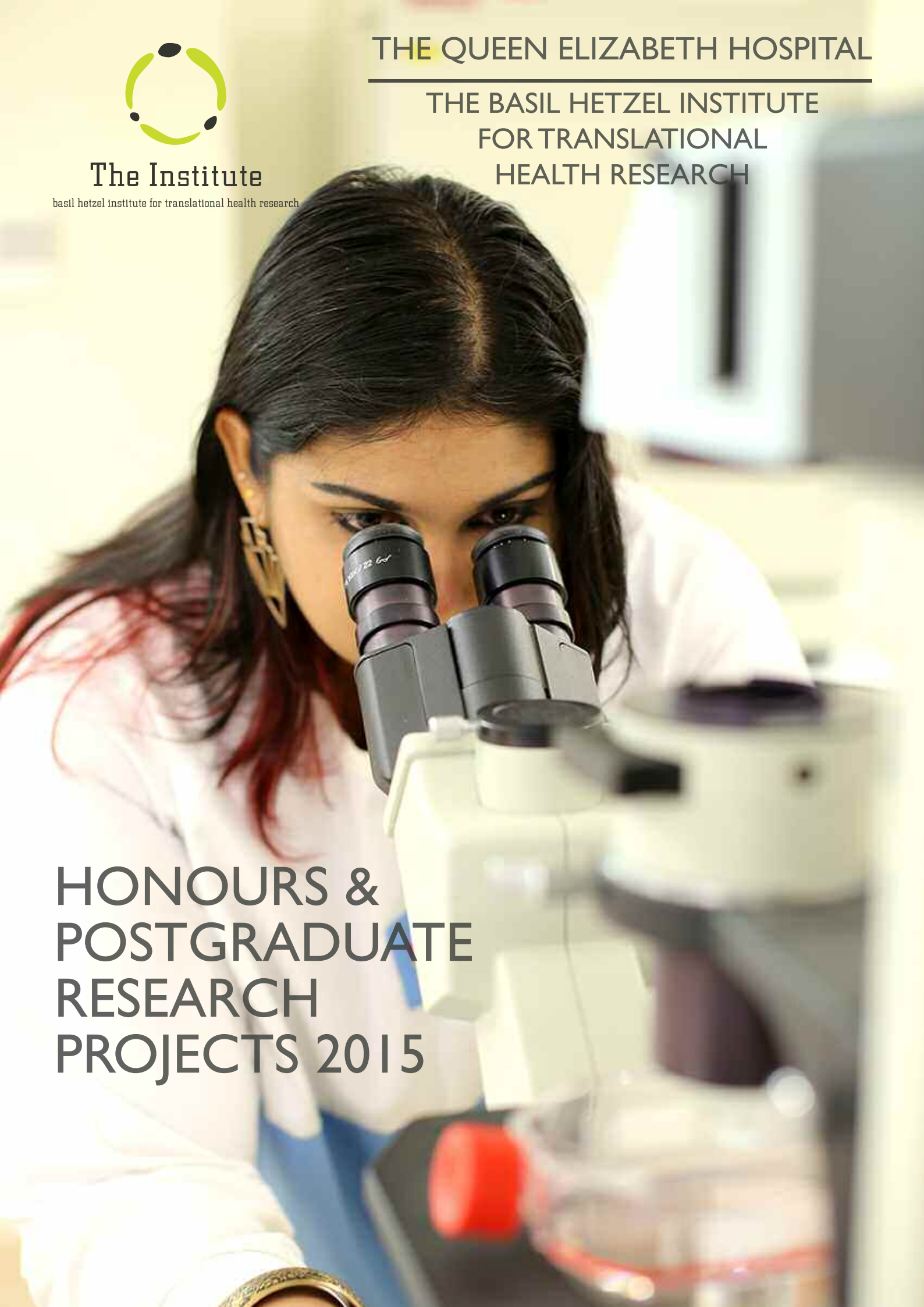
The Institute

basil hetzel institute for translational health research

THE QUEEN ELIZABETH HOSPITAL

THE BASIL HETZEL INSTITUTE FOR TRANSLATIONAL HEALTH RESEARCH



HONOURS & POSTGRADUATE RESEARCH PROJECTS 2015

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THE BASIL HETZEL INSTITUTE FOR TRANSLATIONAL HEALTH RESEARCH (BHI)

Professor Guy Maddern

BHI is the productive research arm of The Queen Elizabeth Hospital (TQEH) at Woodville South, South Australia, is headed by Professor Guy Maddern and hosts 19 research groups from the Universities of Adelaide and South Australia and the hospital. These groups undertake laboratory, clinical and population projects focusing on the most prevalent diseases/health issues in the regional community. Close links with TQEH clinical departments and shared resources with the universities, along with a $19m purpose-built research facility provides researchers, clinical academics and students with the most modern health and medical research facilities colocated with a hospital currently available in South Australia.

Research areas include cardiovascular disease, cancers, immunological diseases, chronic inflammation, population epidemiology, vascular surgery, drug response, stroke, and surgical technologies and training.

Director/Head:	Professor Guy Maddern
Contact:	Basil Hetzel Institute Research Secretariat
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Email:	gwenda.graves@health.sa.gov.au
Webpage:	http://www.basilhetzelinstitute.com.au/

The Queen Elizabeth Hospital - **(Postal address)** 28 Woodville Road, Woodville South, South Australia 5011

Basil Hetzel Institute - **(Courier address)** 37a Woodville Road, Woodville South, South Australia 5011

For enquiries about project opportunities please contact:

Gwenda Graves - Research Secretariat

Phone: 08 8222 7836

E-mail: gwenda.graves@health.sa.gov.au

The Institute
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THE HOSPITAL RESEARCH FOUNDATION & DEPARTMENT POSTGRADUATE RESEARCH SCHOLARSHIPS 2015

the hospital research foundation
finding cures improving care

The Basil Hetzel Institute for Translational Health Research (BHI), The Queen Elizabeth Hospital, is committed to expanding the pool of research scholars at the hospital. A number of 12 month Postgraduate Scholarships, funded through The Hospital Research Foundation will be available.

Stipend – Equivalent to Australian Postgraduate Award (APA) rate. ($25,392 in 2014) (full time candidates tax free)

Duration – 12 months only (conditions apply). Successful candidates are expected to apply and be awarded other scholarships for the subsequent years of their higher degree.

Number available: Potential exists to award three scholarships.

For more information, including advice to applicants and application forms please go to:
http://www.basilhetzelinstitute.com.au/postgraduate-training/scholarships/postgraduate-scholarships

ADVICE FOR POTENTIAL UNIVERSITY OF ADELAIDE CANDIDATES

THE UNIVERSITY of ADELAIDE

Structured program for the degrees of Masters (Research) and Doctor of Philosophy

Introduction

All candidates commencing a Doctorate or a Masters by research program through the University of Adelaide are required to participate in the Structured Program.

The Structured Program consists of two components:

- **Core Component** involving all commencing students and
- **Specialist Component,** devised in consultation with the supervisor, and tailored to the needs of the individual student.

Core Obligations (to be completed within the first 6 months)

1. Complete the Graduate Centre's online induction program.
2. Be familiar with the Guide to Candidature for Higher Degree by Research Students (Research Student Handbook) produced by the Graduate Studies Branch.

   http://www.adelaide.edu.au/graduatecentre/forms/handbook.pdf
3. Read the University's guide to Research Data management: **https://libguides.adelaide.edu.au**
4. Complete the introductory training on the Australian Code for the Responsible Conduct Research **www.adelaide.edu.au/rb/code**
5. Refer to the document **Academic Program Rules & Specifications for Thesis** and **http://www.adelaide.edu.au/graduatecentre/program_rules/**
6. Be aware of their obligations to submit an Annual Review of Progress Report by October 31 each year.
7. Students should consult with the relevant Postgraduate Coordinator (see names listed below) regarding regulations governing the use of all departmental resources (eg photocopying, placing orders and electronic communications), the role of the postgraduate coordinator and Occupational Health and Safety regulations, policies and procedures.
8. Present a seminar on their research proposal within the first six months.

9. Must have completed within the first 6 months of their candidature (12 months if part-time candidature) a:
    - Literature review, which is to be submitted to their supervisor (Postgraduate Coordinator to ensure).
    - Research Proposal Outline, which must be submitted to the supervisor and then Graduate Centre (Postgraduate Coordinator to ensure).
    - Core Component form and submit to the Graduate Centre (form available from **http://www.adelaide.edu.au/graduatecentre/policy/)**

Specialist Component

The specialist component is Discipline specific and is to be organised in consultation with the supervisor.

Please check individual Discipline advice regarding the Specialist component of the Structured Program.

Postgraduate Coordinators in each of the Disciplines listed below will also be able to provide advice on the Specialist component of the Structured Program.

Ongoing Commitments for all Postgraduate Students

- Attendance at departmental special seminars and BHI Postgraduate Seminars.
- **Annual** seminar on progress to be given prior to submission of Annual Review of Progress report, and a **final** seminar to be presented no less than **two** months prior to the estimated date of submission.
- Any change in status (eg full time to part-time or vice versa; leave of absence) to be discussed with the supervisor and Postgraduate Coordinator.

University of Adelaide Postgraduate Coordinators, The Queen Elizabeth Hospital

Discipline of Medicine: Dr Peter Zalewski Phone 8222 7344; **peter.zalewski@adelaide.edu.au**

Discipline of Psychiatry: Professor Helen Winefield Phone 8222 5141; **helen.winefield@adelaide.edu.au**

Discipline of Pharmacology: Dr Scott Smid; Phone 8303 5287; **scott.smid@adelaide.edu.au**

Discipline of Surgery: Dr Prue Cowled, Phone 8222 7541; **prue.cowled@adelaide.edu.au**

ADVICE FOR POTENTIAL UNIVERSITY OF SOUTH AUSTRALIA CANDIDATES

University of South Australia

Potential applicants are encouraged to review the information available at:

http://www.unisa.edu.au/resdegrees/welcome.asp

University of South Australia Postgraduate Coordinators

Contact information regarding Postgraduate Coordinators is available at:

http://www.unisa.edu.au/Research/Research-degrees/Enquire-about-a-research-degree/

ADVICE FOR POTENTIAL FLINDERS UNIVERSITY CANDIDATES

Flinders UNIVERSITY

Potential applicants are encouraged to review the information available at:

http://www.flinders.edu.au/rhdstudents/

Flinders University Postgraduate Coordinators

Contact information regarding Postgraduate Coordinators is available at:

http://www.flinders.edu.au/research/research_home.cfm

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THE HOSPITAL RESEARCH FOUNDATION & DEPARTMENT HONOURS RESEARCH SCHOLARSHIPS 2015

the hospital research foundation
finding cures improving care

The Basil Hetzel Institute for Translational Health Research (BHI), The Queen Elizabeth Hospital, is committed to expanding the pool of research scholars at the hospital. The BHI offers a number of Honours Scholarships, funded either through The Hospital Research Foundation Program grants or by individual departments, as outlined below:

Stipend – in the range **$4,000 - $8,000 per annum**

Duration – **12 months**

Number available – dependent on funding available through The Hospital Research Foundation or by individual departments

Mid-year commencements, negotiated with a potential supervisor, are permitted.

For more information, including advice to applicants and application forms please go to:
http://www.basilhetzelinstitute.com.au

University of Adelaide Honours Coordinators, The Queen Elizabeth Hospital

School of Medicine: Associate Professor Chris Rayner, Phone 8222 5501; **chris.rayner@adelaide.edu.au**

ADVICE FOR POTENTIAL UNIVERSITY OF SOUTH AUSTRALIA CANDIDATES

University of South Australia

Potential applicants are encouraged to review the information available at:

http://www.unisa.edu.au/resdegrees/default.asp

University of South Australia Honours Coordinators

Contact information regarding Honours Coordinators is available at:

http://www.unisa.edu.au/Research/Research-degrees/Enquire-about-a-research-degree/

ADVICE FOR POTENTIAL FLINDERS UNIVERSITY CANDIDATES

Flinders UNIVERSITY

Potential applicants are encouraged to review the information available at:

http://www.flinders.edu.au/future-students/courses/honours-programs.cfm

Flinders University Honours Coordinators

http://www.flinders.edu.au/graduate-research/

Aged & Extended Care Services

Director: Professor Renuka Visvanathan
Contact: Prof Renuka Visvanathan or Dr Solomon Yu +61 8-82226000 or renuka.visvanathan@adelaide.edu.au or solomon.yu@health.sa.gov.au

Professor Renuka Visvanathan

Australia, like almost every other country internationally is experiencing population ageing. The fastest growing age demographic is the 80 years and over age group. Helping older people achieve healthier ageing is a major focus of this research group. This academic geriatrics and gerontology research group is especially interested in translational research that contributes to improved health and well-being of frail older people, as well as prevents the development of frailty and other related adverse health outcomes such as falls or under-nutrition. Current areas of research interests include under-nutrition and sarcopenia, frailty, falls prevention, technology interventions in health and aged care and appropriate prescribing.

Projects are adaptable to Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

Under-nutrition and Sarcopenia: This research team has an international reputation in the research area of nutritional frailty and is associated with the Centre of Research Excellence in Translating Nutritional Science to Good Health. Currently, there are two PhD students completing research in this area. The research team is interested in developing a better understanding on the impact of sarcopenia on quality of life and other health outcomes of interest such as physical performance.

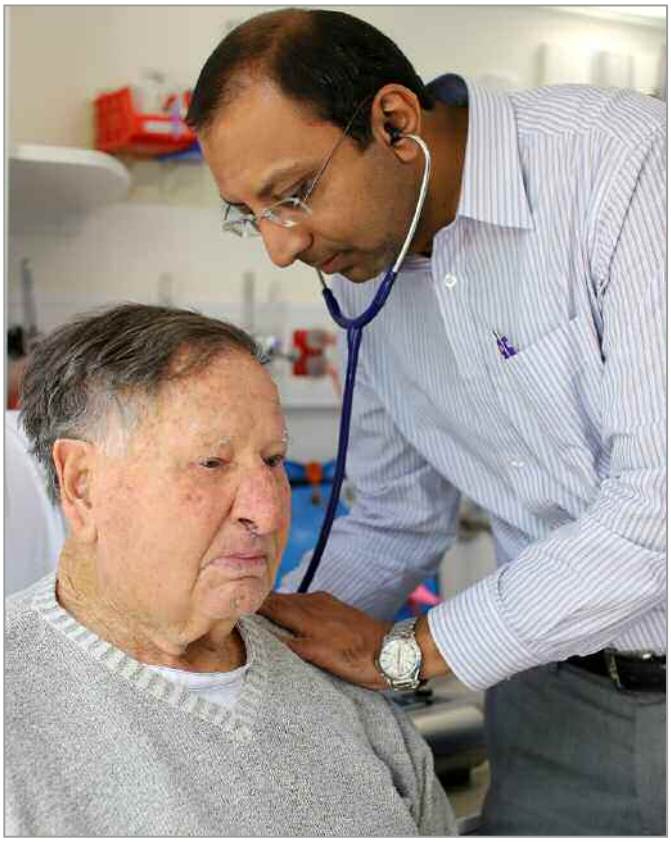
Technology and Under-nutrition: We are hoping to develop a novel system for human activity recognition, monitoring would result in an intelligent home environment better able to help older people living alone with dementia maintain their nutritional health. There is opportunity for a research student with an interest in evaluating user (older people with dementia, carers and service providers) perspectives via mixed methods methodology.

Falls Prevention and Technology: There is currently one PhD student and three masters students working on projects related to this technology. The research team has developed a novel movement sensor alarm system and are currently undertaking research work within the hospital setting. There may be opportunities to work on a clinical feasibility trial with regards to this technology in 2015.

Hip Fracture: The service currently maintains a hip fracture registry and therefore, there is opportunity to build on this registry and undertake research to benefit hip fracture care in older people.

Frailty: Frailty is more common in older people aged 80 years and older. Frail older people are major consumers of health care. Better addressing frailty may result in health cost savings. This research group is interested in better understanding how common frailty is within our community and the impact of frailty on health outcomes and quality of life. Therefore, there is opportunity for a postgraduate student with an interest in developing skills in epidemiology and frailty research. The team is also interested in improving health services for frailty in hospitals and the community and this is another area of opportunity for research.

See http://health.adelaide.edu.au/medicine/g-trac/ for recent publications and additional details of the Research Group and projects.



Blood Disease Research Group

Laboratory Head: Professor Richard D'Andrea
Current research focus: Acute Myeloid Leukaemia (AML)
Supervisors: Professor Richard D'Andrea, PhD
Phone: 61 8 8222 3636
Email: richard.dandrea@unisa.edu.au

Dr James Gray, MD, PhD -
Phone: 61 8 8222 6000
Email: james.gray@health.sa.gov.au

Dr Sarah Bray, PhD - Phone: 61 8 8222 6524
Email: sarah.bray@unisa.edu.au

Professor Richard D'Andrea

Dr James Gray

Dr Sarah Bray

Projects are adaptable to Honours, Masters and PhD students through the University of South Australia

RESEARCH PROJECT

Molecular mechanisms of Acute Myeloid Leukaemia: Acute Myeloid Leukaemia (AML) has a worldwide incidence of approximately 3.5 per 100,000 persons per year, with most cases occurring in adults (~1000 new cases per year in Australia). The majority of AML cases respond well to the initial chemotherapy, but relapse is the norm and is associated with very poor response to subsequent chemotherapy, hence the poor overall survival. The twelve month average survival of 50 to 70 year-olds is less than 30% and less than 10% at 5 years.

The leukaemogenic process is characterized by the accumulation of acquired somatic mutations and epigenetic changes in haematopoietic progenitor stem cells, which result in deregulation of cell

proliferation and survival, and maturational arrest. An increasing number of genetic alterations have been identified in AML and these may provide new targets for therapy, or have important impact on outcome following treatment with conventional chemotherapy. However, the emerging paradigm is that there is most likely a range of genetic events that contribute to development of AML, with recurring mutations detected affecting a number of genes and pathways, which cooperate in the leukaemogenic process.

High resolution molecular methods such as "next generation" DNA sequencing was used to analyze the protein-coding genome from the diagnosis and relapse genomes of a single AML patient. Germ-line control DNA was extracted from mesenchymal cells (MSC) derived from cryopreserved bone marrow aspirate of the same patient. Current research in this lab now focuses on novel mutations identified from this work. Mutations in these genes are of significant interest and to date, are not reported in AML.

Projects can be adapted for Honours, Masters and PhD level of research. Students working on this project will have exposure and learn molecular biology methods, such as gene cloning, DNA sequencing, mammalian tissue culture, gene expression, PCR, microarray based assays and variety of standard DNA and protein molecular methodologies.

Breast Biology and Cancer Unit

Lead Researcher: A/Prof Wendy Ingman
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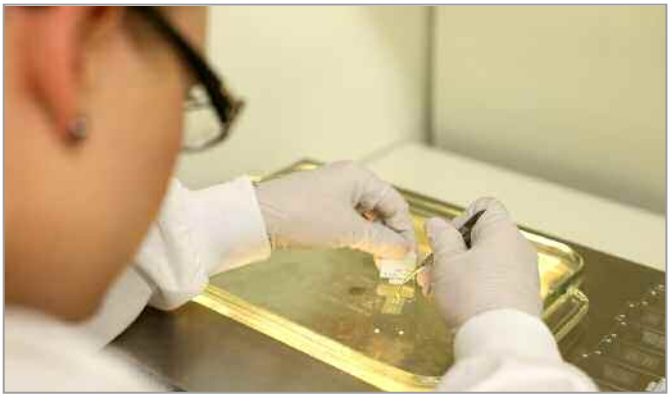
Dr Pallave Dasari +61 8 8133 4001 or
pallave.dasari@adelaide.edu.au

The Breast Biology and Cancer Unit at the Basil Hetzel Institute

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

Breast cancer is the most prevalent type of cancer among women, with approximately 13,000 new cases diagnosed each year in Australia. The aim of our research is to understand the cellular and molecular mechanisms that underpin this high incidence of breast cancer. We use a variety of mouse models together with human breast tissue to study how key risk factors, including menstrual cycling and breast density, lead to increased susceptibility of the mammary gland to cancer. We focus on how these risk factors affect the ability of the immune system to protect this unique tissue against carcinogens and other cancer initiating factors. The overarching objective of this research is to provide therapies that reduce a woman's lifetime risk of developing breast cancer.

In addition to studies on breast cancer susceptibility, we also conduct mastitis research. Mastitis is a common inflammatory disease in lactating women that causes pain, fever, low milk supply and leads many to cease breastfeeding. This research explores the cellular mechanisms that lead to inflammation, and investigates potential therapies to quickly and effectively stop the symptoms of mastitis.



RESEARCH PROJECTS

Macrophages in mammographic density: Macrophages are cells with diverse roles in immune responses against invading pathogens and cancer, and tissue development and homeostasis. This project will explore the function of macrophages in establishing breast density, which is a major risk factor for breast cancer.

Hormonal regulation of macrophages in the breast: The ovarian hormones estrogen and progesterone regulate a variety of cellular pathways in the breast that affect cancer risk. This project will investigate how these hormones regulate macrophages using tissue cultures and histological analysis of breast tissue.

Novel approaches to the treatment and prevention of mastitis: Recent studies indicate that antibiotics have limited efficacy in both treating and preventing mastitis. This project will investigate the underlying cause of mastitis using a combination of animal models and cell culture.

See adelaide.edu.au/directory/wendy.ingman for recent publications and additional details of the research group and projects.

Breast Cancer Research Unit

Lead Researcher and Contact:
Prof Andreas Evdokiou +61 8 8222 7451 or
andreas.evdokiou@adelaide.edu.au

The Breast Cancer Research Unit at the Basil Hetzel Institute

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

Breast cancer is the most common cancer in women that metastasizes to bone. Despite recent advances, our knowledge of why bone is such a fertile "soil" for tumour cells to home to the bone with devastating consequences remains poor. The aim of our research is to provide vigorous cell and animal-based preclinical data that will facilitate the translation of novel therapeutics to clinical trials for bone metastases. Our goal is to continue towards developing new and cutting-edge therapies to improve the quality of life and longevity of patients with bone related malignancies.

RESEARCH PROJECTS

Antitumour efficacy of pro-apoptotic receptor agonists: an immunotherapeutic approach for the treatment of skeletal malignancies: Recombinant TRAIL is an exciting new cancer therapeutic for the treatment of solid and haematological malignancies. Potency and lack of toxicity to normal tissues make activation of TRAIL signalling an ideal target for cancer therapy. This project is built upon our extensive preclinical studies in this area and is a logical extension of the work to date, in which proof of principle for a therapeutic role of TRAIL protein in skeletal malignancies was obtained.

Discovery of peroxidase enzymes as novel modulators of collagen extracellular matrix biosynthesis: Peroxidases are heme-containing enzymes found in both animals and plants that are classified within the oxidoreductase family of proteins. We have described for the first time the potential for peroxidase enzymes of either mammalian or plant origin to be used in the context of regenerative medicine. This project aims to investigate the role of peroxidise enzymes in normal tissue repair as well as dysfunctional fibrosis damaged or diseased organs.

A nano-engineered solution for the treatment of skeletal malignancies: The delivery of drugs to specific skeletal sites is the ideal, but remains a challenge. In order to increase effectiveness and to reduce systemic side effects, drugs would ideally be applied focally to bone sites requiring therapy, at optimal concentrations and for an appropriate duration. The hypothesis underlying this project is that tumours in bone can be treated effectively by direct introduction of chemo-therapeutic drugs to the affected site using novel nano-engineered drug-releasing implants

Cardiovascular Diseases and Therapeutics Research Group

Lead Researcher and Contact:
Prof John Horowitz
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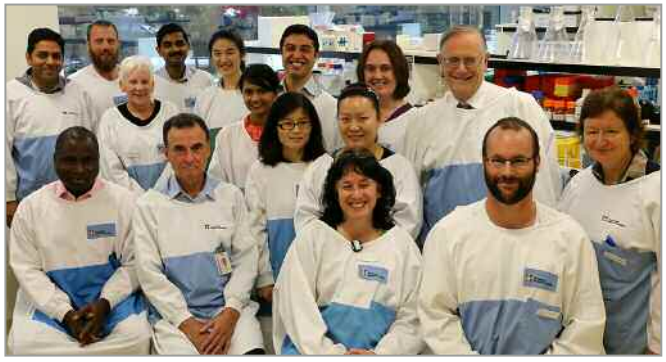
john.horowitz@adelaide.edu.au



The cardiovascular diseases and therapeutic group staff and PhD students.

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

We are interested in improving understanding of the mechanisms underlying the "new" forms of cardiac disease which have become increasingly important in the 21st century, such as aortic valve disease, Tako-Tsubo Cardiomyopathy, congestive heart failure and atrial fibrillation, as well as rarer disorders such as hypertrophic cardiomyopathy and bicuspid aortic valve. Furthermore, we are attempting to develop more effective treatments for these conditions.

Our research involves collaborators in the USA, UK and Germany aswell as interstate, and includes extensive collaboration with the Kosterlitz Institute of Drug Discovery (UK) and the Baker Institute (Melbourne).

RESEARCH PROJECTS

Normalising vascular function: Approaches to disordered nitric oxide signaling (Dr Y Chirkov, Dr A Chan). We have demonstrated that vascular and platelet responses to nitric oxide (NO) are impaired in many cardiac conditions, including valvular disease, angina pectoris and heart failure. We are attempting to reverse this NO resistance with a number of established and new drugs, and are also evaluating the therapeutic potential of nitrites and of nitroxyl donors to "bypass" the problem.

Congenital and acquired aortic valve disease: (Dr TH Nguyen, Prof J Horowitz). Bicuspid aortic valve (BAV) is the mot common form of congenital heart disease: patients with BAV often require surgery by the age of 50. We are trying to develop treatments to prevent degeneration of valves in such patients. We are also interested in the treatment of the more common form of aortic valve narrowing, which usually occurs in the elderly. In collaboration with researchers at SAHMRI, we are evaluating the role of native and modified lipoproteins in this process (A/Prof B Sallustio).

Can the heart run out of energy?: Recent studies by our group and by our UK collaborators have shown that the depletion of ATP within the heart in many cardiac conditions, including heart failure, is potentially reversible by some cardiac drugs. The prototype "energetic" agent, perhexiline, once thought too dangerous for routine use, is nevertheless being developed for wider clinical use in heart failure and hypertrophic cardiomyopathy and we are working with collaborators in the UK, Melbourne and the US to develop safer ways of improving cardiac energetics via various new derivatives of perhexiline.

"Broken heart": (Tako-Tsubo Cardiomyopathy: TTC) (Dr TH Nguyen). This disorder, although only recently recognised, accounts for about 10% of "heart attacks" in women, heals slowly and often recurs. We have the largest TTC data base in Australia and are carrying out a combined clinical/basic research program to elucidate the precise chemical triggers for TTC, in order to develop effective therapy.

Mechanisms of action of anti-aggregatory drugs: The P2Y12 antagonists are a group of recently developed drugs which inhibit platelet aggregation and which exhibit the ability to prevent thrombosis of coronary stents. However, patient responses to some or all of these agents are variable, in some cases partially for pharmacogenetic reasons. We have recently identified new factors which control patient responses to this group of drugs, and now seek to determine to what extent it is possible to prevent poor clinical responses and thus reduce risk of thrombotic complications.

Nitric oxide signaling in atrial fibrillation (AF): We have recently demonstrated that stroke risk in AF is increased in the presence of impaired NO signaling, and that this is a particular problem with new onset AF. Ongoing studies will evaluate the impact of various AF treatments on this aspect of risk.

Chronic Disease and Population Health Research Group

Lead Researcher: Prof Robert Adams
Contact: Prof Robert Adams +61 8 82227413 or +61 8 8222 6740 or robert.adams@adelaide.edu.au or Dr Sarah Appleton +61 8 8222 7439 or sarah.appleton@adelaide.edu.au

Professor Robert Adams

Our mission is to conduct innovative population and clinical research studies and produce the evidence for initiatives that promote prevention, lead to early detection, better management of disease and improve quality of life, well-being and mental health. Our research also investigates the interaction of health services with patients to identify opportunities that lead to more effective health care and management that will maximise health outcomes. We also conduct clinical trials to determine the effectiveness of clinical programs and policy directions. Current work includes studies in sleep health, chronic diseases related to obesity and health literacy.

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

Sleep Health: We have successfully completed the largest community population study in Australia using full polysomnography (sleep studies). This study group has been followed for over 10 years and a rich and extensive longitudinal database exists of biopsychosocial information on this people. Opportunities exist to explore links between sleep health and a wide range of health conditions, including cardiac and metabolic diseases, respiratory conditions, cognition and mental health, lower urinary tract problems, and the effect on work and well-being. With collaborating partners from health economics, the economic burden of sleep disorders and effects of different service delivery models can be investigated.

Chronic diseases/Lung health: The Health Observatory has had a long-standing interest in the epidemiology of lung diseases including asthma and chronic obstructive pulmonary disease. These interests include trends in asthma and the relationship of asthma with obesity. Further work is required to identify cellular and biochemical mechanisms linking these two conditions.

Health literacy: Most Australian adults do not have the health literacy skills that enable them to meet the routine literacy demands of modern health care. Research opportunities exist to examine the importance of listening and speaking skills for interacting with the health care system and for the critical exchange in the clinical encounter. Further research aims to expand the focus beyond the skills and abilities of the consumer or patient to include the skills and abilities of healthcare providers of information and care, and the barriers set up in health care that limit access and participation by people with average or below-average health literacy.

See thehealthobservatory.org.au or adelaide.edu.au/directory/robert.adams for recent publications and additional details of the research group and projects.

Colorectal Cancer Research Group
Molecular Oncology

Name(s) of Supervisors: Dr Jennifer Hardingham, Associate Professor Tim Price, Professor Andrea Yool
Discipline and Location of laboratory: Molecular Oncology, Level 1, The Basil Hetzel Institute for Translational Health Research, The Queen Elizabeth Hospital, and School of Medical Sciences, University of Adelaide.
Contact Person: Dr Jennifer Hardingham - Phone: 8222 6142, Mobile: 0427 557 707
Email: jennifer.hardingham@adelaide.edu.au

Staff of the Colorectal Cancer Research Group

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

Determination of predictive biomarkers of response to therapeutic agents in metastatic colorectal cancer is one of our main interests in clinical oncology. In the era of 'personalised medicine' the determination of biomarkers that will predict those patients who will benefit from novel therapies is important to reduce both unnecessary exposure to adverse effects of therapy, and excessive healthcare expenditure.

Another focus is the collaborative investigation of novel synthetic inhibitors of aquaporin 1 water channels. Rapid water flow into and out of cells has been shown to be fundamental in enabling the migration and invasion of cancer cells through tissues.

The detection of circulating tumour cells (CTC) as a prognostic marker of disease relapse in colorectal cancer is an ongoing area of interest. We have identified several tumour-associated markers for this purpose, but some lack tumour specificity. Now we have extended this work to include cancer stem cell markers, the hypothesis being that it is the circulating cancer stem cells that are responsible for initiating the development of metastases in colorectal cancer.

RESEARCH PROJECTS

Role of aqupaorins 1 and 5 in colon cancer growth and metastasis: Aquaporins (AQPs) are water channel proteins involved in controlling water permeability of cell membranes, and have been implicated in enhanced migration, angiogenesis (tumour blood vessel formation) and metastasis in a number of different cancers. Although aquaporins have been suggested as an attractive target for potential therapeutic strategies, until recently pharmacological agents have been lacking. The drug discovery program in Professor Yool's lab has identified small molecule drug-like agents that modulate aquaporin channel activity. We have recently found that 2 of these drugs are effective at reducing migration and invasion of colon cancer cells in vitro. The next step is to investigate the efficacy of these drugs in an in vitro angiogenesis assay, and then using a mouse xenotransplant model of human colon cancer. Techniques will include cell culture, RNA interference, RT-PCR. western blotting and functional assays of cell proliferation, matrigel invasion assay, migration assay, angiogenesis assay, and mouse studies. Adaptable to both Honours and PhD projects

RESEARCH PROJECTS (CONT.)

Determination of Aurora-A amplification in colon cancer by copy number PCR as a biomarker of resistance to chemotherapy: Chromosomal instability (CIN) is a key feature of many tumours and is present in about 85% of colorectal tumours. It is thought to arise as a result of mutation or amplification of several genes including Aurora-A. Over-expression of this gene results in centromere amplification and aneuploidy and thus plays a key role in tumour initiation and progression. The aim of the project is to measure the amplification of Aurora-A in DNA extracted from patients' archived frozen colorectal tumour tissues using copy number PCR and to correlate results with clinical outcome. The effect of knockdown of Aurora A on reversal of the resistance to chemotherapy will be investigated. Techniques include DNA extraction, real-time duplex PCR, RNA interference, RT-PCR, western blot, clinical data retrieval and Kaplan-Meier survival analyses.

Investigation of circulating colon cancer stem cells In colorectal cancer (CRC): A proportion of patients with early stage (TNM stage I or II) disease still die of recurrent or metastatic disease within 5 years of diagnosis despite undergoing "curative" resection. The implication is that tumour cells with metastatic potential had already escaped from the primary tumour, before or at the time of surgery, into the bloodstream or the peritoneal cavity. We have developed a test using magnetic antibody-labelled beads to capture circulating tumour cells (CTC) followed by qRT-PCR of tumour markers as an early predictive test for metastatic disease. However, while the test showed 80% specificity there was still a significant number of patients who were positive for CTC but did not relapse. We hypothesise that it is the stem cells within the circulating epithelial tumour cell pool that are responsible for subsequent relapse. Aims are to determine the most appropriate markers for colon stem cells, to use flow sorting to identify presence of tumour stem cells in blood and to determine the tumorigenicity of isolated stem cells in a nude mouse model.

SET/I2PP2A, an inhibitor of the tumour suppressor protein phosphatase 2A, as a therapeutic target in colorectal cancer:/ We have previously identified SET/I2PP2A as being over-expressed in colon tumours compared to matched normal mucosa. PP2A is an important part of the β-catenin turnover complex in the Wnt signalling pathway. PP2A functions as a tumour suppressor by de-phosphorylating and activating GSK3β which in turn results in phosphorylation and proteosomal degradation of β-catenin. Further, PP2A suppresses NEDD9-mediated adhesion signalling that underlies cell spreading and reduces the NEDD9-mediated switch to a mesenchymal phenotype. Hence SET over-expression could be considered an oncogenic mutation in colorectal cancer. The hypothesis is that over-expression of SET is a critical factor in growth, survival and adhesion signaling in colorectal cancer and down-regulation of SET using RNA interference (RNAi) will contribute to reversal of this oncogenic activity. Techniques include cell culture, RNA interference, qRT-PCR, Western blotting, cell proliferation, migration and invasion assays. Successful completion of the aims is an essential step before proceeding to the mouse model of human metastatic colon cancer.

SAHMRI Colorectal node, BHI

Lead Researchers: A/Prof Joanne Young
A/Prof Tim Price
Contact: A/Prof Joanne Young
+61 8 8222 8695 or
joanne.young@adelaide.edu.au

RESEARCH PROJECTS

Colorectal Cancer in Young Adults: Understanding Modern Lifestyle Risks and Outcomes: Colorectal cancer is largely a condition of older adults, with the incidence rising sharply after the age of 50 years. In contrast, colorectal cancer is relatively rare before 50 years. During recent decades, the incidence of colorectal cancer has risen in young adults but the cause is currently unknown. In this proposal, epidemiology, pathology and genetic approaches will be used to describe young onset colorectal cancer, to investigate the risks and outcomes of this condition, and to identify persons most at risk in the community, thereby promoting better outcomes for young adults through prevention (removal of pre-cancerous polyps) and though early detection of colorectal cancers (screening).

Colorectal Cancer in Relatives of Patients with Advanced Polyps at Colonoscopy: CRC is among the most familial of the solid tumours. Its prevention is also effectively achieved using colonoscopy to both detect early cancers and remove precancerous polyps. With the rise in polypectomy, opportunities for the identification of familial risk for CRC through observation of clustering of CRC are likely to decline. However, the examination of polyps themselves may offer an alternative avenue to identify patients whose relatives are at increased risk for CRC, as evidence is emerging that US guidelines recommending screening in relatives of patients who develop adenomas at less than 60 years may be justified. A prospective study of genetic and environmental factors using a case-control design will address limitations of reported retrospective studies to date.

Otolaryngology (ENT) Research

Lead Researcher and Contact:
Prof Peter J Wormald
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Professor PJ Wormald

The Department of Otolaryngology, Head and Neck Surgery is committed to excellence in ENT research and education. The research team currently consists of 14 Masters and PhD students, supported by five scientists and clinical staff and is recognized internationally as one of the leading rhinological research institutions in the world. Prof Wormald was nominated for the 2012 University of Adelaide award for excellence in research supervision.

Research is focused on understanding the pathogenesis of chronic rhinosinusitis (CRS), using a multidisciplinary approach, aimed at identifying new diagnostic/prognostic markers and treatment strategies to the benefit of our patients

Projects are suitable for Honours, Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

Despite extensive research in the bacteriological and immunological aspects of CRS, the pathogenetic basis of CRS remains poorly understood. Several of our research projects are aimed at understanding molecular, cellular, microbiological and immunological aspects of CRS using patient samples and applying techniques of molecular/cell biology and flow cytometry. Treatment of CRS is aimed at controlling rather than curing the disease. However, despite optimal treatment measures, a significant subset of patients do not respond well and require multiple surgical interventions and repetitive antibiotic treatments. There is thus a need for the identification of further and improved therapeutic targets to treat this complex disease.

Several of our projects involve testing the safety and efficacy of novel compounds in an animal model of CRS, developed by the department.

Specific projects for the year 2015 include:

Safety and efficacy of novel anti-bacterial compounds *in vitro* and *in vivo*.

Effect of hypoxia on epithelial cell integrity and mucociliary clearance.

Probiotic manipulation of the sinonasal microbiome.

Clinical Studies in ICU Patients

Lead Researcher and Contact:
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sandra.peake@health.sa.gov.au

A/Prof Sandra Peake

The research activities of the Department of Intensive Care Medicine at The Queen Elizabeth Hospital include a combination of company sponsored clinical trials, Investigator initiated studies conducted under the auspices of the Australian and New Zealand Intensive Care Society-Clinical Trials Group and local investigator-initiated studies. The research focuses on improving patient safety and outcomes and advancements in the delivery of more efficient and effective treatments that will benefit patients, decrease costs and preserve resources.

RESEARCH PROJECTS

Sepsis studies and observational surveys.

Patient safety, nutrition studies and outcome studies.

Pharmacokinetic studies and statistical method reviews, and the Augmented versus Routine approach to Giving Energy Trial (TARGET) studies, antibiotic dosing for critically ill patients receiving renal replacement therapy.

health.adelaide.edu.au/acm/
See publications in health.adelaide.edu.au/acm/research/pubs

Respiratory Medicine (Clinical Practice Unit)

Lead Researcher: Prof Brian Smith
Contact: Prof Brian Smith
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or Kristin Carson
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kristin.carson@health.sa.gov.au

Respiratory Medicine Research Staff

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

Building a quality research track record is an essential component for any early career researcher, and this multi-disciplinary unit facilitates such opportunities. The unit offers researcher's flexibility to pursue areas of interest within the scope of evidence based medicine, epidemiology and respiratory health. Health priority areas including COPD, asthma, tobacco cessation and prevention, sleep apnoea and Indigenous health. Research can take on a number of forms including hospital based randomised controlled trials or cross-over studies, with the potential to attract high impact publications and media attention, retrospective evaluations to inform policy and establish risk prediction models, qualitative research and meta-analyses.

RESEARCH PROJECTS

Systematic meta-analyses for evidence-based medicine (various topics): Cochrane meta-analyses offer guaranteed publication in one of the highest ranking journals in evidence-based medicine internationally, whilst allowing researchers the ability to significantly contribute to current evidence in their chosen field of medicine. Consolidation of this evidence is essential in establishing best practice treatment efficacy and identification of gaps in clinical practice whilst informing the next phase of research. Following this, a hospital-based clinical research trial can be conducted to address identified gaps.

Addressing the health disparity in Aboriginal and Torres Strait Islander health (multiple research projects): Indigenous Australian's bear a disproportionate burden of disease experiencing the largest gap in life expectancy for any Indigenous population worldwide. There is a valuable opportunity to conduct research including: prognostic risk factor, risk prediction model, meta- analyses, biomarker and qualitative research that may have a significant impact for some of the most disadvantaged in Australia.

Rheumatology Research Group

Director/Head: A/Prof Maureen Rischmueller (Head of Department)
Contact: Sue Lester, Chief Medical Scientist, Rheumatology Laboratory, Level 2, Basil Hetzel Institute, TQEH,
Woodville Road, Woodville South, 5011, SA
+61 8 8133 4026 or
susan.lester@health.sa.gov.au

Associate Professor Maureen Rischmueller

The Rheumatology Department's research focus is the causation and complications of rheumatic diseases. The research encompasses immunogenetics, pathogenesis and epidemiology.
Dr Maureen Rischmueller's research focus is the genetics of systemic autoimmune diseases (such as rheumatoid arthritis, Sjögren's syndrome) and autoantibody-mediated inflammatory and pathogenic disease mechanisms. Associate Professor Catherine Hill's research focus is population studies of health literacy, and musculoskeletal disorders, treatment of osteoarthritis, and the epidemiology and genetics of Giant Cell Arteritis. Dr Samuel Whittle's research focus is fibromyalgia and chronic musculoskeletal pain with reference to inflammatory and epigenetic mechanisms.

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

Primary Sjögren's syndrome (pSS) is an autoimmune disorder, with an increased risk of lymphoma. Most patients have anti-nuclear autoantibodies which are indicators of more severe disease, yet their association with cancer is unknown. The aim of this project is to determine cancer risk associated with pSS autoantibodies in South Australia.

Cartilage Oligomeric Matrix Protein (COMP) may be a serum biomarker for cartilage degradation in osteoarthritis, and may also inversely correlate with DHA (an omega 3 fatty acid). The aim of the project will be to determine the relationship between serum COMP levels, osteoarthritis outcomes, and DHA levels in patients from the FOSTAR (fish oil supplementation) study.

Copy number variation in the FCGR3B gene has emerged as a genetic risk factor for a number of systemic autoimmune diseases. The aim of the project will be to evaluate this in systemic sclerosis patients from the Australian Scleroderma Interest Group (ASIG) national repository.

Contact: A/Prof Catherine Hill, Staff Consultant Rheumatologist +61 8 8132 6691 or
catherine.hill@health.sa.gov.au

Projects are for Honours only through the University of Adelaide

RESEARCH PROJECTS

Impact of gout in a population cohort (NWAHS)
Description: Gout and hyperuricaemia are increasing in Western society, particularly amongst men. These diseases are associated with comorbidities such as diabetes and cardiovascular disease. There is no data on the impact on quality of life, medication use and health services use amongst Australians with gout and hyperuricaemia. This study uses data from the North West Adelaide Health Study to determine the effect of self-reported gout and elevated serum uric acid on health-related quality of life, medicines and health service use.

Measuring the patient's perceptions of glucocorticoid therapy Description: Glucocorticoid therapy is used commonly in rheumatological and other diseases. The adverse effects of corticosteroids are common (approximately 65%) and some of these effects such as hypertension, hyperglycaemia and osteopenia can be easily measure. However, other adverse effects which affect the patient such as change in body habitus, sleep and mood disturbance are more difficult for clinicians to measure. The aim of this project is to determine the patient's perception of glucorticoid adverse events by surveying a group of patients on glucocorticoid treatment for rheumatic diseases. The overall research objective is to develop a questionnaire (patient reported outcome measure) that measures adverse events of glucocorticoid therapy from the patients perspective. Currently although it is known that adverse effects are common in patients on glucocorticoid therapy, there is no currently validated questionnaire of these from the patient's perspective.

Solid Cancer Regulation Research Group

Lead Researcher and Contact: Dr Eric Smith
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Eric Smith (front) Paul Drew (back

The Solid Cancer Regulation Research Group is investigating the role of stromal cells, including fibroblasts and adipocytes (fat tissue), on the development and progression of solid tumours, particularly oesophageal and prostate cancers. We use a combination of cutting edge cellular and molecular biology techniques, including cell co-culture, explant and xenograft models, genome- wide next generation sequencing, DNA methylation, proteomic and secreteomic analyses. We aresituated in the well-equipped laboratories at the Basil Hetzel discover novel genes and gene variants which influence cancer growth, invasion, metastasis, or have therapeutic potential. Institute for Translational Health Research, and have active collaborations with local, national and international clinical and basic scientists who complement our research approaches.

Projects are suitable for Honours, Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

The role of oestrogens and androgens and their receptors in epithelial-stromal cell interactions in oesophageal and prostate cancers: We will explore the effect of oestrogens and androgens on the interactions between fibroblast and tumour cells and the progression of these cancers.

Barrett's oesophagus and cancer, obesity and inflammation: Is peri-oesophageal fat the missing link? We will investigate the cellular and molecular profile of peri-oesophageal fat, and its functional role in the development and progression of Barrett's oesophagus and oesophageal adenocarcinoma.

The role of cancer associated fibroblasts in oesophageal adenocarcinoma: Insights derived from comprehensive genomic and proteomic profiling: We will profile normal and cancer associated fibroblasts by integrating RNA-Seq, DNA methylation, microRNA, proteomic and secretomic datasets. We aim to discover novel genes and gene variants which influence cancer growth, invasion, metastasis, or have therapeutic potential.

See adelaide.edu.au/directory/eric.smith for recent publications and additional details of the research group and projects.

Stroke Research Programme (SRP)

Lead Researcher: Prof Simon Koblar
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or anne.hamilton-bruce@health.sa.gov.au

Staff and students of the Stroke Research Programme (SRP)

The Stroke Research Programme (SRP) is a collaboration between The Queen Elizabeth Hospital (TQEH) and the University of Adelaide via the Schools of Medicine, Medical Science and Molecular and Biomedical Science. The SRP is located at the South Australian Health and Medical Research Institute (SAHMRI) and The Basil Hetzel Institute (BHI) of TQEH. We also participate in the Australian Stroke Genetics Collaboration, a multi-centre study into genetic causes of stroke.

The SRP has trained 22 PhD students, 23 honours students and four Neurologists with clinical and/or scientific interests in stroke medicine. Honours projects often lead to opportunities for a future PhD.

RESEARCH PROJECTS

We have many projects including:

Neuroplasticity in Stroke: Characterising post-stroke cortical plasticity to identify critical windows for rehabilitation after brain injury.

Dental pulp stem cell (DPSC) therapy for Stroke: Our research investigates brain repair following ischaemic stroke using adult human stem cells from teeth (DPSC). We have published that DPSC have therapeutic potential, however, it remains unknown how these stem cells mediate improvement following stroke, and the best treatment paradigm for DPSC adminstration.

Animal Assisted Therapy (AAT) for Stroke Victims: We aim to examine saliva of both patients and animals for soluble markers for objective assessment of therapy with pets.

Transient Ischemic Attack (TIA) Intervention: Our group seeks improved diagnosis of TIA to help prevent stroke. We have completed a pilot study that found potential biomarkers specific for TIA and wish to confirm this study.

See adelaide.edu.au/srp/ for recent publications and additional details of the research group and other projects.

Surgical Evaluation Group

Lead Researcher and Contact:
Prof Guy Maddern +61 8 8222 6756 or
guy.maddern@adelaide.edu.au

Professor Guy Maddern

We are interested in developing minimally invasive techniques capable of destroying both primary and secondary liver tumours by inserting electrodes into the tumours. A study looking at inoperable colorectal secondary metastatic disease treated by this technique has commenced using new hybrid technology.

The evidence behind new surgical technologies and its implementation and introduction into the Australian health care system is another interest focus of our group. New technology is assessed using formal systematic reviews, accelerated reviews and horizon scanning. This has led to in excess of 80 peer reviewed papers on surgical evidence.

A further research interest is in the prevention of adhesion formation following abdominal surgery using a novel gel agent building from the research performed by Professor Wormald and his group in the ENT field.

Projects are adaptable to Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

Ablative techniques in tumour treatment

Health technology assessment in surgery

Prevention of adhesion formation in abdominal surgery

Surgical simulation

Factors in surgical mortality

See adelaide.edu.au/directory/guy.maddern for recent publications and additional details of the research group and projects.

Therapeutics Research Centre - UniSA

Lead Researcher: Professor Michael Roberts
Contact: Prof Mike Roberts +61 8 8302 2815 or michael.roberts@unisa.edu.au or
Dr Lorraine Mackenzie +61 8 8222 6521 or lorraine.mackenzie@unisa.edu.au

Professor Mike Roberts

The Therapeutics Research Centre (TRC) is headed by Professor Michael Roberts, an NHMRC Senior Principal Research Fellow with a joint appointment between the University of South Australia and the University of Queensland. Staff at the TRC have active research interests covering a spectrum of therapeutics from the chemistry of drugs (including drug design and natural products), the effects drugs have on the body (pharmacology and toxicology) and the effects the body has on drugs (pharmacokinetics and drug delivery) through to how drugs can be best used to treat disease (topical drug delivery and quality use of medicines) for patients. Current special interest areas include defining drug disposition and effects by in vitro and in vivo (including patient) bioimaging using confocal and multiphoton reflectance, fluorescence and Raman spectroscopy.

The following projects can be adapted to suit Honours, postgraduate or vacation students. Research projects offered for 2015.

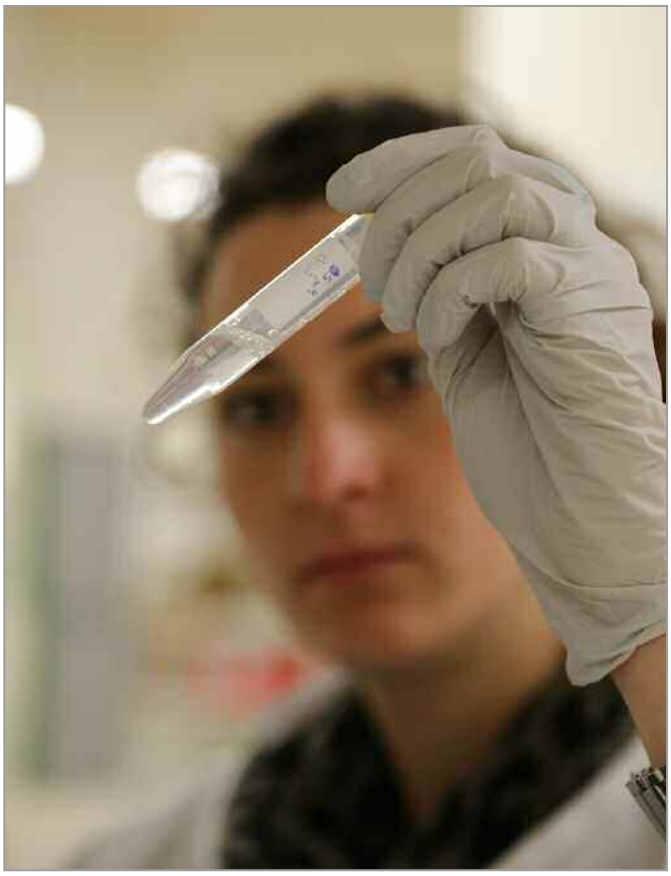
RESEARCH PROJECTS

Specific targeting of nanosystems by cutaneous delivery - *Supervisors: Professor Mike Roberts/Dr Lorraine Mackenzie*
The skin is a major site for the delivery of drugs, cosmetics and increasingly for vaccine, diagnostic and systemic delivery. It is a heterogeneous organ, with several delivery routes and target sites that can be targeted for desirable pharmacological and immune responses. A key challenge is to deliver sufficient quantities of these agents to achieve the desired responses. This project seeks to study the feasibility of using nanosystems to meet these needs, noting also the need to define their safety profiles. A major component of this work is also concerned with the evaluation of nanotechnology products applied to the skin.

Targeted drug delivery by topical application - *Supervisors: Professor Mike Roberts/Dr Lorraine Mackenzie*
The aim of this project is to understand how the different chemical structures of drugs, the ingredients in their formulations, the blood flow under the skin and the way in which they are applied combine to determine how deep a drug will penetrate. The outcomes of this work will help us in designing optimal therapeutic formulations for the future and also in minimising the risk of penetrations for materials required to stay on the surface.

The efficacy of silver nanoparticle wound therapies - *Supervisors: Professor Mike Roberts/Dr Amy Holmes*
This project will establish an in vitro burn wound model utilising ex vivo human skin to investigate the localisation and efficacy of novel and conventional silver nanoparticle therapies. The project incorporates techniques such as multiphoton microscopy, fluorescence lifetime imaging, immunohistochemistry, dermatoming, cell culturing, cryosectioning and nanoparticle characterisation within formulations in order to develop and optimise novel burn wound formulations that incorporate a range of antimicrobial metallic nanoparticles.

Enrolment: School of Pharmacy, University South Australia.
Location of research: Level 2, The Institute (BHI), The Queen Elizabeth Hospital, 37a Woodville Road Woodville South SA 5011.



The Translational Vascular Function Research Collaborative

Professor John Beltrame

Director/Head and Contact: Prof John Beltrame
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The Translational Vascular Function Research Group undertakes basic, clinical and epidemiological studies into vascular disorders with the objective of improving the health of these patients. Currently the group focuses upon coronary heart disease and peripheral artery disease, although many principles are applicable to other vascular disorders. The research group includes both physicians and medical scientists located at the Basil Hetzel Institute, the University of Adelaide Medical School and The Queen Elizabeth Hospital. The integrative nature of the group provides a unique opportunity to ensure that innovations are translated from bench to bedside to health outcome, as well as the reverse.

Molecular Physiology of Vascular Function Research Group

Lead Researchers: Prof John Beltrame, Prof Rob Fitridge, Dr Prue Cowled, Dr David Wilson
Contact: Dr David Wilson +61 8 8313 3193 or david.p.wilson@adelaide.edu.au

This group focuses upon the pathophysiology and molecular signalling of vascular disorders. This includes coronary artery spasm, coronary microvascular disorders, peripheral vascular disorders and reperfusion injury. Laboratory studies include the assessment of isolated human vessel function using myography, followed by a series of biomolecular assays aimed to provide a mechanistic understanding of the disorders and thus direct the translation to improvements in medical therapy.

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

Molecular Mechanisms of Coronary Artery Spasm: Coronary artery spasm is a well-recognised clinical entity although its molecular mechanisms remain unclear. This project will utilise physiologic and molecular techniques to identify mechanistic differences amongst patients with a propensity to coronary artery spasm.

Mechanisms underlying Coronary Microvascular Dysfunction: The coronary slow flow phenomenon is a coronary microvascular disorder that was first clinically characterised by this research team. This project will further advance our understanding of the pathophysiologic mechanisms responsible for this disabling condition.

Vasomotor dysfunction in Peripheral Artery Disease: Peripheral arterial disease typically involves obstructive atherosclerotic lesions of the large leg arteries although the role of the microcirculation is less clear. In this project the functional properties and molecular characteristics of the microcirculation in patients with peripheral artery disease will be investigated.

The Translational Vascular Function Research Collaborative

Clinical Physiology of Vascular Function Research Group

Lead Researchers: Prof John Beltrame, Prof Rob Fitridge, A/Prof Margaret Arstall, A/Prof Mathew Worthley, A/Prof Chris Zeitz, Dr Sharmalar Rajenderan
Contact: Prof John Beltrame
+61 8 8222 6740 or
john.beltrame@adelaide.edu.au

This clinical research team utilise both invasive and/or non-invasive techniques to identify the presence of vascular dysfunction in patients with vascular symptoms including angina and intermittent claudication. These include the assessment of coronary artery spasm, coronary blood flow, cardiac magnetic resonance imaging, popliteal artery vasodilation, subcutaneous blood flow and endothelial function.

RESEARCH PROJECTS

Vasomotor Studies of Patients with Myocardial Infarction and Non-Obstructive Coronary Arteries: Approximately 5-10% of patients who experience a myocardial infarct do not have significant coronary artery disease, prompting the clinical question of what is the underlying mechanism? This study will utilise invasive and non-invasive clinical techniques to elucidate potential mechanisms that may be responsible for the myocardial infarct.

Vasomotor Properties of the Popliteal Artery: The popliteal artery is a peripheral limb vessel that is readily imaged thereby allowing dynamic assessment of its function. This project will assess the presence of vasomotor dysfunction in this vessel amongst patients with peripheral artery disease, thereby providing insights into the underlying pathophysiological processes and potentially identifying novel therapeutic targets.

Vascular Disorders Health Outcome Research Group

Lead Researchers: Prof John Beltrame, Prof Rob Fitridge, A/Prof Margaret Arstall, A/Prof Mathew Worthley, A/Prof Chris Zeitz, Dr Rosanna Tavella
Contact: Prof John Beltrame
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john.beltrame@adelaide.edu.au

This group focuses upon the health status of patients with vascular disorders including their symptomatic status, associated physical limitations and quality of life. Consistent with the changing environment in medical research, this group adopts a 'patient- orientated' approach to the delivery of medical care in patients with vascular disorders by: (a) evaluating patient health status in population studies and (b) assessing the quality of care delivered.

The group have developed large databases in patients with acute myocardial infarction, coronary artery and microvascular disease, coronary spasm, and peripheral artery disease. Most of these databases have international links thereby providing collaborative opportunities.

RESEARCH PROJECTS

Improving Health Outcomes in Patients undergoing Coronary Angiography: Coronary angiography is the clinical benchmark technique in the assessment of coronary artery disease with more than 8,000 performed in South Australia each year. Despite its diagnostic benefits in identifying the presence of coronary disease, its benefit to the patient has been less rigorously studied and will be the focus of this project.

Optimising the Quality of Care in Patients with ST Elevation Myocardial Infarction: ST Elevation Myocardial Infarction (STEMI) is a medical emergency for which effective therapies have been developed, although their implementation may need to be optimised. This project will identify treatment gaps in the management of STEMI and investigate potential system improvements.

Health Outcomes in Patients with Intermittent Claudication: Intermittent claudication is the primary symptom of peripheral artery disease. This project will examine the disability associated with this symptom and its impact on quality of life.

Vascular Surgical Research Group

Lead Researcher: Prof Rob Fitridge
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Dr Prue Cowled +61 8 8222 7541 or prue.cowled@adelaide.edu.au

Professor Rob Fitridge

Dr Prue Cowled

Research themes of the Vascular Surgical Research Group address both basic laboratory science and clinical research. Major interests include peripheral arterial disease and abdominal aortic aneurysms. Research projects address aspects of the pathophysiology of vascular inflammation, wound healing, potential therapies and their clinical implications.

A second research strength is in predictive modelling. An interactive surgical-decision model has been developed that predicts likely clinical outcomes for individual patients after endovascular repair of abdominal aortic aneurysms based on their preoperative variables. Current research is directed at improving the predictive models using new clinical data and innovative new imaging technologies.

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

Effect of supervised exercise training volume in patients with peripheral artery disease: Intermittent claudication is defined as leg pain, occurring on exertion and resolving with rest and is a result of peripheral arterial disease. These studies will examine the role of exercise in clinical management of claudication.

Outcome Modelling in Aortic Surgery: Data has been collected from patients who underwent elective surgery for endovascular repair of abdominal aortic aneurysms (EVAR). The project aims to improve a preoperative risk assessment model. The complete dataset is also suitable to use in projects analysing clinical outcomes after EVAR.

Healing of chronic leg wounds in patients with diabetes and venous ulcers: These projects will collect wound fluid and biopsies from chronic wounds to examine the patterns of inflammation and predict the healing status of the wounds. New technologies for point-of-care sensors in wound healing will also be investigated.

See adelaide.edu.au/directory/robert.fitridge for recent publications and additional details of the research group and projects.

Virology Laboratory

Director/Head: Prof Eric Gowans
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Staff of the Virology Laboratory

Our interests are the design of novel vaccine strategies for HCV and HIV. As these viruses escape neutralising antibody, problems associated with vaccine design are similar. Thus, our efforts are directed towards the design of vaccines which elicit cell mediated immunity, and encompass basic immunology through to clinical trials, although it is vital to examine the efficacy of vaccines in animals.

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

A DNA vaccine to elicit neutralising antibody to the HIV tat protein: The potential of DNA vaccines has not been realised due to suboptimal delivery, poor antigen expression and a lack of a localised inflammatory response. Vaccination with DNA results in endogenous expression of the immunogen and generally elicits cell mediated immunity (CMI) although weaker humoral responses are also elicited. The HIV tat protein is a transactivator that increases HIV replication by recruitment of host transcription factors. The protein is also secreted and circulates in the blood of HIV-infected individuals, and probably facilitates spread of HIV infection in an individual. The aim of this study is to generate neutralising antibody (NAb) to Tat by DNA vaccination and to determine if co-delivery of CpG oligonucleotides can increase the antibody titre. HIV tat neutralisation will be determined in an *in vitro* transactivation assay and in *in vivo* experiments using a chimeric HIV, EcoHIV, that replicates in mice.

See Science Direct for recent publications and additional details of the research group and projects.

Zinc Biology Group

Lead Researcher and Contact:
Dr Peter Zalewski
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peter.zalewski@adelaide.edu.au

Zinc deficiency, together with vitamin A deficiency, have become top priority global issues. Zinc deficiency affects on average, one-third of the world's population. Young children, the elderly and the chronically sick are at high risk of zinc deficiency. Major health problems associated with zinc deficiency include: i) impairments in brain function and development, ii) impairment of the immune system with consequent risk of fatal infectious diseases such as pneumonia and iii) stunting of growth. Zinc deficiency weakens the epithelial linings of our bodies and predisposes to chronic inflammatory diseases such as asthma, COPD and diabetes.

The Zinc Biology Group aims to better understand the role of dynamic pools of zinc within the body. Our group was the first to develop a real time fluorophore for zinc, Zinquin, that enabled imaging of zinc in cells and tissues. We were the first to describe the marked accumulation of protective zinc ions at the luminal surface of our airways (trachea, bronchioles). The focus of our research over the last decade has been the roles of this airway zinc in protecting against asthma. As zinc has been shown to be protective for the cardiovascular system, we are now extending these studies to the vasculature in collaboration with the John Beltrame Vascular group at TQEH and the Sandy Hodge/Paul Reynolds labs at the RAH.

Projects are adaptable to Honours, Masters and PhD students through the University of Adelaide

RESEARCH PROJECTS

Role of zinc in the vasculature: We are looking for 1-2 motivated Hons/Masters students to explore the role of zinc and its family of transporter proteins in the endothelial lining of the peripheral blood vessels. This will be the first characterisation of zinc homeostasis in the blood vessels. The project will involve a range of techniques including Zinquin fluorescence, immunofluorescence, western blotting, qPCR, myography and cell death assays.

See adelaide.edu.au/directory/peter.zalewski for recent publications and additional details of the Research Group and projects.

The Institute

basil hetzel institute for translational health research

For further enquiries

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