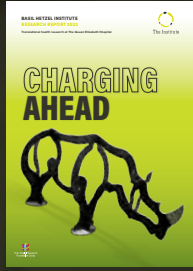




CHARGING AHEAD



BHI RESEARCH REPORT 2023



ON THE COVER

Rhino sculpture

Gerry McMahon (Australian Sculptor),
2001/2003, 300 x 150 x 90 cm in
steel and stainless steel.

► [www.artlogic.com.au/artist/
gerry-mcmahon](http://www.artlogic.com.au/artist/gerry-mcmahon)

Photography

Andrew Beveridge, asbCreative

► asbphoto.com

Graphic Design

Icarus Design

► icarus.com.au

BASIL HETZEL INSTITUTE FOR TRANSLATIONAL HEALTH RESEARCH

The Queen Elizabeth Hospital

Research Secretariat DX465101

28 Woodville Road
Woodville South,
South Australia 5011

T +61 8 8222 7836

F +61 8 8222 7872

► basilhetzelinstitute.com.au

The Basil Hetzel Institute, TQEH, forms
part of the Central Adelaide Local Health
Network (CALHN), one of ten local health
networks within SA Health.



ACKNOWLEDGEMENT OF COUNTRY

We acknowledge that this land we meet,
work, live and play on is the traditional lands
of the Kurna people, and we respect their
spiritual relationship with this country.

We pay our respects to their leaders, past,
present and emerging and acknowledge
that their language, cultural and traditional
beliefs held for over 60,000 years are still as
important and relevant to the living Kurna
and all Aboriginal people today.

Wardli Purrutinhi, "Place to live or to be alive"

Designed by accomplished Aboriginal South
Australian artist Allan Sumner, a descendant of the
Ngarrindjeri, Kurna and Yankunytjatjara people.



VISION

To be a premier
institute for
Translational
Health Research.



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MISSION

The BHI is the productive research arm of The Queen Elizabeth Hospital (TQEH) with a 'bench to bedside' approach.

At the forefront of an emerging area of medical science, it aims to improve public health through collaborative discoveries and innovations in patient care, education and research.



GUY MADDERN

Director of Research

Basil Hetzel Institute for Translational
Health Research
THE QUEEN ELIZABETH HOSPITAL

○
The result of our annual audit of activity within the Institute has shown significant increase in funding being directed towards research.

As the Australian healthcare system comes out of the COVID challenges, so too the research community has been able to become focussed on its core activity of translational research within the BHI. The result of our annual audit of activity within the Institute has shown significant increase in funding being directed towards research, with increased publications, a maintenance of higher degree student completions and a stable number of candidates undergoing Masters or PhD studies associated with the Basil Hetzel Institute.

Further significant success has been achieved with new MRFF grants and NHMRC support for the Institute's activities, which is further underpinned by contract research endeavours associated with the translational research being conducted within The Queen Elizabeth Hospital.

Over the past twelve months, increasing discussions are occurring around the value for Clinical Academics within the South Australian healthcare system. This is a feature of the staffing profile present at The Queen Elizabeth Hospital and further reinforces the activities within the BHI. It is important that quarantined time be available for academically orientated clinicians to conduct research.

These activities impact directly on the quality of patient care provided by the public health system and, with the large number of medical practitioners who also provide services to the private health system, providing benefit to the wider South Australian community. Unless research is seen as a core activity of our public hospitals, we are unlikely to be able to lead important clinical and therapeutic changes within the health system.

The recognition by the Premier and SA Health in collaboration with the Salaried Medical Officers' Association promises to provide a better definition and clarity around how research is recognised, conducted and rewarded within South Australian hospitals.

The 2023 Research Expo in October highlighted the outstanding translational work being performed in association with the Basil Hetzel Institute and this success needs to be celebrated and encouraged, particularly from within the ranks of our junior medical staff. There is also increasing evidence of nursing and allied health becoming more involved in translational research efforts.

The year also saw the commencement of Associate Professor Robert Bryant as the Michell McGrath Research Fellow working in areas of inflammatory bowel disease and the faecal microbiome. The basic science research was further supported by the mid-year appointment of Dr Michael Samuel to the Michell McGrath Breast Cancer Fellowship, supporting his work on the extracellular matrix and its role in cancer development. His group in part has relocated from the University of South Australia's facilities on North Terrace to the Basil Hetzel Institute with other groups within South Australia expressing interest in joining the research teams active within the Institute.



RESEARCH METRICS

FROM THE ANNUAL ASSESSMENT OF RESEARCH PRODUCTIVITY (2022-2023)

At the end of each financial year the Director of Research, BHI, TQEH engages with the research leaders at the precinct to assess productivity and progress. This involves collecting data on research inputs (staff, students and grants) and on the research outputs generated by the institute (including papers, patents, policies, products and graduates). Over the 25 years that this process has been happening TQEH has collected a rich, longitudinal data set of research indicators that track research productivity at the precinct. Below is a summary of the 2022-2023 Annual Assessment of Research Productivity. Detailed information on grants and publications can be found on the BHI website.

► www.basilhetzelinstitute.com.au/latest-news/research-reports



\$27M+
REVENUE

Grants, clinical academic salaries, contracts, scholarships and infrastructure support



\$6.2M+
Peer-reviewed grants



\$19.4M+
Other research support



\$1.3M+
Scholarship funding



\$0.3M+
Infrastructure support



121
New and continuing grants



80+
FTE Clinical and Research Staff



100+
Research students



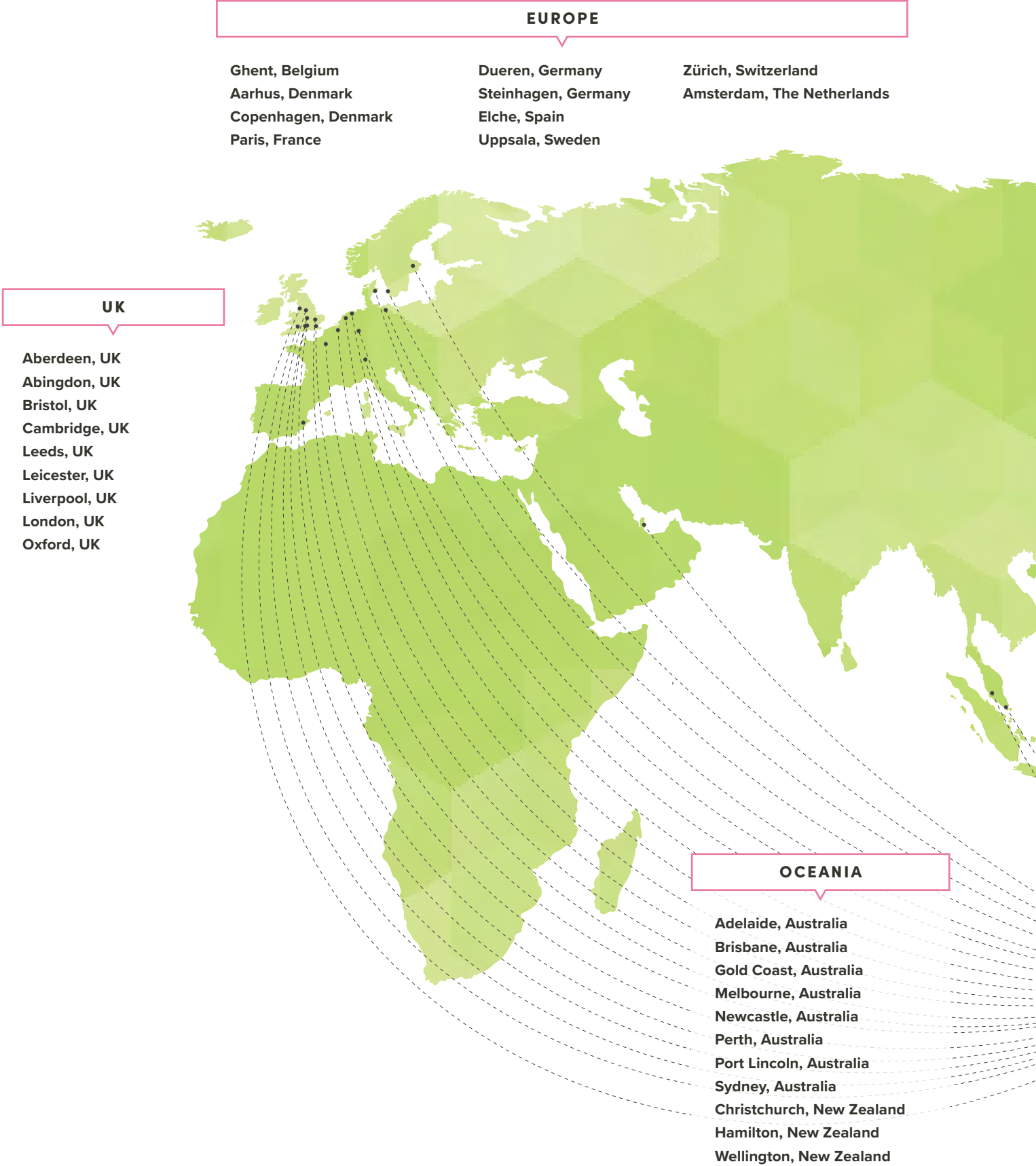
560+
Journal articles, books and abstracts



25+
Research groups



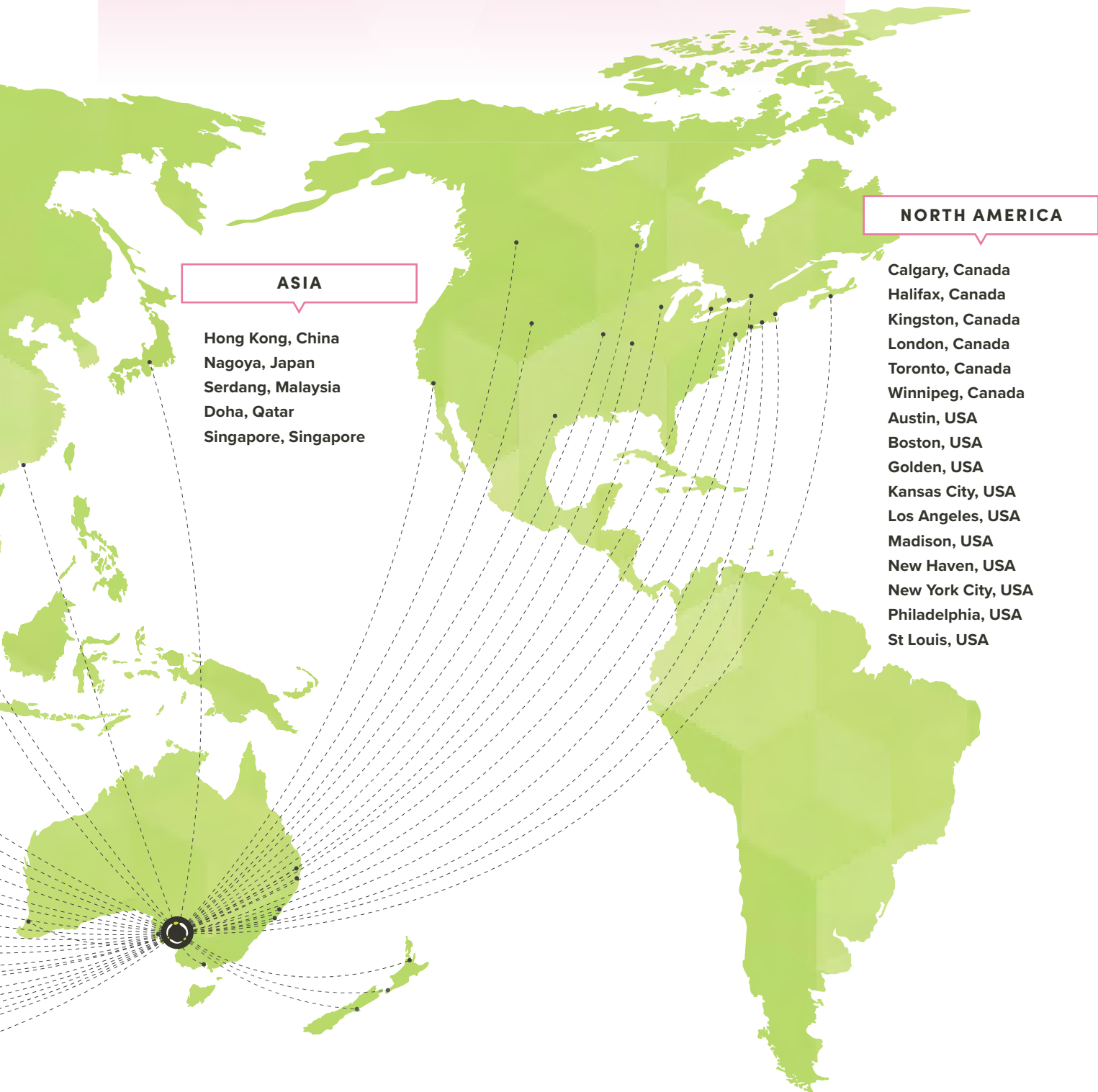
BHI NATIONAL AND INTERNATIONAL COLLABORATORS 2023



18
COUNTRIES

50
CITIES

330+
EXTERNAL
COLLABORATORS



ASIA

Hong Kong, China
Nagoya, Japan
Serdang, Malaysia
Doha, Qatar
Singapore, Singapore

NORTH AMERICA

Calgary, Canada
Halifax, Canada
Kingston, Canada
London, Canada
Toronto, Canada
Winnipeg, Canada
Austin, USA
Boston, USA
Golden, USA
Kansas City, USA
Los Angeles, USA
Madison, USA
New Haven, USA
New York City, USA
Philadelphia, USA
St Louis, USA

SUPPORT STRUCTURES 2023

The translational health research program of the Basil Hetzel Institute, TQEH, is underpinned by a well-established Committee structure.

The BHI Policy Committee, chaired by the Director of Research, BHI, TQEH, has a membership drawn from the research leadership of the BHI, the BHI research community and key stakeholders. The committee provides strategic counsel for the operation of the BHI, support for the Director of Research and advice on available support for the BHI's research programs.

The BHI Policy Committee is assisted by a number of sub-committees, with membership drawn from the BHI and stakeholders, and with defined areas of expertise: the BHI Research Advisory Committee, the BHI Management Committee, BHI Scholarship Selection Committee and the organising committee for the annual TQEH Research Expo.



BHI POLICY COMMITTEE REPORT

The Policy Committee of the Basil Hetzel Institute met on four occasions during the year. With the support of Carmela Sergi as the new Director of Innovation and Research, the Committee has been able to steer the organisation through the challenges presented over the last twelve months.

Professor John Beltrame stepped down in October from the role of Director of Research of CALHN but continues to serve on the Policy Committee.

The Committee is ably supported by its Standing Committees which provide excellent leadership and guidance to the Policy Committee's deliberations.

Professor Guy Maddern
Chair



BHI RESEARCH ADVISORY COMMITTEE REPORT

The BHI Research Advisory Committee is tasked with providing strategic advice and input on all issues pertaining to research across the BHI and TQEH to the Director of Research, the Director of Innovation and Research Translation, and the BHI Policy Committee. Members of the committee are drawn from across the precinct and represent researchers and clinicians at all stages of the research career, across all research themes, and reflect all key stakeholders.

The BHI Research Advisory Committee noted key development areas including 1) improving the BHI's corporate identity, 2) increasing consumer engagement at all stages of the research journey, 3) improving BHI strategic relationships with local, state, and national stake-holders, 4) incorporating new and expanding clinical specialities resulting from TQEH redevelopment, 5) adapting to the formation of Adelaide University, and 6) attracting exceptional students who embody the core values of the BHI/TQEH.

The Committee designed several new approaches to be implemented into 2024 to further establish the BHI/TQEH as a place of research excellence. This includes new Top-Up scholarships for Research Higher Degree Students, as well as changes to simplify and streamline student Travel awards.

Dr Eric Smith
Chair



BHI MANAGEMENT COMMITTEE REPORT

In 2023, the BHI Management Committee welcomed a number of new researchers, including Professor Michael Samuel joining BHI as the Australian Breast Cancer Research Fellow. The Committee was pleased to see the building at capacity with all available desks allocated to students.

Students also resumed “Off the Clock” activities after some disruption in 2021/2022.

The Committee thanks The Hospital Research Foundation Group for generously supporting equipment for the BHI totalling a \$175,000. This included four new items of equipment supporting the Inflammatory Bowel Disease Research Group, the Ophthalmology researchers, the Virology Group and Surgical Science, ENT Surgery researchers. One notable equipment item included enhanced laser capability to the Cytek Aurora flow cytometer, which was co-funded with the University Faculty Infrastructure Awards.

The Spectral flow cytometry is a relative new technology. The funding has allowed the BHI to provide one of the most advanced flow cytometers in South Australia to its researchers.

I thank all Committee members for their contributions and valuable discussions throughout the year.

Associate Professor Rosanna Tavella
Chair



BHI SCHOLARSHIP SELECTION COMMITTEE REPORT

During 2023, new decisions were made regarding scholarship support. The current requirement of The University of Adelaide to set aside 3.5 years’ funding for all higher degree students awarded scholarships has made the amount of funding available to us to distribute impossible to provide more than one year’s scholarship at any point in time.

This change has led to a new approach to the funding being offered, and a decision to provide top-up scholarships of \$8,000 to outstanding new and existing students has been made for decision at the end of 2023 and beginning of 2024. It is hoped this will recognise outstanding contributors who are already in receipt of research support at the Institute and encourage new applicants to choose the Basil Hetzel Institute as their preferred venue to conduct their postgraduate research. Additionally, support is being offered to Honours and Masters of Research students and this continues at the level of \$5,000 per year.

The funding environment continues to change and it is important that the scholarship program offered by the Institute adjusts and adapts to the changing circumstances in which it finds itself. These new changes of top-up scholarships will be reassessed towards the end of 2024 and the decision how best to utilise the scholarships funds will be further debated.

Professor Guy Maddern
Chair



TQEH RESEARCH EXPO ORGANISING COMMITTEE REPORT 2023

This year we hosted over 120 attendees and held 42 student presentations over two days to showcase the high quality and diverse scope of health and medical research occurring at the TQEH health and medical precinct.

Eighteen students took part in the mini-oral presentation sessions, four students participated in the dedicated CALHN Clinical Trainee session, and twenty students took part in oral presentations to compete for prizes across five categories.

Our student presentations captured the collaborative research that occurs within the Basil Hetzel Research Institute, and highlight research outputs that can only be achieved through long-standing and trusted collaborations between researchers, clinicians and patients at the TQEH precinct.

Ms Carmela Sergi
Chair



RESEARCH SUPPORT SERVICES

Operations at the BHI are supported and enriched by the following services.

Statistical support

Dr Suzanne Edwards of the Data, Design and Statistics Service, Adelaide Health Technology Assessment (AHTA), School of Public Health at The University of Adelaide provides support and training to BHI staff and students in statistical methods. This support, of one day a week, is provided through The Hospital Research Foundation Group.

Library support

Anna Holasek and Rachel Davey from the SA Health Library Service help staff and students at the BHI, TQEH with literature and database searches and accessing relevant material from libraries and publishers. They also provide training in the use of online resources and bibliographic tools. The librarians provide the research support team at the BHI with publication lists that document the outputs of TQEH-based researchers which are used in all our reporting processes.

TQEH Institutional Biosafety Committee

TQEH Institutional Biosafety Committee, chaired by Dr Eric Smith, ensured that the PC2 laboratory spaces of the BHI Research Facility comply with the Office of the Gene Technology Regulator PC2 licence requirements.

Operational support

Many people give of their time to support the researchers and the BHI Facility Manager with procedural compliance, research services and grant applications. Their service to our community is greatly appreciated.

- Mr Shane Spencer, Health and Safety Representative, Basil Hetzel Institute.
- Ms Elham Faez, Senior Work Health & Safety Consultant and Annette Skoda, Work Health & Safety Coordinator, Central Adelaide Local Health Network and their team.
- HSW Advisory team, The University of Adelaide.
- Dr Tony Cambareri, Faculty Executive Director, Faculty of Health and Medical Sciences, The University of Adelaide and his team.
- Dr Rebecca Cook, Research Support Lead, Health and Medical School, The University of Adelaide and Nicole Moore, Strategic Development Manager, Innovation and Commercialisation Service, Division of Research and Innovation, The University of Adelaide.
- Professor Amanda Page, Associate Dean Graduate Studies, Research Education and Development, Faculty of Health and Medical Sciences, The University of Adelaide.
- Mr Martin Hutchens, Team Leader Main Campus/LHN East Precinct, Faculty of Health and Medical Sciences, The University of Adelaide.

- Mr Vus Andrushenko and the TQEH Biomedical Engineering team.
- Mr Matthew Smith, Mrs Bronwyn Hutchens and Mrs Michelle Slawinski from TQEH Experimental Surgical Suite.

CALHN HREC and Research Office Support

The BHI has a dedicated office for use by CALHN Research Services. Research Services staff members provide essential ethics and governance support to all researchers working at TQEH. The office is continually seeking ways to streamline and simplify the provision of this support to BHI, and all sites of CALHN. Research Services staff members also provide help with grant submissions and post-approval and reporting requirements. Many thanks to Bernadette Swart (CALHN Research Office Manager) and Ian Tindall (CALHN HREC Chair), and their teams, for their ongoing support of BHI staff and students.

The Hospital Research Foundation Group is constantly impressed by the incredible innovation and impact being made by the teams at the BHI and TQEH.

In particular, the Australian Breast Cancer Research Fellowship has been a long-time staple of the BHI, driving world-leading outcomes and knowledge in breast cancer and even changing policy.

In 2023 we were pleased to award this five-year Fellowship to Professor Michael Samuel, to develop new therapies for metastasised breast cancer targeting the tumour-promoting microenvironment.

Professor Samuel's collaborative research also involves the use of artificial intelligence (AI), an important field to build efficiencies and knowledge quicker than we've ever seen before.

The BHI's work in cardiovascular disease has also been globally revered and we enjoy seeing Professor John Beltrame AM's translational work continue through his team in their success of competitive grant rounds run by THRF.

This team also enjoys giving back and has generously volunteered their time for our Giving Day over the past two years. Thank you for your incredible efforts on this day and always for our community.

Associate Professor Gabby Cehic AM has also been tireless in her work in TQEH's Nuclear Medicine department over many years, particularly for patients with neuroendocrine tumours.

We are proud to support her team's research through the implementation and maintenance of a database for Peptide Receptor Radionuclide Therapy (SA PRRT), and I know her patients are very grateful for the wonderful care they receive through the unit.

Of course, we are proud of all the research we fund at the BHI and TQEH which is

having a life-changing impact. In addition to the ones mentioned above, this covers a range of areas such as kidney disease, inflammatory bowel disease, healthy ageing, rheumatology, infectious diseases, stroke, liver disease, diabetes, ENT and surgery.

It is also important to note that The Hospital Research Foundation Group can only deliver this funding thanks to our generous donors, fundraisers, corporate partners and Home Lottery ticket buyers.

If you are looking to give back through regular giving, fundraising, volunteering or just through advocacy when talking to your networks, please think of The Hospital Research Foundation Group.

Congratulations to all the research groups on your outstanding efforts in 2023.



PAUL FLYNN
CEO

THE HOSPITAL RESEARCH FOUNDATION GROUP

We are proud of all the research we fund at the BHI and TQEH which is having a life-changing impact.



Professor Renuka VISVANATHAN

Adelaide Geriatrics Training and Research with Aged Care (GTRAC) Centre

Frailty to achieve healthy ageing.



Professor Michael SAMUEL

Centre for Cancer Biology

Informing the development of next-generation mechanotherapies against breast cancer metastasis.

Professor Andreas EVDOKIOU

Breast Cancer Research Unit

Liposomal-based delivery of phosphoantigens as sensitisers for adoptive gd T cell anticancer immunotherapy.

A/Prof Gabby CEHIC

Molecular Imaging and Therapy Unit (MITU)

Implementation and maintenance of a database of South Australia Peptide Receptor Radionuclide Therapy (SA PRRT) service.

Professor John BELTRAME

Translational Vascular Function Research Collaborative (TVFRC)

Value-based healthcare in elective coronary stenting.



A/Prof Rosanna TAVELLA

Translational Vascular Function Research Collaborative (TVFRC)

Gender Matters: Coronary Heart Disease – An Old Disease with New Problems.

Dr Clementine LABROSCIANO

Translational Vascular Function Research Collaborative (TFVRC)

Readmission Risk Prediction Following Acute Myocardial Infarction.



Dr Sivabaskari PASUPATHY

Translational Vascular Function Research Collaborative (TVFRC)

The Anti-Anginal Benefits of Zinc in Angina with Non Obstructive Coronary Arteries (ANOCA) Patients.

A/Prof Anne HAMILTON-BRUCE

Stroke Research Programme

- FAST-IT - Find A Simple Test In TIA (Transient Ischaemic Attack).
- DOgSS - Dogs Offering Support after Stroke.



Professor Catherine HILL

Rheumatology Research Group

Optimising transition care for adolescents with juvenile rheumatic disease in South Australia.

Professor Michael ROBERTS

Therapeutics Research Centre

Addressing potentially life-threatening ketoacidosis associated with key antidiabetic medicines.

Dr Makutiro MASAVULI

Viral Immunology Group

Hepatitis C virus (HCV) challenge in vaccinated HCV-permissive transgenic mice.

Associate Professor Branka GRUBOR-BAUK

Viral Immunology Group

COVID-19 SA: Understanding South Australia's unique and diverse COVID experiences to inform future management strategies.

A/Prof Robert BRYANT

Inflammatory Bowel Disease Research Group

- Microbial manipulation in inflammatory bowel diseases: a novel therapeutic paradigm.
- The 4-SURE (4-Sulphide-Reducing) project: pioneering a new diet paradigm in the management of ulcerative colitis.

THRF Group is proud to fund state-of-the-art medical research equipment each year to support BHI researchers in their work. In 2023, THRF Group provided \$175,000 for equipment to keep BHI technology at the cutting edge, and to enable researchers to continue their vital work with updated equipment.

Binoptometer® 4P

Binoptometer® 4P is a state-of-the-art functional vision analyser. It allows for comprehensive visual function testing, including contrast sensitivity testing under low light conditions. This is particularly relevant for evaluating the performance of trifocal and extended depth of focus intraocular lenses which may degrade that kind of vision. These are lenses that are used as part of cataract surgery to correct age-related failure of reading vision. This equipment will add a new dimension to ophthalmology research capabilities at TQEH for refractive surgery and measuring outcomes for patients.

Cytek aurora laser upgrade

In 2021, THRF Group, in conjunction with The University of Adelaide's Faculty of Health and Medical Science, generously funded a 3-laser Cytek Aurora flow cytometer. The 3-laser system could detect 24 colours. In 2023, The Faculty and THRF Group supported the upgrade of this system to its full, 5-laser capacity, detecting 40 colours. Phenotyping more cell signatures per sample will increase outputs for:

- The ENT Surgery Group, to characterise microbial dysbiosis and immune cell infiltration in chronic rhinosinusitis and the role of microbial infiltrates in head and neck cancers.
- The Solid Tumour Group, seeking novel treatments for breast and rectal cancer.
- The Surgical Science Research Group, who will use this technology to develop cell-based immunotherapy for bowel cancer.
- The Viral Immunology Group, in development of novel vaccines against zika, hepatitis and COVID-19.

Essential equipment

THRF Group also funded essential equipment to support all laboratory research groups at BHI. These include a class II biosafety cabinet, CO2 incubator, ultracold freezer, Thermacage warming cabinet and IVIS® imaging system upgrade.



Q-NRG Metabolic Monitor & Philips Lumify L12-4 Linear Array Transducer

The Q-NRG Metabolic Monitor measures energy expenditure. Also known as indirect calorimetry, this involves analysis of oxygen consumption and carbon dioxide production during resting respiration and is essential to prescribed diet therapy.

The Philips Lumify L12-4 Linear Array Transducer is a handheld ultrasound, providing high resolution imaging of skeletal muscle, soft tissue vasculature and lung tissue. This will assess muscle mass without exposing patients to ionizing radiation.

When used in combination, these two pieces of equipment form a sarcopenia assessment toolkit.

Sarcopenia is the age-related loss of muscle and strength. This toolkit will support:

- The Adelaide GTRAC Centre to study and add to the limited research surrounding IBD in older people. By understanding of the impact of IBD on body composition in middle age, there is opportunity to develop preventative care mechanisms, allowing IBD patients to age-well.
- The Inflammatory Bowel Disease Research Group in accurately calculating metabolic requirements and therefore explore variability of nutritional requirements in IBD with disease severity in differing body composition states.

Samantha Plush using the Q-NRG Metabolic Monitor & Philips Lumify L 12-4 Linear Array Transducer.

RESEARCH STUDENTS 2023



The Basil Hetzel Institute, TQEH, has provided basic and clinical research training to undergraduate and Higher Degree by Research (HDR) students for more than 30 years through its teaching and research affiliations with the South Australian Universities.

In 2023, over 90 research students undertook their Honours, Masters or PhD research projects with BHI, TQEH research supervisors. Over 90% of these students conducted their research within the BHI, TQEH precinct. In 2023, 19 students were awarded a PhD or Master's Degree. Half of the students who completed their PhD at The University of Adelaide received a Dean's Commendation for Doctoral Thesis Excellence. In addition, all 6 students who completed their Honours degrees through The University of Adelaide were awarded First Class Honours. For those students completing their research training we congratulate them on their achievements and wish them well in their future careers.

The BHI plays a central role in Adelaide in training the clinical researchers of the future. Of the total student cohort of 2023, over 60% of our trainees were clinically-trained or allied health practitioners. TQEH Clinical Researchers take an active role in student supervision of clinically-trained and scientifically-trained students providing valuable insights into unmet needs in healthcare. Through our student training we provide real-life opportunities to make a difference to health and medical outcomes.

BHI, TQEH based research students enrolled through the Faculty of Health and Medical Sciences at The University of Adelaide were expertly assisted by Honours and Postgraduate Coordinator Dr Peter Zalewski, and Postgraduate Coordinators Associate Professor Sarah Vreugde and Professor Betty Sallustio.

Work Experience Students

The BHI work experience program continues to be a popular window into medical science for secondary school students. In 2023, 6 students from Blackwood High School, Endeavour College, Marryatville High School, Seymour College, Temple Christian College (Paralowie), Walford Anglican School for Girls completed a placement. Each student spent a few days with BHI research groups, observing laboratory and clinical research and contributing to general lab duties.

UniSA Design Students

BHI, TQEH researchers were again fortunate to be partnered with UniSA Creative Bachelor of Design (Communication Design) students. In small groups, students created animations with voice over to simplify 4 medical concepts or studies for the researchers' intended audience. All animations were intended for patient or potential participant use, with some animations doubling as educational tools.

Dr Laurine Kaul (Richter Lab) was awarded a PhD at The University of Adelaide alongside her supervisor Dr Katharina Richter in July 2023.

RESEARCH STUDENTS 2023

COMPLETED HIGHER RESEARCH DEGREES & HONOURS

Listed alphabetically by surname; BHI, TQEH based supervisors are underlined; *indicates students with BHI, TQEH supervisors who undertake their research at other precincts.



THE UNIVERSITY OF ADELAIDE

PhD AWARDED

Ghais HOUTAK ^{BMed, MNeurosc (Research), MMed}

Development of a personalised therapeutic protocol for S. aureus recalcitrant CRS

Supervisors: Vreugde S, Wormald PJ

ENT Surgery

The University of Adelaide Divisional and Fee Scholarship; The Hospital Research Foundation Postgraduate Research Top-Up Scholarship

The University of Adelaide, PhD Awarded 31 July 2023

Unyime JASPER ^{BMR(PT) MSc}

A pre-post, feasibility and acceptability study investigating the effects of a goal-setting coaching intervention using accelerometer guided objective feedback on real time feedback on sedentary behaviour and physical activity in hip fracture patient.

Supervisors: Visvanathan R, Yu S, Jadcak A, Dollard J

Adelaide Geriatrics Training and Research with Aged Care (GTRAC) Centre

International Wildcard Scholarship, CRE Frailty in Healthy Ageing Top-up Scholarship

The University of Adelaide, Awarded 21 July 2023

Laurine KAUL* ^{MPharm, PharmSc}

A Novel Antibiofilm Treatment for Surgical Site Infections

Supervisors: Richter K, Süss R (University of Freiburg, Germany), Zannettino A (The University of Adelaide)

Richter Lab

Beacon of Enlightenment PhD Scholarship

The University of Adelaide & University of Freiburg, PhD Awarded 5 July 2023

Adeel Akbar KHOJA ^{MBBS MSc(Epidemiology & Biostatistics)}

Assessing the Influence of Pregnancy and its Complications on Cardiovascular Disease Risk

Supervisors: Arstall M (NAHLN), Tavella R, Andraweera P (The Robinson Research Institute, The University of Adelaide)

Translational Vascular Function Research Collaborative

The University of Adelaide Scholarship

The University of Adelaide, PhD Awarded 31 Dec 2023

Anna MEGOW ^{MBBS}

The protective role of Corynebacterium species in chronic rhinosinusitis

Supervisors: Wormald PJ, Psaltis A, Vreugde S

ENT Surgery

The University of Adelaide Divisional Scholarship

The University of Adelaide, PhD Awarded 29 May 2023

Roshan NEPAL ^{BSc, MSc (Biotech)}

The role of prophages in bacterial virulence

Supervisors: Vreugde S, Wormald PJ

ENT Surgery

The Hospital Research Foundation Postgraduate Research Scholarship; The University of Adelaide Fee Scholarship

The University of Adelaide, PhD Awarded 11 Oct 2023

THE UNIVERSITY OF ADELAIDE

MASTER OF PHILOSOPHY (SURGERY) AWARDED

Harrison BOLT ^{MD}

Understanding the immunoepigenetic function of mucosal epithelial cell FOXP3 expression in chronic inflammatory sinonasal disease

Supervisors: Psaltis A, Vreugde S, Wormald PJ, Ramezanpour M

ENT Surgery

The University of Adelaide, Awarded 11 Oct 2023

Dr Anna Megow (ENT Surgery) was awarded a PhD The University of Adelaide in May 2023.

RESEARCH STUDENTS 2023 COMPLETED HIGHER RESEARCH DEGREES & HONOURS

THE UNIVERSITY OF ADELAIDE

HONOURS AWARDED

Ethan ARTHURS BHMS, Hons

EEG markers of symptoms, cognition and function in mood disorders

Supervisors: [Clark S](#), Mitchell Goldsworthy (University of South Australia)

Psychiatry Research Group

Honours (First Class), Awarded 31 July 2023

Harriet COOLING

Antimicrobial Efficacy and Non-Toxicity of a Far-UVC Laser in vitro

Supervisors: [Richter K](#)

Richter Lab

The Hospital Research Foundation Group BHI TQEH Research
Scholarship

Honours (First Class), Awarded 28 Nov 2023

Dray HARRISON BSc

*The Effect of Respiratory Virus Infection on IL-33 Mediated Type II
Inflammatory Response in Airway Epithelial Cells of Chronic
Rhinosinusitis patients*

Supervisors: [Vreugde S](#), [Ramezanpour M](#)

ENT Surgery

Honours (First Class), Awarded 31 July 2023

Connor JESSOP BSc

Diabetic Foot Ulcer Infection: Time for a smart phage cocktail therapy?

Supervisors: [Liu S](#), [Vreugde S](#)

ENT Surgery

Honours (First Class), Awarded 31 Dec 2023

Kaviya KALYANASUNDARAM

Phage therapy for antibiotic and phage resistant sinus infections

Supervisors: [Liu S](#), [Vreugde S](#)

ENT Surgery

Adelaide Medical Research Honours Scholarship

Honours (First Class), Awarded 31 Dec 2023

Jia Wen LIM

Investigating mucus binding properties of bacteriophage

Supervisors: [Liu S](#), [Vreugde S](#)

ENT Surgery

Honours (First Class), Awarded 31 Dec 2023

Rebecca NASH

Supervisors: [Hewett P](#)

Peritoneal Cancer Research Group

The University of Adelaide, Awarded 31 Dec 2023

Gayatri ASOKAN

Supervisors: [Hewett P](#)

Peritoneal Cancer Research Group

The University of Adelaide, Awarded 19 Dec 2023

THE UNIVERSITY OF ADELAIDE

MASTER OF MINIMALLY INVASIVE SURGERY (MMIS) AWARDED

Daniel CATTANACH

Supervisors: [Hewett P](#)

Peritoneal Cancer Research Group

The University of Adelaide, Awarded 31 Dec 2023

Abdul RANA

Supervisors: [Hewett P](#)

Peritoneal Cancer Research Group

The University of Adelaide, Awarded 31 Dec 2023

RESEARCH STUDENTS 2023

CONTINUING RESEARCH HIGHER DEGREE & HONOURS STUDENTS

Listed alphabetically by surname; BHI, TQEH based supervisors are underlined; *indicates students with BHI, TQEH supervisors who undertake their research at other precincts; **indicates students based at the BHI, TQEH but who do not have supervisors there.

THE UNIVERSITY OF ADELAIDE

PhD STUDENTS

Abdul Ali ABBAS BHMSc (Hons)

Investigating the potential of wound healing cells loaded in chitosan succinate-based hydrogel

Supervisors: Wormald PJ, Awad M, Vreugde S, Psaltis A

ENT Surgery

Sally Suriani AHIP MBBS Doctor of Family Medicine

The Malaysian Pictorial Fit-Frail Scale (M-PFFS): Development and Testing of Feasibility, Validity and Reliability In Malaysia

Supervisors: Visvanathan R, Theou O (Department of Medicine, Dalhousie University), A/Prof Dr Sazlina Shariff (Universiti Putra Malaysia).

Adelaide Geriatrics Training and Research with Aged Care (GTRAC) Centre

Government of Malaysia Scholarship

Zahra Aliakbar AHOVAN

A wound healing device for delivery of bacteriophage to infected wounds

Supervisors: Vreugde S Wormald PJ, Awad M

ENT Surgery

Mirabel ALONGE BHlthMSc(Hons)

Using Pharmacokinetic Principles to Improve the Safety of Tacrolimus in Kidney Transplant Recipients

Supervisors: Sallustio B, Collier J (The University of Adelaide), Jesudason S (CALHN, The University of Adelaide), Reuter-Lange S (University of South Australia)

Clinical Pharmacology Research Group

The University of Adelaide Faculty of Health & Medical Sciences Divisional Scholarship; The Hospital Research Foundation Top-up Scholarship

Avisak BHATTACHARJEE MBBS FCPS FMAS MPH

Mammographic density: optimising communication and clinical care

Supervisors: Ingman W, Turnbull D (School of Psychology, The University of Adelaide), White S (Centre for Social Impact, University of NSW)

Breast Biology and Cancer Unit

The Hospital Research Foundation Group Scholarship

Urmi BHATTACHARJEE MD

The role of virus-bacterial adhesion in shaping the host immune response in CRS

Supervisors: Vreugde S Wormald PJ, Psaltis A

ENT Surgery

George BOURAS LLB (Hons), B MaCompSci, B Fin.

Investigating Phage, Microbe and Host Interactions by Integrating Systems Multiomics

Supervisors: Vreugde S, Edwards R

ENT Surgery

Madeleine BRYANT MBBS

Patient Reported Experience Measures in Australian outpatient rheumatology care

Supervisors: Hill C, Black R

Rheumatology Research Group

Arthritis Australia Scholarship

Nick CANDY

Developing a marker for pituitary adenoma

Supervisors: Wormald PJ, Psaltis A

ENT Surgery

James Thomas CONNELL MBBS

Ecological interactions between fungal and bacterial elements in chronic rhinosinusitis

Supervisors: Wormald PJ, Psaltis A, Vreugde S

ENT Surgery

The University of Adelaide Research Training Program Stipend

Rachel DAVIS APD

Protein intake and ulcerative colitis

Supervisors: Bryant R, Day A

Inflammatory Bowel Disease Research Group

The University of Adelaide Scholarship

Jesse EY

Understanding and improving non-technical skills in surgery

Supervisors: Maddern G, Bruening M, Wells A

Surgical Science Research Group

Faculty of Health & Medical Sciences Short Term Scholarship

Fangmeinuo (Mona) WU MBiotechnology (Biomedical)

Repurposing the anti-anginal drug perhexiline for the treatment of head and neck squamous cell carcinoma

Supervisors: Smith E, Fenix K, Tomita Y

Solid Tumour Group

The University of Adelaide International Research Scholarship

Andrew FON MBBS FRACP

Endoscopic Lung volume reduction and Physiological Changes

Supervisors: Reynolds P (CALHN), Jersmann H (CALHN), Nguyen P (CALHN)

Respiratory Research Group

Thomas GOODSALL MBBS

Intestinal ultrasound in Crohn's disease

Supervisors: Prof Jane Andrews J (The University of Adelaide), Bryant R, Ma C (University of Calgary)

Inflammatory Bowel Disease Research Group

The University of Adelaide Scholarship

Chelsea GRAHAM BSc (Animal Sc)(Hons)

Developing a Schwann cell line from Tasmanian devil (Sarcophilus harrisii) dental pulp stem cells

Supervisors: Hamilton-Bruce MA, Pyecroft S (The University of Adelaide), Kremer K (The University of Adelaide)

Stroke Research Programme

Aashray GUPTA BMBS MS(Cardiothoracic Surgery) GDipSurgAnat GDipClinUS

Evidence supporting strategies for coronary artery revascularisation

Supervisors: Maddern G, Bennetts J (Flinders Medical Centre, Flinders University)

Surgical Science Research Group

NHMRC Postgraduate Scholarship

RESEARCH STUDENTS 2023

CONTINUING RESEARCH HIGHER DEGREE & HONOURS STUDENTS

Anupam DATTA GUPTA MBBS, MD, Clin Dip Pall Med, Grad Dip Musc Med, FAFRM (RACP)

Lower limb spasticity and dystonia

Supervisors: [Visvanathan R](#), [Koblar S](#) (The University of Adelaide, SAHMR), [Cameron I](#) (University of Sydney)

Adelaide Geriatrics Training and Research with Aged Care (GTRAC) Centre

Olivia GIROLAMO BAppSci BHlthMSc(Hons)

Clinical Considerations in Coronary Vasomotor Disorders

Supervisors: [Beltrame J](#), [Tavella R](#), [Zeitz C](#)

Translational Vascular Function Research Collaborative

The University of Adelaide Research Training Program Stipend

Matheesha HERATH MBBS

POWER to the people – Improving communication in surgery

Supervisors: [Maddern G](#), [Bruening M](#)

Surgical Science Research Group

THRF Group BHI TQEH Research Scholarship; The University of Adelaide Research Training Program

Hanieh HEYDARLOU

The role of TLR4 in mammographic density and breast cancer risk

Supervisors: [Ingman W](#), [Smith E](#)

Breast Biology and Cancer Unit

International Student Scholarship

Sumeena KARKI MSc (Biotech)

Potential use of essential oils from ethno-medicinal plants in clinical research

Supervisors: [Vreugde S](#), [Wormald PJ](#), [Ramezanzpour M](#)

ENT Surgery

The University of Adelaide Scholarship

Stephen KINSEY-TROTMAN MBBS, B.Pharm (Hons), MS, PGDip (Surg.Sci), FRACS

Defining male breast cancer: From the biological, clinical and patient perspective

Supervisors: [Ingman W](#), [Dasari P](#)

Breast Biology and Cancer Unit

Research Training Program Scholarship

Tanja KLOTZ BOccTherapy MClInSc

Hypertrophic scar measures relationship to trans epidermal water loss, and the effect of generic moisturisers on transepidermal water loss model

Supervisors: [Maddern G](#), [Wagstaff M](#) (RAH)

Surgical Science Research Group

Björn KOLBE

Plasma-activated water as a novel disinfectant against foodborne bacteria

Supervisors: [Richter K](#), [Coad B](#) (The University of Adelaide)

Richter Lab

The University of Adelaide Research Scholarship

Joshua KOVOOR BHlth MSc(Hons) MBBS

Characterisation of gastrointestinal recovery after general surgery

Supervisors: [Maddern G](#), [Jones K](#)

Surgical Science Research Group

Sarena LA BHlthMSc(Advanced) (Hons)

Clinical insights into patients with chest pain and NOCA (non-obstructive coronary arteries) syndromes

Supervisors: [Tavella R](#), [Pasupathy S](#), [Beltrame J](#)

Translational Vascular Function Research Collaborative

The University of Adelaide Research Training Program Stipend

Runhao LI BSc (Biotechnology), MBiotechnology (Biomedical)

Over-expression of SFRP5 in hepatocytes: a novel treatment strategy for colorectal cancer liver metastases

Supervisors: [Smith E](#), [Fenix K](#), [Price T](#)

Solid Tumour Group

The University of Adelaide International Research Scholarship

Celine Man Ying LI BSc BHlthMSc(Hons)

Investigation on the cytokine induced killer cells (CIK) in the treatment of colorectal cancer liver metastasis

Supervisors: [Maddern G](#), [Fenix K](#), [Drew P](#)

Surgical Science Research Group

The University of Adelaide Divisional Scholarship

Suellen LYNE* MBBS FRACP

Epidemiology, Clinical Phenotype and Treatment Implications of Giant Cell Arteritis in Australia and New Zealand

Supervisors: [Hill C](#), [Ruediger C](#), [Shanahan EM](#) (Flinders University)

Rheumatology Research Group

Research Training Stipend

Lee MAI

The role of intratumor microbiota in response to therapy in oral carcinoma

Supervisors: [Vreugde S](#), [Fenix K](#)

ENT Surgery

Ryan MATHIAS MBBS

Intestinal ultrasound to identify gastrointestinal contents

Supervisors: [Bryant R](#), [Costello S](#), [Day A](#)

Inflammatory Bowel Disease Research Group

The University of Adelaide Scholarship

James MARTIN MAPS

Investigating the substrate processes underlying the relationship between cognitive functioning and Anomalous Self-Experience, in adolescents with first-episode psychosis

Supervisors: [Schubert O](#), [Clark S](#)

Psychiatry Research Group

Alex Tony MINOPOULOS BHlthSc BHlthMSc(Hons)

The role of endothelial dysfunction and the expression of rho-kinase in coronary artery spasm

Supervisors: [Beltrame J](#), [Tavella R](#), [Sallustio B](#)

Translational Vascular Function Research Collaborative

THRF Group BHI TQEH Research Scholarship

William Mark MURPHY BHSci, MD

Use of mesalazine in chronic rhinosinusitis

Supervisors: [Wormald PJ](#), [Psaltis A](#), [Vreugde S](#)

ENT Surgery

Getandale Zeleke NEGERA BPharm., MSc.

Investigation of the cardiovascular complications of diabetes

Supervisors: [Chong CR](#), [Chirkov Y](#), [Horowitz P](#)

Cardiovascular Pathophysiology and Therapeutics Group

The University of Adelaide Research Scholarship

RESEARCH STUDENTS 2023

CONTINUING RESEARCH HIGHER DEGREE & HONOURS STUDENTS

Jem NINAN MBBS MD FRACP FACP CCPU

Giant Cell Arteritis - understanding mechanisms of disease, improving the diagnostic certainty, and optimising management through Fast Track Clinics

Supervisors: [Hill C](#), [McNeil J](#)

Rheumatology Research Group

Modbury Hospital Foundation Research Grant

Huai Leng (Jessica) PISANIELLO MBBS FRACP

Understanding the Longitudinal Characteristics of Chronic Pain in Arthritis: the Role of Intensive Longitudinal Methods in Analysing Pain and the Attributable Burden of Persistent Pain on Treatment and Health Outcomes

Supervisors: [Hill C](#), [Beltrame J](#), [Dixon W](#) (University of Manchester), [Whittle S](#)

Rheumatology Research Group

Arthritis Australia Ken Muirden Travelling Scholarship 2018;
The University of Adelaide Faculty of Health and Medical Sciences
Divisional Scholarship

Andrew PEEL MBBS

The relationship between obesity, insulin resistance and fertility in men

Supervisors: [Mcpherson N](#) (The University of Adelaide), [Jesudason D](#), [Wittert G](#) (The University of Adelaide, Royal Adelaide Hospital)

Endocrine and Diabetes Unit

Samantha PLUSH APD

Dietitian First clinic in Functional Gastrointestinal Disorders

Supervisors: [Bryant R](#), [Day A](#), [Kumar S](#) (University of South Australia)

Inflammatory Bowel Disease Research Group

The University of Adelaide Scholarship

Sima KIANPOUR RAD BSc, MMedSc

The Biology of Triple Negative Breast Cancer

Supervisors: [Smith E](#), [Townsend A](#), [Ingman W](#)

Solid Tumour Group

The University of Adelaide International Research Scholarship

Sreecanth RAJA MBBS

Faecal microbiota transplantation for refractory ulcerative proctitis

Supervisors: [Rayner C](#) (The University of Adelaide), [Bryant R](#), [Costello S](#)

Inflammatory Bowel Disease Research Group

The University of Adelaide Scholarship

Karen ROYALS RN

PhD Nurse Practitioner in COPD management

Supervisors: [Carson-Chahhoud K](#) (University of South Australia), [Veale A](#)

Respiratory Research Group

Oscar RUSSELL MBBS

The impact of socioeconomic factors on medication use and health outcomes in Australians with rheumatoid arthritis

Supervisors: [Hill C](#), [Black R](#)

Rheumatology Research Group

Research Training Place Stipend, 2023 Arthritis SA Post Graduate Research Scholarship

Tomomichi SAKAI M.D.

The validation Study of FRAIL-NH in Japanese Nursing Homes and the Comparison Study with Australia

Supervisors: [Visvanathan R](#), [Masafumi K](#) (Department of Community Healthcare and Geriatrics, Nagoya University), [Jadczak AD](#)

Adelaide Geriatrics Training and Research with Aged Care (GTRAC) Centre

Jonathon SCHUBERT MBBS

Helicobacter pylori resistance patterns in Australia

Supervisors: [Rayner C](#) (The University of Adelaide), [Bryant R](#), [Roberts-Thompson I](#)

Inflammatory Bowel Disease Research Group

The University of Adelaide Scholarship

Deeksha SHARMA BHlthSc (Hons)

Find A Simple Test for TIA (FAST-IT)

Supervisors: [Hamilton-Bruce MA](#), [Koblar S](#)

Stroke Research Programme

Janet Helena SMITH (BN, BSc (Hons), MClIn Edu)

Acute coronary syndrome in women

Supervisors: [Beltrame J](#), [Tavella R](#)

Translational Vascular Function Research Collaborative

James SMYTH FFSEM, FRCEM, FACEM, DCH, FRCSI, MB, BCh, BA(Mod)

Roles of assessment activities of daily living (ADL's) and frailty for transfers of nursing home (NH) residents to the emergency department

Supervisors: [Visvanathan R](#), [Arendts G](#) (The University of Western Australia), [Grantham H](#) (Curtin University/Flinders Medical Centre)

Adelaide Geriatrics Training and Research with Aged Care (GTRAC) Centre

Xiaohan SUN PhD

Exploring the Efficacy of Phage Therapy in Disrupting Polymicrobial Biofilms in Chronic Rhinosinusitis

Supervisors: [Vreugde S](#), [Wormald PJ](#), [Psaltis A](#)

ENT Surgery

Reena TEWARI M.D.

Dementia diagnosis in residential care settings

Supervisors: [Visvanathan R](#), [Jadczak AD](#)

Adelaide Geriatrics Training and Research with Aged Care (GTRAC) Centre

Ying Yang TING MBBS

Coaching in surgical ward rounds

Supervisors: [Maddern G](#), [Bruening M](#)

Surgical Science Research Group

THRF Group BHI TQEH Research Scholarship; The University of Adelaide Research Training Program

Kai TIT TAN BHMS

Exploring The Relationship between Electroencephalography Aperiodic Slope, Neuroinflammation, Cognition and Function in Posttraumatic Stress Disorder Supervisors

Supervisors: [Schubert O](#), [Clark S](#), [Mitchell Goldsworthy](#) (University of South Australia)

Psychiatry Research Group

THRF Postgraduate Research Scholarship, International Scholarship

Ellie TRELOAR BHlthMedSc

Optimising the Surgical Ward Round

Supervisors: [Maddern G](#), [Bruening M](#)

Surgical Science Research Group

The University of Adelaide Research Training Program

RESEARCH STUDENTS 2023

CONTINUING RESEARCH HIGHER DEGREE & HONOURS STUDENTS

Sintayehu WONDEMAGEGN BSc MSc

The effect of bacterial exoproteins on the mucosal barrier of human nasal epithelial cells (HNECs)

Supervisors: [Vreugde S](#), [Fenix K](#), [Psaltis A](#)

ENT Surgery

The University of Adelaide Research Scholarship

Kenny Ker Li YEO BSc (Hons)

The Interplay Between Tumour-associated Microbiota, Tertiary Lymphoid Organ Development and Oral Cancer Carcinogenesis

Supervisors: [Vreugde S](#), [Fenix K](#)

ENT Surgery

Adelaide University-Nottingham Scholarship

Edward YOUNG MBBS

Mesh tissue integration index

Supervisors: [Maddern G](#), [Trochsler M](#)

Surgical Science Research Group

THE UNIVERSITY OF ADELAIDE

MASTER OF MEDICAL RADIATION PHYSICS STUDENT

Shuyun FAN MSc (Medical Radiation Physics)

Comparison of biokinetics and dosimetry for different methods of preparation for ablative radioiodine therapy

Supervisors: [Forster J](#), [Badger D](#)

Molecular Imaging and Therapy Unit

THE UNIVERSITY OF ADELAIDE

MASTER OF CLINICAL SCIENCE STUDENTS

Julia NEW TOLLEY MBBS

Rheumatoid Arthritis and Exercise in Australia

Supervisors: [Hill C](#), [Black R](#)

Rheumatology Research Group

Research Training Program Stipend

Matipaishe MASHAYAMOMBE MBChB MMed

Identification of bacterial resistance to silver-based wound dressings

Supervisors: [Fitridge R](#), [Kidd S](#) (The University of Adelaide)

Vascular Surgery Research Group

Suhanya SEIMON MBBS

The impact of treatment patterns on quality of life in individuals with critical limb ischaemia

Supervisors: [McMillan N](#), [Fitridge R](#)

Vascular Surgery Research Group

THE UNIVERSITY OF ADELAIDE

MASTER OF PHILOSOPHY (MEDICAL SCIENCE) STUDENTS

Matthew CHU MBBS

Exclusive enteral nutrition in Inflammatory Bowel Disease

Supervisors: [Bryant R](#), [Day A](#)

Inflammatory Bowel Disease Research Group

Basil Hetzel Institute Scholarship

Nikolaos FILIPPATOS

Liposomal-based delivery of phosphoantigens as sensitizers for $\gamma\delta$ T cell immunotherapy in breast cancer

Breast Cancer Research Group

Supervisors: [Licari J](#), [Panagopoulos B](#) (The University of Adelaide/SAHMRI)

Karmen TELFER MBBS

Faecal microbiota transplantation for maintenance of remission of Crohn's disease

Supervisors: [Weinstein P](#) (The University of Adelaide), [Costello S](#)

Inflammatory Bowel Disease Research Group

The University of Adelaide Scholarship

THE UNIVERSITY OF ADELAIDE

MASTER OF PHILOSOPHY (SURGERY) STUDENTS

Victor AGUIRRE GUTIERREZ MBBS

Title of thesis: Novel video recording systems in surgery: a new era in surgical education, safety and medico legal documentation

Supervisors: [Fitridge R](#), [Maddern G](#)

Vascular Surgery Research Group

Sean BRIEN MBBS AFRACMA

Surgical perioperative mortality for urological oncological procedures performed in Australia

Supervisors: [Maddern G](#), [Catterwell R](#)

Surgical Science Research Group

Isabella BURDON

Bacteriophage therapy for recalcitrant chronic rhinosinusitis

Supervisors: [Psaltis A](#), [Vreugde S](#), [Wormald PJ](#)

ENT Surgery

Katerina FLABOURIS MBBS

Peri-operative Glycaemic Control, post-operative Outcomes and Ethnicity in Adult Patients with Diabetes Mellitus Undergoing Surgery in South Australia

Supervisors: [Jesudason D](#), [Marathe C](#) (The University of Adelaide, Royal Adelaide Hospital)

Endocrine and Diabetes Unit

Kay HON MD

Evaluating musculoskeletal effects in diabetes-related foot disease

Supervisors: [Fitridge R](#), [Loughry C](#) (CALHN); [Thewlis D](#) (RAH, The University of Adelaide)

Vascular Surgery Research Group

RESEARCH STUDENTS 2023

CONTINUING RESEARCH HIGHER DEGREE & HONOURS STUDENTS

Jianliang (Laurence) LIU MBBS

An analysis of rural general surgical departments' caseload and patient outcomes in South Australia

Supervisors: [Maddern G](#), [Bruening M](#)

Surgical Science Research Group

Richard SMITH FRACS

Optimising post-operative interventions on musculoskeletal disorders in surgeons

Supervisors: [Maddern G](#), Neuhaus S

Surgical Science Research Group

Brandon STRETTON MBBS

Perioperative haemostasis and anticoagulation

Supervisors: Boyd M (The University of Adelaide), [Maddern G](#)

Surgical Science Research Group

THE UNIVERSITY OF ADELAIDE

HONOURS STUDENT

Jordan HALL

The role of influenza virus- in shaping the host immune response in CRS

Supervisors: [Vreugde S](#) [Ramezanzpour M](#)

ENT Surgery

FLINDERS UNIVERSITY OF SOUTH AUSTRALIA

PhD STUDENT

Tom ALTREE MBBS FRACP

Novel Pharmacology in Airway disease during sleep

Supervisors: Eckert D (Flinders Medical Centre), Murherjee S (Flinders Medical Centre), Catcheside P (Flinders Medical Centre)

Respiratory Research Group

The Flinders Health and Medical Research Institute Scholarship

FLINDERS UNIVERSITY OF SOUTH AUSTRALIA

MASTER OF PHILOSOPHY (MS) STUDENTS

Matthew MARSHALL-WEBB MBBS

Validation of a simple and practical method to monitor the efficacy of medical vs. surgical therapy for patients with Barrett's oesophagus

Supervisors: Thompson S (Flinders University), Watson D (Flinders University), [Myers J](#), Bright T (Flinders University)

Oesophageal Physiology Group

Flinders University

Rippan SHUKLA* MBBS

Best predictors for a good outcome after laparoscopic fundoplication in patients with gastro-oesophageal reflux

Supervisors: Thompson S (Flinders University), Watson D (Flinders University), [Myers J](#), Bright T (Flinders University)

Oesophageal Physiology Group

Flinders Foundation Grant

Flinders University

LATROBE UNIVERSITY

PhD STUDENT

Sonya McDOWALL B.Bus, B.Vet.Technol, Animal Science(Hons) GAICD RVT RVN

Exploring the Influence of the Social Determinants of Human Health on Companion Animal Welfare

Supervisors: Howell T, Stuckey R (La Trobe University), Hazel S (The University of Adelaide), [Hamilton-Bruce MA](#)

Stroke Research Programme

MONASH UNIVERSITY (ALFRED HOSPITAL, CENTRAL CLINICAL SCHOOL)

PhD STUDENT

Annie WALKER MBBS (Hons) GCertClinEd FRACP

New models of Integrated Palliative Care and Dyspnoea Management for People with Lung Cancer

Supervisors: Smallwood N (Monash University, Alfred Health), Holland A (Monash University, Alfred Health), Nguyen PT (The University of Adelaide, CALHN), Sullivan D (Oregon Health and Science University)

Respiratory Research Group

Australian Government Research Training Program Scholarship



To our BHI Community and stakeholders, thank you so much for making the event a success!

Congratulations to all the presenters who highlighted their research at the 32nd TQEH Research Expo on 19th and 20th October 2023.

This year we hosted over 120 attendees and held 42 student presentations over two days to showcase the high quality and diverse scope of health and medical research occurring at the TQEH health and medical precinct. Eighteen students took part in the mini-oral presentation sessions, four students participated in the dedicated CALHN Clinical Trainee session, and twenty students took part in oral presentations to compete for prizes across five categories.

Our student presentations captured the collaborative research that occurs within the Basil Hetzel Research Institute, and highlight research outputs that can only be achieved through long-standing and trusted collaborations between researchers, clinicians and patients at the TQEH precinct.

The plenary lecture was given by **Professor Leanna Read**, who spoke to us about the importance of both science skills and business leadership in translation of health outcomes, as well as outlining approaches for integration of research outcomes into health care. Her lecture was titled “Research and Health Care - bottom-up or top-down?”. The plenary lecture was inspiring and very well received. We are grateful to Prof Read for sharing her wisdom and insights.

At the conclusion of presentations, student awards were presented by Professor Guy Maddern, Director of Research at the BHI, TQEH. This year we also awarded a **Basil Hetzel Institute Award** to Professor John Beltrame in recognition of his exceptional contribution to research at the Basil Hetzel Research Institute and to The Queen Elizabeth Hospital.

This event does not happen without the generous support of the research community and supporters of the BHI. We thank our major sponsor, The Hospital Research Foundation Group, and all our sponsors for their generous support. We also thank our senior researchers and clinicians who take time out of their busy schedules to volunteer as Session Chairs, and Judges of abstracts, oral and mini-oral presentations.

Finally, a big thank you to the Research Expo Organising Committee for their unwavering support and assistance. I am personally very grateful to the Committee for their guidance in what was my first experience as the Research Expo Organising Committee Chairperson, and my second-ever Expo experience, with last year's Expo falling on my day 1 at BHI.

To our BHI Community and stakeholders, thank you so much for making the event a success!



CARMELA SERGI
Chairperson

TQEH Research Expo Organising
Committee
BASIL HETZEL INSTITUTE



Professor Guy Maddern presenting the Basil Hetzel Institute Award to **Professor John Beltrame**.

32ND TQEH RESEARCH EXPO 2023 AWARD WINNERS



AWARD CATEGORY	VALUE AWARD SPONSOR	WINNER	BHI RESEARCH GROUP
Best Lay Description	\$350 John Morris Group	Olivia Girolamo The University of Adelaide	Translational Vascular Function Research Collaborative (TVFRC)
Best Mini-Oral Presentation	\$500 The Hospital Research Foundation Group	Kaviya Kalyanasundaram The University of Adelaide	ENT Surgery
Best Clinical Trainee Research Presentation (tied winner)	\$500 The Hospital Research Foundation Group	Dr Natasha Stolz CALHN	Department of Anaesthesia, TQEH and RAH
Best Clinical Trainee Research Presentation (tied winner)	\$500 The Hospital Research Foundation Group	Sangwoo Han CALHN	Department of Gastroenterology, TQEH
Best Oral Presentation: Honours	\$1,000 The Hospital Research Foundation Group	Rohan Bhattacharjya The University of Adelaide	Research in Organ Preservation and Resuscitation Group
Best Oral Presentation: Junior Laboratory Research	\$1,000 The University of Adelaide, Clinical & Health Sciences	George Bouras The University of Adelaide	ENT Surgery
Best Oral Presentation: Senior Laboratory Research	\$1,000 The University of Adelaide, Faculty of Health & Medical Sciences	Ryan Santos The University of Adelaide	Viral Immunology Group
Best Oral Presentation: Junior Clinical Research	\$1,000 The Hospital Research Foundation Group	Dr Ryan Mathias The University of Adelaide	Inflammatory Bowel Disease Research Group
Best Oral Presentation: Senior Clinical Research	\$1,000 The Hospital Research Foundation Group	Olivia Girolamo The University of Adelaide	Translational Vascular Function Research Collaborative

L-R: 32nd TQEH Research Expo award winners **Ryan Santos**, **George Bouras**, **Kaviya Kalyanasundaram**, **Sangwoo Han**, **Olivia Girolamo**, **Ryan Mathias**, and **Rohan Bhattacharjya**.



RESEARCH GROUP

Adelaide Geriatrics Training
and Research with Aged Care
(GTRAC) Centre

AGEING

Dr Basil S Hetzel AC 1922 - 2017



The Adelaide Geriatrics Training and Research with Aged Care (GTRAC) Centre collaborates with research groups globally and is associated with The University of Adelaide and the Aged and Extended Care Services (Geriatric Medicine) at The Queen Elizabeth Hospital.

Our research focus includes healthy ageing, frailty, sarcopenia, gerontechnology, aged care, dementia assessment and management and falls prevention.

The team is committed to building the next generation of clinician and research leaders in the field of geriatric medicine and gerontology.

RESEARCH HIGHLIGHT OF 2023

Our research collaboration (led by Dr Agathe Jadczyk) with the Adelaide University Judo Club secured funding from The University of Adelaide Commercial Accelerator Scheme and the Hospital Research Foundation in the Innovations of Ageing Well grant round to investigate the benefits of Judo like exercise in improving safe-landing skills. The funds will also help the team develop a strategy to translate the research evidence generated, for example by establishing a train-the-trainer program.

Our research collaboration (led by Professor Renuka Visvanathan) with the Canadian Frailty Network, the Charles Sturt Council, Adelaide Primary Health Network and Dr Helen Barrie from University of South Australia also secured funding from the Hospital Research Foundation through the Innovations for Ageing Well grant round. Here the team aims to empower older people to AVOID frailty. The behavioural change intervention (focused on Activity, Vaccination, Optimising medication, Interaction and healthy Diet) leverages technology to promote behaviour change and brings to Australia for the first time, an innovative program developed and operationalised in 3 cities in Canada.



The team is committed to building the next generation of clinician and research leaders in the field of geriatric medicine and gerontology.

2023 research

Our PhD candidate, Dr Sally Ahip (a family medicine physician) has successfully translated frailty assessment and management services (GeKo) across 32 primary care clinics funded and operated by the Malaysian Ministry of Health. These clinics are aligned to the World Health Organisation's Integrated Care for Older People guidelines.

Our research paper (Professor Visvanathan co-author), "*Improving resilience of housing for low socio-economic older people: Let's first look at the frailty level!!!*", an output from our Australian Research Council Discovery Project 230103213 was awarded Best Paper and Presentation Award at the Architectural Science Association Conference 2023, Launceston.

Professor Visvanathan was invited to author a chapter (Geriatric Medicine in the Asia Pacific Region) for the 9th Edition of the Brocklehurst Textbook of Geriatric Medicine, the leading reference in the field of geriatric medicine.

GROUP MEMBERS

Professor and Head of Department

Renuka Visvanathan

Clinical Associate Professor

Solomon Yu

Senior Lecturers

Kareeann Khoo

Neha Mahajan

Adjunct Professor

David Wilson

Adjunct Associate Professor

Graeme Tucker

Adjunct Senior Lecturer

Mark Thompson

Lecturer, Research Fellows

Joanne Dollard

Agathe Jadczyk

Clinic Teaching Nurse (Casual)

Kathy Bray

Project Support (Casual)

Leonie Baker

Clinical Senior Lecturers

Bavand Biddelli

Fin Cai

Faizal Ibrahim

Shailajar Nair

Ronaldo Piovezan

Pazhvoor Shibu

Khai Tam

Postgraduate Students

Sally Suriani Ahip

Melkamu Bedimo Beyene

Anupam Datta Gupta

Tomomichi Sakai

James Smyth

Reena Tewari

BHI COLLABORATOR

Guy Maddern

Surgical Science Research Group

EXTERNAL COLLABORATORS

Azmeraw Amare

Mellick Chehade

Kylie Lange

Larissa Martins

Dino Pisaniello

Damith Ranasinghe

Veronica Soebarto

Terrence Williamson

The University of Adelaide,

Adelaide, Australia

Danielle Taylor

Australian Bureau of Statistics,

Adelaide, Australia

Hossein Haji Ali Afzali

Laura Edney

Hugh Grantham

Jon Karnon

Michael Lawless

Clara Pham

Alejandro Pinero De Plaza

Aubyn Pincombe

Tim Schultz

Barbara Toson

Flinders University, Bedford Park,

Australia

Helen Barrie

Maria Inacio

University of South Australia,

Adelaide, Australia

Gillian Caughey

Tahfsun Eshetie

Max Moldovan

SAHMRI, Adelaide, Australia

Rachel Ambagtsheer

Justin Beilby

Torrens University, Adelaide,

Australia

Simon Bell

Don Campbell

Amanda Cross

Laura Dowd

Keith Hill

Shin Liao

Monash University, Melbourne,

Australia

Glenn Arendts

University of Western Australia,

Perth, Australia

Mandy Archibald

University of Manitoba and The

Children's Hospital Research,

Institute of Manitoba (CHRIM),

Winnipeg, Canada

Olga Theou

Dalhousie University, Halifax,

Canada

John Muscedere

Canadian Frailty Network,

Kingston, Canada

John Beard

International Longevity Centre,

Columbia University, United States

of America, USA

John Morley

St Louis University, St Louis, USA

Isuru Ranasinghe

The Prince Charles Hospital &

The University Queensland,

Brisbane, Australia

Merridy Baylis

Tina Cooper

Resthaven Inc., Adelaide, Australia

Michael Headland

Meera Verma

Adelaide University Judo Club Inc,

Adelaide, Australia

Hiroyuki Umegaki

Nagoya University, Nagoya,

Japan

Sazlina Shariff

Universiti Putra Malaysia,

Serdang, Malaysia

Jean Woo

The Chinese University of

Hong Kong, Hong Kong, China

Lin Wee Shiong

Institute of Geriatrics and Active

Ageing, Singapore, Singapore



RESEARCH GROUPS

Breast Biology and Cancer Unit

Breast Cancer Research Unit

Molecular Imaging and Therapy Unit

Peritoneal Cancer Research Group

Solid Tumour Group

CANCER

GROUP MEMBERS

Research Leader

Wendy Ingman

Postdoctoral Researchers

Pallave Dasari

Ali Farajpour

Amna Ghith

Research Assistant

Leigh Hodson

Postgraduate Students

Avisak Bhattacharjee

Hanieh Heydarlou

Stephen Kinsey-Trotman

BHI COLLABORATORS

Tim Price

Eric Smith

Amanda Townsend

Solid Tumour Group

EXTERNAL COLLABORATORS

Erik Thompson

Queensland University of
Technology, Brisbane, Australia

Kara Britt

Peter McCallum Cancer Centre,
Melbourne, Australia

Jennifer Stone

University of Western Australia,
Perth, Australia

John Hopper

University of Melbourne,
Melbourne, Australia

Lisa Amir

La Trobe University, Melbourne,
Australia

Sarah White

University New South Wales,
Sydney, Australia

Luke Grzeskowiak

Flinders University, Adelaide,
Australia

Wendy Raymond

SA Pathology, Adelaide, Australia

Mark Hutchinson

Rebecca Robker

Deborah Turnbull

Lucy Woolford

The University of Adelaide,
Adelaide, Australia

David Walsh

CALHN, The University of
Adelaide, Adelaide, Australia



The Breast Biology and Cancer Unit investigates development and function of the breast across puberty, lactation and ageing to understand how disease states occur. Our research integrates basic biology model systems together with clinical and public health research to improve breast health across the life course.

We research breast cancer risk factors, including breast density and menstrual cycling, to better understand the underlying biology of the disease with a view to developing new ways to prevent the disease. We also research a common lactation condition known as mastitis, investigating why some women are more susceptible than others.

With a focus on community-driven outcomes, we work alongside clinicians within the Breast-Endocrine Surgical Unit, the Oncology Unit and Radiology Unit at TQEH, with pathologists at SA Pathology, and with lactation consultants.

RESEARCH HIGHLIGHT OF 2023

Improving access to breast density information has been a significant outcome from research led by Associate Professor Wendy Ingman and the Breast Biology & Cancer Unit. While dense breasts are common and normal, they do make detecting breast cancer in a mammogram more difficult. Dense breasts can also increase a woman's chance of developing breast cancer in the future.

A/Prof Ingman led a nationwide public awareness campaign reaching 7 million Australians in 2016, developed a website, and has fostered a shared well-informed conversation about breast density between government, clinicians and the community.

Through research conducted at The Queen Elizabeth Hospital, Dr Avisak Bhattacharjee showed that over 80% of women attending breast screening wanted to be informed of their own breast density, a study that was reported in the Advertiser and on Channel 10 news. In 2023, and following the completion of a successful pilot study, BreastScreen South Australia became the first state BreastScreen program to report breast density category to all their clients, which is a major advance in providing the information needed for women to make the best choices for their breast health.

2023 research

- A/Prof Wendy Ingman was awarded a Commendation for the Enhancement and Innovation of Student Learning from The University of Adelaide for her supervision of Higher Degree by Research students.
- Dr Ali Farajpour and A/Prof Wendy Ingman filed a PCT-phase patent "Scale-dependent elastography method for detection of small inclusions in biological tissue".
- A/Prof Wendy Ingman gave a talk at Parliament House in Canberra as part of the Research Australia launch of Parliamentary Friends of Health and Medical Research. In her talk she advocated for a national strategic approach to Australian health and medical research future workforce planning.



GROUP MEMBERS

Head of Unit

John Licari

Honorus Student

Xinyu Wang

Postgraduate Student

Nikolaos Filippatos

BHI COLLABORATORS

Benedetta Sallustio

Clinical Pharmacology

Eric Smith

Solid Tumour Group

EXTERNAL COLLABORATORS

Clive Prestidge

Matt Sykes

*University of South Australia,
Adelaide, Australia*

Bill Panagopoulos

*The University of Adelaide/
SAHMRI, Adelaide, Australia*

Gerald Atkins

Chunxia Zhao

*The University of Adelaide,
Adelaide, Australia*

Andrew Zannettino

SAHMRI, Adelaide, Australia

Vladimir Ponomarev

*Memorial Sloan Kettering Cancer
Center NY, New York City, USA*

The aim of the Breast Cancer Research unit is to find novel treatments for breast cancer. Our work is focused around how we can reprogram the patient's own immune system to not only locate but also attack and eliminate primary and metastatic breast cancer.

We have developed a world first approach of delivering therapies directly into cancer cells. We have packaged chemical sensitizers, known as phosphoantigens, in lipid carriers for transportation into the cancer cells. The patient's own circulating cancer fighting T-cells recognize the chemical sensors and bind to and eliminate cancer cells selectively, leaving normal cells unharmed. This research provides robust preclinical data that will facilitate the translation of novel therapeutic drugs and approaches to clinical trials for breast cancer and its spread.

2023 research

Protecting the heart from chemotherapy induced cytotoxicity

Chemotherapy has many unwanted side effects particularly causing heart damage. We have recently shown that mice genetically deficient in a protein known as TRAIL (TNF-related apoptosis inducing ligand) are protected from the toxic effects of chemotherapy, demonstrating for the first time that TRAIL is a major protein responsible for causing heart failure in cancer patients.

As a prelude to therapeutic development, we showed that intravenous administration of the TRAIL blocking drug, sDR5-Fc, in mice protected the heart from dox-induced damage and consequently improved cardiac function. We are continuing our drug development program and in collaboration with Dr Matt Sykes, from Pharmaceutical Sciences, University of SA, we used molecular modelling approaches to successfully identify existing drugs used for other purposes that may be re-purposed in this setting.

RESEARCH HIGHLIGHT OF 2023

The HER2 protein, residing on the surface of cells in normal breast tissue, plays a crucial role in the regulation of tissue growth and repair. However, when HER2 is present at abnormally higher levels on the surface of breast cancer cells, it triggers abnormal growth patterns. This specific subtype of breast cancer tends to be more aggressive and has a higher likelihood of recurrence post-treatment.

In response to this challenge, our research has yielded a groundbreaking technology poised to significantly enhance the effectiveness of T cell-based adoptive immunotherapy for HER2-positive breast cancer. This approach involves the recruitment of a specialized subunit of T cells known as gamma-delta T cells. These gamma-delta T cells exhibit a unique capability to selectively target HER2 breast cancers, thereby holding the potential to elevate therapeutic outcomes.

Crucially, what sets this technology apart is its ability to specifically target and attack HER2 breast cancer cells while concurrently minimizing damage to surrounding non-cancerous cells. This targeted therapeutic strategy represents a promising advancement in the field, offering a more nuanced and effective approach to combating HER2-positive breast cancer with reduced collateral damage to healthy tissues.

A more nuanced and effective approach to combating HER2-positive breast cancer with reduced collateral damage to healthy tissues.



TQEH Molecular Imaging and Therapy Department (Nuclear Medicine) conducts clinical research in 3 main areas:

1. **Molecular imaging and therapy (Theranostics) including:**
 - a. **Neuroendocrine Tumours (NETs) and Thyroid Cancer**
2. **CNS Related disorders – POTS and Sjögren's Syndrome**
3. **Medical and health physics:**
 - a. **Image guidance in proton therapy.**
 - b. **Radiation safety - Improvement to written discharge precautions for patients undergoing treatment with radioactive substances.**
 - c. **Improving the process for radiation dose and risk estimation for research studies.**
 - d. **Modelling the distribution and dose effects of radionuclide daughters in therapy with radionuclides with decay chains.**
 - e. **Laser based dosimetry during internal radiation therapy.**

RESEARCH HIGHLIGHT OF 2023

Neuroendocrine tumours (NETs) occur in many different organs of the body with no common set of symptoms, often leading to delayed diagnosis. NETs affect men, women and children of all ages.

Our department coordinates the state-wide NET multi-disciplinary meeting to provide individualised management plans for NET patients in SA and NT. Peptide Receptor Radionuclide Therapy (PRRT) is a form of systemic targeted radiotherapy that can stabilise disease, often improving quality of life by reducing the impact of hormones and controlling patients' symptoms. TQEH continues to be the only SA site to provide this service to SA/NT patients with metastatic NET.

Our focus in 2023

Service level

- Ongoing utilisation of the CALHN Sponsored Electronic Data Registry (REDCAP™) to capture data for South Australian patients with NETs treated with Peptide Receptor Radionuclide Therapy (PRRT). This clinical registry is, and will continue to be, a link to other service registries nationally. It also meets the National Safety and Quality Health Service (NSQHS) standards for service quality and clinical research.
- This SA Registry is also part of a larger National Registry for planning of treatment and research in Neuroendocrine Tumours (PLANET Registry) which continues to provide a large patient cohort for clinical trials.
- Along with the other National PRRT Centres, we are part of a 3 year study (AUSNET), under the auspices of the Medical Research Future Fund, which will develop and evaluate a Nurse-led shared care model to support Australian patients with NETs.

State-wide and National level

- Along with several other services, we are working with Centre for Excellence and Innovation in Health (CEIH) to develop and Implement a state-wide Patient Reported Measures program (PRMs). It is envisaged the data collected will improve patient-centred care, and provide important evidence for planning and financing future services.
- Clinical Oncology Society of Australia (COSA) have published the revised consensus guidelines for the management of Neuroendocrine neoplasms (NENs). We acknowledge and thank the Working Group Chair, Dr David Chan, and two Department Members who were chapter leads (Gabrielle Cehic PRRT Therapy) and (Michael Kitchener - Liver Directed Therapy).

► [Neuroendocrine Neoplasms \(NENs\) Clinical Guidelines | Cancer Council](#)



A case series on the value of Ceretec dynamic flow and SPECT perfusion cerebral imaging for the diagnosis and characterisation of Postural Orthostatic Tachycardia Syndrome (POTS).

2023 research

- A case series on the value of Ceretec dynamic flow and SPECT perfusion cerebral imaging for the diagnosis and characterisation of Postural Orthostatic Tachycardia Syndrome (POTS). The case series has been completed with 60 patients imaged. Statistical analysis is complete and a manuscript is underway. It is envisaged that this will lead to further studies with respect to POTS Syndrome. (Leads Dr Rey Casse, Technologists Tess Smith, Clair Coat and Physicist Kevin Hickson)
- A case series on the value of Ceretec dynamic flow and SPECT perfusion cerebral imaging for the diagnosis and characterisation of frontal lobe features of Sjögren's Syndrome. 20 patients have been imaged and statistical analysis is being performed. There will be a collaboration with RAH who will perform statistical analysis of Brain MRI of these patients. (Leads Dr Rey Casse, Technologists Tess Smith, Clair Coat and Physicist Kevin Hickson)

Medical Physics Team

- Patients undergoing treatment with radioactive substances may require precaution information as they are still radioactive on discharge. Currently used generic precautions can place excessive restrictions on patients. The team has conducted an extensive literature review and are building a system to give appropriate and individualised precautions based on sound principles.
- Prostate cancer treatment with radionuclide therapy: Medical physics have been providing radiation safety and other physics support for clinical trials into Lu-177 PSMA treatment.
- Improving the process for radiation dose and risk estimation for research studies: Any research involving the exposure of participants to ionising radiation must provide a radiation dose and risk assessment to the HREC. Medical Physicists produce these reports, but the process and requirements are not consistently followed. The medical physics team have been implementing an improved process to gather information and producing a template and clear guidelines for the reports.
- Modelling the distribution and dose effects of daughters in therapy with radionuclides with decay chains: Current dose models assume that the daughters of radionuclides deposit their radiation dose at the location of the parent. This research shows the effects on the dose of off-target organs of transport in the body of these radioactive daughters.

GROUP MEMBERS

Clinical Lead PRRT Service, Chair SA GEPNET MDT

Gabrielle Cehic

Head of Unit TQEH Nuclear Medicine

Steven Unger

Senior Nuclear Medicine Physicians

Paula Averbuj

Rey Casse

Michael Kitchener

Nicholas Liu

Martin Tan

Anke Warner

Nuclear Medicine Registrar

Mohamed Mohamed

NET Research Fellow

Liesl Altus

NET Therapy Fellow

Vaishali Padhye

SAMI Nuclear Medicine Therapy Nurse Consultant

Jessica Mercurio

Head of Medical Physics, SAMI

Kevin Hickson

Principle Medical Physicist

Daniel Badger

Medical Physicists

Ben Crouch

Jake Forster

Erin Lucas

Graduate Physicists

Melissa McIntyre

Stephen Tronchin

Nuclear Medicine Technologist (Manager Q1 and Q2 2023)

Peow Ong

Nuclear Medicine Technologist (Acting Manager)

George Pandos

Nuclear Medicine Technologists

Alessandra Caretti

Clair Coat

Elyse Connole

Nicholas Farnham

Sumaiya Hamid Juma

Jacy Lawrie

Jianing Liu

Dai Nguyen

Amanda Ranchodhrai

Tess Smith

Nuclear Medicine Registered Nurses

Davina Nicholls

Nuclear Medicine Enrolled Nurse

Tracy Coulthard

MDT and Nuclear Medicine Clerical Staff

Aleli Rigori

Kay Smith

BHI COLLABORATORS

Timothy Price

Solid Tumour Group

Emma Bradshaw

Guy Maddern

Surgical Science Research Group

Carmela Sergi

BHI, Director of Innovation and Research Translation

EXTERNAL COLLABORATORS

Nadia Corsini

Marion Eckert

Rosemary Bryant AO Research Centre, University of South Australia, Adelaide, Australia

Eva Bezak

Cancer Research Institute, University of South Australia, Adelaide, Australia

Cristina Blefari

Katherine Guerrero

Ashleigh Hull

University of South Australia, Adelaide, Australia

Dainik Patel

Lyell McEwin Hospital, Adelaide, Australia

Georgina England

David Moffat

SA Pathology, Adelaide, Australia

Dylan Bartholomeusz

Madison Bills

Bridgid Connolly

Yang Du

James McNeil

Alex Pearce

SA Medical Imaging, Adelaide, Australia

Grace Kong

Peter MacCallum Cancer Centre, Victoria, Australia

Meredith Cummins

NeuroEndocrine Cancer Australia and Cancer Nurses Society of Australia, Victoria, Australia

David Chan

Clinical Oncology Society of Australia, Sydney, Australia

Daniel Hefford

CALHN ICT, Adelaide, Australia

Pamela Cooper

Nada Falkenberg

TQEH, CALHN, Adelaide, Australia

Pascale Dettwiller

Australian Clinical Trials Network, Port Lincoln, Australia

Sandy Patel

RAH, Adelaide, Australia

Maureen Reichmeuller

TQEH, Adelaide, Australia

Marie-Claire Seeley

Australian POTS Foundation, Adelaide, Australia

Skye Hayes

Kym Peoples

PRMs Program, Adelaide, Australia

GROUP MEMBERS

Research Leader

Peter Hewett

Consultant

Markus Troschler

EXTERNAL COLLABORATOR

Susan Woods

SAHMRI, Adelaide, Australia



A novel pilot trial enrolling patients for neoadjuvant PIPAC in the setting of high risk stomach cancers has now extended to all gastric cancer patients thanks to a supporting grant by Tour de Cure.

The research focus of the Peritoneal Cancer Research Group at TQEH continues to be on effective clinical treatment of peritoneal cancer.

There are a variety of cancers that can spread to the lining of the abdomen (the peritoneum). They can be difficult to treat because they grow into the cavity (the peritoneal cavity) surrounding the abdominal organs and chemotherapy given into the blood stream may not effectively penetrate the peritoneum and the cavity to treat peritoneal cancers.

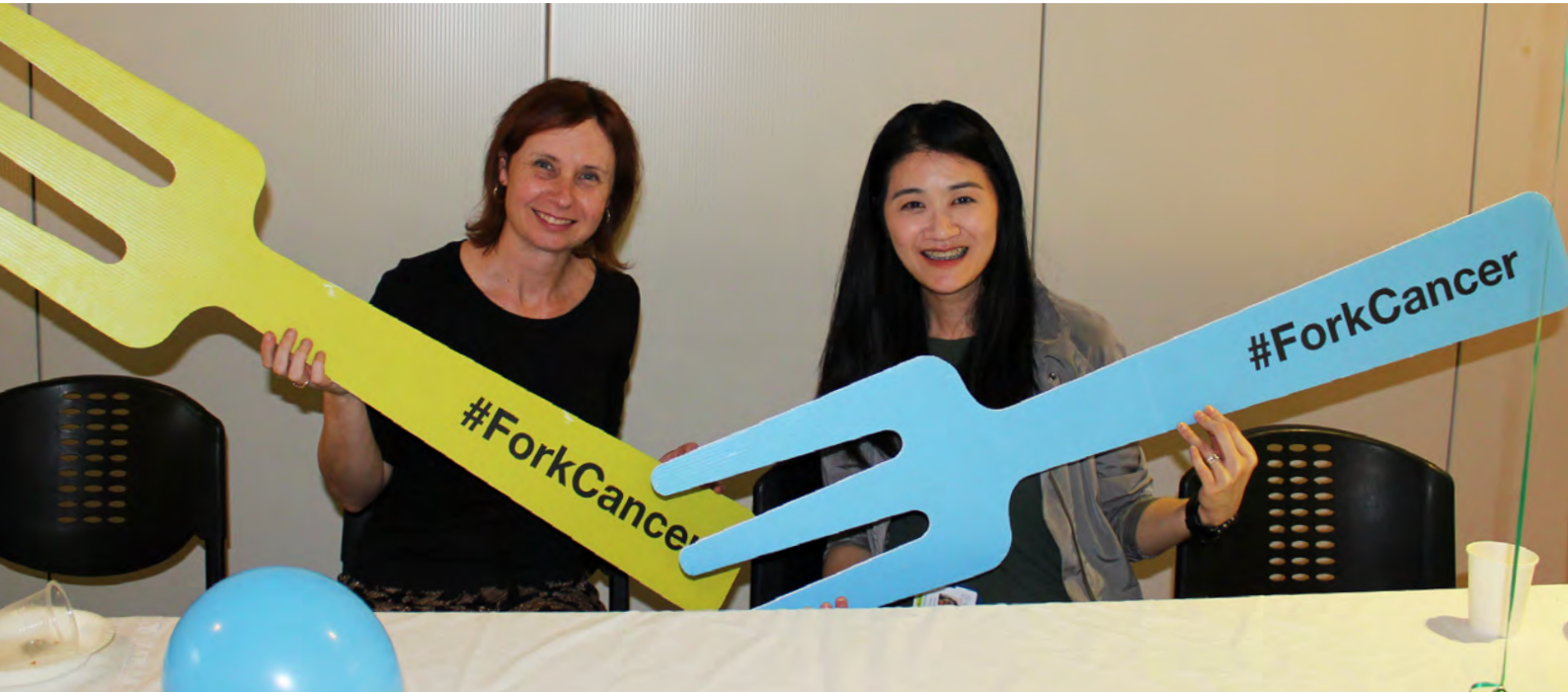
RESEARCH HIGHLIGHT OF 2023

The Pressurised intraperitoneal chemotherapy (PIPAC) program has continued with initial results presented at the GSA ASM in October 2022 and also ELSA Dubai conference. A paper is being prepared for publication in regard to the original safety trial. A novel pilot trial enrolling patients for neoadjuvant PIPAC in the setting of high risk stomach cancers has now extended to all gastric cancer patients thanks to a supporting grant by Tour de Cure.

The close link that the Peritoneal Cancer Research Group has with the Upper GI Surgical Unit and the Colorectal Surgical Unit is indispensable in delivering these innovative treatments.

► <https://doi.org/10.1515/pp-2023-0047>

Mortensen MB, Casella F, Duzgun O, Glehen O, Hewett P, Hubner M, Jorgensen MS, Konigsrainer A, Marin M, Pocard M, Rezniczek G, So J, Frstrup CW, Second annual report from the ISSPP PIPAC database. *Pleura and Peritoneum*. 8(4):141-146, 2023 Dec.





RESEARCH HIGHLIGHT OF 2023

Population screening for colorectal (bowel) cancer has been successful in decreasing the incidence and mortality from this malignancy. Prevention is most effective when directed to that sector of the population that is most at risk.

In Australia bowel cancer screening has traditionally been carried out on members of the population aged 50 years and over, as increasing age is the best known of risk factors. However, the incidence in younger adults is rising in Australia, and elsewhere around the world with this observation remaining essentially unexplained.

In response to this, in October 2023, the National Health and Medical Research Council (NHMRC) recommended lowering the age at which members of the population could be enrolled in the national screening programme from 50 to 45. This will help in part to lower the incidence of mortality and morbidity from bowel cancer in younger adults. However more needs to be done, specifically to understand the aetiology of this trend, and to target screening to those most at risk.

The South Australian Young Onset Colorectal Polyp and Cancer Study (SAYO) is a multidisciplinary state-wide consortium which seeks to identify the risk factors and warning signs for bowel cancer in young adults. In 2020 we extended SAYO to understand why appendiceal cancers are also on the rise in our population. We have previously reported that young adults developing colorectal cancer under 55 years of age were four times more likely to have a personal history of type 2 diabetes.

In more recent times we have looked at the polyps in young adults in a pilot study and found that precancerous polyps of the bowel are also more frequently observed in younger adults with type 2 diabetes. Though not all young adults with bowel cancer have this condition, our findings have the potential to reduce the incidence or prevent bowel cancer in young adults who are diagnosed with type 2 diabetes, a group who may benefit from a bowel cancer surveillance program regardless of age.

The Solid Tumour Group, led by Professor Tim Price, is a large, multidisciplinary group, that brings together researchers and clinicians from the BHI, TQEH and collaborators from across the state.

The group has a comprehensive research program that works towards improved prevention strategies, better diagnostics and new therapeutics for a range of solid tumours, notably colorectal, appendix, upper gastrointestinal tract, neuroendocrine, breast, head and neck. The group links directly with the clinical services at TQEH, a link which facilitates the collaboration with the clinical trials program and enables an opportunity to translate pre-clinical findings into improved patient care.

The group comprises three parts:

- Young Onset Colorectal and Appendix Cancer Group
- Clinical Trials Group
- Molecular Oncology Group

YOUNG ONSET COLORECTAL AND APPENDICEAL CANCER GROUP

In young adults, cancers of the bowel and the appendix are rising in incidence. The purpose of our registry is to highlight the risk factors which may be contributing to this observation with a view to approaches aimed at prevention and early detection.

CLINICAL TRIALS GROUP

There are over 30 clinical trials open within the TQEH Cancer trials unit. The focus has shifted of late to early phase trials investigating novel targeted agents building on the successful work in the KRAS G12C space which saw 2 NEJM and one Lancet Oncology publications. Prof Price was invited to talk at the ESMO Asia meeting in October 2023 summarising the current data on G12C mutation agents and their impact on colorectal cancer outcomes.

Current targets under investigation include M-TAP, IDH1 and FGFR1. Later phase trials in most tumour types complement the Phase 1 trials with a particular focus on gastrointestinal, lung and melanoma Phase 3 trials.

In addition to Pharma sponsored trials the group continues to be involved in national cooperative group trials including those from AGITG and ALTG. In addition, trials initiated within the group, such as the PIT (Panitumumab, irinotecan and Tas 102) trial, have been successful with the final results to be published.

MOLECULAR ONCOLOGY GROUP

We have evaluated the potential of a novel blood biomarker, circulating secreted frizzled related protein 5 (SFRP5), for the early detection and prognosis of progression of colorectal cancer in more than 1000 patients and healthy donors. The SFRP5 concentration was elevated in patients with colorectal cancer and polyps as well as in those with other inflammatory diseases.

The SFRP5 concentration declined with the spread of colorectal cancer to distant organs, raising the possibility that it may have therapeutic potential.

We have developed novel SFRP5 delivery methods which we will use to test its therapeutic potential in model systems of colorectal cancer metastasis. Findings were reported at the Lorne Cancer Conference.

2023 research

- We are the TQEH hub for two clinical trials which use blood tests 1) to predict early relapse in colorectal and upper gastrointestinal cancer patients and 2) as a non-invasive test to predict findings at colonoscopy. These markers are showing promise in detecting a relapse earlier than traditional methods in a subset of patients.
- TQEH will be one of only 3 sites in Australia investigating a new form of immunotherapy for colon cancer. The vaccine which helps the patient develop antibodies to PD-1 is hoped to reduce the cancer burden prior to planned surgery and with this reduce the risk of future recurrence. Our group will undertake translation work to understand reasons behind why some patients do not respond to this therapy.

○
Our findings have the potential to reduce the incidence or prevent bowel cancer in young adults who are diagnosed with type 2 diabetes...

GROUP MEMBERS

Research Leader

Timothy Price

Chief Medical Scientist

Joanne Young

Clinical Research Leads

Yoko Tomita

Amanda Townsend

Principal Medical Scientist

Eric Smith

Research Nurses

Mehgan Horsnell

Esme Jasko

Clinical Trials Team

Pam Cooper

Elizabeth Eagan

Nada Falkenberg

Lynda Lok

Stella Papacharissiou

Celine Phay

Sophie Smith

Kiddki Tran

Postgraduate Students

Runhao Li

Sima Rad

Fangmei Luo (Mona) Wu

BHI COLLABORATORS

Kevin Fenix

Guy Maddern

Surgical Science Research Group

Wendy Ingman

Breast Biology and Cancer Unit

Branka Grubor-Bauk

Viral Immunology Group

Sarah Vreugde

ENT Surgery

Peter Hewett

Peritoneal Cancer Research Group

John Licari

Breast Cancer Research Unit

EXTERNAL COLLABORATORS

Susan Woods

SAHMRI, Adelaide, Australia

Ehud Hauben

Business SA, Adelaide, Australia

Erin Symonds

Flinders Medical Centre, Adelaide, Australia

James Kimber

The University of Adelaide, Adelaide, Australia



CARDIOVASCULAR DISEASE

RESEARCH GROUPS

Cardiovascular Pathophysiology
and Therapeutics Group

Translational Vascular Function
Research Collaborative (TVFRC)

Vascular Surgery Research Group

Zinc and Cardiovascular Disease
Research Group



In many cases, the past five years have seen a major change in understanding of causes of various forms of heart disease, especially in women and the elderly: this new understanding will lead to the development of new and better treatments.

A major focus of our group is degeneration of the endothelial glycocalyx, the inner layer of blood vessels. This damage turns out to be important in the causes of heart attacks, heart failure, diabetic heart disease, coronary artery spasm and “broken heart syndrome”.

RESEARCH HIGHLIGHT OF 2023

Diabetes is becoming more common in Australian society, partially due to poor diets, development of obesity, and ageing of the population. Most diabetics die of heart disease, and heart failure (HF) occurs both acutely and chronically. However, the form of heart disease specifically causing HF in diabetics (“diabetic cardiomyopathy”) rarely occurs in a “pure” form in humans.

To improve our understanding of the causes of diabetic cardiomyopathy, Dr Cher-Rin Chong and PhD student Getandale Negera have developed a rat model of diabetes, where cardiomyopathy develops over several weeks. They have utilized this model to evaluate the mechanisms underlying the development of HF, by examining changes in the integrity of the glycocalyx, the functionality of small coronary blood vessels, the implications of damage to the glycocalyx to the development of inflammation within the heart itself, and the precise mechanisms whereby diabetic HF may be associated with inflammation, increased rates of cell death, impaired handling of calcium by the heart, and impaired cardiac function.

To date, no diabetes-specific treatments for HF have been developed, and acute diabetic HF remains a very substantial clinical problem. The current experiments offer a path towards reversing this problem.



This damage turns out to be important in the causes of heart attacks, heart failure, diabetic heart disease, coronary artery spasm and 'broken heart syndrome'.

2023 research

TakoTsubo Syndrome (TTS)

- Our group remains among the world's leading investigators of TTS and we continue our collaboration with the Inter-Tak group (Zurich), exploring ways to improve diagnosis of TTS. Independently in 2023, Dr Yuliy Chirkov and Honours student Indy Lawrie demonstrated that patients recovering from TTS exhibit impaired responses of platelets to anti-aggregatory hormones in the long term. Dr Gao-Jing Ong, as part of his clinical studies, together with medical student Farnaz Jalili, have demonstrated that the acute stages of TTS are associated with damage to the walls of the coronary microvessels.

Bushfires and Heart Attacks

- It has been shown in the past that heart attacks are more likely to occur as air pollution increases. Review of data from the 2019-20 bushfires showed an additive effect of extent of air pollution, ambient temperature and proximity to a bushfire as correlates of increased heart attack risk, providing a basis for future designation of some summer days as "high fire risk/high heart attack risk".

Perhexiline

- Perhexiline is the most effective treatment for angina pectoris, increasing the efficiency of the heart. We continue our participation in a controlled trial of Perhexiline to improve cardiac structure in patients with hypertrophic cardiomyopathy (RESOLVE-HCM).

Publications

- In 2023, members of our group published 10 papers related to TTS, heart failure, coronary artery spasm, microvascular dysfunction cardiac function & metabolism.

► [See Publications](#)

GROUP MEMBERS

Research Leader

John Horowitz

Principal Medical Scientist

Yuliy Chirkov

NHMRC Peter Doherty Early Career and NHF Postdoctoral Fellow

Cher-Rin Chong

Senior Medical Scientist (part-time)

Thanh Ha Nguyen

Laboratory Manager

Irene Stafford

Postgraduate Students

Getandale Zeleke Negera

Hourieh Tousianshandiz

Honours Student

Indy Lawrie

Vacation Student

Farnaz Jalili

BHI COLLABORATORS

Benedetta Sallustio

Clinical Pharmacology Research Group

Sandra Peake

Intensive Care Medicine Research Group

EXTERNAL COLLABORATORS

Matthew Chapman

Sven Surikow

NALHN, Adelaide, Australia

Matthew Worthley

CALHN, Adelaide, Australia

Derek Chew

Joseph Selvanayagam

Flinders University, Adelaide, Australia

Rebecca Ritchie

Monash University, Melbourne, Australia

Rustem Dautov

The Prince Charles Hospital,

University of Queensland, Brisbane, Australia

Kuljit Singh

Gold Coast University Hospital,

Griffith University, Gold Coast, Australia

Doan Ngo

Aaron Sverdlov

The University of Newcastle, Newcastle, Australia

Michael Frenneaux

University of Qatar, Hamad

Medical Corporation, Doha, Qatar

Dana Dawson

University of Aberdeen,

Aberdeen, UK

Christian Templin

University Hospital Zurich, Zurich,

Switzerland



Vascular diseases remain a major cause of death and poor health in Australia. Vascular diseases can be largely attributed to abnormalities within blood vessels and compromised blood supply to the organs, including the heart.

The Translational Vascular Function Research Collaborative (TVFRC) undertakes interdisciplinary discovery, clinical and epidemiological research into vascular diseases aimed at improving our understanding of these disorders, optimising healthcare management and developing new and effective therapies.

The TVFRC comprises clinicians and medical scientists working at the BHI, The University of Adelaide, the Cardiology Departments of the Heart and Lung Unit, Central Adelaide Local Health Network and the Cardiology Department of Northern Adelaide Local Health Network, who together form a large, multidisciplinary collaborative group that prioritises interdisciplinary input to the development of clinically relevant solutions for the treatment of vascular disease.

The group is arranged around 3 themes:

- Translational Vascular Molecular Physiology
- Translational Vascular Clinical Physiology
- South Australian Cardiovascular Outcomes Registry (SACOR)

TRANSLATIONAL VASCULAR MOLECULAR PHYSIOLOGY

The Molecular Physiology group focuses on the pathophysiology and molecular signalling of vascular disorders including coronary artery spasm, coronary microvascular 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.

TRANSLATIONAL VASCULAR CLINICAL PHYSIOLOGY

The Clinical Physiology research team uses invasive and non-invasive techniques to identify the presence of vascular dysfunction in patients with vascular symptoms including angina (chest pain due to insufficient blood supply to the heart) and intermittent claudication (pain and/or cramping in the lower leg due to inadequate blood flow to the muscles). Techniques include the assessment of coronary artery spasm, coronary blood flow, cardiac magnetic resonance imaging, subcutaneous blood flow and endothelial function.

SOUTH AUSTRALIAN CARDIOVASCULAR OUTCOMES REGISTRY (SACOR)

The SACOR group is focused on health service delivery and patient health outcome improvement through healthcare quality assessment and evaluation of the health status of patients including symptoms, physical limitations and quality of life. Consistent with the changing environment in medicine, this group adopts a 'patient-orientated' approach to the delivery of health care by evaluating patient health status and quality of care delivered. The group has developed large databases and clinical quality registries from patients with coronary artery disease, microvascular disease, coronary spasm and peripheral artery disease. Most of these databases have international links thereby providing collaborative opportunities.

RESEARCH HIGHLIGHT OF 2023

Cardiac Society of Australia and New Zealand (CSANZ) held in Adelaide in August 2023, Prof John Beltrame was the Chair of the Clinical and Surgical Stream

Underscoring Prof Beltrame's national leadership in advancing cardiovascular research, he was invited to Chair the Clinical and Surgical Stream for the Cardiac Society of Australia and New Zealand (CSANZ) Conference, held in Adelaide in August 2023. This was a major opportunity to include novel sessions at this meeting, several of which highlighted research undertaken by the TVFRC and included:

An inaugural session dedicated to **Clinical Quality Registries** including presentations by researcher collaborator Prof Bertil Lindahl on the renowned SWEDEHEART Registry, presentation by Associate Professor Rosanna Tavella discussing the establishment of the Coronary Angiogram Database of South Australia (CADOSA) and the registry's integration with research and poster presentation by Dr Clementine Labroschiano demonstrating the development of predicative models from the CADOSA Registry.

The inaugural **Coronary Vasomotor Disorders** session highlighting progress of the CSANZ Coronary Vasomotor Working Group (established and chaired by Prof John Beltrame) and key presentations on angina and non-obstructive coronary artery disease (ANOCA) and myocardial infarction and non-obstructive coronary artery disease (MINOCA) by TVFRC researchers including Associate Professor Chris Zeitz, Dr Jessica Marathe, and Dr Tharshy Pasupathy.

In addition, PhD Students were selected for poster presentations, including:

Olivia Girolamo for her research on a) evaluating a 10-year, real work experience of functional angiography in South Australia and b) assessing clinical and system factors causing delays in primary reperfusion for patients with ST-elevation acute myocardial infarction.

Sarena La for her studies evaluating Coronary Vasomotor Disorders in ANOCA Patients. Sarena's research highlighted underdiagnosis of coronary vasomotor disorders. She was selected as a finalist for her poster and awarded the "Best Young Investigator (Poster Category)" for her research presentation.

2023 research

In 2023, the TVFRC contributed to 20 peer reviewed publications across research projects in clinical registries, coronary vasomotor disorder patients and clinical trials. Underscoring international excellence, TVFRC researchers were invited to produce an important clinical review article highlighting sex and ethnic difference in MINOCA for the prestigious *Nature Reviews Cardiology* journal (impact factor 49.6).

La S, Beltrame J, Tavella R. Sex-specific and ethnicity-specific differences in MINOCA. *Nat Rev Cardiol.* 2023 Sep 29. doi:10.1038/s41569-023-00927-6.

TRANSLATIONAL VASCULAR MOLECULAR PHYSIOLOGY

GROUP MEMBERS

Research Leader and Consultant Cardiologist

John Beltrame

Senior Medical Scientists

David Wilson
Peter Zalewski

Consultant Cardiologists

Sharmalar Rajendran
Matthew Worthley
Christopher Zeitz

Research Officers

Austin Milton
Harsha Padmanabhan
Mei Ling Soo

Postgraduate Student

Alex Minopoulos

BHI COLLABORATORS

Peter Zalewski
*Zinc and Cardiovascular Disease
Research Group*

Betty Sallustio
*Clinical Pharmacology Research
Group*

EXTERNAL COLLABORATORS

Peter Psaltis
*SAHMRI, Vascular Research
Centre, Heart Health, Adelaide,
Australia*

Hugh Cullen
James Edwards
Fabiano Viana
*Cardiothoracic Surgery Unit
(CTSUS), RAH, Adelaide, Australia*

TRANSLATIONAL VASCULAR CLINICAL PHYSIOLOGY

GROUP MEMBERS

Research Leads

John Beltrame
Chris Zeitz

Consultant Cardiologists

Sharmalar Rajendran
Matthew Worthley

Postdoctoral Researchers

Sivabaskari (Tharshy) Pasupathy
Rosanna Tavella

BHI COLLABORATORS

Jessica Marathe
Heart and Lung, CALHN

EXTERNAL COLLABORATORS

Bertil Lindahl
*Uppsala University Hospital,
Uppsala, Sweden*

C. Noel Bairey Merz
*Cedars Sinai Medical Centre,
Los Angeles, USA*

Tom Ford
*Gosford Public Hospital, NSW
Health, Sydney, Australia*

Jamie Layland
*Peninsula Health, Frankston and
Monash University, Melbourne,
Australia*

Andy Yong
*Concord Repatriation General
Hospital, Macquarie University,
University of Sydney, Sydney,
Australia*

Kuljit Singh
*Gold Coast Hospital, Gold Coast,
Australia*

Adil Rajwani
Jon Spiro
*Royal Perth Hospital, Perth,
Australia*

Stuart Turner
*John Hunter Hospital, Newcastle,
Australia*

Cindy McCall
*Consumer Representative,
Brisbane, Australia*

SOUTH AUSTRALIAN CARDIOVASCULAR OUTCOMES REGISTRY (SACOR)

GROUP MEMBERS

Research Leads

John Beltrame
Rosanna Tavella

Consultant Cardiologists

Matthew Worthley
Christopher Zeitz

Postdoctoral Researchers

Clementine Labroschiano
Sivabaskari (Tharshy) Pasupathy

Statistician

Jing Wu

Research Officers

Natasa Damjanic
Kleo Georgiadis
Maxine Hallows
Sarah McEwen
Ellen Schier
Sophia Tan
Wishy Thirasantikamol
Suzette Treen
Lynda Tully

Postgraduate Students

Olivia Girolamo
Janet Grant
Adeel Akbar Khoja
Sarena La

BHI COLLABORATORS

Robert Fitridge
Vascular Surgery Research Group

EXTERNAL COLLABORATORS

John Spertus
*Saint Luke's Mid America Heart
Institute, University of Missouri,
Kansas City, USA*

Bertil Lindahl
*Uppsala University Hospital,
Uppsala, Sweden*

Margaret Arstall
*Lyell McEwin Hospital, NALHN,
Adelaide, Australia*



Our group is affiliated with CALHN Vascular and Endovascular Services and operates across The Queen Elizabeth Hospital and Royal Adelaide Hospital precincts.

Our research is focused on interventions and outcomes studies for peripheral arterial disease and diabetes-related foot complications. This program has a special focus on culturally-safe approaches for addressing gaps in care, service delivery via telehealth, and cross-disciplinary collaboration.

Our goal is to reduce amputations and improve quality of life for patients with lower-limb disease.

RESEARCH HIGHLIGHT OF 2023

Our group led a successful \$2.27mil grant from the Medical Research Futures Fund that will support the development and testing of advanced telemedicine for lower-limb complications through Augmented Reality. With principal leadership from Prof Robert Fitridge, and project management by Dr Neil McMillan supported in a new Senior Research Fellow role at The University of Adelaide, this program aims to revolutionise telehealth delivery for people with lower-limb disease living outside of metropolitan areas. This will include providing a “clinician’s-eye-view” of a foot assessment with AI tools for wound analysis and healing rate calculations. Building on past research at the BHI, this project is a multidisciplinary partnership between hospital specialists from the Central Adelaide LHN, technologists from Insight Via Artificial Intelligence Pty Ltd, psychologists from UniSA, and rural and Aboriginal health practitioners from the Riverland Mallee Coorong LHN.

This grant also supports the foundation of the Vascular Surgery Research Group Consumer Advisory Panel, a group of patients, carers, and practitioners convened at the end of 2023 who will provide consumer oversight for this project and support our ongoing research with expert advice from end-to-end.



○
Our group led a successful \$2.27mil grant from the Medical Research Futures Fund that will support the development and testing of advanced telemedicine for lower-limb complications through Augmented Reality.

2023 research

- Prof Fritridge co-chaired the Peripheral Arterial Disease committee for the International Working Group for the Diabetic Foot, producing the first international clinical guideline update from this group to be published across three international societies. These guidelines will inform gold-standard clinical practice across the world.
- Prof Fritridge is clinical co-investigator on an approved grant from the Medical Research Futures Fund to provide improved culturally-safe rehabilitation and prehabilitation for Aboriginal and Torres Strait Islander people across a spectrum of chronic disease. Headquartered at SAHMRI, this will be an Aboriginal Health Practitioner-led program partnered with hospital specialities.
- Prof Fritridge is clinical co-investigator on new grants from the NHMRC and THRF for a 3D-printed microcatheter for endovascular imaging of plaques. Led by The University of Adelaide medical engineer Dr Jiawen Li, this system will be tested using leg arteries to produce better diagnosis of stable vs high-risk artery disease.
- In collaboration with podiatrist/psychologist Dr Kristin Graham from UniSA, we published two qualitative research papers showing the perspectives of both Aboriginal patients and rural clinicians regarding video telehealth for lower-limb complications. This research demonstrated the value of the new Multidisciplinary Telehealth Foot Service.
- Dr Zahra Lotfollahi is a podiatrist who completed her PhD at the end of 2022, and is now a researcher in our group leading clinical research in wound healing diagnostics for an NHMRC Ideas Grant collaboration, led by Prof Allison Cowin at UniSA Future Industries Institute.

GROUP MEMBERS

Professor of Vascular Surgery
Robert Fritridge

Associate Professor
Joseph Dawson

**Principal Medical Scientist,
Senior Research Fellow**
Neil McMillan

Senior Research Officer
Zahra Lotfollahi

Clinical Research Nurse
Li Lao

Senior Research Podiatrist
Hannah Snelling

Research Podiatrist
Madeline Primavera

BHI COLLABORATOR

Sha Liu
Sarah Vreugde
ENT Surgery

Adrian Abdo
Katharina Richter
Surgical Science / Richter Lab

EXTERNAL COLLABORATORS

Stephen Kidd
Jiawen Li
*The University of Adelaide,
Adelaide, Australia*

Cathy Loughry
CALHN, Adelaide, Australia

Allison Cowin
Kristin Graham
Ancret Szpak
*University of South Australia,
Adelaide, Australia*

Christina Bursill
Kim Morey
Peter Psaltis
SAHMRI, Adelaide, Australia

Zygmunt Szpak
*Insight Via Artificial Intelligence
Pty Ltd, Adelaide, Australia*

Nicolas Voelcker
*Monash University, Melbourne,
Australia*

Elif Ekinci
*University of Melbourne,
Melbourne, Australia*

Shirley Jansen
*Sir Charles Gardner Hospital,
Perth, Australia*

Manar Kashram
*Waikato Hospital, Hamilton,
New Zealand*

Kim Smolderen
Yale University, New Haven, USA

GROUP MEMBERS

Research Leader, Consultant Cardiologist

John Beltrame

Senior Medical Scientist

Peter Zalewski

Consultant Cardiologist

Chris Zeitz

Postdoctoral Researchers

Sivabaskari Pasupathy (Tharshy)

Rosanna Tavella

Collaborating Postdoctoral Researchers

Adrian Abdo

Anna Wawer

Technical Officers

Nicholas Gunn

Mei Ling Soo

Anja Zelmer

BHI COLLABORATORS

Susan Lester

Rheumatology

Yuliy Chirkov

Irene Stafford

*Cardiovascular Pathophysiology &
Therapeutics Group*

EXTERNAL COLLABORATORS

Peter Psaltis

*SAHMRI, Vascular Research
Centre, Heart Health, Adelaide,
Australia*

Chiara Murgia

*University of Melbourne,
Melbourne, Australia*

Ashenafi Betrie

*Eugene Roscioli
The University of Adelaide,
Adelaide, Australia*

The Zinc and Cardiovascular Disease Research Group investigate the role of the major dietary metal, zinc, in the blood vessels and in vascular diseases.

Our work will enable us to directly relate endothelial zinc levels and zinc transporter expression with endothelial dysfunction, vasoconstriction, cigarette smoking and small and large artery disease in humans. It now incorporates a zinc interventional clinical trial.

RESEARCH HIGHLIGHT OF 2023

- **New clinical trial of zinc in treating treat heart disease**

Research into heart disease has come a long way in recent years but some unknowns still exist, particularly for people living with ANOCA (a type of angina where no blockage in the artery is found). But that could be about to change. Our group are investigating the role zinc supplements can play in managing chest pain symptoms in ANOCA. Recent research in our lab has shown that zinc may have an important role in maintaining normal function of blood vessels and that many patients with angina have zinc deficiency.

- **New technique to harvest vascular endothelial cells from patients with heart disease**

We are collecting patient samples using our unique endothelial biopsy technique which isolates endothelial cells from the linings of human coronary arteries during coronary angiography at no harm to the patient. This technique enables us to study the molecular and genetic basis of vascular dysfunction and cardiovascular disease. This research infrastructure has demonstrated that there is a real potential for capture of biological data for personalised medicine. In particular, this biobank has been used to improve our understanding of zinc and its role in vascular disease.

- **Characterization of novel vascular endothelial zinc transporter proteins**

Two large families of zinc transporter proteins control the levels, distribution and functions of zinc in the linings of the arteries. Our group has shown that one of the zinc transporters known as ZIP2 is impaired by cigarette smoke exposure. We are now characterizing the role of single nucleotide polymorphisms (SNPs) in the ZIP2 gene, looking at associations between these polymorphisms and inflammatory disease markers and cardiovascular disease.

2023 research

- **University of Adelaide Faculty of Health and Medical Sciences Mature Grant Award 2023**

This grant was awarded based on a recent near-miss NHMRC Ideas Grant application. We are using it to further expand on the endothelial cell biopsy study and the zinc transporter gene expression and SNP studies.

- **New national collaboration with a Florey cardiovascular research group in Melbourne**

Our expertise in zinc cardiovascular biology has resulted in a new collaboration with Dr Ashenafi Betrie and Prof Yugeesh Lankadeva who are interested in the role of endogenous zinc in coronary myogenic tone and in putting in with us a joint Ideas grant application in the 2024 round. In particular, they have a sheep model of heart failure and cardiopulmonary bypass which may be very useful for mechanistic studies.



Our group are investigating the role zinc supplements can play in managing chest pain symptoms in ANOCA.

RESEARCH GROUPS

Clinical Pharmacology Research Group

Diabetes and Endocrinology Unit

Stroke Research Programme

CHRONIC DISEASE

GROUP MEMBERS

Research Leader, Principal Medical Scientist

Benedetta Sallustio

Senior Medical Scientist

Shane Spencer

PhD Student

Mirabel Alonge

EXTERNAL COLLABORATORS

Toby Coates

Shilpa Jesudason

CALHN, Adelaide, Australia

Janet Collier

The University of Adelaide, Adelaide, Australia

Stephanie Reuter-Lange

University of South Australia, Adelaide, Australia



Importantly, we have shown that higher tacrolimus doses may be associated with decreased maternal kidney function in the last trimester of pregnancy...

The Clinical Pharmacology Research Group aims to improve the effectiveness and safety of medicines used to prevent rejection following kidney transplantation. These immunosuppressant medicines must be monitored carefully as too much immunosuppression can cause adverse effects, including damaging the new kidney, whilst too little can lead to rejection of the new kidney.

Collaborating with the Renal Transplant Service, we aim to improve monitoring of immunosuppressants so doctors can tailor doses for each transplant patient to minimise both the risk of rejection and adverse effects. Our research has focussed on improving outcomes for female transplant recipients during pregnancy, and for improving efficacy of Covid vaccines in transplant recipients.

2023 research

- Collaboration with Prof Toby Coates (CALHN Renal Transplantation Service) and Dr Branka Grubor-Bauk (BHI Viral Immunology Group) on a project demonstrating that use of the immunosuppressant sirolimus at the time of primary COVID-19 vaccination enhances the formation of functional, vaccine-specific T cell memory in immunosuppressed kidney transplant recipients.
- Collaboration with PARC Clinical Research on a clinical trial of sirolimus as a potential new treatment for Inclusion Body Myositis, a rare autoimmune disease that causes progressive muscle damage and weakness. The trial is ongoing and results are still blinded to the investigators.
- Publication of a novel method for monitoring tacrolimus in kidney transplant recipients: Alonge et al., Determining Plasma Tacrolimus Concentrations using High-performance LC-MS/MS in Renal Transplant Recipients. *Ther Drug Monit* (published online ahead of print, 27.9.2023).

RESEARCH HIGHLIGHT OF 2023

Recent advances in transplantation have allowed increasing numbers of female transplant recipients to have successful pregnancies. However, these are still rare and high-risk pregnancies where only a limited number of immunosuppressant medicines are safe to use for the developing baby.

Tacrolimus is the main immunosuppressant used in transplant recipients during pregnancy. However, it can cause increased blood pressure, diabetes and can also damage the transplanted kidney. These adverse effects of tacrolimus are often very difficult to distinguish from some of the complications of pregnancy, which can result in premature births. It is not clear if tacrolimus contributes to premature births or how doses should be individualised in pregnant transplant recipients.

In 2023 our PhD student, Ms Mirabel Alonge, completed a pilot study of women with kidney transplants who received tacrolimus during pregnancy. This work has confirmed that transplanted kidneys have a lower ability to adapt to the physiological changes that occur in pregnancy. Importantly, we have shown that higher tacrolimus doses may be associated with decreased maternal kidney function in the last trimester of pregnancy, and that higher maternal exposure to tacrolimus may also be associated with premature births and low newborn birth weights.

These results suggest that we may be able to develop specific dosing and exposure targets for tacrolimus in pregnancy. Together with Prof Shilpa Jesudason's team in the CALHN Renal Transplantation Service, we are now proceeding to a larger, multi-centre clinical trial to determine the most appropriate monitoring and exposure targets for tacrolimus in pregnant women.

The results of our pilot study were presented at the 2023 national scientific meeting of the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists.

The TQEH Diabetes and Endocrinology Unit conducts research in the areas of diabetes, osteoporosis and andrology. Our main research focuses on prevention and treatment of diabetes, particularly improving our understanding of the mechanisms of diabetes drug action and drug related adverse effects.

Sodium-Glucose Cotransporter-2 Inhibitor Therapy (SGLT2i), a drug commonly used in the treatment of type 2 diabetes, is our primary research interest and we collaborate closely with the TQEH Department of Anaesthesia.

Other areas of research, include the ongoing analysis of the Testosterone for Prevention of Type 2 Diabetes Mellitus trial and clinically focussed diabetes studies such as foot infections in people with diabetes. Through our research, we seek to contribute to the improvement in care and clinical outcomes for all Australians with diabetes.

2023 research

Dr Emily Meyer was a successful recipient of the \$200,000 CALHN CEO Clinical Rapid Implementation Scheme Grant titled “Development and implementation of a digital solution for personalised weight loss management within the Comprehensive Metabolic Care Clinic (CMCC).



SGLTi therapy has benefits beyond assisting with glycaemic control in diabetes, also improving outcomes in heart failure and renal disease.

RESEARCH HIGHLIGHT OF 2023

Our recent studies on euglycaemic diabetic ketoacidosis (DKA), an uncommon but well recognised complication of SGLT2i treatment, have investigated risk factors associated with developing this complication and explored an approach to management, particularly in the perioperative setting. Fasting, diabetes medication changes and intercurrent illness are factors identified from our earlier studies that may precipitate euglycaemic DKA perioperatively. The Australian Diabetes Society subsequently published periprocedural guidelines to mitigate the risk of euglycaemic DKA with SGLT2 inhibitor use and assist in the early identification and management of this complication.

Our more recent research has focussed on SGLT2i associated euglycaemic DKA occurring at the time of colonoscopy, a previously underappreciated precipitant. SGLTi therapy has benefits beyond assisting with glycaemic control in diabetes, also improving outcomes in heart failure and renal disease. These medications are now firmly established treatment options for people with and without diabetes who have heart failure or kidney disease associated with proteinuria.

Although euglycaemic DKA had not been an adverse event identified with SGLT2i therapy in landmark cardiovascular outcome trials in people with diabetes, our group was the first in the world to report a case series of SGLT2i associated euglycaemic DKA in 2018. Once again, in 2023 our group has reported the first 2 cases of euglycaemic DKA in two patients without diabetes after the introduction of SGLT2i therapy for heart failure. This was published in *Diabetes Care*, the highest ranking purely diabetes journal.

An increased association with euglycaemic DKA had not been recognised in the larger heart failure and kidney trials in people without diabetes. In 2024, we plan to continue our research on SGLT2i associated euglycaemic DKA in people with and without diabetes.

GROUP MEMBERS

Endocrinologist and Research Leader
David Jesudason

Endocrinologists
Kirsten Campbell
Lucia Gagliardi
Narsing Laddipeerla
Emily Meyer
Marni Nenke

Senior Medical Scientists
Erica Robinson
Chris Seaborn

Fellow
Mahesh Umapathysivam

Registrars
Malcolm Borg
Caitlin Chehade
Phillipa Kirby
Andrew Peel

BHI COLLABORATORS

Venkatesan Thiruvengatarajan
Anaesthesia Research Group

Lorraine Mackenzie
Michael Roberts
Therapeutics Research Centre

EXTERNAL COLLABORATOR

Gary Wittert
The University of Adelaide, Adelaide, Australia

GROUP MEMBERS

Research Leader

Anne Hamilton-Bruce
 Director, Stroke Research Programme (SRP)
 and Principal Medical Scientist, TQEH;
 Co-Lead, Research, CALHN Neurology
 Senior Management Committee, RAH;
 Principal Research Fellow, South Australian
 Health & Medical Research Institute
 (SAHMRI); Affiliate Associate Professor,
 Discipline of Medicine, Adelaide Medical
 School, The University of Adelaide

Co-Director

Simon Koblar
 Emeritus Professor, Adelaide Medical
 School, The University of Adelaide

Clinical Associate Professor

Jim Jannes
 Senior Consultant Neurologist, CALHN;
 Clinical Associate Professor, Adelaide
 Medical School, The University of Adelaide

Postdoctoral Research Fellow

Karlea Kremer
 Research Affiliate, Adelaide Medical School,
 The University of Adelaide

Senior Medical Scientist

Austin Milton
 Research Fellow, SAHMRI

Postgraduate Students

Chelsea Graham
 Anupam Datta Gupta
 Sonya McDowall
 Deeksha Sharma

BHI COLLABORATORS

Renuka Visvanathan
 Adelaide GTRAC Centre

John Beltrame
 Translational Vascular Function Research
 Collaborative

EXTERNAL COLLABORATORS

Stan Gronthos
 Suanne Edwards
 Mark Jenkinson
 Tim Kleinig
 The University of Adelaide, Australia

Stephan Lau
 The University of Adelaide, TQEH,
 RAH, Adelaide, Australia

Suzanne Edwards
 The University of Adelaide, Adelaide,
 Australia / Oxford University, London, UK

Roman Kostecki
 The University of Adelaide, TQEH,
 Adelaide, Australia

Anupam Gupta
 The University of Adelaide, RAH,
 Adelaide, Australia

Susan Hazel
 Erik Noschka
 Stephen Pyecroft
 The University of Adelaide, Roseworthy,
 Adelaide, Australia

Chris Proud
 The University of Adelaide, SAHMRI,
 Adelaide, Australia

Chris Levi
 Liz Holliday
 Tom Lillcrap
 University of Newcastle, Australia

Ben Mani
 Carmel Nottle
 Janette Young
 University of South Australia, Adelaide,
 Australia

Sonya McDowall
 University of South Australia, The University
 of Adelaide, Adelaide, Australia / La Trobe
 University, Melbourne, Australia

Tiffani Howell
 La Trobe University, Melbourne, Victoria

Martin Lewis
 Sushma Rao
 Marten Snel
 Paul Trim
 SAHMRI, Adelaide, Australia

Sam Darvishi
 Rehabswift, Adelaide, Australia

Emilie Mas
 Tomas Rozek
 SA Pathology, Women's & Children's
 Hospital, Adelaide, Australia

The Stroke Research Programme investigates biomarkers affecting risk of stroke and Transient Ischaemic Attack (TIA), an early marker of stroke that impacts the progress of stroke. We link nationally and internationally on stroke-related biomarker research via the TOTO (Targeting Optimal Thrombolysis Outcomes) multicentre cohort study.

We also investigate the effect of dog-visiting to the Royal Adelaide Hospital Stroke Unit to see if there is a change in mood of patients, formal and informal supports, as well as monitoring the effect on the dog, in an Action Research Project 'DOgSS' – Dogs Offering Support after Stroke.

2023 research

FAST-IT aims to find diagnostic markers to differentiate TIA from minor stroke and TIA mimics, e.g., migraine and seizures using proteomic, lipidomic, metabolomic and oxidative stress blood biomarkers. This and earlier work has been presented internationally [[▶ https://doi.org/10.1177/23969873231169660](https://doi.org/10.1177/23969873231169660)] and nationally [[▶ https://doi.org/10.1177/17474930231188838](https://doi.org/10.1177/17474930231188838)] by our doctoral student, Deeksha Sharma, in 2023.



DOgSS is a Royal Adelaide Hospital (RAH) Stroke Unit Action Research project to find out if, when following an action research protocol, dog-visits make a difference to the expressed mood of stroke patients.

RESEARCH HIGHLIGHT OF 2023

DOgSS is a Royal Adelaide Hospital (RAH) Stroke Unit Action Research project to find out if, when following an action research protocol, dog-visits make a difference to the expressed mood of stroke patients, as well as their formal and informal supports present at the time of the dog-visit, and also monitors the dog's wellbeing. This multi-disciplinary research includes medical scientists, medical, nursing and allied health clinicians, academics from The University of Adelaide and University of South Australia, and the RAH volunteers and is supported by funding from The Hospital Research Foundation.

Therapy Dog Services Inc. commenced dog-visiting in December 2022, with the 12 once/week dog-visits being completed by June 2023. Key to our research is that not only human wellbeing is monitored, but also that of the dog.

Preliminary findings were platform-presented by Affiliate Associate Professor Anne Hamilton-Bruce at the Animal Therapies Ltd. Conference in Brisbane in February 2023 and the DOgSS Protocol was published subsequently: Developing and Planning a Protocol for Implementing Health Promoting Animal Assisted Interventions (AAI) in a Tertiary Health Setting [[▶ mdpi.com/1660-4601/20/18/6780](https://mdpi.com/1660-4601/20/18/6780)]. The Protocol sets out how our action research is conducted from conception to assess human and animal wellbeing and assist subsequent decision-making about introducing dog-visiting to the Stroke Unit. The Protocol can also be used or adapted by other organisations that may want to undertake research or introduce such a service.

As project processes vary for jurisdictions, our protocol would not necessarily be transferrable but offers insight into the complexity of undertaking multi- and inter-disciplinary, multifaceted research and how labour intensive and lengthy the process can be. This One Welfare approach is significant for human-animal relations and encourages continual practice management improvement for the benefit of all.

CLINICAL SCIENCES, HEALTH SERVICES AND POPULATION HEALTH

RESEARCH GROUPS

Anaesthesia Research Group

Intensive Care Medicine Research
Group

Oesophageal Physiology Group

Psychiatry Research Group

Respiratory Research Group

Rheumatology Research Group

Richter Lab

Surgical Science Research Group

GROUP MEMBERS

Director

Roelof Van Wijk

Research Leaders

Venkatesan Thiruvankatarajan
*High Flow Nasal Oxygen, SGLT2
inhibitors, and Opioid Sparing*

Vasanth Rao Kadam
Regional Anaesthesia

Nagesh Nanjappa
Anaesthesia Allergy

Clinical Researchers

Arpudaswamy Kumar
Graeme Newcombe
Rajesh Sethi
Thavarajah Visvanathan
Medhat Wahba

BHI COLLABORATORS

David Jesudason
Emily Meyer
Diabetes and Endocrinology Unit

Anil Roy
Respiratory Research Group

Peter Hewett
*Peritoneal Cancer Research
Group*

EXTERNAL COLLABORATORS

Tim Semple
Krishnaswamy Sundararajan
RAH, Adelaide, Australia

Sanjib Adhikary
*Penn State Medical School,
State College, USA*

David Wong
*University of Toronto, Toronto,
Canada*

The Anaesthesia Research Group is linked to Critical Care & Perioperative Services: Anaesthesia at the TQEH. The primary research interests of our group are:

- **To improve the surgical outcome of patients with type 2 diabetes, especially those who are prescribed a new class of medications called Gliflozins**
- **To implement a preoperative pathway to wean opioid medications for patients who require total knee replacement surgery**
- **To validate the diagnostic tools to screen sleep apnoea in patients presenting for surgery**
- **To implement a strategy to minimise preoperative opioid use and long-term opioid use after surgery**
- **To explore the application of ultrasound guided nerve blocks for postoperative pain relief and opioid use**
- **Applications of high flow nasal oxygen for airway management and procedural sedation**
- **To assess the pattern and diagnostic utility of various tests for severe hypersensitivity reactions/anaphylaxis during anaesthesia.**

2023 research

We published a 7 year follow up study that assessed the incidence and factors impacting post-traumatic stress disorder following the 2005 Eyre Peninsula bushfire. The study was well received with a media release from The University of Adelaide and other media outlets.

RESEARCH HIGHLIGHT OF 2023

Approximately one in three patients who present for total knee replacement in Australia are likely to be on an opioid related pain medication before the procedure. Available evidence suggests that if a patient is taking opioid medication before knee replacement, it increases their risk of having a postoperative infection, long-standing pain after surgery, requirement for repeat knee replacements.

Our group was successful in securing a research grant from the Australian and New Zealand College of Anaesthetists to implement a pathway to wean opioid medications before knee replacement. The strategy is a collaboration across anaesthetists, orthopaedic surgeons, chronic pain specialist, clinical psychologists, and general practitioners. This implementation strategy will help to improve the postoperative outcomes in patients who require knee replacement operations.



Available evidence suggests that if a patient is taking opioid medication before knee replacement, it increases their risk of having a postoperative infection.



The Queen Elizabeth Hospital (TQEH) Department of Intensive Care Medicine participates in, and conducts, research aimed at improving patient outcomes, particularly in the areas of sepsis and nutrition.

We seek to answer pragmatic, relevant clinical questions that are of importance to the ICU clinicians who provide patient care and deliver more efficient and effective treatments; treatments that will not only benefit critically ill patients but also decrease costs, preserve resources and increase access to scarce critical care beds.

RESEARCH HIGHLIGHT OF 2023

The effect of augmented administration of enteral protein to critically ill adults on clinical outcomes: A cluster randomised, cross-sectional double cross-over, registry-embedded, pragmatic clinical trial completed recruitment in 2023 in 8 Australian and New Zealand sites, with over 3,000 participants enrolled. This trial was funded by the NHMRC in 2021. The TARGET Protein trial is the largest randomised controlled trial to investigate the administration of enteral protein in critically ill patients. Professor Peake is a chief investigator and both Professor Peake and P Williams are members of the study management committee.

2023 research

In 2023 a funding application to the MRFF Clinical Researchers Initiative proposing to implement the first national platform to transform the future of nutrition care for critically ill adults and children in Australia, was successfully awarded \$1,494,950 over 4 years.

The primary aim of the platform is to inform and re-design new models of nutrition care to ensure efficient and effective application of resources to meet consumer need. This will enable improved quality of care and rapid reduction in complications associated with poor nutrition (for which critically ill patients are at high risk) with the potential for millions of dollars saved. Professor Peake is a chief investigator and both Professor Peake and P Williams are members of the study management committee.

Professor Peake and colleagues were awarded the following funding in 2023:

- AUSPEN Novice Investigator Grant 2023. Enhancing dietary intake during non-invasive ventilation: a feasibility randomised controlled trial (EAT-NIV). E Viner Smith, L Chapple, E Ridley, M Plummer, S Peake, K Wittholz, K Haines. \$15,000.
- 2024 CALHN Allied Health, Pharmacy & Nursing Grant. Nutrition practices in the long-stay critically ill patient. C Davis, L Chapple, E Viner-Smith, E Chittleborough, B Reddi, S Peake. \$34,091.25 12-month period (2024).
- 2021 MRFF Early to Mid-Career Researchers stream 2 - (APP 2023066) A National Critical Care Research Platform To Ensure High-Quality Sepsis Care In Australian ICU's. A Udy, R bellomo, J Cooper, S Webb, J Cohen, C French, S Peake, D Pilcher, S Finfer. \$4,899,778.81 over 5 years.
- MRFF Clinical researchers Initiative- 2022 Clinicians Researchers: Nurses, Midwives and Allied Health Grant opportunity- Sreem 2 (APP 2023953) - A national platform for improving quality of nutrition care for critically ill adults and children. E Ridley, C Hodgson, S Peake, A Nichol, D Ayton, O Tatucu, M Bailey, V King, J Winderlich, A Udy, A Marshall, L Chapple, A Freeman-Sanderson, W Butt, K Fetterplace. \$1,494,950.90 : 2023- 2027.

GROUP MEMBERS

Director Research
Sandra Peake

Consultants
James Malycha
John Moran
Nikki Yeo

Research Coordinator
Patricia Williams

Research Project Officer
Catherine Kurenda

Research Portfolio Nurse
Srilatha Vemparala

EXTERNAL COLLABORATORS

ANZICS-Clinical Trials Group,
Melbourne, Australia

Emma Ridley
Steve Webb
The Australian & New Zealand
Intensive Care Research Centre,
Department of Epidemiology
and Preventive Medicine, School
of Public Health and Preventive
Medicine, Monash University,
Melbourne, Australia

Adam Deane
Royal Melbourne Hospital,
University of Melbourne,
Melbourne, Australia

Paul Young
Medical Research Institute of New
Zealand, Wellington, New Zealand

James Walsham
The George institute for Global
Health, NSW, Sydney, Australia

The primary aim of the platform is to inform and re-design new models of nutrition care to ensure efficient and effective application of resources to meet consumer need.



GROUP MEMBERS

Research Leader

Jennifer Myers

Consultant Surgeon

Markus Trochsler

Staff Surgeon

Vijay Abraham

Postgraduate Students

Matthew Marshall-Webb

Rippan Shukla

EXTERNAL COLLABORATORS

Taher Omari

Sarah Thompson

Flinders University, Adelaide,
Australia



This new technology flips the focus to evaluate secondary peristalsis, a physiological mechanism for clearing oesophageal luminal contents.

The Oesophageal Physiology Group explores abnormalities of swallowing function (oesophageal motility) for those experiencing swallowing discomfort or gastric reflux (symptoms of heartburn and regurgitation) that impacts the enjoyment of meals. Studies of swallow pressures and bolus flow are complex, yet reveal subtle variations, like the interplay between swallow muscle vigour and impaired food passage in those struggling to eat or drink. This clinical research helps us better manage patients undergoing surgery for reflux disease, swallowing disorders or obesity at TQEH Upper GI & Bariatric Surgery Unit.

2023 research

- Mucosal impedance is a marker of oesophageal mucosal integrity and is also a novel technique for assessing oesophageal function and pathology. Dr Matthew Marshall-Webb, MS candidate, reports on literature findings that suggest strong clinical utility for use of mucosal impedance in assessing eosinophilic oesophagitis, however only minimal direction for application in Barrett's oesophagus due to limited data. In this multi-disciplinary, cross-institutional research, studies are continuing into the utility of mucosal integrity assessment in patients with reflux who undergo surgical or medical therapy.
- Pre-operative factors may play a significant role in determining good outcome after laparoscopic fundoplication for gastro oesophageal reflux disease. Dr Rippan Shukla, MS candidate, has undertaken a systematic review of the literature, followed by institutional based outcome study and explored utility of artificial intelligence in predicting patient outcomes. In patients with objective confirmation of gastro-oesophageal reflux disease, evidence supports specific predictors such as age, sex and oesophageal function influence surgery outcomes.

RESEARCH HIGHLIGHT OF 2023

FLIP it – detecting abnormalities of swallow function without the need to record a swallow!

Causes of swallowing difficulty (dysphagia), chest pain and regurgitation can vary, thus challenging for diagnosis and management. To date measures of swallow pressures (manometry) and flow (fluoroscopy) in addition to assessment of tissue damage (endoscopy) are helpful, but at times of limited value or modest at best.

A new device, EndoFLIP, a functional luminal impedance planimetry probe inserted during endoscopy, enables assessment of luminal diameter, pressure and cross-sectional area along the oesophagus and lower sphincter. While conventional motility assessments focus on effectiveness of primary peristalsis, this new technology flips the focus (pun intended) to evaluate secondary peristalsis (unrelated to swallowing), a physiological mechanism for clearing oesophageal luminal contents.

Exploratory EndoFLIP measurements and patterns of luminal distension reveal the role of oesophageal lumen and sphincter distensibility in dysphagia e.g. repetitive waves of retrograde oesophageal distension and narrow lower sphincter diameter with restrictive distensibility are features of a spastic achalasia (absent primary peristalsis & inadequate sphincter opening for flow into the stomach). Thus, facilitating a timely and correct clinical diagnosis for patients with a perplexing presentation and avoiding inappropriate treatments.

As the only centre in South Australia with EndoFLIP technology, this research led by Dr Jenny Myers PhD, was disseminated during invited speaker educational sessions in Adelaide, Brisbane & Sydney (RACS, AGW; ANGMA respectively) and local teaching sessions (BHI; TQEH) during 2023. Further research will inform patient selection and best practice for optimal use of this technology. Dr Myers will present on these new motility perspectives and discoveries as invited faculty at the first Australasian Neurogastroenterology and Motility Masterclass in early 2024.

The Psychiatry Research Group research follows 6 main themes:

1. Personalised psychiatry and genomics of psychiatric disorders;
2. Psychiatric neuroscience and neuroimmunology of psychiatric disorders;
3. Neuropsychiatry and psychiatric and medical comorbidities;
4. Clinical phenotype research into the cognitive, emotional and behavioural underpinnings of psychiatric disorders;
5. The identification of electrophysiological markers of cognition and function in psychiatric disorders; *and*
6. The conduct of clinical trials, including pharmacological, psychological and neurostimulation interventions.

2023 research

Associate Professor Tibrewal will lead the implementation of a novel transcranial magnetic stimulation (TMS) trial (COGENT) in collaboration with Dr Leo Chen from Monash University in 2024. The trial combines TMS with d-cycloserine to improve efficacy for depression treatment in 2024.



We performed the largest and most detailed analysis of clozapine monitoring data finding that after two years monthly blood testing is no longer required.

RESEARCH HIGHLIGHT OF 2023

Highlighting the diversity of our research we report 4 high impact publications for 2023.

1. In collaboration with University of Queensland and Viatrix we performed the largest and most detailed analysis of clozapine monitoring data finding that after two years monthly blood testing is no longer required.¹
2. In collaboration with Insight Timer we performed the largest and most detailed analysis of Mindfulness Meditation Apps, finding a dose-response relationship indicating that practice consistency and variety (internal and external meditation focus) rather than length best predict improvement.²
3. We led the development of a polygenic score for lithium response in bipolar disorder.³
4. Associate Professor Tibrewal led a high impact commentary on a novel hypothesis for the role of glutamate transmission in antipsychotic supersensitivity.⁴

1. Northwood K, Myles N, Clark SR, et al. Evaluating the epidemiology of clozapine-associated neutropenia among people on clozapine across Australia and Aotearoa New Zealand: a retrospective cohort study. *Lancet Psychiatry*. 2024 Jan;11(1):27-35. [▶ https://pubmed.ncbi.nlm.nih.gov/38040009/](https://pubmed.ncbi.nlm.nih.gov/38040009/)
2. Cearns M & Clark SR. The Effects of Dose, Practice Habits, and Objects of Focus on Digital Meditation Effectiveness and Adherence: Longitudinal Study of 280,000 Digital Meditation Sessions Across 103 Countries. *J Med Internet Res* 2023;25:e43358. [▶ jmir.org/2023/1/e43358/](http://jmir.org/2023/1/e43358/)
3. Amare AT, ..Clark SR, Baune BT. Association of polygenic score and the involvement of cholinergic and glutamatergic pathways with lithium treatment response in patients with bipolar disorder. *Mol Psychiatry*. 2023 Jul 11. doi: 10.1038/s41380-023-02149-1. [▶ nature.com/articles/s41380-023-02149-1](https://nature.com/articles/s41380-023-02149-1)
4. Tibrewal P, Nair PC, Gregory KJ, Langmead CJ, Chan SKW, Bastiampillai T. Does clozapine treat antipsychotic-induced behavioural supersensitivity through glutamate modulation within the striatum? *Mol Psychiatry*. 2023 May;28(5):1839-1842. doi: 10.1038/s41380-023-02026-x. [▶ https://pubmed.ncbi.nlm.nih.gov/36932159/](https://pubmed.ncbi.nlm.nih.gov/36932159/)

GROUP MEMBERS

**Head of Discipline of Psychiatry,
The University of Adelaide**
Scott Clark

Clinical Lead Cramond Clinic
Prashant Tibrewal

Consultant Psychiatrists
Andrew Giam
Manoj Padhiar

NHMRC CRE Post Doc
Simon Hartmann

Study Coordinator
Zsuliet Kristof

EXTERNAL COLLABORATORS

Kelly Allot
Barnaby Nelson
Orygen, Melbourne, Australia

Leo Chen
Monash University, Melbourne, Australia

Dan Siskind
University of Queensland, Brisbane, Australia

GROUP MEMBERS

Research Leader

Antony Veale

Research Coordinators

Lyndsay Bibb

Pamela Kidd

Head of Unit

Jonathan Polasek

Respiratory Consultants

Tom Altree

Andrew Fon

Anil Roy

Zafar Usmani

Annie Walker

Medical Scientists

Kushani Dharmabandu

Donna Keatley

Pamela Kidd

Jeremy Mercer

Ryan Morena

Respiratory Nurses

Kathy Lawton

Karen Royals

Registrars

Same LaBroome

Jo Lauren

EXTERNAL COLLABORATORS

Hubertus Jersmann

Phan Nguyen

Paul Reynolds

RAH, Adelaide, Australia

Kristin Carson-Chahhoud

Adrian Esterman

University of South Australia,

Adelaide, Australia

Respiratory Medicine and Sleep is a large department with a clinical sleep laboratory, pulmonary function unit and a clinical trials group (CTG). During COVID the CTG was threatened with closure, but since that time it has attracted more research, increased staffing and looks forward to a strong future. Current trials are principally Phase III focused on ILD, COPD and asthma.

Tom Altree is currently doing Post Doctorate work in Canada looking to return in 2024. He has published a number of articles in peer journals in the field of sleep in 2023. He is looking to complete his PhD in sleep by the end of the year. Anne Walker is likewise working on a PhD in Palliative care.

In addition, there are investigator lead projects including bronchodilator response in COPD, infection post endobronchial valves, exercise physiology post valves, ILD. Our Respiratory nurses have finalised telehealth in respiratory medicine. The pulmonary function laboratory continues to do work in CPET, MIPS and MEPs and 6-minute walk testing.



There are investigator lead projects including bronchodilator response in COPD, infection post endobronchial valves, exercise physiology post valves, ILD.

RESEARCH HIGHLIGHT OF 2023

Dr Tom Altree won a New Investigator Award, World Sleep Conference 2023.

2023 research

- Karen Royals and Jonathan Polasek continue with the Interstitial Lung Disease Registry.
- Zafar Usmani continues to collaborate privately and with University of SA on translational research, asthma, and smoking cessation.
- Andrew Fon and Jeremy Mercer looking at comparisons of Fitness watches and sleep disorders.
- Lung function laboratory continue work on an exercise test to assess physiological capacity (6-minute walk test).



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The Rheumatology Unit research program use clinical data and biological samples from clinical cohorts with autoimmune and chronic inflammatory diseases to investigate the epidemiology, causation, clinical outcomes, to develop new treatments, and new models of disease monitoring that incorporate patient reported outcome measures.

The group has expertise in population epidemiology, randomised clinical trials, qualitative research, biobanking, laboratory science and quality improvement. It is the South Australian hub of Australian Arthritis and Autoimmune Biobank (A3BC), and incorporates the South Australian Primary Sjögren's Syndrome Research Clinic and Database and South Australian Giant Cell Arteritis Registry.

RESEARCH HIGHLIGHT OF 2023

The Global Burden of Disease (GBD) study [[▶ healthdata.org/research-analysis/gbd](https://healthdata.org/research-analysis/gbd)] provides a comprehensive picture of disease-related prevalence, mortality and disability across countries, time, age, and sex and is the most comprehensive worldwide observational epidemiological study to date. Rheumatoid arthritis (RA) is the most frequent chronic autoimmune inflammatory disease, and Dr Rachel Black led an internationally collaborative RA GBD study, published in the Lancet Rheumatology in 2023.¹ The study showed that while RA mortality has decreased globally over the past three decades, the age-standardised prevalence rate and years of life lost to disability have increased over the same period. Further, the number of cases is projected to continue to increase to the year 2050. Continuing research and improved access to early diagnosis and treatment of RA globally is required to reduce the future burden of this disease.

Launch at Parliament House, Canberra Dec 4, 2023: Australian Rheumatology Association (ARA) Rheumatoid Arthritis Clinical Care Standards.

The Rheumatoid Arthritis Clinical Care Standards Project was led by Professor Catherine Hill. The standards were developed through a collaborative effort involving a multidisciplinary working group (comprising specialists, general practitioners, allied health professionals, and consumers) in consultation with Arthritis Australia. Consensus was achieved through an online survey with responses from over 900 participants, including both consumers and healthcare professionals. The Standards aim to improve the diagnosis and management of rheumatoid arthritis in adults. The quality statements focus on 12 specific areas of care where improvements should lead to better health outcomes and an improved quality of life for people who live with this chronic condition.

1. Black, RJ et al for the GBD 2021, Rheumatoid Arthritis Collaborators. Global, regional, and national burden of rheumatoid arthritis, 1990-2020, and projections to 2050: a systematic analysis of the Global Burden of Disease Study 2021. Lancet Rheumatol, 2023. 5(10): p. e594-e610.

2023 research**Publications**

42 peer reviewed publications in 2023 including:

- High profile publication (Lancet. 2023;402(10414):1764-1772) of results from an investigator lead, multi-site Australian RCT from the Osteoarthritis Clinical Trials network (Catherine Hill co-investigator), demonstrating efficacy of methotrexate for pain reduction in hand osteoarthritis with an inflammatory phenotype.
- Publications from the Outcome Measures in Rheumatology (OMERACT) international collaboration, (co-authors Catherine Hill, Rachel Black, Joanna Tieu, Suellen Lyne) relating to development, definition and validation of patient reported glucocorticoid impact and health related quality of life outcome measures for use in clinical trials.
- Publications from the International Sjögren's Big Data Consortium revealing increased mortality in patients with severe Sjögren's disease, and effects of air pollution and severe climate change events on the severity of sicca and systemic manifestations.

Grants

- NIHR-NHRMC Project Grant (\$890,000, 2021-24). Steroid-Reducing Options for ReLapsING PMR STERLING-PMR: a pragmatic, randomised trial to compare the clinical and cost-effectiveness of adding immunosuppression to steroid-tapering treatment for patients with relapsing PMR, versus steroid-tapering. CI: Hill C (Australia), Mackie SL (UK).
- MRFF Grant (\$2,496,875, 2022-2025). A3BC for Kids. CI: March L, Singh-Grewal D, Munro J, Buchbinder R, Thomas R, Saffery R, Lassere M, Hill CL, Whittle SL, Shrestha R, Keen HI.
- MRFF Grant (\$2,720,942, 2021-24). Cost-Utility Comparison of Down-Titration Strategies for Safer and More Efficient Use of Biologics in Adults with Rheumatoid Arthritis and Psoriatic Arthritis. CI: March L, Whittle SW. AI: Hill C.
- NHMRC Centre for Research Excellence (\$2,500,000, 2021-26). CRE for Better Outcomes in Inflammatory Arthritis. CI: March L, Hill CL.
- The Hospital Research Foundation Group (\$129,653, 2020-23). Does light treatment improve sleep and pain? CI: Gill T, Adams R, Hill C, Lovato N.
- The Hospital Research Foundation Group (\$125,000, 2023-2025). Optimising transition care for adolescents with juvenile rheumatic disease in South Australia. CI: Hill C, Murray G, Friswell M, Crossley L. AI: Black R, Tan J, Rose T, Reynolds A, Goodwin S.
- Arthritis Australia (\$43,000, 2023). A Randomised Trial of a Novel Glucocorticoid Tapering Clinic for Rheumatology Patients. CI: Dr Rachel Black.

International Conference Invited Presentations**Sam Whittle**

- Developing Recommendations in Rheumatology, APLAR Mid-Term Symposium, Fukuoka, Japan. April 2023.
- Applying evidence to the practice of rheumatology in the Asia Pacific region: challenges and opportunities, 67th Annual Scientific Meeting of the Japan College of Rheumatology, Fukuoka, Japan. April 2023.
- Advances in spondyloarthritis diagnosis and treatment, APLAR Patronage Program, Hanoi, Vietnam. September 2023.

Maureen Rischmueller

- Sjögren's Disease Systemic Manifestations. OMERACT Sjögren's special interest group workshop. Colorado Springs, USA. May 2023.
- Sjögren's Disease Systemic Manifestations. OMERACT Sjögren's International Working Group Zoom. June 2023.

- GWAS In Sjögren's Syndrome. APLAR Congress 2023; Chiang Mai, Thailand. December 2023.
- Rheumatoid Arthritis Perspectives on Management. APLAR Congress 2023; Chiang Mai, Thailand. December 2023.

Catherine Hill

- Epidemiology and clinical features of Giant Cell arteritis. APLAR Congress 2023; Chiang Mai, Thailand. December 2023.

National Conference Invited Presentations**Maureen Rischmueller**

- Vasculitis? ARISE Meeting Case Panel, Melbourne. February 2023.
- Never Lupus? Limbic Corridor Consult Complex Rheumatology Cases, National Webinar. February 2023.
- Routine ILD Screening: New Thinking on Who, When, and what then? National Webinar. April 2023.
- Case studies of connective tissue disease-associated interstitial lung disease. Scientific Education Events in Rheumatology by Sandoz (SEERS 2023), Adelaide. October 2023.

Sam Whittle

- Advocacy for rheumatology in Australia, Australian Rheumatology Association Annual Scientific Meeting, Hobart. May 2023.

Catherine Hill

- Workforce Issues in Australian Rheumatology. Australian Rheumatology Association Annual Scientific Meeting, Hobart. May 2023.
- PBAC - Behind the scenes, Australian Rheumatology Association (WA Branch) Scientific Meeting, Perth. October 2023.
- A3BC-ARAD Update. Australian Rheumatology Association (WA Branch) Scientific Meeting, Perth. October 2023.

Joanna Tieu

- Malignancy and mortality in ANCA-associated vasculitis. Australian and New Zealand Society of Nephrology 58th Annual Scientific Meeting, Christchurch, New Zealand. September 2023.
- Update on ANCA-associated vasculitis. NSW-ACT Australian Rheumatology Association 45th Annual Scientific Meeting, Hunter Valley. November 2023.

Student Presentation Prizes**Oscar Russell**

- The Impact of Area-level Socioeconomic Status on Visits to General Practitioners and Specialist Physicians by Inflammatory Arthritis Patients: An Australian Rheumatology Association Database, Medicare and Pharmaceutical Benefits Schedule Claims Data Linkage Analysis. Central Adelaide Local Health Network Nimmo Prize, November 2023 (full time research category).

Huai Leng (Jessica) Pisaniello

- Trajectories of self-reported pain-related health outcomes. NHMRC CRE for Better Outcomes in Inflammatory Arthritis Award for Best Completed Project, October 2023.

Madeleine Bryant

- Charting a path to better care quality for patients: the adaptation and validation of a Patient Reported Experience Measure (PREM) in Australian outpatient rheumatology care Australian Rheumatology Association SA State Meeting best clinical presentation October 2023.



GROUP MEMBERS

Head of Unit, Research Leader

Catherine Hill

**Consultant Rheumatologist,
Principal Investigator**

Maureen Rischmueller

Consultant Rheumatologists

Rachel Black

Simon Burnet

Suellen Lyne

Oscar Russell

Joanna Tieu

Sam Whittle

Rheumatology Registrars

Madeleine Bryant

Andrea Lyon

Cristina Pelkas

Clinical Research Manager

Sarah Downie-Doyle

Senior Clinical Researcher

Carlee Ruediger

Clinical Trials Nurse

Sara White

Clinical Trial Co-ordinator

Janelle Harris

Clinical Trials Research Assistant

Kate Dyer

Jannatul Ferdoush Tuli

Nerylee Watson

Chief Medical Scientist

Sue Lester

Senior Research Officer

Chandra Kirana

EXTERNAL COLLABORATORS

Rachelle Buchbinder

*Monash University, Melbourne,
Australia*

Claire Barber

Glen Hazlewood

*University of Calgary, Calgary,
Canada*

Tari Turner

*The Australian Living Evidence
Consortium, Monash University,
Melbourne, Australia*

Britta Tendal Jeppesen

*The Alliance for Living Evidence,
Future Evidence Foundation,
Copenhagen, Denmark*

Paul Glasziou

*Bond University, Queensland,
Australia*

Nicole Pratt

Tash Stanton

*University of South Australia,
Adelaide, Australia*

Michael Shanahan

Mihir Wechalekar

*Flinders Medical Centre, Adelaide,
Australia*

Peter Chapman

Lisa Stamp

*University of Otago, Christchurch,
New Zealand*

*OMERACT Glucocorticoid Adverse
Events Working Group*

David Jayne

*University of Cambridge,
Cambridge, UK*

Peter Merkel

*University of Pennsylvania,
Philadelphia, USA*

Michael Walsh

*McMaster University, Hamilton,
Canada*

*Global Burden of Disease RA
collaborators*

Sarah Mackie

*University of Leeds,
Leeds, UK*

Susan Goodman

*Hospital for Special Surgery,
New York City, USA*

Joanna Robson

*University of Bristol,
Bristol, UK*

Elizabeth Hoon

*The University of Adelaide,
Adelaide, Australia*

Helen Keen

Johannes Nossent

*University of Western Australia,
Perth, Australia*

David Liew

*Austin Hospital, Melbourne,
Australia*

Lyn March

*University of Sydney, Sydney,
Australia*

*OMERACT Glucocorticoid Adverse
Events Working Group*

*Australian Arthritis & Autoimmune
Biobank Collaborative (A3BC)*

Graeme Jones

*University of Tasmania, Hobart,
Australia*

Ranjeny Thomas

*University of Queensland
Diamantina Institute, Brisbane,
Australia*

OMERACT Polymyalgia

Rheumatica (PMR) Working Group



Adrian Abdo
Postdoctoral Researcher
Richter Lab, The University
of Adelaide





Superbugs, or antibiotic-resistant bacteria, pose one of the greatest threats to human health worldwide, causing 1.3 million deaths every year, stressing the need for novel treatments.

The Richter Lab is dedicated to improving medical therapies for superbug infections, such as surgical site infections, non-healing wounds and implant infections.

We also collaborate with veterinary and food scientists to fight foodborne superbugs and innovate industry sanitisation for safer, more sustainable food production.

RESEARCH HIGHLIGHT OF 2023

Grants

- MRFF Early to Mid-Career Researcher Scheme (\$760,000, 2023-25). Plasma Flush – translating cold plasma technology as an antimicrobial wound irrigation towards clinical trials. CIA: Katharina Richter. CIB: Adrian Abdo. CIC: Guilherme Pena. *Success rate below 5%!*
- Agrifood and Wine FAME Scale grant (DVCR funding) + industry grant by End Food Waste CRC (\$220,000, 2024-25). Innovating food safety processes through cold plasma technology. CIA: Katharina Richter. CIB: Andrea McWhorter.

Award Highlights

Katharina Richter

- Women in MedTech Champion Award 2023, Medical Technology Association of Australia.
- Finalist, Prime Minister's Prize for Science, Frank Fenner Prize for Life Scientist of the Year.

Laurine Kaul

- Highest distinction 'summa cum laude' (Uni Freiburg).
- Dean's Commendation for Doctoral Thesis Excellence (UoA).

Harriet Cooling

- Westpac Future Leaders PhD scholarship, 2024-26. *Only 17 scholarships awarded Australia wide!*

High Profile Presentations

Katharina Richter

- Invited speaker for the WHO, Lyon, France.
- Symposium speaker, Future of Drug Development, Leibniz Institute for Infectious Diseases & University of Jena, Germany.
- Plenary speaker, Flinders Nano Conference.
- Oral presentation, ECCMID Copenhagen, Denmark (world's largest microbiology meeting with 16,000 attendees).
- Invited panellist for Antimicrobial Resistance Australia Tour 2023, invited by CARB-X, USA.

Publication Highlights

Efficacy of plasma-treated water against salmonella typhimurium: Antibacterial activity, inhibition of invasion, and biofilm disruption.¹

- We developed a novel, eco-friendly sanitiser to kill resistant foodborne bacteria and improved food safety. Our findings will have significant implications to prevent foodborne disease worldwide.
- Co-inventor of provisional patent, to be published 2024 as commercial in confidence.
- This work led to Katharina Richter being recognised as a Finalist, Prime Minister's Prize for Life Scientist of 2023.
- Featured in Canberra Times, 95 media outlets globally.
- Altmetric (Alt) 496; Q1 Pharmacology; Rank 13/110.

In vitro and in vivo evaluation of diethyldithiocarbamate with copper ions and its liposomal formulation for the treatment of Staphylococcus aureus and Staphylococcus epidermidis biofilms.²

- We quantified efficacy and safety of DDC-Cu in a smart drug-delivery gel and discovered that DDC-Cu is highly effective against bacteria causing surgical site infections.
- Our paradigm shifting findings resulted in international patent application PCT/AU2020/050661, sole inventor.
- Katharina Richter won a Cat 3 grant as sole CI, \$130,000.
- Our work was featured in Cosmos Magazine and 95 media outlets globally.
- PhD student 1st author Kaul won a research excellence award and two best oral presentations.
- Alt 501; Q1 Applied Microbiology; Rank 13/122 (Top 10%); Top 2 journal for biofilm research.

Community Engagement

Katharina Richter

- Featured in 95 Australian and international media titles, including The Canberra Times [[▶ How AI is joining the fight against superbugs](#)] and [[▶ Cosmos Magazine](#)]. *Media article reaching 20 million readers!*
- Radio interview for ABC, SA Country Hour with Selina Green, SAFM and NSW Country Hour [[▶ abc.net.au/listen/programs/sa-country-hour/sa-country-hour/103204386](#)] reaching 50k listeners.
- TV Role model for science, Hard Quiz on ABC with Tom Gleeson, S8/E16.

1. Abdo A, McWhorter A, Hasse D, Schmitt-John T, Richter K. Efficacy of plasma-treated water against salmonella typhimurium: Antibacterial activity, inhibition of invasion, and biofilm disruption. *Antibiotics*. 2023;12(9):1371. [▶ https://doi.org/10.3390/antibiotics12091371](https://doi.org/10.3390/antibiotics12091371)

2. Kaul L, Abdo AI, Coenye T, Swift S, Zannettino A, Süss R, Richter K. In vitro and in vivo evaluation of diethyldithiocarbamate with copper ions and its liposomal formulation for the treatment of Staphylococcus aureus and Staphylococcus epidermidis biofilms. *Biofilm*. 2023;5:100130. [▶ https://doi.org/10.1016/j.biofilm.2023.100130](https://doi.org/10.1016/j.biofilm.2023.100130)

 Our findings will have significant implications to prevent foodborne disease worldwide.

GROUP MEMBERS

Group Leader

Katharina Richter

Postdoctoral Researcher

Adrian Abdo

Hang Thi Nguyen

PhD Student & Postdoctoral Researcher

Laurine Kaul

Honours Student

Harriet Cooling

PhD Student

Björn Kolbe

BHI COLLABORATORS

Markus Trochslar

Oesophageal Physiology Group

Robert Fitridge

Guilherme Pena

Vascular Surgery

EXTERNAL COLLABORATORS

Gerald Atkins

Bryan Coad

Heike Ebendorff-Heidepriem

Andrea McWhorter

David Ogunniyi

Anna Sheppard

Scott Smid

Nigel Spooner

Andrew Zannettino

The University of Adelaide,

Adelaide, Australia

Zlatko Kopecki

University of South Australia,

Adelaide, Australia

Regine Süss

University of Freiburg, Freiburg,

Germany

Michel Hoogenkamp

Bastiaan Krom

Free University Amsterdam,

Amsterdam, The Netherlands

Tom Coenye

Aurelie Crabbe

Ghent University, Gent, Belgium

Trine Rolighed Thomsen

Danish Technological Institute,

Aarhus, Denmark

Thomas Schmitt-John

Plasmateat, Steinhagen,

Germany



The Surgical Science Research Group is led by Professor Guy Maddern, the RP Jepson Professor of Surgery at The University of Adelaide and the Director of Research at the Basil Hetzel Institute for Translational Health Research (BHI), The Queen Elizabeth Hospital (TQEH).

The Surgical Science Research Group is a large, multidisciplinary group focused on clinical research, health service innovation and translational benchtop to bedside medicine in the surgical setting. The Surgical Science Research Group continues to produce high-quality research and publishes widely in critically acclaimed journals, in 2023 the group published 176 peer review publications.

The group is always looking for enthusiastic students who wish to challenge themselves and further their education through Honours or higher degree programs.

RESEARCH HIGHLIGHT OF 2023

Dr Virginie Gaget, Prof Maddern, and colleagues completed their trial “Mobile X-Ray services provided within residential aged care facilities” (MRFF grant #1183855) and submitted the final report to the Medical Services Advisory Committee (MSAC). The report proposed recommendations for the future implementation of mobile radiology services in nursing homes.

Dr Gaget also wrote a successful MRFF grant on using faecal transplant to treat patients with pancreatic cancer. This world-first pilot phase I clinical trial is set to start in 2024 at three sites across two states (The Queen Elizabeth Hospital (TQEH, SA), the Royal Adelaide Hospital (RAH, SA) and the Jreissati Pancreatic Centre (JPC, VIC) Epworth Healthcare). The trial aims to improve symptoms and visceral pain levels, as well as treatment efficacy for patients with non-resectable pancreatic cancer by restoring a healthy microbiota, gut barrier and digestion through faecal microbiota transplantation (FMT) as a co-treatment to chemotherapy with Folfirinox. This study represents a unique opportunity to provide a novel and promising cancer treatment to Australian patients to improve their health outcomes and chances of survival.

2023 research**Ellie Treloar**

- PhD student Ellie Treloar was a finalist at the South Australian 2023 Falling Walls competition hosted by The University of Adelaide. She was the 1st female to represent South Australia/the University of Adelaide at the National competition in Canberra.
- Ellie Treloar also received an AVANT Foundation Grant for her project:
 - Investigators: Ellie Treloar, Matheesha Herath, Martin Bruening, Emma Bradshaw, and Guy Maddern
 - Project title: "Solving ward round woes: an intervention to improve patient care"
 - Value: \$100,000

Matheesha Herath

- PhD student Dr Matheesha Herath published a systematic review in EClinical Medicine (IF:17.3). Patient focused interventions and communication in the surgical clinic: A systematic review and meta-analysis. EClinicalMedicine 2023;57: 101893 (IF = 17.3) Herath M, Reid J, Ting YY, Bradshaw E, Edwards S, Bruening M, Maddern G (2023). Dr Matheesha Herath also presented his work at the Royal Australasian College of Surgeons Annual Scientific Conference (RACS ASC).
 - Poster: Talking The Talk: Do Patient Focussed Interventions Improve Communication In The Surgical Clinic – A Systematic Review And Meta-analysis
 - Verbal: Simple Interventions To Improve Patient Care

Jesse Ey

- PhD student Jesse Ey was awarded the Faculty of Health and Medical sciences short term scholarship 2023. Jesse also presented his research, *Improving communication and patient information recall via a question prompt list: randomized clinical trial*, at RACS annual scientific Congress 1-5th May 2023 and Adelaide University Surgical Society (AUSS) research night (where he won a first place prize), and obtained an Adelaide Medical School Foundation (AMSF) Research conference grant. This work was published in BJS and featured online in CALHN research newsletter 'CALHN research is guiding better doctor-patient communication', posted 23/11/2023.
 - Ey JD, Herath MB, Reid JL, Bradshaw EL, Ting YY, Treloar EC, Maddern GJ. Improving communication and patient information recall via a question prompt list: randomized clinical trial. British Journal of Surgery. 2023 Dec;110(12):1793-9.

Deanna Mazzarolo and Professor Guy Maddern

- Deanna Mazzarolo and Professor Guy Maddern have continued to work on the STP Project: Asynchronous Video Coaching in Rural settings and are set to add a new rural site (Wagga Wagga) in early 2024. This project is aligned with the 'Train for Rural' section of the Rural Health Equity Strategy, and aims to improve the non-technical skills of surgeons via coaching over time.

Ying Yang Ting

- PhD Candidate Dr Ying Yang Ting presented his work at the RACS ASC Conference and is set to submit his PhD thesis in early 2024 titled: Improving Surgical Excellence

Kevin Fenix

- The pioneering work of postdoctoral research fellow Dr Kevin Fenix in the field of natural killer cells and tumour development received increasing recognition in 2023. In 2023 Kevin and his team were awarded the following grants:
 - Adelaide Medical School - Mature Grant Fund (\$45,000) for 2023
 - Embargo - Tour de Cure Mid-Career Grant (\$50,000)
 - Embargo - Cure Cancer Mid-Career Grant (\$200,000)
 - Embargo - Beat Cancer Mid-Career Fellowship (\$240,000) with Co-Funding from Adelaide (\$300,000 To be confirmed)
- Dr Kevin Fenix published 3 peer review publications related to his work with Cytokine Induced Killer Cell therapy and its application in Colorectal Cancer
 - Li CM, Li R, Drew P, Price T, Smith E, Maddern GJ, Tomita Y, Fenix K. Clinical application of cytokine-induced killer (CIK) cell therapy in colorectal cancer: current strategies and future challenges. Cancer Treatment Reviews. 2023 Nov 27:102665.
 - Li CM, Tomita Y, Dhakal B, Tin T, Li R, Wright J, Vrbanac L, Woods S, Drew P, Price T, Smith E. Generation and assessment of cytokine-induced killer cells for the treatment of colorectal cancer liver metastases. medRxiv. 2023:2023-09.
 - Li CM, Tomita Y, Dhakal B, Li R, Li J, Drew P, Price T, Smith E, Maddern GJ, Fenix KA. Use of cytokine-induced killer cell therapy in patients with colorectal cancer: a systematic review and meta-analysis. Journal for Immunotherapy of Cancer. 2023;11(4).

Celine Li

- PhD student Celine Li submitted her PhD thesis, title: *Investigation Of Cytokine-Induced Killer Cell Therapy For The Treatment Of Colorectal Cancer Liver Metastasis*.

Professor Guy Maddern

- Professor Guy Maddern was the convener of the 2023 Health Technology Assessment International annual meeting (June 24-28th, 2023) at the Adelaide Convention Centre. He also chaired the plenary talk, entitled "Fast-Tracking Clinical Innovation: The Balance Of Speed And Rigour". The panel of experts included Dr Clifford Goodman (Senior Vice President, Lewin Group USA), Kimberly Hill (Managing Director, Getz HealthCare Aus/NZ), Prof Brendan Murphy AC (Secretary, Dept of Health and Aged Care Australia), Olivia Nassaris (Executive Director, The Hospital Research Foundation Group), Dr Sam Roberts (Chief Executive, National Institute for Health and Care Excellence), and Amanda Vanstone (Formered Australian Politician).

Joshua Kovoor

- PhD Student Dr Joshua Kovoor was involved in various projects to understand and predict recovery and outcomes after general surgery. Notably among them was the Adelaide Score and other AI tools. He also described the significant relationship between patient grit and postoperative recovery and demonstrated clinical feasibility of using handheld wireless ultrasound for gastric assessment around general surgery.
 - Kovoor JG, Bacchi S, Gupta A, Stretton B, Malycha J, Reddi BA, Liew D, O'Callaghan PG, Beltrame JF, Zannettino AC, Jones KL, Horowitz M, Dobbins C, Hewett PJ, Trochsler MI, Maddern GJ. The Adelaide Score: An artificial intelligence measure of readiness for discharge after general surgery. ANZ Journal of Surgery, 93 (9): 2119-2124 (2023)



GROUP MEMBERS

Research Leader

Guy Maddern

Consultant Surgeons

Martin Bruening

Harsh Kanhere

Alex Karatassas

Markus Trochsler

Visiting Research Fellows

Paul Drew

NHMRC CJ Martin Fellow

Katharina Richter

Post-doctoral Research Fellow

Adrian Abdo

THRF Early Career Research Fellow

Kevin Fenix

Senior Researcher

Virginie Gaget

Research Officers

Emma Bradshaw

Jessie Clarke

Deanna Mazzarolo

Research Assistants

Ellie Treloar

Brooke Sivendra

Nathaniel Swan

Administrative Support

Sandra Ireland

Postgraduate Students

Sean Brien

Jesse Ey

Aashray Gupta

Victor Jesus Aguirre Gutierrez

Matheesha Herath

Tanja Klotz

Joshua Kovoov

Celine Man Ying Li

Laurence (Jianliang) Liu

Richard Smith

Brandon Stretton

Ying Yang Ting

Ellie Treloar

Edward Young

Vacation Students

Ann Abraham

Nick Edwardes

Daniel Jesudasan

Divyanshu Joshi (Div)

Scarlette Kulas

Octavia Lee

Jessie Martin

Laure Mansour

Amitesh Nagarantnam

Na Yeon Kim

Matt Penhall

Sam Potter

Vishak Senthil

Eden Smith

Sam Yu

Linyi Zhu

EXTERNAL COLLABORATORS

Wendy Babidge

ASERNIP-S, Royal Australasian

College of Surgeons, Adelaide,

Australia

Wen Chung

Ashley Dennison

University Hospitals of Leicester,

Leicester, UK

Jonathan Karnon

Flinders University, Adelaide,

Australia

Maria Inacio

Susan Woods

SAHMRI, Adelaide, Australia

Amanda LeCouteu

The University of Adelaide,

Adelaide, Australia

Manuela Klinger Hoffman

University of South Australia,

Adelaide, Australia

Sarah Ellis

Olivia Newton John Cancer

Centre, Melbourne, Australia

Frederic Hollande

Victorian Comprehensive Cancer

Centre, Melbourne, Australia

Nico Voelker

Monash University, Melbourne,

Australia

Bernd Klosterhalfen

Hospital of Dueren, Dueren,

Germany

Tom Coenye

Ghent University, Ghent, Belgium

BHI COLLABORATORS

Branka Grubor-Bauk

Viral Immunology Group

Peter Hewett

Colorectal Cancer Research

Group

Tim Price

Solid Tumour Group

PJ Wormald

ENT Surgery

RESEARCH GROUP

Viral Immunology Group

DRUG AND VACCINE DEVELOPMENT

GROUP MEMBERS

Research Leader

Branka Grubor-Bauk

Senior Scientist

Eric Gowans

THRF Early Career

Research Fellow

Makutiro Masavuli

Postdoctoral Researchers

Zelalem Mekonnen

Research Assistants

Arthur Yeow

Dawn Whelan

Postgraduate Students

Zahraa Al-Delfi

Ryan Santos

Honours Students

Stella Batelaan

Morgan Skinner

EXTERNAL COLLABORATORS

Nicholas Eyre

Flinders University, Adelaide, Australia

Michael Beard

Jill Carr

Chunxia Zhao

The University of Adelaide, Australia

Simon Barry

Toby Coates

RAH / The University of Adelaide, Adelaide, Australia

Steven J Chadban

Julian Singer

Department of Renal Medicine, Royal Prince Alfred Hospital, NSW, Australia

Heidi Drummer

Burnet Institute, Melbourne, Australia

Rowena Bull

Andrew Lloyd

Stuart Turville

University of NSW, Sydney, Australia

David Bowen

Centenary Institute, Sydney, Australia

Keith Howard

Avaxzipen, Abingdon, UK

Marilyn Dysart

Pharma Jet, Golden, USA

Ashley St John

Duke-NUS, Singapore, Singapore

Dave O'Connor

University of Wisconsin, Madison, USA

David Lynn

SAHMRI, Adelaide, Australia

Renjy Nelson

Jane Rose

Benjamin Reddi

Mark Plummer

Eamon Raith

Pravin Hissaria

Matthew Roberts

RAH, Adelaide, Australia

Katherine Kedzierska

Scott Mueller

University of Melbourne, Melbourne, Australia

Nicole Messina

Nigel Curtis

MCRI, Melbourne, Australia

Danushka Wijesundara

Vaxxas, Brisbane, Australia

David Miller

University of Queensland, Brisbane, Australia

Pablo Valtanen

Universidad Miguel Hernández de Elche, Elche, Spain

Alessandro Sette

Daniela Weiskopf

La Jolla Institute of Immunology, San Diego, USA

Adriana Tomic

Boston University, Boston, USA

Viruses pose significant challenges to human health. Our history is replete with references to plagues, pestilence, and contagions, yet today we seem to have relegated these events to history and downplayed the threat pandemics pose.

Over the last 3 years, the enormous human and economic toll of the rapidly spreading COVID-19 pandemic demonstrated that infectious disease pandemics remain one of the greatest existential threats to humanity. We are again reminded that harnessing the body's defence system through immunisation is the most effective approach to control the pandemics. Learning how our immune system fights viral infections allows us to gain better insight which leads to development of more efficacious treatments and vaccines.

Our group is focussed on developing novel vaccines for viruses for which no effective immunisation regimens exist, including Zika virus, hepatitis C virus and more recently SARS-CoV-2. In 2023 we progressed our novel booster COVID-19 vaccine to Phase I Human Clinical Trial.

In addition to vaccine development, our team focuses on evaluation of immunity to respiratory viral infections and investigates how to harness this knowledge for development of better vaccines, treatments, and therapies.

In 2023 we continued our COVID-SA state-wide study, supported by funding from The Hospital Research Foundation Group and expanded it to include investigation into Long COVID, with the goal of identifying early biomarkers of Long COVID, to aid treating clinicians and patients as they seek treatments and recovery. The COVID-SA research program is continuing to uncover new knowledge about the immune response to COVID-19, the impact of emerging variants on the population, and the impact of long COVID, and is opening the path to better diagnosis of those at risk of developing Long COVID, so that they can be identified early and treated early. With support by The Hospital Research Foundation Group, to date we have published 9 scientific studies on COVID-19 in prestigious journals with more publications under review and more to follow as the studies progress.

Our vaccine development portfolio has expanded to development of different mRNA vaccines, aided by new collaboration with Prof Chunxia Zhao and her team at Faculty of Sciences and Engineering at The University of Adelaide. In 2023 we successfully partnered with Vaxxas, (QLD) and have formulated our Zika vaccine together with their high-density microarray patch, to deliver the vaccine to immune cells beneath the skin's surface with thousands of tiny microprojections. Zika vaccine patch evoked T-cell responses that were about 270 per cent higher than from a needle or syringe vaccine delivery, with findings published in *Molecular Therapy Nucleic Acids* [[▶ https://doi.org/10.1016/j.omtn.2023.102056](https://doi.org/10.1016/j.omtn.2023.102056)].

RESEARCH HIGHLIGHT OF 2023

SARS-CoV-2 infection can result in the development of a persistent and considerable burden of symptoms with multi-system organ involvement called post-acute sequelae of COVID-19 (PASC), or Long COVID. As Long COVID can involve a range of symptoms, it is a challenge to diagnose. It is currently difficult to predict who will be afflicted with protracted symptoms and new medical diagnoses. There is still no validated treatment for Long COVID, as it may take many years to fully understand the biological mechanism/s responsible for the debilitating symptoms. Identification of Long COVID specific biomarkers is paramount for the diagnosis and management of disease. In collaboration with Prof Simon Barry and his team at The University of Adelaide, we have gathered data from COVID19 convalescents and Long COVID sufferers that identifies a potential biomarker of Long COVID and could lead to the development of a new diagnostic tool in collaboration with SA Pathology.

Together with Associate Professor Mark Plummer, Dr Eamon Raith and the team at the Intensive Care Unit of the Royal Adelaide Hospital we have comprehensively evaluated immunity in critically ill COVID19 patients, and in 2024 we aim to translate these findings to novel therapeutic interventions for better patient outcomes and reduced in hospital mortality. We have expanded our ICU studies into severe respiratory infections caused by other viruses (influenza, RSV etc) that require admission to ICU and have commenced a new clinical study.

2023 research

- We have developed novel prophylactic mRNA vaccines against different flaviviruses and are investigating how to improve their stability, encapsulation, delivery and immunogenicity.
- Associate Professor Branka Grubor-Bauk was re-elected Vice-President of the Australian Centre for Hepatitis Virology (ACHV).
- Dr Makutiro Masavuli was awarded The University of Adelaide/Burnet Institute ECR travel grant for collaborative infectious disease work with a group at the Burnet Institute.

RESEARCH GROUPS

ENT Surgery

Inflammatory Bowel Disease
Research Group

INFLAMMATORY DISEASE



Our research team of clinical academic surgeons, research scientists, bio-informaticians and engineers is focused on improving treatment outcomes for patients suffering from chronic relapsing infections of the nose and sinuses (Chronic Rhinosinusitis, CRS) and wound-healing after surgery. We have a translational medicine approach where novel therapeutic candidates discovered in our laboratory undergo extensive testing before treatment of patients.

In addition, novel research nodes have started investigating bacteriophage biology and therapy, acoustic drug delivery, and genomic analysis of the sino-nasal microbiota. Lastly, we implement a surgical training program aimed at educating the next generation of surgeons and surgeon scientists in advanced surgical techniques of the sinuses and skull base with the Department of Otolaryngology Head and Neck Surgery at The Queen Elizabeth Hospital.

2023 research

- We performed genetic analysis of bacteria involved in CRS, showing bacterial genes adapt over time to create thick harder-to-treat bacterial biofilms. We also investigated immune cells that are active in patients with these biofilms. This helps us in development of targeted therapies as an alternative to antibiotics in CRS.
- We created a bioinformatics tool that allows easy and accurate reading of the genes that make up bacteriophages, which are viruses that specifically kill bacteria. This allowed us to precisely characterise bacteriophages for use as personalised therapies in patients with chronic disease.
- Leading on from this, we developed a phage cocktail specific to *S. aureus*. We will use this in a pioneering clinical trial evaluating safety and effectiveness of this therapy in chronic rhinosinusitis patients. Recruitment of participants is expected to start in early 2024.

○

This year we have made substantial progress toward harnessing sequencing technologies to develop novel treatments for CRS.

RESEARCH HIGHLIGHT OF 2023

This year we have made substantial progress toward harnessing sequencing technologies to develop novel treatments for CRS. Precise understanding of the composition of the sinonasal microbiome is currently lacking, and older technologies don't provide accurate representation of the microbiome, with an inability to accurately assign taxonomy to a species order. With the advent of new technologies however, the sinuses are an ideal niche to apply this technology, being a low biomass environment where bacteria are implicated in disease propagation.

We have set up a custom built 'BHI-nion' workstation with 3 small sequencers (MinIONs) and 1 large (P2 solo), allowing us to become a fully independent centre of sequencing excellence, where we can prepare samples, run sequencing and perform data analysis, all here at the BHI. We can generate up to 3TB of data in 72 hours. We have developed novel algorithms to process the sequencing data, including Hybracter, the current leading software tool for generating complete bacterial genome assemblies at scale. We can and have sequenced human and rat RNA, bacterial isolate DNA and metagenomic DNA. Examples of the wide range of questions we have tackled in 2023 using this technology and expertise:

- Performed RNA-sequencing on 40 samples (20 organoid + 20 matched tissue) of CRS patients
- Optimised long-read metagenomics directly from patient swabs allowing us to confirm the species of bacteria and phages colonising the sinus.
- Used long read 16S sequencing to better species ID the sinus microbiome vs traditional short read methods
- Generated an enormous collection of closed *S. aureus* genomes (over 200+ from CRS patients)
- Sequenced a collection of hundreds of head and neck cancer associated bacteria to generate complete genomes

The long-term objective of the project is to better understand the pathophysiology of the sinonasal tract, and design and make personalised treatments available for patients in Australia and beyond.

GROUP MEMBERS

Chair, Department of ENT
Peter-John Wormald

Head, Department of ENT
Alkis James Psaltis

Director of Research, Department of ENT
Sarah Vreugde

Laboratory Manager
Clare Cooksley

Post-doctoral Scientists

Muhammed Awad

Sholeh Feizi

Kevin Fenix

Sha Liu

Andrew Nan Hao

Mahnaz Ramezanpour

Gohar Shaghayegh

Post-doctoral Scientist (Engineering)

Oveis Pourmehran

Bio-informatics & Bio-statistics

George Bouras

Research Coordinator

Emma Barry

Research Assistants

Uri Hauben

Karen Hon

Clinical Research Assistant

Leejaye Solano

BHI COLLABORATORS

Kevin Fenix

Guy Maddern

Surgical Science Research Group

Branka Grubor-Bauk

Viral Immunology Research Group

EXTERNAL COLLABORATORS

Ben Boyd

John Quinn

Michael Whittaker

Monash University, Melbourne, Australia

Michael Connor

Pasteur Institute, Paris, France

Maziar Arjomandi

Ben Cazzolato

Martin Donnelley

Stephen Kidd

David Parsons

Camille Schubert

Keith Shearwin

The University of Adelaide, Adelaide, Australia

Allison Cowin

Zlatko Kopecki

Clive Prestidge

University of South Australia, Adelaide, Australia

Amber Luong

University of Texas, Texas, USA

Michael Beer

Defence Science & Technology Group, Melbourne, Australia

Sandra Morales

Phage Solutions PTY LTD, Sydney, Australia

Robert Edwards

Flinders University, Adelaide, Australia



Our research focuses on the role of the gut microbiome and diet in inflammatory bowel disease (IBD) with the overarching aim of improving patient outcomes and quality of life.

We are investigating interventional approaches to manipulate the gut microbiome for therapeutic effect, in particular using dietary therapies and faecal microbiota transplantation (FMT).

We are also undertaking clinical research in the area of IBD and gastrointestinal ultrasound. Our group is linked with the Inflammatory Bowel Disease Service at TQEH.

RESEARCH HIGHLIGHT OF 2023

Awards

Michell McGrath Fellowship

Associate Professor Rob Bryant was awarded the Michell McGrath Fellowship for the research stream exploring microbial manipulation in IBD. The 5-year Fellowship awarded by The Hospital Research Foundation Group facilitates ongoing seminal studies to evaluate the role of dietary therapy and faecal microbiota transplantation in IBD.

SA Health Award Finalist

Our TQEH BHI Inflammatory Bowel Disease Group was a finalist in the Minister's Health and Research Innovation category of the SA Health Awards [[▶ www.youtube.com/watch?v=TSsE8YAWI4U](https://www.youtube.com/watch?v=TSsE8YAWI4U)]. The nomination was for our work in advancing care of patients with IBD, both through novel microbial manipulation strategies, as well as through intestinal ultrasound.

CALHN Allied Health and Scientific Excellence Awards Finalist

Dr Alice Day was a finalist in the Executive Director Allied Health Award for Research and Innovation category for the research she and her team have been pioneering examining novel diet strategies for treatment of IBD and new models of care for gastroenterology-diet clinics.

Publications

Shedding light on *Helicobacter pylori* resistance

Our group published a multicentre study describing rates of refractory *H. pylori* across both South Australia and Western Australia, demonstrating alarmingly high rates of levofloxacin resistance (PMID 37705320).

Intestinal ultrasound as an accurate monitoring tool in ulcerative colitis

Our group demonstrated that intestinal ultrasound is an accurate non-invasive marker of histological disease activity in ulcerative colitis (PMID 36928672).

Therapy for refractory ulcerative proctitis

Our group published a systematic review exploring therapies for refractory ulcerative proctitis, revealing a lack of good quality evidence and a dearth of therapies (PMID 36644922).

Dietary therapy in Crohn's disease

Our research team was involved with generation of a practical guideline for application of a therapeutic diet (Crohn's disease exclusion diet, CDED) in Crohn's disease (PMID 38059536).

Intestinal Ultrasound and disease activity

Our group published a cohort study examining the correlation between non-invasive ultrasound, inflammatory biomarkers and histological indices in ulcerative colitis (PMID: 36928672).

Talks and Conferences

GastroDiet Conference, October 2023

Dr Alice Day and Associate Professor Rob Bryant were invited to speak at GastroDiet Conference at Monash University Prato Centre Italy on the topics of dietary therapy in IBD.

Australian Gastroenterology Week, September 2023

AGW recognised the successful output of the TQEH/BHI IBD Research Group. The BHI research group was well-recognised at the national conference with invited talks, chairing, as well as both oral and poster presentations of research. Laura Portman received a finalist nomination for her poster exploring the role of a dietitian in administering dietary advice in research studies.

► Adelaide IBD Summit 2023, November 2023.

Community Engagement

CALHN Research Pulse Podcast

Dr Alice Day was invited to share insights into the dietary research for IBD being undertaken at BHI/TQEH with the community, highlighting how our microbial manipulation research looks to change treatment paradigms for people with IBD.

Translating Research in CALHN: Improving the gut microbiome to heal inflammatory bowel diseases

Associate Professor Rob Bryant was invited to discuss how microbial manipulation is helping to fight IBD.

 Our TQEH BHI Inflammatory Bowel Disease Group was a finalist in the Minister's Health and Research Innovation category of the SA Health Awards.

GROUP MEMBERS

Head of Research Group

Robert Bryant

Head of Clinical Trials

James Fon

Post-doctoral Academic Dietitian

Alice Day

Clinical Trials Manager

Lyndsay Bibb

Clinical Trials Business Officer

Cathy Bollella

Clinical Trials Nurses

Agata Kryszczyńska

Danielle Milowski

Post-doctoral Scientist

Natasha Madigan

Hospital Research Scientist

Wendy Uylaki

BHI COLLABORATORS

Lorraine MacKenzie

Therapeutics Research Centre

Sarah Vreugde

ENT Surgery

EXTERNAL COLLABORATORS

Sam Forster

Hudson Institute of Medical Research, Sanger Institute, Melbourne, Cambridge, Australia, UK

Peter Gibson

Emma Halmos

CK Yao

Monash University, Melbourne, Australia

Chris Probert

Liverpool University, Liverpool, UK

Michael Kamm

University of Melbourne, Melbourne, Australia

Rupert Leong

Macquarie University & University of Sydney, Sydney, Australia

Jakob Begun

Mater Research University of Queensland, Brisbane, Australia

Christopher Rayner

Hannah Wardill

Philip Weinstein

The University of Adelaide, Adelaide, Australia

Trevor Lawley

Wellcome Sanger Institute, Cambridge, UK

Simon Travis

University of Oxford, Oxford, UK

Vipul Jairath

Alimentiv Clinical Trials, London, Ontario, UK, Canada

Christopher Ma

Alimentiv Clinical Trials, London, Ontario, UK, Canada

Saravana Kumar

University of South Australia, Adelaide, Australia



Natasha Maddigan
*Postdoctoral Researcher,
Inflammatory Bowel Disease
Research Group, The
University of Adelaide*



The Institute

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John Morris
GROUP



The Institute

basil hetzel institute for translational health research

28 Woodville Road
WOODVILLE SOUTH
South Australia 5011

T +61 8 8222 7836
F +61 8 8222 7872

basilhetzelinstitute.com.au



The Hospital Research Foundation Group

62 Woodville Road
WOODVILLE
South Australia 5011

T +61 8 8244 1100
F +61 8 8244 1200

hospitalresearch.org.au