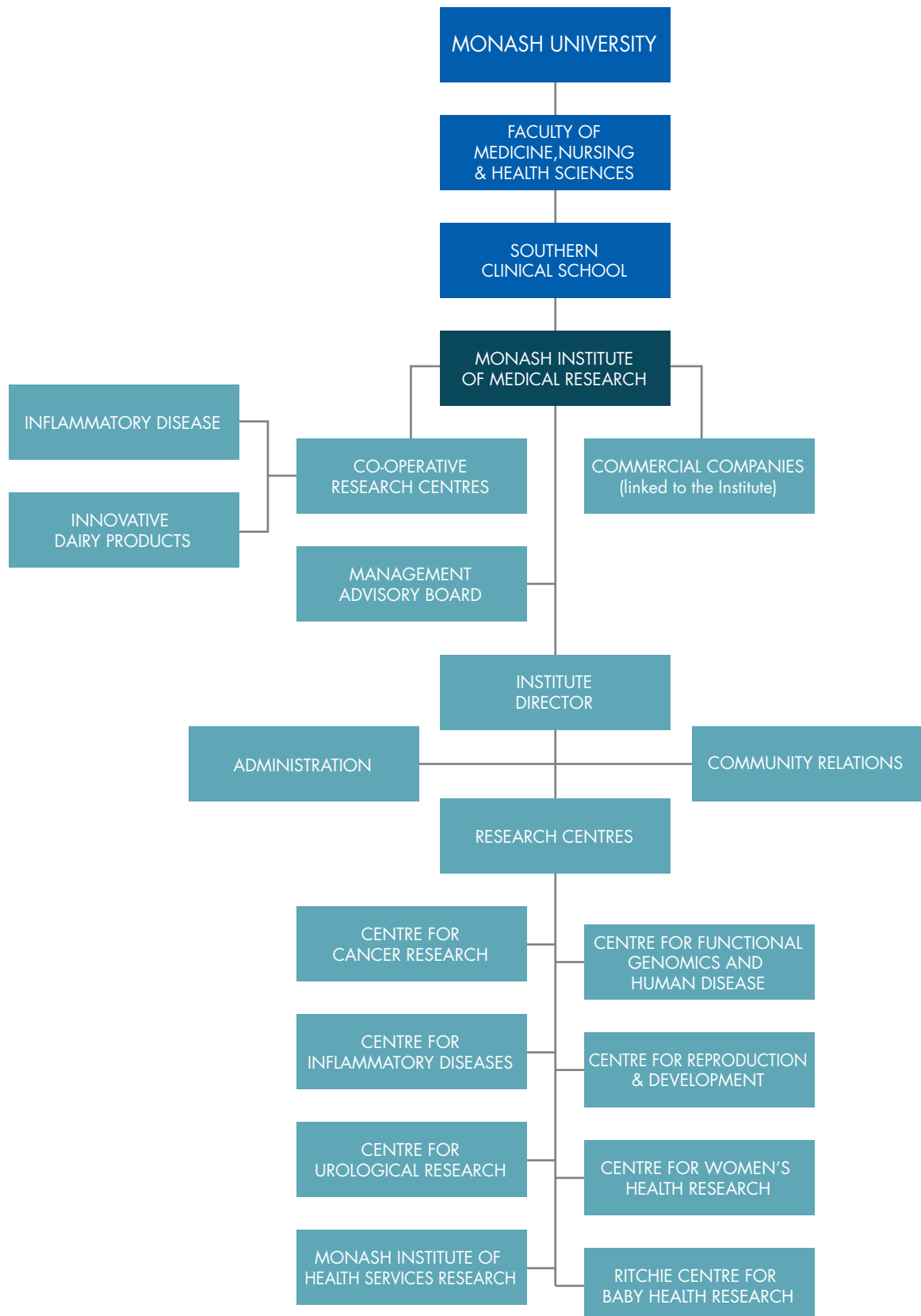
Recognizing that its research had evolved beyond reproduction and development, MIRD became Monash Institute of Medical Research (MIMR) on 1 February, 2005. Key medical research entities of Monash University and Southern Health joined forces with the existing team of researchers and clinicians to collectively take their valuable biomedical discoveries through all stages of development to commercial reality.

Today, MIMR comprises seven research centres and one affiliated Institute, and more than 400 scientists and students.

Throughout its relatively short but dynamic history, the Institute has enjoyed the patronage of former Australian Governor General Sir Zelman Cowen AK, GCMG, GCVO. In 2006, the Institute was honored to welcome Monash University Vice Chancellor, Professor Richard Larkins AO as co-patron. The Director and Executive Team are also supported by a Management Advisory Board comprising leading members of the community and representatives from the education and health sectors.

Professor de Kretser retired as Institute Director in 2005, following which he was appointed the Governor of Victoria. In January 2006, a new era for the Institute began, when Professor Bryan Williams officially commenced as the new Director of MIMR. Upon his arrival, Professor Williams, one of America's highly regarded cancer experts, established the Institute's eighth Centre, the Centre for Cancer Research. The next exciting next phase of MIMR's research excellence has begun.

ORGANISATIONAL STRUCTURE



DIRECTOR'S MESSAGE

My first year as Director at the Monash Institute of Medical Research has proved challenging and exciting. I am grateful for the support of Institute scientists and staff and members of the Management Advisory Board who helped ensure my smooth transition.

In addition to assuming the helm as Institute Director, I established the Centre for Cancer Research and introduced centralised core services to underpin the Institute's diverse research activities. Creating a new research group meant ensuring a seamless transition for my team from Cleveland, USA to Melbourne. In our first year, the Centre was successful in the 2007 National Health and Medical Research Council funding round. In our first 12 months, we have established dynamic collaborations, both within MIMR and with the wider Melbourne research community.

As a member of the Faculty of Medicine, Nursing and Health Sciences Executive Committee, I received a rapid introduction to Monash University's organizational structure and Faculty business operations. Membership of the Research Working Group for the Victoria Cancer Agency (VCA) and concurrent membership of the VCA's Steering Committee also informed me about the State's research policies. The VCA is responsible for co-ordinating cancer research activity across Victoria, as well as connecting cancer research and services, improving cancer survival and reducing the costs associated with ineffective treatments. Of special importance for the development of our cancer programs at MIMR, the VCA supports breast and prostate cancer research.

At the beginning of 2006, MIMR moved into a new research facility, which we share with our Monash Health Research Precinct partners. This first stage of our building plan has relieved some severe overcrowding, but it has not given us the office and laboratory space to recruit new researchers or to consolidate Precinct research teams. Consequently, we have spent considerable effort this year the further expansion of our facilities. A proposal for funding support has been submitted for consideration to the State and Federal Governments with the express goal of building a new facility that will allow research activities to flow from the bench to bedside and back, ultimately improving health care for all.

Clearly, we will need significant philanthropic support to achieve our ambitious goals. With this in mind, we are focusing our fundraising efforts in three areas: women's health, men's health and early human development. Through the Development Office, formal requests have been made to different philanthropic organizations for support, and I am very pleased with the response we have received so far. In addition, we have established the MIMR Patrons Club under the leadership of Advisory Board member Robert Smorgon. In less than 12 months, we already have more than 40 members.

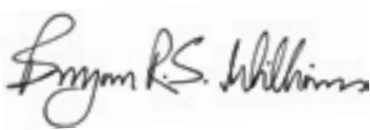
Over the past year, several discoveries made at MIMR have made national and international headlines. These include advances in stem cell biology with the growth of human prostate tissue in the laboratory; the rapidly expanding field of RNA interference and its development for combating virus infections and cancer, and new advances in our understanding of bladder cancer and cancer metastasis. These and other advances are highlighted in more detail in the Annual Report, and illustrate how our research is having a major impact on different areas of human health.

Professor Adrian Walker retired as MIMR Executive Director and Member of the Advisory Board. Adrian was a dedicated founding member of the Institute and his support has been invaluable throughout my first year. Professor Michael Holland, Director of the Centre of Reproduction and Development, will commence as Deputy Institute Director at the start of 2007.

Change also occurred at a Faculty level when Professor Edward Byrne AO, Dean of the Faculty of Medicine, Nursing and Health Sciences, announced his decision to take up the role of Executive Dean of the Faculty of Biomedical Sciences and Head of the Medical School at University College, London. Ed's four years as Dean have created a lasting legacy of excellence in medical-based research and education at Monash University. We are grateful that he will remain a member of the Advisory Board, despite moving to the United Kingdom.

As my first year as Institute Director draws to a close, the honour and privilege I felt when I was offered this position has only increased.

More than ever, I can see and appreciate the talent of our scientists, and the enormous potential we have as a medical research institute to make our mark on the international biomedical stage.

A handwritten signature in black ink, reading "Bryan R.S. Williams". The signature is written in a cursive, flowing style.

Bryan Williams
Institute Director



CHAIRMAN'S MESSAGE

January 2006 was the beginning of a new era for MIMR with the arrival of Institute Director, Professor Bryan Williams. Bryan is a cancer biologist of international acclaim, and we are all privileged to benefit from his 30 years of research expertise. In his first year, Bryan has made his mark both as an inspirational leader and as a scientist. I know the Board is looking forward to this relationship developing further in the years ahead.

Recognition must be given to MIMR's Founding Director, Emeritus Professor David de Kretser AC who was appointed the 28th Governor of Victoria in January. David's background as a medical practitioner, scientist, husband and father enables him to provide exemplary leadership, guidance and advice to the people of Victoria.

As the Institute continues to grow and evolve, so does its governance team. At the end of 2006, Professor Adrian Walker retired from his role as Executive Director of the Institute and Advisory Board Member. Adrian has been an Advisory Board Member for 16 years, and with David de Kretser, played a significant leadership role in the Institute's early days and evolution. Professor Michael Holland has assumed the position of Deputy Director of MIMR.

Dr James Murray's direct involvement with MIMR concluded with his retirement at the end of the year. James has been involved with the Institute for 14 years. As an Advisory Board Member and then Chairman, he played a major role in all facets of the Institute's growth. My own decision to join the Advisory Board was largely due to James' enthusiasm for medical research and, in particular, MIMR.

Bruce Parncutt and Anne Heyes also retired from the Advisory Board. During their time as members, they both made a large contribution to the Board and provided thoughtful, insightful viewpoints. On behalf of the Board, I thank all retiring members for their involvement.

Towards the end of the year, MIMR's Management Advisory Board was expanded and strengthened. It will provide guidance to the new medical research institutes, within the Faculty of Medicine, Nursing and Health Sciences, established by the University. This has the potential to provide enormous

opportunities for collaboration and the sharing of resources, essential requirements for successful research.

MIMR's fundraising program during 2006 was largely focussed on the planned new building which, by 2009, will adjoin the current Monash Health Research Precinct building development. The new building will provide 8000 square metres of state-of-the-art laboratories, as well as the space and resources to undertake onsite clinical trials. This will truly take our scientific discoveries from the bench to bedside, all under the one roof.

This year saw the inception of the Institute's Patrons' Club; developed by Advisory Board Member Robert Smorgon. At the end of the year, 40 Patrons had joined and now receive regular communications and research updates. We intend to hold the inaugural Patrons' Club Dinner in 2007. This will provide valuable networking opportunities for members as well as the opportunity to meet the scientists.

In closing, I would like to thank my fellow Board Members, Centre Directors, staff and students for their dedication and effort during 2006. To play a role, however small, in the groundbreaking research our Institute is world-famous for is a stimulating and rewarding experience. There are challenges ahead, but the goal is definitely worthwhile.



George Pappas

Chair, Advisory Board



GOVERNANCE

MANAGEMENT ADVISORY BOARD

**Chair: Mr George Pappas**

Senior Advisor, The Boston Consulting Group

Chair, Committee for Melbourne

Director, Western Bulldogs Football Club

**Deputy Chair
(January-September):
Ms Barbara Crook**

Chief Executive Officer, Hunt and Hunt

**Deputy Chair
(September-December):
Mr Rod Chadwick
(joined September 2006)**

Former Director, Managing Director and Chief Executive Officer, Pacific Dunlop Ltd

Advisory Board Member for Australia and New Zealand, Oracle Corporation

National Deputy President, Australian Industry Group

**Professor Nick Birrell
(joined September 2006)**

Professorial Fellow, Monash University Faculty of Medicine, Nursing & Health Sciences

Venture Executive, Innovation Capital

Founder and former Chief Executive, Credit Suisse Asset Management Australia

**Professor Edward Byrne AO**

Dean, Faculty of Medicine, Nursing and Health Sciences, Monash University

Non-Executive Board Member, Cochlear Pty Ltd

Board Member, Neurosciences Australia Pty Ltd

Deputy Chair, Neurosciences Victoria Pty Ltd

Governor, BHP Billiton Trustees

**Sir Roderick Carnegie AC
(joined September 2006)**

Former Managing Director, Chief Executive and Chairman of CRA Limited (Rio Tinto)

Fellow of Trinity College, Melbourne

Patron, Australian Centre for Blood Diseases

**Professor Edwina Cornish**

Deputy Vice Chancellor (Research), Monash University

Fellow, Australian Academy of Technology Sciences and Engineering

Director, Victorian Partnership for Advanced Computing

Former member, Prime Minister's Science and Research Council, ARC Board and CRC Committee

**Mr Jerry Ellis
(joined September 2006)**

Chancellor, Monash University

Chairman, Landcare Australia Limited

Chairman, Future Directions International

Past Chairman, Broken Hill Proprietary Company Limited (BHP)

Board of Trustees Member, Eisenhower Exchange Fellowships



**Mr David Evans
(resigned September 2006)**

Managing Director, JB Were Retail
Managing Director, Equity Product Group,
Goldman Sachs JB Were



**Mr Michael Gorton AM
(resigned May 2006)**

Partner, Russell Kennedy Solicitors
Deputy Chair, Infertility Treatment Authority
President, Health Services Review Council
Chair, Victorian Biotechnology Ethics
Advisory Committee
Representative of the Minister for Health
on the Management Advisory Board



**Ms Anne Heyes
(resigned July 2006)**

National Human Resources Manager,
Australian Red Cross Blood Service



**Dr James Murray
(retired December 2006)**

Consultant, Blake Dawson Waldron



**Dr Hugh Niall
(joined September 2006)**

Executive Director, Founding Director and
past Chief Executive Officer, Australian
Stem Cell Centre
Former Chief Executive Officer, Biota
Chairman of the Diabetes Vaccine
Development Centre
Associate Professor, Medicine, Harvard
University Department of Medicine,
Massachusetts General Hospital, Boston,
USA



**Mr Bruce Parncutt
(resigned March 2006)**

Principal, Lion Capital
Director, Vision Systems Ltd
Council Member, Melbourne
Grammar School
Trustee, National Gallery of Victoria



**Mr David Pitt
(joined September 2006)**

Vice President, Finance & Chief Financial
Officer, Monash University
Fellow of the Australian Institute
of Company Directors
Member, Association of Superannuation
Funds of Australia
Former Director, Strategic Projects, Telstra



Mr Robert Smorgon

Deputy Chair, Escor Pty Ltd
Director, Australian Council for Children
& Youth Organisations Inc
Chair, MIMR Patrons' Club

GOVERNANCE



**Ms Linda Sorrell
(resigned September 2006)**

Chief Executive, Southern Health
Board Member, Monash Institute of Health
Services Research
Board Member, Prince Henry's Institute
Chair, HealthSMART Services Steering
Committee, State Government of Victoria



**Mr Robert Thomas
(joined September 2006)**

Senior Advisor, Citigroup Australia
& New Zealand
Chairman, Heartware Limited
Chairman, Australian Wealth
Management Ltd
Board Member, Virgin Blue Ltd
Chairman, Security and Derivatives
Industry Association



**Professor Adrian Walker
(retired December 2006)**

Executive Director, Monash Institute
of Medical Research
Director, Ritchie Centre for Baby Health
Research, Monash Institute
of Medical Research



**Dr Craig White
(resigned September 2006)**

Executive Director Clinical Services and
Chief Medical Officer, Southern Health



Professor Bryan Williams

Director, Monash Institute of
Medical Research
Director, Centre for Cancer Research,
Monash Institute of Medical Research
Chair, Southern Health Research
Advisory Group
Member, Ministerial Taskforce for
Cancer Research Working Group



**The Hon Michael Woolridge
(joined September 2006)**

Chair, Neurosciences Australia
Professor, Monash University Faculty of
Medicine, Nursing and Health Sciences
Chairman, Ministerial Advisory Committee
on AIDS, Sexual Health and Hepatitis
Former Commonwealth Minister for Health

PATRONS



**Sir Zelman Cowen
AK, GCMG, GCOV**

Governor General of Australia
1977 – 1982



Professor Richard Larkins AO

Vice Chancellor and President,
Monash University

A photograph of a scientist in a white lab coat looking through a microscope. The image is overlaid with a semi-transparent teal gradient. A white rectangular box is positioned over the center of the image, containing the word "RESEARCH" in white capital letters. The microscope is a light blue Olympus IX71 model, and a computer monitor is visible in the background.

RESEARCH

RESEARCH HIGHLIGHTS

INTERFERING WITH RNA INTERFERENCE

The spread of viruses throughout the body is normally blocked by RNA interference (RNAi), a naturally occurring process in the body that targets specific proteins responsible for spreading viruses by interfering with the translation of a gene.

Professor Bryan Williams, Institute Director and Director, Centre for Cancer Research, leads a team that has exploited this process by creating short interfering RNA (siRNA) that can be developed into drugs to block viruses. Biotech companies are incorporating Professor Williams' siRNA discovery to undertake clinical trials. If successful, they will accelerate the development of siRNA-based drugs that block the multiplication of viruses and possibly even cancer.

More information: Marques JT *et al* (2006) A structural basis for discriminating between self and nonself double-stranded RNAs in mammalian cells. *Nat Biotechnol.* May;24 (5):559-65.

STOPPING THE SPREAD OF BLADDER CANCER

Bladder cancer is one of the most common cancers in Australian men, but due to the rapid rate of metastasis, invasive bladder cancer patients have less than 50% chance of surviving more than five years.

Dr Elizabeth Williams, Senior Scientist with the Centre for Cancer Research, leads a collaborative team that discovered a group of growth factor receptor molecules in animal bladder cancer tissue samples, and identified the role they play in cancer metastasis. Their research also confirmed that the transition of bladder cancer cells from an epithelial to a mesenchymal state plays a role in the growth of secondary tumors. As these molecules and processes also occur in the metastasis of breast, prostate and lung cancers, Dr Williams' research may be the key to developing therapeutics for a range of cancers, as well as diabetes and liver disease.

More information: Chaffer CI *et al* (2006) Mesenchymal-to-epithelial transition facilitates bladder cancer metastasis: role of fibroblast growth factor receptor-2. *Cancer Res.* Dec 1;66(23):11271-8.

A SINGLE PROTEIN MAY SAVE THOUSANDS OF LIVES

When a bacterial infection develops, a protein called Mal alerts the immune system to fight the infection. Once the infection has passed, another protein, SOCS1, 'tells' Mal to stop. If the message does not reach Mal, the normal inflammatory response snowballs and this can lead to severe sepsis or septic shock, conditions that kill more than 1400 people worldwide each day.

Director of the Centre for Functional Genomics and Human Disease, Professor Paul Hertzog and Senior Scientist, Dr Ashley Mansell, led a collaboration that discovered how SOCS1 can be manipulated to turn off this immune response by destroying Mal. Significantly, their discovery will only affect bacterial infections.

More information: Mansell A *et al* (2006) Suppressor of cytokine signalling 1 negatively regulates Toll-like receptor signalling by mediating Mal degradation. *Nature Immunology.* Feb;7(2): 148-55.

NEW FRONTIER FOR STEM CELL RESEARCH

In December 2006, the Federal Government voted to allow the creation of embryos using cell cloning technology for stem cell research. This decision opens up possibilities for scientists to develop new treatments for a range of debilitating diseases and conditions. It also allows Dr Paul Verma, Senior Scientist in the Centre for Reproduction and Development, to continue as a global leader in this area of medical research.

Dr Verma is recognized internationally for his somatic cell nuclear transfer (SCNT) and cell reprogramming research. These techniques could hold the key to the development of genetically matched tissue for patients suffering from heart, kidney and lung disease, as well as Alzheimer's and Parkinson's disease, spinal cord injuries and infertility. During 2006, Dr Verma worked with the Indian Government to establish a collaborative project based on this technology. The facilities supplied by the Indian Council of Medical Research, combined with Dr Verma's SCNT and cell reprogramming expertise, will expedite a rapid progression of human embryonic stem cell research in 2007 and beyond.

HUMAN PROSTATE TISSUE GROWN IN THE LAB

By surrounding human embryonic stem cells with prostatic mesenchymal cells, Professor Gail Risbridger and her team at the Centre for Urological Research have created a model to observe the factors that play a role in the development of prostate cancer and benign prostate hyperplasia. Healthy human prostate tissue equivalent to that of a 20-year-old man can now be grown in 12 weeks in vitro.

As their research progresses, the Centre for Urological Research team will study the effects specific 'messenger' cells have on embryonic stem cell growth. This may provide significant clues to develop new, more effective treatments for men suffering from prostate disease.

More information: Taylor RA *et al*, (2006) Formation of human prostate tissue from embryonic stem cells. *Nat Methods*. Mar; 3 (3): 179-81.

NEW INSIGHTS INTO BLOOD DISORDERS

Successful treatments of most cancers, including acute myeloid leukemia (AML) and non-Hodgkin's lymphoma (NHL), rely heavily on early detection. This depends on understanding how these diseases form, and identifying key disease markers. One marker that is increased in many cancers is STAT3, although how it becomes elevated is unknown.

Dr Brendan Jenkins, a Senior Scientist in the Centre for Functional Genomics and Human Disease, led a team that studied an altered form of a molecule called gp130 to learn more about how and why blood disorders develop. Using mouse models, the team discovered that the altered gp130 molecule increased the amount of STAT3 produced, leading to the onset of blood disorders mimicking AML and NHL. Dr Jenkins' exciting discovery provides the first evidence that alterations to gp130 can affect STAT3 production, and therefore provides scientists with key insights into the mechanisms of blood cancers and potential therapeutic targets.

More information: Jenkins, BJ *et al* (2007) Pathological consequences of STAT3 hyper-activation by IL-6 and IL-11 during hematopoiesis and lymphopoiesis. *Blood*. March 15. 109:2380-2388. Epub 2006 Nov 2.

'FAT AUSSIES' AIDING FERTILITY RESEARCH

Senior Scientist, Dr Moira O'Bryan and Dr Claire Kennedy, both from the Centre for Reproduction and Development, were part of a team that developed a new Alstrom syndrome mouse model, Fat Aussie, in which the ALMS1 gene contained a mutation. The mutant mice quickly become obese and hyperinsulinemic, conditions that commonly develop into type 1 diabetes. Male mice born with this mutation are infertile because they produce defective sperm.

Fat Aussie is the ideal research tool in which to study the metabolic and fertility defects associated with Alstrom syndrome, including appetite regulation, metabolic syndrome and spermatogenesis.

More information: Arsov *et al* (2006) Fat aussie – a new Alstrom syndrome mouse showing a critical role for ALMS1 in obesity, diabetes and spermatogenesis. *Mol Endocrinol*, Jul; 20(7): 1610-22.

HOPE FOR UTERINE FIBROID SUFFERERS

While more than 50 percent of women develop uterine fibroids, little is known about how and why these benign tumors develop. Director of the Centre for Women's Health Research, Professor Peter Rogers, led a team that compared gene expression profiles in normal uterine smooth muscle cells and fibroid cells, using tissue from women who had undergone hysterectomies. One hundred and twenty-eight genes were found to be different between normal myometrium (uterine wall) tissue and fibroid tissue.

The genetic analysis enabled scientists to identify a small group of fibroid genes that retain altered behaviour despite being grown in culture, suggesting that these genes may be of crucial importance for fibroid growth.

More information: Zaitseva M *et al* (2006) In vitro culture significantly alters gene expression profiles and reduces differences between myometrial and fibroid smooth muscle cells. *Mol Hum Reprod* 12 (3) 187-207.

RESEARCH HIGHLIGHTS

SLEEP RESEARCH TO BENEFIT INFANTS AND ADULTS

Research carried out in the Ritchie Centre for Baby Health Research by Associate Professor Rosemary Horne and PhD student Heidi Richardson showed that healthy babies' reactions to low-oxygen situations change from test to test; the response is particularly variable in dreaming sleep. Their findings highlighted the importance of repeatedly testing individual infants to be sure of their response. The infant's sleep phase also needs to be taken into account, as both breathing and arousal responses differ markedly between quiet and active sleep phases.

Scientists and clinicians in the Ritchie Centre have applied their sleep research to better understand sleep disorders that affect adults, such as obstructive sleep apnea (OSA). Repeated apnea episodes can lead to permanently elevated blood pressure levels and may increase the risk of heart disease and stroke. As OSA patients are generally middle-aged, overweight men, the condition places them at greater risk of coronary disease.

Director of the Ritchie Centre, Professor Adrian Walker and PhD student Garun Hamilton developed a new animal model to assess blood flow to the heart during sleep. It showed that blood pressure rises during an OSA episode, substantially increasing the workload on the heart and its blood flow needs. When endothelial cells (cells lining the coronary artery) are impaired, blood flow is abnormally slow, placing the heart at risk. These experiments suggest an explanation for the greater risk of chest pain and heart attacks during sleep disturbed by OSA.

More information: Richardson HL *et al* (2006) Variability of the initial phase of the ventilatory response to hypoxia in sleeping infants. *Pediatr Res.* May;59(5):700-4

Hamilton G *et al* (2006) A model of coronary artery endothelial dysfunction in the sleeping lamb. *Sleep Med.* Oct 7(7):573-9.

LOCATING STEM CELLS IN THE ENDOMETRIUM

Dr Caroline Gargett, Senior Scientist with the Centre for Women's Health Research, has identified adult stem cells in the human endometrium, which has far-reaching implications for many aspects of women's health research. However, scientists now need to accurately identify their specific location in order to maximize the cells' beneficial properties and determine their role in endometrial disorders.

PhD student Rachel Chan and Dr Gargett discovered two types of adult stem cells, epithelial and stromal, in mouse endometrium for the first time. Their research suggested that these stem cells may be responsible for the regeneration of the uterus during each menstrual cycle. Further research is being undertaken to understand how these cells function and what role they play in diseases such as endometriosis and endometrial cancer.

More information: Chan RW and Gargett CE (2006) Identification of label retaining cells in mouse endometrium. *Stem Cells* 24:1529-38.

CENTRE FOR CANCER RESEARCH

Director and Institute Director: Professor Bryan Williams

The Centre for Cancer Research was established in January 2006 under the leadership of Institute Director, Professor Bryan Williams. Scientists working in the Centre for Cancer Research are studying basic cancer biology in an effort to learn more about the growth and development of different cancers, and thus discover new approaches to cancer prognosis and therapy.

The team conducts its own research, collaborates closely with scientists throughout the Institute and across the Monash Health Research Precinct to share expertise and resources to further understand a range of cancers, including cancer of the breast, endometrium, ovary, stomach, prostate, bladder, kidney and testes.

Cancer, viruses and proteins

Everyone develops cancerous cells in their lifetime, but for the majority of us, our innate immunity is strong enough to fight the cancer invasion. Dr Anthony Sadler and his team are investigating kinase PKR, a protein that regulates the translation of genes into proteins. Kinase PKR is triggered by a viral infection and thought to have a role in tumorigenesis; a process regulated by the immune system. Dr Sadler is investigating how viruses elude the immune system, which will increase understanding of how cancer cells proliferate.



CENTRE FOR CANCER RESEARCH

Kidney cancer

Wilms tumor, a childhood kidney cancer, may hold the key to many of cancer's unanswered questions. Based on Professor Bryan Williams' internationally-acclaimed research, Dr Chris Butler is investigating the role two genes, WT1 and P53, play in its onset. Children born with a mutation in WT1 have a much higher chance of developing a range of cancers in later life. The P53 gene normally tells cells to stop growing, but if the gene is damaged, this message is turned off, allowing unhealthy cells to survive. Dr Butler is working with the only cell line in the world derived from Wilms tumor tissue that expresses the WT1 and P53 genes.

Cancer research and the common cold

The occurrence and progression of many diseases, including cancer, are profoundly affected by our primary innate immunity. Professor Bryan Williams has shown that short interfering RNA (siRNA) can activate innate immunity by RNA interference (RNAi). Professor Williams and Dr Michael Gantier are working with biotech companies to develop therapies based on RNAi for cancer and a range of viral infections. For more information about this research, refer to page 12.

Cancer metastasis

As ninety percent of cancer deaths are caused by metastasis of the primary tumor, new therapeutic strategies are needed. Dr Elizabeth Williams' team is investigating the interaction of prostate cancer cells with endothelial cells within the prostatic lymphatic system. Breast cancer also commonly spreads to the lymphatic system. Dr Williams is developing predictive tools to diagnose and treat lymphoedema, a painful condition that can affect breast cancer patients who have had their lymph nodes removed.

Scientists are also aiming to identify key molecules involved in the metastasis of bladder cancer, which could have implications for cancers of the prostate, breast and lung. For more information about this research, refer to page 12.

Interferon action and renal cell cancer

The interferon 'family' is a group of proteins that are produced in response to viruses, bacteria or cancer cells invading the body. Interferon regulates cell growth and death as well as the body's immune response; properties that underpin their widespread use in cancer therapies. Dr Dakang Xu is exploring the molecular mechanisms of interferon against renal cell carcinoma (RCC). Using gene chip technology and bioinformatics, Dr Xu has identified promyelocytic zinc finger protein (PLZF) a transcription factor that regulates interferon action. Further analysis of the interaction between PLZF and interferon could lead to new therapies for treating RCC and other cancers.

NEW FUNDING RECEIVED IN 2006

National Institutes of Health

Professor Bryan Williams: Interferon-regulated dsRNA-activated kinase, PKR

National Institutes of Health/ National Cancer Institute

Professor Bryan Williams: IFNs and cytokines: Signalling and action

National Breast Cancer Foundation

Dr Elizabeth Williams: Novel approach to the prevention and treatment of lymphoedema associated with breast cancer

Cancer Council Victoria

Dr Elizabeth Williams, Dr Kenneth Opeskin, Catherine Temelcos: Mechanisms underlying prostate cancer lymph node metastasis

FELLOWSHIPS

Dr Richard Redvers: United States Department of Defense Prostate Cancer Program Post-Doctoral Training Award

AWARDS

Professor Bryan Williams: Dolph Adams Award from the Journal of Leukocyte Biology for the most highly cited article published in the journal in the previous last five years.

2006 GRADUATES

PhD:

Christine Chaffer,
University of Melbourne

Arindam Chakrabarti,
Kent State University, Kent, Ohio, USA

Michelle Holko,
Case Western Reserve University, Cleveland,
Ohio, USA

CENTRE FOR FUNCTIONAL GENOMICS AND HUMAN DISEASE

Director: Professor Paul Hertzog, NHMRC Principal Research Fellow

Scientists working in the Centre for Functional Genomics and Human Disease use technologies such as DNA microarray and genetically modified mouse models to identify the role genes play in immune responses to infection and cancer, and conditions such as inflammation, Down syndrome and Alzheimer's disease. As understanding of the molecular basis of these diseases increases, scientists believe their findings will play a key role in the development of new diagnostic tools and therapies.

The Centre is a collaborative partner with the Cooperative Research Centre for Inflammatory Diseases.

Molecular regulation of immunity

Interferon, a member of the cytokine family, is a protein produced in response to viruses, bacteria or tumor cells invading the body and plays a key role in the body's homeostasis. For this reason, it is a common component in cancer and viral therapies. Professor Paul Hertzog leads a team investigating the molecular mechanisms behind cytokine signalling and how the immune system activates and de-activates interferon. His research has the potential to produce better treatments for patients suffering from a wide range of diseases including multiple sclerosis, hepatitis B and C, melanoma and a range of leukaemias.

Toll-like receptors in innate immunity

The response to infection is primarily controlled by the Toll-like receptor (TLR) family, a group of proteins that alerts the immune system to the infection. Once the danger has passed, another protein tells TLR to stop. In some instances, however, this message does not reach TLR, triggering a severe immune response that can result in septic shock. Dr Ashley Mansell and his colleagues are investigating which mechanisms in the body activate TLR, and what signals tell the body to stop passing messages to the immune system.

Dr Mansell has identified that TLR also plays a role in the onset of inflammatory conditions such as arthritis and atherosclerosis. For more information about Dr Mansell's research, refer to page 12.

Cytokine signal transduction in inflammation and cancer

Another group of proteins, the interleukin-6 cytokine family, plays an important role in maintaining the even regulation of blood cell formation, immunity and bone metabolism. This family of proteins relies on a receptor, gp130, to transmit signals which ensure healthy cellular activity. Abnormal gp130 signalling can cause disruption to this cytokine family, resulting in stomach cancer, lung disease and blood disorders. Dr Brendan Jenkins and his team are undertaking molecular and genetic research to better understand how and why this process occurs. For more information about Dr Jenkins' research, refer to page 13.

Molecular genetic basis of developmental disorders

All Down syndrome patients will develop Alzheimer's disease. Dr Melanie Pritchard leads a team investigating the genetic and molecular links between the two conditions. Dr Pritchard has discovered two genes, DSCR1 and Intersectin, that play a role in transmitting messages in the brain. Using animal models, Dr Pritchard and her team have mimicked the onset of Down syndrome by altering these genes. The neurons that degenerated as a result of this research are known to also deteriorate as Alzheimer's develops. These genes could become ideal targets for therapies for both Down syndrome and Alzheimer's disease.

Dr Pritchard is also investigating the role the Elf5 gene plays in the mammary gland development and milk production. As Elf5 is involved in cell growth and differentiation in the breast, Dr Pritchard believes it has the potential to be involved in the development of breast cancer.

NEW FUNDING RECEIVED IN 2006

National Health and Medical Research Council (NHMRC)

Professor Paul Hertzog: *Function of a novel interferon in reproduction and development*

Dr Brendan Jenkins, Professor Paul Hertzog, Dr Matthias Ernst: *The opposing roles of STAT1 and STAT3 signalling by IL-6 family cytokines in inflammation and tumorigenesis*

Australian Research Council

Associate Professor Mark Hedger, Professor Paul Hertzog: *Investigation of macrophage function in an immunologically-privileged site*

FELLOWSHIPS

Dr Brendan Jenkins: NHMRC RD Wright Biomedical Career Development Award

Dr Brendan Jenkins: Monash University Fellowship Support Grant

AWARDS

Dr Brendan Jenkins: International Society for Interferon and Cytokine Research Young Investigator Award, Sixth International Cytokine Conference 2006, Vienna, Austria

2006 GRADUATES

PhD:

Shamith Samarijiwa: *The role of soluble interferon in regulating responses*



CENTRE FOR INFLAMMATORY DISEASE

Director: Professor Stephen Holdsworth

Inflammation is the body's basic response to trauma or disease. Through greater understanding of how cells and tissue respond when inflammation occurs, scientists and staff in the Centre for Inflammatory Disease are developing new methods of diagnosis and treatments for conditions affecting a range of organs in the body, including rheumatoid arthritis, glomerulonephritis (kidney disease) and auto-immune diseases such as lupus and type 1 diabetes.

Arthritis

Common diseases such as rheumatoid arthritis and systemic lupus erythematosus (lupus) are characterized by the effects of unprogrammed inflammation. Associate Professor Eric Morand leads research into the contribution the cytokine migration inhibitory factor (MIF) makes to these diseases. MIF is a pro-inflammatory protein that modulates the body's sensitivity to glucocorticoids, a group of steroid hormones involved in the onset of rheumatoid arthritis and lupus. During 2006, Associate Professor Morand and his team investigated the signalling pathways used by the body and how glucocorticoids interact with MIF.

Glomerulonephritis

Glomerulonephritis (kidney disease) is a common cause of end-stage renal failure. Professor Stephen Holdsworth and Associate Professor Richard Kitching lead a team that aims to increase understanding of the key events in the generation of immune responses within the kidney. Research undertaken during the year included investigating the role renal dendritic cells play in immune renal injury and the nature of the loss of tolerance to a particular intra-renal antigen ($\alpha 3(\text{IV})\text{NC1}$).

Innate immunity

The innate immune system dictates how the body intrinsically responds to infection. Dr Kumar Visvanathan is investigating the role this system plays in inflammatory diseases such as sepsis, hepatitis B and rotavirus infection. His group's discovery of novel advances in hepatitis B and sepsis research highlighted the importance of TLR and innate immunity.

Autoimmunity

Professor Ban-Hock Toh's team is exploring innovative strategies to manipulate the immune system in a bid to prevent and cure autoimmune diseases such as type 1 diabetes, multiple sclerosis, autoimmune nephritis and autoimmune gastritis. Research tools the team use include gene therapy, regulatory T-cells to control autoimmune responses, and spontaneous, transgenic and induced mouse models of specific autoimmune diseases. Professor Toh also collaborates with scientists in MIMR and Baker Heart Research Institute, researching the role of the immune system in atherosclerosis (heart disease) and molecules identified by auto-antibodies that are involved in uncontrolled cell division, a characteristic of cancer.

Understanding how leukocytes travel around the body

Dr Michael Hickey's team examines the mechanisms that regulate leukocytes (white blood cells) in inflammatory diseases. The team is particularly interested in key inflammatory molecules, including adhesion molecules, cytokines, chemokines and signalling molecules. Dr Hickey is studying the responses mediated by these molecules, as well as macrophage inhibitory factor (MIF) and tissue-specific responses in the brain and kidney. This research provides scientists with a greater understanding of how molecules contribute to inflammatory diseases.

World Lupus Day: 10 May 2006

In recognition of World Lupus Day on May 10, MIMR hosted an information evening with the support of the Lupus Australia Foundation Inc (Victoria). Associate Professor Eric Morand and Dr Alberta Hoi presented the latest in lupus research and clinical trials. Guests heard from Tammy Reznik, a chronic lupus sufferer, who defied her medical specialists and managed to give birth to two healthy, albeit very premature, babies. The evening concluded with Mrs Enid Elton from the Lupus Association presenting the Institute with a cheque to support Associate Professor Morand's lupus research program.

2006 GRADUATES

PhD:

Mark Biondo: Working with transgenic mouse models towards a cure of Autoimmune Disease



CENTRE FOR REPRODUCTION AND DEVELOPMENT

Director and Deputy Institute Director: Professor Michael Holland

Scientists working in the Centre for Reproduction and Development apply knowledge derived from developmental and reproductive biology to practical problems in medicine and biotechnology. Working within these broad parameters, they undertake research into assisted reproductive technology, male reproductive function (including infertility and contraceptive development), stem cell research and animal biotechnology.

The Centre's research also provides insights for Southern Health clinicians in cardiology and gastroenterology, which will help address issues such as liver disease, inflammatory disorders, cardiovascular disease and organ transplant rejection.

This diverse research has led to collaborations with the national Cooperative Research Centre for Innovative Dairy Products and the Australian Research Council Centre for Excellence in Biotechnology and Development.

Activin: not just for sex

Activin, a protein discovered by Emeritus Professor David de Kretser AC, MIMR's Founding Director and Governor of Victoria, was originally considered to be a reproductive hormone responsible for stimulating the production of sperm and ovarian follicles, or eggs. Working with Professor de Kretser, Associate Professor David Phillips is now researching the role activin plays in inflammatory diseases and acute inflammatory syndromes such as liver fibrosis, septicemia, meningitis and traumatic brain injury.

Stem cell research

Human embryonic stem cells (ES cells) are pluripotent, meaning they can become any cell in the human body. This provides scientists with the potential to generate specific cell types to treat debilitating, life-threatening conditions such as Alzheimer's disease, multiple sclerosis, type 1 diabetes, spinal cord injuries and infertility.

A major issue limiting the clinical use of ES cells is the risk that the patient may reject the engineered cells. Dr Paul Verma is a world leader in somatic cell nuclear transfer (SCNT) research, the most achievable solution to this problem. A critical step in SCNT involves returning an adult cell to its embryonic, pluripotent state to create a group of cells genetically identical to the patient. These cells can then be grown into the specific cell type required by the patient, such as cardiac, kidney or neural cells, without risk of rejection by the body's immune system.

In December 2006, the Federal Government voted to allow the creation of embryos using cell cloning for stem cell research. This landmark decision means Dr Verma can continue his groundbreaking research in Australia. For more information about Dr Verma's research, refer to page 12.

Sperm biology and male infertility

Male infertility affects approximately 1 in 20 Australian men. Despite this, many of the processes of sperm development and function remain poorly understood. Dr Moira O'Bryan is researching sperm development and the biochemical changes that occur once sperm enters the female reproductive tract. Using mouse models and infertile male tissue samples, Dr O'Bryan's team is also investigating the mechanism of sperm tail development and function, genetic causes of infertility and specific proteins that play a role in male fertility. Collaborating with scientists in Australia and overseas, Dr O'Bryan is applying this research to the development of a male contraceptive pill. For more information about Dr O'Bryan's research, refer to page 13.

Endocrinology and immuno-physiology

Associate Professor Mark Hedger knows the immune system in the testis is naturally suppressed; sperm do not appear in the reproductive tract until after the male immune system is developed, yet the body does not reject it. By investigating the unique mechanisms of immunoregulation in the testis and the effects of inflammation and infection on male reproductive function, Associate Professor Hedger will better understand the relationship between the male reproductive tract and the immune system. This will provide clues about autoimmune infertility and inflammation of the male reproductive tract. It may also hold the key to the development of male contraceptives and immunotherapeutics for transplant patients.



CENTRE FOR REPRODUCTION AND DEVELOPMENT

Testis development and germ cell differentiation

The incidence of testicular cancer in young Australian men is rising. Both testicular cancer and infertility can be determined by events during fetal development, the juvenile period and adulthood. Dr Kate Loveland's team focuses research on understanding how germ cells (the precursors to sperm cells) are established and what guides their maturation. This work will lead to the development of preventative, diagnostic and therapeutic strategies for testicular cancer, infertility and cryptorchidism (absence of one or both testes).

NEW FUNDING RECEIVED IN 2006

National Health and Medical Research Council (NHMRC)

Emeritus Professor David de Kretser AC, Professor Gail Risbridger, Professor Milton Hearn, Professor Graham Jenkin, Associate Professor Mark Hedger, Professor Evan Wallace, Dr Kate Loveland, Associate Professor David Phillips, Dr Moira O'Bryan: *Control mechanisms of reproductive processes*

Dr Craig Harrison, Associate Investigators: Associate Professor David Robertson, Professor Wylie Vale, Associate Professor David Phillips, Dr R Kasper – project grant: *Activin type II receptor antagonists: mechanisms of action and biological applications*

Associate Professor Mark Hedger, Professor Paul Hertzog: *Investigation of macrophage function in an immunologically privileged site*

Professor Rob McLachlan, Dr Moira O'Bryan, Professor John Aitken, Professor Lois Salmonson, Dr Luk Rombarts, Professor Evan Simpson: *The Australian network to identify novel contraceptive targets and endometrial regulators*

Monash IVF

Professor Rob McLachlan, Emeritus Professor David de Kretser AC, Dr Moira O'Bryan, Dr Michael Lynch, Dr David Cram: *Studies on the genetic basis of male idiopathic infertility, and the trans-generational health of children conceived through ART*

Australian Stem Cell Centre

Dr Paul Verma: *Reprogramming somatic cells by fusion with pluripotent cells*

Dr Paul Verma: *Investigation of chromosomal instability in hybrid cells*

Royal Veterinary and Agricultural University, Copenhagen, Denmark

Professor Preben Thomsen, Professor Poul Maddox-Hyttel, Dr Nancy D'Cruz: *The investigation of the SMARC gene family during bovine pre-implantation embryo development*

FELLOWSHIPS

Associate Professor Mark Hedger: NHMRC Senior Research Fellow

Dr Duangporn Jamsai: NHMRC Peter Doherty Training Fellow

Dr Kate Loveland: NHMRC Senior Research Fellow

Dr Moira O'Bryan: NHMRC Senior Research Fellow

AWARDS

Dr Moira O'Bryan: Reproductive Health Award for Excellence in Reproductive Biology Research, Society for Reproductive Biology

Dr Huseyin Sumer: Clive and Vera Ramaciotti Foundations Biomedical Research Award

Dr Zhen Zhang: Society for Reproductive Biology Meat and Livestock Award

2006 GRADUATES

PhD:

Neil Borg: *Influence of the in vitro environment on rat gametes and preimplantation embryos*

Brock Conley: *Human embryonic stem cells: investigation of embryoid body and extraembryonic endoderm formation in vitro*

Leanne Cotton: *Fibroblast growth factor receptor-1 (FGFR-1) is essential for spermiogenesis and male fertility*

Adam Filipczyk: *Cell cycle and growth control of human embryonic stem cells*

Denise Goldman-Johnson: *A potential role for androgens in mouse embryo genesis*

Janine Harrison: *Matrices for embryonic stem cell culture*

HONORS:

Kimberley Crawford: *Characterization of two novel testis specific genes; KEC6.8ab and KEC1a*

Dinesh Indracharan: *Characterization of karyotypic instability in embryonic stem-somatic cell hybrids*

Boris Novakovic: *Strain-specific effects of sperm cryopreservation on embryo development, gene expression and protein localisation*

Alex Wildling: *Negative regulators of nuclear import in spermatogenesis*



RITCHIE CENTRE FOR BABY HEALTH RESEARCH

Director: Professor Adrian Walker, NHMRC Senior Principal Research Fellow

The Ritchie Centre for Baby Health Research has an international reputation for excellence in fetal, newborn and paediatric research. Scientists and clinicians work together to enhance the lives of babies through greater knowledge of pre-and post-natal development, with a particular focus on the brain, heart and lungs.

Fetal and neonatal physiology

Birth is a major event for the newborn baby. A smooth and safe transition from the liquid-filled uterus to the air-breathing world after birth depends upon the baby's drive to breathe and its first breaths of air. Breathing ensures adaptation of the lung to its post-natal role of oxygenating the blood, while also facilitating important transitional changes in the heart and blood circulation of the newborn. Ritchie Centre scientists led by Dr Philip Berger are exploring how the control of breathing develops in fetal life, and how the lung prepares for its rapid adaptation from fetus to the newborn.

Imaging techniques for the neonatal brain

Near infrared spectroscopy (NIRS) is a technique that may provide early warning of brain injury in preterm infants. Dr Flora Wong has devised a mathematical model, that, when used in conjunction with NIRS, will allow scientists and clinicians to judge the capability of a premature baby's heart to provide sufficient oxygen for its brain. The Ritchie Centre team has adapted the NIRS technology to evaluate the impact of drugs used for cardiovascular support in preterm infants on cerebral circulation and oxygenation.

Medical device innovation

A unique partnership in the Ritchie Centre exists between scientists, clinicians and engineers. Dr Philip Berger and Dr Mal Wilkinson lead a collaborative team that has developed innovative approaches to the diagnosis of respiratory and other conditions in preterm infants, including an acoustic device to assess baby lung inflation, a device to measure cardiac output and a device to measure complex infant movement.

Sleep in the newborn infant

As infants spend the major part of their early life asleep, it is vital to understand the important role sleep plays in early development. A team led by Professor Adrian Walker and Associate Professor Rosemary Horne is researching physiological responses during sleep at different stages of infant development, and the long-term effects sleep problems may have on the cardio-respiratory system of children. Major sleep research areas include Sudden Infant Death Syndrome (SIDS); development of sleep: effects of neonatal environment; development of cardiovascular control during sleep in preterm infants and sleep disturbance; and behaviour and learning in preschool and school-age children.

For more information about this research, refer to page 14.

EVENTS

Kaarene Fitzgerald lecture: July, 2006

The annual Kaarene Fitzgerald lecture is a tribute to the tireless founder of SIDS and Kids who died in 2003. Members of Kaarene Fitzgerald's family, representatives from SIDS and Kids, scientists, expectant parents and parents of newborns heard about the latest research into caring for the neonatal brain. Guest speakers were Professor John Wyatt from University College, London, UK, Associate Professor Laura Bennet from the University of Auckland, New Zealand and Southern Health neonatologist and MIMR PhD student, Dr Flora Wong.



RITCHIE CENTRE FOR BABY HEALTH RESEARCH

NEW FUNDING RECEIVED IN 2006

National Health and Medical Research Council (NHMRC)

Professor Adrian Walker, Dr Charles Barfield,
Associate Professor Rosemary Horne: *Novel
approaches to assessing cerebral circulation and
oxygenation in preterm human infants*

Professor Adrian Walker, Dr Peter Solin:
*Cerebral circulation in sleep: impact of
endothelial dysfunction*

Dr Philip Berger: *A novel, acoustic device for
the early detection of emphysema*

Associate Professor Rosemary Horne,
Professor Vicki Anderson, Professor John
Trinder, Dr Margot Davey, Professor Adrian
Walker: *Project grant: Cardiovascular,
neurophysiological and neurocognitive
assessments to define sleep disordered
breathing in children*

FELLOWSHIPS

Professor Adrian Walker: NHMRC Senior
Principal Research Fellow

Associate Professor Rosemary Horne, NHMRC
Senior Research Fellow

Dr Denise O'Driscoll: inaugural Kaarene
Fitzgerald Fellow

AWARDS

Associate Professor Rosemary Horne: The
Helgi Kristbjarnarson award for Outstanding
Scientific Presentation, 18th Congress of the
European Sleep Research Society

Dr Flora Wong: New Investigator Awards,
(Overall and Neonatology), 2006 10th
Annual Congress, Perinatal Society of Australia
and New Zealand

Perinatal Research Society (California) Award

Stephanie Yiallourou: New Investigator Award
(Basic Science), 2006 10th Annual Congress,
Perinatal Society of Australia and New Zealand

2006 GRADUATES

PhD:

Elaine Stockx: *Ontogeny of supraspinal control
of spinal circuits*

BACHELOR OF MEDICAL
SCIENCE (HONORS):

Freya Summons: *Chest wall movement in high
frequency oscillatory ventilation*

BACHELOR OF SCIENCE (HONORS):

Matthew Southwell: *Assessment of autonomic
control in preterm infants and a comparison of
blood pressure measuring techniques*

CENTRE FOR UROLOGICAL RESEARCH

**Director: Professor
Gail Risbridger, NHMRC
Principal Research Fellow**

Scientists working in the Centre for Urological Research aim to provide better diagnosis, treatment and prevention of prostate cancer, benign prostatic hyperplasia and prostatitis. These common conditions afflict men of all ages and have an immeasurable impact on the patient's life and his family.

The Centre's scientists and clinicians continue to provide a comprehensive interface with government, biotechnology and the pharmaceutical industry. In 2006, the Bayer-Schering Pharma AG Australian Network II contract was renewed, a partnership that was recognised with the 2006 Monash University Industry Engagement Award.

The Urological Research team continues its relationship with the Australian Prostate Collaboration (APCC) as the Victorian node of the APCC BioResource, a national prostate cancer tissue bank. Men undergoing a radical prostatectomy are encouraged to donate their prostate tissue to the BioResource, enabling scientists to use the donated tissue to learn more about the development of prostate cancer and to test potential new therapies.

Throughout 2006, the team also continued to foster close ties with community education groups Andrology Australia and the Prostate Cancer Foundation of Australia.



CENTRE FOR UROLOGICAL RESEARCH

Human prostate stem cells

Dr Renea Taylor is applying the team's internationally-recognized research into prostate cancer and embryonic stem cells to gain new insight into how cancer cells develop in the prostate. Dr Taylor's stem cell research also contributes to improving fundamental knowledge of the processes governing the differentiation of human prostatic cells, with a view to creating prostate cancer therapies. For more information about this research, refer to page 13.

Prostate cancer and the tumor micro-environment

Prostate cancer is the most common cancer in Australian men. While Dr Taylor is researching how prostate cancer starts, Dr Preetika Balanathan is studying the metastasis (or spread) of the disease. By examining the tumor microenvironment, Dr Balanathan researches the role the protein inhibin plays in metastasis. Using human tissue samples and mouse models, she is investigating the relationship between elevated inhibin levels and the spread of prostate cancer throughout the body.

Benign prostate disease

Benign prostatic hyperplasia (BPH) affects the majority of men over the age of 50. While not life threatening, the constant need to pass urine dramatically affects quality of life and can cause serious bladder and kidney problems. Research has shown estrogens may play a role in the development of BPH in men, although these hormones are usually considered to be more relevant to women's diseases. Dr Stephen McPherson is using this knowledge to carry out pre-clinical testing of Beta-selective estrogen receptor moderators for the prevention and treatment of BPH.

NEW FUNDING RECEIVED IN 2006

Cancer Council Victoria

Professor Gail Risbridger, Dr Stephen McPherson: Early origins of prostate cancer

United States Army Medical Research and Materiel Command Department of Defense Grant

Dr Stephen McPherson: *Is hormonal induction of prostate carcinogenesis due to declining androgens in late life and/or increased estrogen in early life?*

Bayer-Schering Pharma AG (consultancy)

Australian Male Network II

FELLOWSHIPS

Professor Gail Risbridger: NHMRC Senior Principal Research Fellow

AWARDS

Prue Cowin (PhD student): Postgraduate Student Prize for Biological Sciences, Royal Society of Victoria

Professor Gail Risbridger: Asia and Oceania Medal, British Endocrinology Society

Dr Renea Taylor: Servier Award, Endocrine Society of Australia

2006 GRADUATES

HONORS:

Deepa Srinivasen: *Characterization of the prostate of an activin beta C over-expressing mouse*

Jo-Ann Yap (co-supervised by Prince Henry's Institute): *Characterization of the ovary of an activin beta C over-expressing mouse model*

CENTRE FOR WOMEN'S HEALTH RESEARCH

Director: Professor Peter Rogers, NHMRC Principal Research Fellow

One of this Centre's great strengths lies in the interaction between scientific and clinical staff which helps focus research on clinically relevant problems. The Centre for Women's Health Research's laboratories are located within a few metres of the Monash Medical Centre birthing centre and operating theatres.

Endometrial stem cell biology

Dr Caroline Gargett has discovered adult stem cells are present in the human endometrium (lining of the uterus). Adult stem cells differ from embryonic stem cells in that they self-renew and can only develop into one of the major types of tissue or organ in which they are found. As Dr Gargett and her team further their research into this rare population of cells, her findings will have implications for angiogenesis (blood vessel growth) and debilitating conditions such as endometriosis, and breakthrough bleeding. The role of endometrial stem cells and lymphatics in the onset of endometrial cancer is also being explored. For more information about Dr Gargett's research, refer to page 14.



CENTRE FOR WOMEN'S HEALTH RESEARCH

Maternal-fetal medicine

Professor Euan Wallace, the Centre's Clinical Director, leads a team that investigates placental growth and development, immunological modulation, cell trafficking, and other events that can lead to miscarriage, fetal growth restriction, preterm labour and preeclampsia.

During 2006, a focus of Professor Wallace's research was amnion-derived cells, which are present in fetal membranes immediately following birth. These cells possess stem cell characteristics, and may become an alternative to embryonic stem cells in the fields of regenerative and reparative medicine.

Infertility and IVF

Endometriosis is a common gynaecological disease, affecting up to 15 percent of all women between puberty and menopause. It causes chronic pain and is a leading cause of infertility. Chair of Monash University's Department of Obstetrics and Gynaecology, Professor David Healy, is investigating whether endometriosis patients are at an increased risk of gynaecological cancers later in life.

Cancer biology

Professor Peter Rogers, Centre Director, is working with the Southern Health breast oncology team to identify molecular markers in patients with established breast cancer. A better understanding each patient's specific type of breast cancer may lead to individualized chemotherapy protocols with improved patient outcomes.

Scientists have identified that if radiotherapy could be applied in narrow, intense x-ray beams, tumours would be destroyed more effectively and the surrounding, healthy tissue would remain undamaged. However, the cellular and molecular responses underpinning this are still unknown. Professor Rogers is leading a collaborative research project to harness the intense beams of the Australian Synchrotron to develop more effective radiotherapy treatments. Project scientists include representatives from MIMR, Monash School of Physics, Monash Centre for Synchrotron Science, Peter MacCallum Cancer Centre and Radiation Oncology Victoria.

NEW FUNDING RECEIVED IN 2006

National Health and Medical Research Council (NHMRC)

Professor Peter Rogers, Dr Jane Girling: *Regulation of blood and lymph vessel growth in the uterus*

Professor Euan Wallace: *Fast Real-time PCR Platform* (NHMRC Equipment Grant)

Ovarian Cancer Research Foundation

Professor David Healy

Cancer Council Victoria Venture Grant

Professor Peter Rogers, Professor Rob Lewis, Dr Imants Svalbe, Professor Bryan Williams, Dr David Blakey: *The biological effects of synchrotron microbeam radiation therapy on normal and tumor tissues*

AWARDS

Dr Ursula Manuelpillai: President's Presenter Award, Society for Gynaecological Investigation

2006 GRADUATES

PhD:

Rachel Wah Shan Chan: *Identification of human and mouse endometrial stem / progenitor cells*

Poonam Ligam: *The role of the kynurenine pathway in human placenta - implications in pregnancy*

Anna Prasanthi Ponnampalam: *Molecular profiling of the human endometrium*

MASTER OF SCIENCE:

Saifulla Syed: *Evaluation of markers to predict tumor response to breast cancer neoadjuvant chemotherapy*

BACHELOR OF BIOMEDICAL SCIENCE:

Kristen Curtis: *Does quinolinic acid affect the expression of adhesion markers in the endothelium and in leukocytes?*

BACHELOR OF MEDICAL SCIENCE:

Shavi Fernando: *Outcomes of assisted reproductive technology in women with endometriosis*

Sebastian Hobson: *The role of activin in endothelial cell dysfunction in pre-eclampsia*

MONASH INSTITUTE OF HEALTH SERVICES RESEARCH



Health services research addresses the relationships between need, demand, supply, use and outcomes of health services. Led by Professor Don Campbell, the Monash Institute of Health Services Research (MIHSR) aims to improve the use of research knowledge and evidence to efficiently and effectively inform clinical practice, health service delivery and policy development. Their wide range of disciplines include health systems management, health economics, clinical epidemiology, evidence-based practice, organisational change, information technology, social sciences, biostatistics and operations research. The multidisciplinary team works with clinicians, consumers, managers and policy makers to provide an independent perspective.

Research and education programs draw upon staff from six different centres:

- Australasian Cochrane Centre
- Centre for Clinical Effectiveness
- Centre for Health Informatics Education
- Monash Ageing Research Centre
- Jean Hailes Research Centre
- Centre for Gender in Medicine

When united under the MIHSR umbrella, the synergy of these groups enables research outcomes which exceed their individual contributions.



MONASH INSTITUTE
OF HEALTH SERVICES RESEARCH



EDUCATION

EDUCATION

EDUCATION PROGRAM IN REPRODUCTIVE BIOLOGY

The Education Program in Reproductive Biology (EPRB) is a postgraduate training unit based within MIMR. The Program is supported by Prince Henry's Institute and assisted by scientists and staff from Monash University biomedical and human bioethics departments, and Monash and Melbourne IVF.

EPRB provides education and skills training in reproductive sciences, developmental biology and clinical embryology. The program offers three accredited postgraduate courses:

- Master of Clinical Embryology (MCE)
- Master of Reproductive Sciences (MRS)
- Graduate Diploma in Reproductive Sciences (GRS)

A key course initiative this year was the inclusion of a work experience program for MCE students, offered by collaborating IVF clinics in Australia and New Zealand. This allowed students to undertake one week of work experience in an accredited IVF laboratory and provided a career-linked practicum in human IVF and embryology.

Nine students graduated from the MCE course in 2006. All graduates have been offered jobs within the industry, demonstrating the excellent career opportunities for EPRB graduates.

Three students graduated from the MRS course in 2006 and three more have upgraded to PhD programs. Another ten students completed the GRS, five of whom have enrolled in the Masters degree programs in 2007.

During 2006, a close relationship was formed between EPRB and Gadjah Mada University in Yogyakarta, Indonesia. Four Indonesian specialists visited MIMR and completed the new EPRB short course, *Basic Assisted Reproductive Technology and Infertility Management*.

In line with the Institute's strategic direction, EPRB is aiming to form broader international collaborations, create new online and short courses, enable larger student intakes and develop new educational initiatives.

2006 EPRB GRADUATES

MASTER OF CLINICAL EMBRYOLOGY

Simon Aiken
Lin Wei Chen
Murray Hamilton
Loretta Houlahan
Mandy Leslie
Mahiraj Singh
Philippa Thompson
Yan Wei
Jesmine Wong

MASTER OF REPRODUCTIVE SCIENCES

Jean Loren
Saifulla Syed
Kalyani Krishnamoorthy

GRADUATE DIPLOMA IN REPRODUCTIVE SCIENCES

Katie-Lee Alexander
Amal Barakat
Anusua Chanda
Christine Harris
Senthuran Jayakumaran
Itziar Rebollar Lazaro
Debora Romero
Davina Rosairo
Naomi Tappe
Mithuna Thiruvassagan

2006 STUDENT OPEN DAY

Recruiting enthusiastic, talented students to undertake post-graduate research at MIMR ensures the continued excellence in research at the Institute. To promote the diverse range of research opportunities available, MIMR conducts a Student Open Day each year. Nearly 50 students attended the 2006 event. Institute Director, Professor Bryan Williams and final-year PhD students Cathryn Hogarth and Michael Kuligowski, gave comprehensive overviews of professional, academic and social life at MIMR. Tours of each Centre were conducted giving students the opportunity to meet with the Institute's senior scientists.

Professor Williams expressed his appreciation to Associate Professor Rosemary Horne, Chair of the Student Open Day Committee, and all members of the Committee, who successfully managed this event.

2006 STUDENT SYMPOSIUM

Sponsored by Invitrogen, the Student Symposium provides PhD students with the opportunity to present their research to their peers and the Institute's Senior Scientists. The following students were recognized for their exceptional performances:

THIRD YEAR STUDENTS

First: Connie Wong

Equal second: Raymond Wong and Catherine Itman

Third: Badia Barakat

FOURTH YEAR STUDENTS

First: Renee Chehab Rogers

Equal second: Dean Whelan and David Aridi

Third: Dr Alberta Hoi

TEAM PLAYER AWARDS

Catherine Itman and Renee Chehab Rogers





COLLABORATIONS AND COMMERCIALISATION

COLLABORATIONS AND COMMERCIALISATION

CRC FOR CHRONIC INFLAMMATORY DISEASES

The Centre for Functional Genomics and Human Disease is one of four groups that form the Cooperative Research Centre for Chronic Inflammatory Diseases (CRC-CID), a national initiative comprising MIMR, the University of Melbourne, the University of Queensland, and pharmaceutical company AstraZeneca (UK).

The CRC works collaboratively on a range of projects aimed at discovering and validating drug candidates for chronic inflammatory diseases such as osteoarthritis, rheumatoid arthritis and chronic obstructive pulmonary disease. Research techniques include gene expression profiling, stem cell technology and bioinformatics.

Scientists in the Centre for Functional Genomics and Human disease play key roles in the CRC-CID: Centre Director, Professor Paul Hertzog is a member of the Executive Committee; Dr Ashley Mansell is a member of the Education Committee and Dr Trevor Wilson is on the Program Management Committee. In addition, Dr Wilson and Dr Bernadette Scott are project leaders for three validation projects that explore different drug candidates and embryonic stem cells for treatment of a range of inflammatory diseases.

During 2006, validation studies on four potential anti-inflammatory drug candidates began. Research was also undertaken into 16 new genes that are potential drug targets. These genes will be expressed to confirm they are present in mammalian cells, and then cloned for protein production.



Cooperative Research Centre for
Chronic Inflammatory Diseases

CRC FOR INNOVATIVE DAIRY PRODUCTS

Scientists working in the Centre for Reproduction and Development play a key role in the Cooperative Research Centre (CRC) for Innovative Dairy Products, a Federal Government initiative that aims to enhance the profitability of the Australian dairy industry through development and application of new genetic technologies.

MIMR's role within the CRC is to investigate new methods to improve genetics through a range of advanced reproduction technologies. Highlights include Dr Paul Verma's team's discovery of ways to isolate and maintain large numbers of bovine embryonic stem cells. Internationally, this is the most advanced stem cell work in a domestic species. Dr Nancy D'Cruz's laboratory continued to study aspects of epigenetic regulation of gene expression during pre-implantation embryogenesis. This will provide the basis for molecular tests to identify high genetic value embryos with highest developmental potential which will lead to the more efficient application of breeding technologies for the Australian dairy industry.

MIMR's PhD students working with the Dairy CRC excelled during 2006. Ben Rollo was a finalist at the annual CRC Association conference in Brisbane in May for his research presentation, *The race to unravel the secrets of the egg*. Natalie Alexopolous was an invited speaker at the 22nd Meeting of European Embryo Transfer Association in Switzerland in September. Natalie also spent several months working at the KVL Laboratory in Denmark with Professor Maddox-Hyttel, with whom she completed her bovine embryo electron microscopy studies.

The CRC's Education Officer, Dr Susan Cumming, was invited to give two presentations in New Zealand in July: a development day workshop for PhD students at the University of Otago, and a presentation on *My genes and cow genes* at the International Science festival in Dunedin.



CRC for Innovative
Dairy Products

ANDROLOGY AUSTRALIA

Andrology Australia (the Australian Centre of Excellence in Male Reproductive Health) is funded by the Federal Government Department of Health and Ageing and administered by MIMR.

Community education outreach stepped up another level in 2006. More than 110,000 consumer guides on male reproductive health have now been distributed. Men from culturally and linguistically diverse backgrounds gained access to information which was adapted, translated and tested in 12 different languages. The Andrology Australia website www.andrologyaustralia.org was redesigned with additional information; a health professional section was added which includes the latest research papers, clinical guidelines and training programs available for clinicians and other health professionals. The website continued to attract more than 23,000 visitors every month.

A major achievement in professional education was the development of online *Active Learning Modules* to bring specialist training to busy GPs in key areas of men's reproductive health. Summary guidelines were also produced to help GPs understand and manage patients with reproductive disorders.

Inaugural Director of Andrology Australia, Emeritus Professor David de Kretser AC retired from his position in early 2006, when he was appointed Governor of Victoria. Professor de Kretser has since become Patron of Andrology Australia. Professor Rob McLachlan, Principal Research Fellow at Prince Henry's Institute, became the new Director. In another appointment during 2006, Australian cricket legend Merv Hughes became the program's Ambassador.



COLLABORATIONS AND COMMERCIALISATION

MONASH UNIVERSITY COMMERCIAL OFFICE

The Commercial Office at MIMR acts as the interface for external investors and partners seeking opportunities in the commercial aspects of the Institute's research. The main purpose of the Commercial team is to support the Institute's scientists by providing appropriate routes for the translational development of Intellectual Property. The research being conducted by the Institute scientists creates a strong foundation for future commercial activity. In 2006, the Commercial team contributed towards \$3.1 million in revenue for the Institute through commercial transactions, generated through a mixture of activities including research contracts, licenses and royalties.

Two valued Commercial Office members, Mr David Campbell and Dr Sally Mellor left the team to take up other opportunities. David led the Commercial Team for five years and Sally's hard work and enthusiasm will be missed. Business Development Manager, Dr Rocco Iannello will now manage the Institute's commercial activities.

An aerial photograph of the Monash Health Research Precinct, showing a large, multi-story medical building complex with a central courtyard, surrounded by parking lots and greenery. The image is overlaid with a semi-transparent white rectangle containing the text.

MONASH HEALTH RESEARCH PRECINCT

MONASH HEALTH RESEARCH PRECINCT

The Monash Health Research Precinct comprises Monash University (including MIMR and Monash Institute of Health Services Research), Prince Henry's Institute and Southern Health. In December 2005, scientists and staff moved into the new Precinct building adjoining the original MIMR building. Precinct members now share new, state-of-the-art facilities that encourage collaborative research projects and the sharing of resources.

MONASH GENE TARGETING FACILITY

The ability to target a specific gene in the mouse genome, remove it, alter it or even replace it with the human equivalent is a powerful research tool. This process has many applications in determining gene function and in studying human conditions such as respiratory disease, embryo development, blood diseases, muscle development, the immune system and male infertility.

The Monash Gene Targeting Facility (GTF) was set up in late 2005 to provide gene targeting services in mice to the Monash research community. In its first full year of operation, the GTF team carried out work for MIMR, Monash Immunology Stem Cell Laboratories, Australian Centre for Blood Diseases and Monash University Departments of Biochemistry and Molecular Biology.

The GTF team worked with the Centre for Functional Genomics and Human Disease to develop a mouse model to further research into the interferon epsilon gene. This particular gene may play a role in maternal recognition of a fetus during pregnancy, and may protect the fetus from infection. The GTF also worked with the Centre of Reproduction and Development to produce a mouse model for a gene that may be involved in male infertility.

GANDEL CHARITABLE TRUST SEQUENCING CENTRE

The Gandel Charitable Trust Sequencing Centre provides an accredited* DNA sequencing service to researchers at the Monash Health Research Precinct and external clients such as the Ludwig Institute for Cancer Research.

The Centre was re-launched in 2006 in recognition of the generosity of the Gandel Charitable Trust. The Trust's gift facilitated the purchase of a new genetic analyser. This machine incorporates the latest analytical technology and enables researchers to gain a greater understanding of gene structure and function. Information generated by the DNA sequencer is vital to learn more about the detection, diagnosis and prevention of diseases such as cancer, Alzheimer's disease and infertility.

In April, John and Pauline Gandel and Laurence and Stephanie Joseph from the Gandel Foundation joined members of the Monash Health Research Precinct Sequencing Committee to celebrate the installation of the new sequencer and the launch of the newly-named centre.

As a result of a successful NHMRC Equipment Grant, a new quantitative Real-Time PCR instrument was purchased for the Centre. This tool has several applications, in particular, measuring the level of gene expression in a particular sample. This information greatly accelerates the ability to understand cell signalling pathways. MIMR research into the role genes play in Down syndrome and male infertility was expanded as a result of the new cutting-edge technology at the scientists' disposal.

* NATA (National Association of testing Authority Australia) accredited



MONASH HEALTH RESEARCH PRECINCT

HISTOLOGY LABORATORY

The Histology Laboratory offers a range of functions including processing of electron microscopy and all aspects of paraffin, frozen and resin histology from cut up through to stained slides in a range of slides.

With the appointment of new Histology Facility Manager, Lucas Law, the Facility continued to provide expert histological services throughout the Institute, as well as working with external clients such as the Burnet Institute. A new illuminated floatation bath was acquired to improve workflow efficiency.

During the year, plans were developed to move the department to a new location within the Precinct in 2007.

NETWORK SERVICES, MONASH MEDICAL CENTRE

Network Services manage computer installations, email accounts, security issues and network management across the Monash Health Research Precinct. Results from the 2006 customer service survey showed the Network Services team continues to provide a prompt, efficient, cost-effective service to all scientists and staff.

A highlight for the year was the development of the MIMR intranet site. MIMR staff now have easy access to logistics, policy and general staff information, as well as access to the Institute's core facilities and news updates.

New technical services implemented include videoconferencing facilities in the MIMR boardroom, updated security software and new network application sharing software.

ANIMAL FACILITIES, MONASH MEDICAL CENTRE

The Animal Facilities at Monash Medical Centre (MMCAF) provides vital support services to researchers across University departments based at the Monash Medical Centre (MMC), MIMR, Prince Henry's Institute and a number of biotechnology start-up companies incubated at MMC.

The facility breeds and cares for conventional mice, rats & sheep as well as unique strains of specific pathogen free (SPF) mice which require elaborate individually ventilated cages. Pigs & rabbits can also be accommodated within the complex. In 2006, the facility looked after 3500 conventional and 4000 SPF mice.

Redevelopment to double the size of the Animal House has been approved, and work is expected to start in March 2007.

A high-angle photograph of a desk with various office supplies, including a pen, a calculator, a pair of glasses, and a coffee cup. The entire image is covered with a semi-transparent blue overlay. A white rectangular box is centered on the image, containing the text "COMMUNITY RELATIONS AND PHILANTHROPY".

COMMUNITY RELATIONS AND PHILANTHROPY

COMMUNITY RELATIONS AND PHILANTHROPY

Throughout 2006, individual donors, community groups, philanthropic trusts and corporations all made valuable contributions to the Institute. Scientists and staff are sincerely grateful for this support of our research.

Farewell to David de Kretser

It was the end of an era. On Friday 24 March, Institute Founding Director, Emeritus Professor David de Kretser AC, officially left the Institute to embark on the next stage of his acclaimed career - as the 28th Governor of Victoria.

A celebratory afternoon tea was held for Institute staff, David's family, close friends and associates, including Institute Patron Sir Zelman Cowen AK, GCMG, GCVO and his wife Lady Anna Cowen, to farewell the man who created our Institute. Tributes were paid to the visionary and driving force behind MIMR's inception and continued growth. David's portrait, painted by Peter Byron, was unveiled during the celebrations.

Community support

While our scientists are highly successful in attracting major competitive grants from organisations within Australia and overseas, the Institute depends on donations from the community and the corporate and philanthropic sectors to provide the equipment and research facilities the scientists need for their work. As the Institute continues to grow, raising sufficient funds will become even more important.

During the year, the quarterly appeals focussed on cancer, prostate cancer, mesothelioma and research into premature babies. The funds raised from these appeals have contributed to the purchase of much-needed research equipment that will enable scientists and students to continue to progress their work.

The sale of Christmas cards to our supporters through direct mail and at charity card shops across Victoria was again a successful fundraising exercise for the Institute. Funds raised will greatly assist a range of research projects.

Communications

The Institute has a regular communication program with the scientific and general community through its quarterly newsletter the MI News, the annual report, brochures, the MIMR website and the media.

During the a promotional DVD was produced: MIMR: the Next Decade. The DVD is a five-minute, documentary-style film which demonstrates the extensive range of research currently undertaken at the Institute. The DVD is used extensively for tour groups and community speaking engagements.

Media coverage enhances the general public's understanding of our scientists' work. This year we have had strong support from media across Australia and have attracted for a number of our research projects.

Community programs

The Institute Speakers Program involves scientists presenting aspects of their research to the members of service organisations including Rotary, Probus and Masonic Lodges. Presentations have included the latest research into stem cells, paediatric research, cancer, prostate disease and Alzheimer's disease.

After hearing Professor Gail Risbridger's presentation on prostate disease, Toorak Rotary donated \$5000 to the Centre for Urological Research to purchase a doubleheader microscope attachment – a vital addition to Professor Risbridger's research.

Themed 'discovery tours' of research centres continued this year for Institute donors and support groups. These customised tours provide supporters with a first-hand glimpse of scientists carrying out their research and the opportunity to discuss the research with the scientist.

Advisory Board Sub-Committees

Thank you to the members of the Fundraising and Communications Advisory Board Sub-Committees for their advice, guidance and enthusiasm for the tasks at hand. Their efforts and contributions are sincerely appreciated by the Development Office team.

WISE

WISE (Women in Scientific Excellence), brings together passionate women who have a desire to assist up-and-coming female scientists develop their research careers.

The Patrons Club and WISE have provided valuable support to the Institute during the year.

WISE Members 2006

Ms Patricia Baitz
Mrs Mary Conigrave
Professor Gillian Duchesne
Mrs Vivienne Fried
Mrs Maureen Hindle
Mrs Karen Joel
Mrs Diana Jones AM, DSJ
Ms Dawn King
Mrs Esther Lewin
Mrs Marcia Pinski
Mrs Vicki Smorgon
Mrs Val Smorgon OBE, JP
Mrs Lisa Thurin

PATRONS' Club

Finding money to progress medical research is an ongoing challenge for scientists. Regardless of the Institute's technology, infrastructure and expertise, research cannot prosper and grow without ongoing financial support.

With this in mind, the Institute launched the MIMR Patrons Club in 2006. Chaired by Advisory Board Member Robert Smorgon, the Patrons Club is aimed at people and organisations committed to advancing medical research.

PATRONS' Members 2006

Mr Ross Adler AO
Mr Ian Allen OAM
Mr John & Mrs Meredith Baldwin
Mr Andrew Blode
Mr Mark Bryce
Ms Robin Campbell
Mr Frank Costa OAM
Ms Ashley Crook
Mr Clyde Davenport
Emeritus Professor David de Kretser AC
Mr Michael Drapac
Mr David Evans
Mr Barry Fradkin
Mr Peter Fraser
Dr Joel Freeman
Ms Alison Gargan
Ms Lauren Gargan
Mr Paul Gargett
Ms Ann Geddes
Mrs Greta Grossberg
Ms Lanie Harris
Mr Anthony Heffernan
Mr Craig Kimberley
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Mr Bruce Parncutt
Professor Gail Risbridger
Mr Antony Rogers
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Mr Tony Smorgon
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COMMUNITY RELATIONS AND PHILANTHROPY

PHILANTHROPIC SUPPORT

MIMR is sincerely grateful for the gifts made by individuals and organisations during the year. These assist the Institute to continue its important research.

The Institute acknowledges the following generous supporters

American Health Assistance Foundation
Australian Stem Cell Centre
Australasian Sleep Association
Bayer Australia Ltd
Bayer Schering Pharma AG
BHP Billiton Petroleum Pty Ltd
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CHEMICON Australia Pty Ltd
Dorothy Hill Memorial Trust
Duke of Richmond Masonic Lodge
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Geoffrey Gardiner Dairy Foundation Limited
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H & K Johnston Family Foundation
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Integrated Sciences Pty Ltd
International Society for Interferon and Cytokine Research
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The BUPA Foundation
The Cancer Council Victoria
The Cass Foundation Limited
The Eirene Lucas Foundation
The Gandel Charitable Trust
The Greatorex Foundation
The J & R McGauran Trust
The Jean Hailes Foundation
The KDB Group of Companies
The Mason Foundation
The Parncutt Family Foundation
The Roy Morgan Research Centre
The Thomas & Rosalinda Ditchfield Medical Research Trust
Toorak Rotary Club
US Army Medical Research and Materiel Command (US Department of Defense)
National Institute of Health (US)
Victorian Trauma Foundation
Whitehorse Lodge at Attainment No.915
Wilrene Pty Ltd
Wood Family Foundation

Individual Donors (\$100 +)

Associate Professor Michael Adamson AM
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Ms Julie Hocking
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 Mr Jim O'Connor
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Mrs Baiba Warhaft
Mr Ken Wells
Mrs Heather Whee
Professor Bryan R G Williams
Mr John Williams
Mr Neville Wright
Ms Denise Young
Mr Laurence Zarth



PUBLICATIONS



PUBLICATIONS

CENTRE FOR CANCER RESEARCH

Refereed journals

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SUMMARY OF INCOME AND EXPENDITURE DECEMBER 2006

	2005	2006
Income		
General Revenue	4,730,423	5,256,680
Other Income	1,074,591	989,705
Commercial Services Income	531,524	579,032
Student Course Fees		11,000
Investment Income	216,941	-4,527
Non Research Funding	1,202,353	559,212
Scholarships & Prizes		2,816
Research Income	16,811,662	18,446,682
	24,567,494	25,840,600
Salaries Expenditure		
All Salary Expenses	14,809,545	16,265,565
	14,809,545	16,265,565
Non Salary Expenses		
Other Expenses	276,688	249,650
Financial & Admin Services	499,823	762,486
Travel & Related	818,649	928,742
Book & Library	45,494	63,974
Print & Stationery	421,384	525,595
Computer Related	472,492	853,185
Communications	290,373	298,665
Equipment Related	863,857	1,448,635
Lab & Operating	3,572,028	4,100,890
Student Related	816,443	755,363
Staff Related	188,305	148,555
Motor Vehicle	34,981	29,315
Building & Property	287,441	231,138
	8,587,958	10,396,193
Operating Surplus / Deficit	1,169,991	- 821,158



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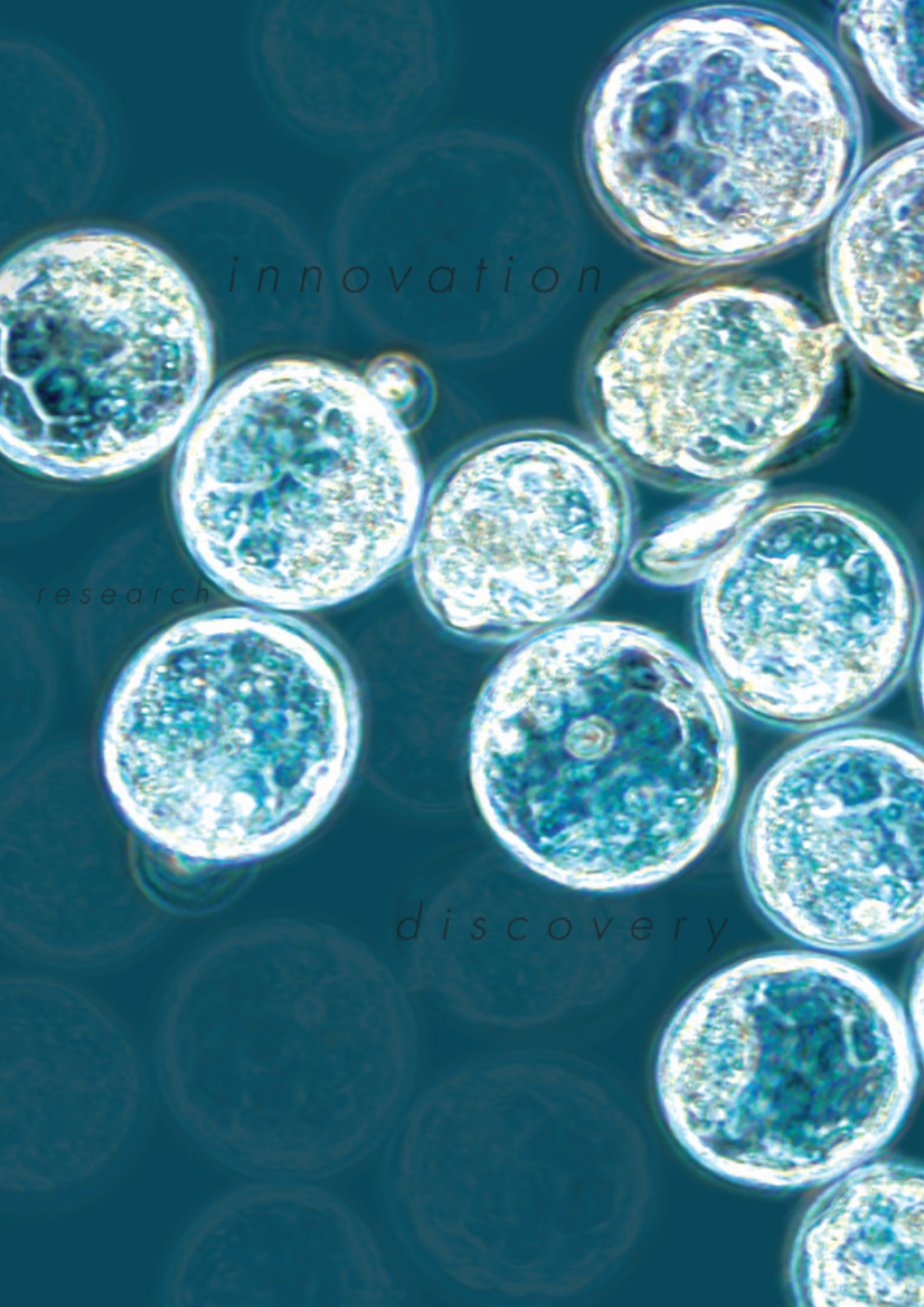
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