Annual Report 2015

SAHMRI

contents

THE UNIVERSITY of ADELAIDE

University of South Australia

Flinders UNIVERSITY

Government of South Australia

Australian Government

CSIRO

EMBL Australia

Cancer Council SA

our story

South Australia has a long history of excellence in health and medical research. The South Australian Health and Medical Research Institute (SAHMRI) was incorporated in December 2009 as the state's first flagship health and medical research institute after a review was conducted by Professor John Shine and Mr Alan Young AM, which recommended the establishment of a flagship research institute to increase South Australia's (SA) health and medical research capacity.

Following support of this recommendation from the State Government, the Federal Government's Health and Hospital Fund provided a $200 million grant to build our research facility.

SAHMRI's purpose is to translate research into health outcomes. Our research focuses on improving the prevention, treatment and diagnosis of some of the worst health issues that face our community.

We currently have over 400 researchers in the building who are committed to transforming innovative health and medical research into practical benefits for patients and the community. We have recruited some of the most talented researchers from across Australia and overseas who are collaborating across our seven research themes:

- Aboriginal Health
- Cancer
- Heart Health
- Healthy Mothers, Babies and Children
- Infection and Immunity
- Mind and Brain
- Nutrition and Metabolism

SAHMRI is a significant investment in the health and quality of life of all South Australians. Through collaboration and innovation, SAHMRI will lead the way in new discoveries, treatments and better health for the entire community. In response to the growing need for improved, affordable and more accessible health care, SAHMRI will focus on delivering real health reform back to the community.

who we are

1 Our Vision

Everything we do is geared towards one vision: to transform research into health

2 Our Values

- Excellence
- Imagination
- Courage
- Integrity
- Teamwork
- Equity and diversity

3 Our Mission

- Be a vibrant, globally-recognised institute that fosters discovery and harnesses dynamic collaborations to deliver health outcomes and community impact
- Fundamentally improve the quality of life for all people, through innovative, world-class and ground-breaking health and medical research
- Provide a clear focal point for health and medical research in South Australia

4 Our Culture

- Bold and driven
- Persistent and focused
- Collaborative and enabling
- Respectful, inclusive and compassionate
- Friendly, fast, flexible and fun

5 Our Brand

Our identity is inspired by a microscope image of a stylised cell. A cell is an appropriate symbol because of our links to biology and as cells require linkages to other cells to provide structural support and carry nutrients and communications to neighbouring cells.

While our research themes operate independently, they have important links to each other. They share common objectives, facilities and knowledge. They are also linked to other health and medical research institutes in South Australia, interstate and overseas; sharing findings and working collaboratively.

However, most importantly, our researchers are linked to the communities they serve. This ensures that all of our discoveries are transformed into better health outcomes and benefits for South Australians and other people around the world.

Each theme is represented by a different colour, which in turn makes up a different section of our overall identity.

The iconic triangular-paneled façade of our building on North Terrace is also reflected in the shapes of our new identity.

Our identity is a fitting representation of our values of excellence, imagination, courage, integrity and teamwork.

a letter from the executive director

Two years have passed since we officially opened the doors of the SAHMRI building. It's been a busy and productive time, and on reflection, we have achieved a lot - however, there is still much to do.

We continue to attract and retain leading researchers, and generate business and employment opportunities in South Australia. Every day, we work to improve the overall health and wellbeing of people across this state and beyond.

2015 marked a focus on gender equity for us. SAHMRI and a number of other institutions around the country are members of the Science and Gender Equity (SAGE) pilot program. As part of the SAGE pilot, our goal is to prove our capacity to eliminate gender inequity and demonstrate a commitment to supporting the hiring, promotion and retention of women, while improving the workplace environment for people of all genders.

We are also very excited to announce the establishment of The South Australian Academic Health Science and Translation Centre (SA Centre). This is an exciting new collaboration between SAHMRI, the three South Australian universities (the University of Adelaide, Flinders University and the University of South Australia), SA Health, Cancer Council SA, the Aboriginal Health Council of South Australia, Health Consumers Alliance SA, and the two SA Primary Health Networks. The SA Centre has been recognised as one of the top four centres in Australia by the National Health and Medical Research Council.

Traditionally, such centres are planned around a single hospital or university, but our state-wide approach makes our centre unique and this was a key factor in our successful bid. In an extremely competitive environment, the South Australian partnership was recognised as being among the world's best for utilising health and medical research to improve patient care.

SAHMRI's vision is to transform research into health. This means that our key measure of success is the extent to which our research is positively impacting on health outcomes. With this longer term goal always in mind, we need to acknowledge the other aspects of our work that help contribute to this objective: successfully applying for competitive research funding, attracting research talent to South Australia, building our research output and sharing these research findings.

Over the last two years, SAHMRI researchers have attracted over $40 million in funding to South Australia. We have attracted 50 research staff from interstate and overseas, and we have published more than 800 articles in high impact journals. Our aim is for these numbers to continue to grow.

In March, 116 world-class researchers were inducted as Fellows into the Australian Academy of Health and Medical Sciences (AAHMS). Of these, 14 were from South Australia, and six were from SAHMRI. SAHMRI's researchers are among the nation's leading minds in health and medicine, and now join a list of Australia's most eminent scientists through the Academy. This recognition of our talented researchers further consolidates the importance and strength of SAHMRI's unique model, through its collaboration with South Australia's three major universities.

Our public tour program continues to thrive, with over 5,000 members of the public coming through our doors during 2015, and bookings for 2016 already filling up.

2015 was a wonderful year, and I'm confident the best is still to come for SAHMRI. I am excited to see what 2016 holds for us.

Professor Steve Wesselingh

a letter from the chair of the board

It brings me much pleasure to introduce to you the 2015 South Australian Health and Medical Research Institute (SAHMRI) annual report.

The journey has just begun, and I am excited to think of what the future holds for this organisation – we are already in discussions for the development of a second SAHMRI facility!

It's difficult to believe that two years has passed since we moved into our flagship research facility – and what an eventful two years it has been.

As South Australia's flagship research facility, SAHMRI has already begun providing a clear focal point for health and medical research in the state, and so much has been achieved to date. SAHMRI exists at such a unique time, and the opportunities and potential for our future are endless.

This year, the Medical Research Future Fund (MRFF) was introduced by the Federal Government, which represents a critical initiative in our nation's history to ensure that Australia stays at the leading edge of medical science, with profound benefits to our health, the world's health, and to our economy.

SAHMRI is a proud partner within South Australia's new Health and Biomedical Precinct, one of South Australia's highest priority projects for health, education and research infrastructure. In addition to the new Royal Adelaide Hospital, and over the next few years we will see new buildings from SAHMRI, the University of Adelaide and the University of South Australia (among others), some of which are already starting to pop up.

This space will grow to become one of the largest health precincts in the Southern Hemisphere. This will create a new horizon to benefit us all in one way or another. SAHMRI is fortunate to be part of this precinct, from which some incredible advancements in health and medical research will develop.

We continue to attract funding from some of the state's leading philanthropists, which have supported the purchase of state of the art equipment and facilities, and we now have 25 Founding Ambassadors on board – we are well on our way to achieving our goal of 50.

Our Founding Ambassadors and Corporate Champions are a group of philanthropists who have the foresight and generosity to support SAHMRI and research in South Australia – that will have worldwide implications and will benefit our generation, and generations to come. We are very grateful to them for their support and belief in our vision.

Over the last two years SAHMRI has had incredible success with the funding awarded to our researchers. Increasing grant funding coming to South Australia was one of the reasons that the decision to establish a dedicated flagship health and medical research institute, like SAHMRI, was made.

I am incredibly proud of SAHMRI's achievements in 2015, and we have such a bright future ahead.

Raymond Spencer

SAHMRI board of directors

MR RAYMOND SPENCER

Chairman

Mr Spencer is also Chairman of South Australia's Economic Development Board. He is Chairman or a board member of a number of private and public companies in Australia and the USA. Mr Spencer was appointed to the Board as Chairman on 21 December 2009.

PROFESSOR STEVE WESSELINGH

Executive Director

Professor Wesselingh is the Executive Director of SAHMRI and Leader of SAHMRI's Infection and Immunity Theme. He is an Infectious Diseases Physician with research interests in Neurovirology, HIV, microbiome research and vaccine development. Professor Wesselingh was appointed to the Board on 1 February 2011.

MR ALAN YOUNG AM

Deputy Chairman

Mr Young was co-author of the Shine Young Report, a review of health and medical research in South Australia commissioned by the South Australian Government. Mr Young is Co-Founder and Joint Managing Director of Baker Young Stockbrokers Limited. He is also the current Founder/Chair of Belvidere Winery, Chair of the Australian Central School of Art, Vice Chair of Solstice Media Ltd, Co-Founder/Chair of Flinders Medical Centre Foundation and Founder/Chair of Flinders Bio Medical Enterprises Pty Ltd. Mr Young was appointed to the Board on 21 December 2009.

PROFESSOR JOHN HOPWOOD

Director

Professor Hopwood is the Director of the Group's Lysosomal Diseases Research Unit. He is also an affiliate Professor in the Department of Paediatrics at The University of Adelaide and the Department of Pharmacy at the University of South Australia. Professor Hopwood was appointed to the Board on 21 December 2009.

PROFESSOR MICHAEL BROOKS

Director

Professor Brooks is the Deputy Vice-Chancellor (Research) at The University of Adelaide and he is a Board Member of National ICT Australia. Professor Brooks was appointed to the Board on 4 August 2015.

PROFESSOR DAVID LLOYD

Director

Professor Lloyd is Vice Chancellor and President of the University of South Australia and is a member of South Australia's Economic Development Board. Professor Lloyd is a biochemist who holds a Bachelor of Science (Honours) in Applied Chemistry and a PhD in Medicinal Organic Chemistry from Dublin City University. Professor Lloyd was appointed to the Board on 29 November 2013.

MS LORETTA REYNOLDS

Director

Ms Reynolds has been a partner with Thomson Geer Lawyers since 1998 and was elected as Chairman of that firm's Board of Partners in 2007. She has completed the FINSIA Graduate Diploma in Applied Finance and Investment. She has a Bachelor of Laws and a Bachelor of Economics from The University of Adelaide and is a Fellow of the Australian Institute of Company Directors and a Senior Fellow of FINSIA. Ms Reynolds was appointed to the Board on 6 May 2014.

MS JUNE ROACHE

Director

Ms Roache has extensive business experience having held several senior executive roles including Chief Executive of SA Lotteries, and a number of governance roles including Vice President of the World Lottery Association and Chair of the Asia Pacific Lottery Association. She currently also holds non-executive positions with ForestrySA, the Essential Services Commission of SA, the SA Football Commission, the History Trust of SA and is Chair of the Adelaide Football Club's Professional Standards and Integrity Committee. She is a Fellow of the Australian Institute of Company Directors, CPA Australia and the Australian Institute of Management. Ms Roache was appointed to the Board on 6 May 2014.

PROFESSOR
COLIN STIRLING

Director

Professor Stirling is the Vice-Chancellor of Flinders University. He is a Member of Universities Australia. Prior to taking up his role at Flinders University he was the Provost and Senior Deputy ViceChancellor at Curtin University, Western Australia. Professor Stirling was appointed to the Board on 4 March 2015.

PROFESSOR
ROBERT SAINT

Director

Professor Saint is the Pro Vice-Chancellor (Research Strategy) at The University of Adelaide. Professor Saint was appointed to the Board on 15 October 2014 and resigned on 27 May 2015.

aboriginal health

Overview

The Aboriginal health research program (Wardliparingga) within SAHMRI conducts research, which is of direct relevance to the health and wellbeing of Aboriginal and Torres Strait Islander people in South Australia and across the country, with a primary focus on improving health outcomes and reducing inequalities in life expectancy.

In order to achieve these objectives, the Wardliparingga team have invested heavily in establishing and servicing partnerships with key Aboriginal stakeholders, community groups and health services; collaborating with leading national and international researchers; building a network of people interested and involved in Aboriginal health research in South Australia; and nurturing existing and newly identified Aboriginal and non-Aboriginal researchers to develop capacity in working within Aboriginal health.

Wardliparingga is a Kaurna term meaning 'house river place', and is also the name for the Milky Way reflected in the River Torrens, alongside of which SAHMRI is located.

What we do

The Wardliparingga team is working hard to implement a research program focusing on Aboriginal and Torres Strait Islander health within SAHMRI, aimed at addressing the significant disparity in health status between Aboriginal and non-Aboriginal people. We know that Aboriginal South Australians die younger than non-Indigenous people across all causes of death. Aboriginal people in SA also experience higher rates of heart and kidney disease, diabetes, cancer, injury and mental health issues. Wardliparingga's goal is to improve the health of Aboriginal people in South Australia through first class research including how health services are provided.

Activities during 2015 focused on developing models of care and wellbeing across multiple health issues and systems, improving quality of health care delivery for Aboriginal people, building people capacity within Wardliparingga as well as our partners, developing better surveillance monitoring and evaluation systems in Aboriginal health as well as trialling interventions to reduce heart disease and diabetes.

The group's research focuses on the broad areas of health services and systems, epidemiology and clinical care. We seek to understand the issues that drive the differences in life expectancy, health outcomes and access to services and care. Once "the gaps" and their causes have been understood, then the next step is seeking to develop solutions, including modifying existing evidence-based approaches for Aboriginal people and communities.

Finally, interventions/approaches in real-life situations are implemented and evaluated with the group's partners in health services (both Aboriginal-specific and mainstream) and we document the results in publications and reports. Wardliparingga conducts research consistent with the South Australian Aboriginal Health Research Accord. The Accord details nine principles for conducting Aboriginal health research the "right way".

Wardliparingga convenes the SAHMRI Indigenous Collective - a forum for all Aboriginal and Torres Strait Islander staff in SAHMRI to meet and collectively provide advice on research from a cultural perspective. This Collective ensures that the needs of Aboriginal and Torres Strait Islander staff within the institute are being addressed in terms of capacity development.

Wardliparringa also hosts the SA Aboriginal Health Research Network which brings together stakeholders within the health system and associated organisations with an interest in Aboriginal health research. During 2015, Wardliparingga hosted two meetings of the SA Aboriginal Health Research Network, on housing status as a determinant of health, and analysing data on Aboriginal health status.

The major programs of Wardliparingga cover:

- Strategies to reduce the incidence and impacts of chronic disease
- Understanding psychosocial determinants of illness and health
- Determining how the disparities in access to treatments and management can be improved to drive better health outcomes

The Aboriginal Diabetes Study

This large case-cohort study aims to assess 2,000 Aboriginal people with diabetes and 2,000 without diabetes across all regions of South Australia to better understand why many Aboriginal people are diagnosed with diabetes so early in life and why many progress to complications of that condition so quickly. Rates of diabetes are up to 4 times higher in Aboriginal populations than non-Aboriginal populations. Diabetes causes major cardiovascular, renal failure, circulatory issues leading to vision impairment (including blindness), renal failure, risk of amputations due to loss of feeling in the toes and feet, and poor healing of wounds. Significant preparatory work occurred in 2015, including the final recruitment of the entire team and development of protocols and procedures for the study. The grant is administered through the University of South Australia and includes partners from Flinders University, Baker IDI, University of Copenhagen, and CSIRO.

The Centre for Research Excellence in Aboriginal Chronic Disease Knowledge Translation and Exchange (CREATE)

The CREATE team undertakes synthesis and translation of evidence to support Aboriginal primary health care services in the management and treatment of chronic disease in Aboriginal and Torres Strait Islander populations nationally. The project is building the capacity of Aboriginal community-controlled health services to understand and apply knowledge within Aboriginal communities. The team also play a significant role in documentation of knowledge from the sector of how they adapt and innovate in terms of service delivery in a culturally safe and responsive manner. The grant is administered through the University of Adelaide and includes partners from the Joanna Briggs Institute (JBI) and the National Aboriginal Community Controlled Health Organisation (NACCHO) and its members throughout Australia.

Aboriginal Cardiovascular Omega 3 Randomised Controlled Trial

This randomised-controlled clinical trial aims to assess the effect of fish oil supplements on subsequent cardiac health (especially the incidence of further cardiac events) for Aboriginal people who have already had a heart attack or other cardiac event. In 2015, major ethics approvals were sought and gained and recruitment commence. The grant is administered by SAHMRI and includes partners within SAHMRI (Heart Health theme) and from the University of Adelaide.

The Cancer Data and Aboriginal Disparities Project (CanDAD)

The CanDAD project aims to develop a cancer monitoring and surveillance system to improve cancer treatments and outcomes for Aboriginal people in SA. In 2015, extensive interviewing of the SA Cancer Registry and 50 in-depth interviews with Aboriginal cancer survivors, and the services they use. This generated new knowledge of the reasons why Aboriginal people have poorer outcomes if they are diagnosed with cancer and why those diagnoses are much later in the cancer journey. The grant is administered through the University of South Australia and includes partners from the Univerity of South Australia, SA Health, Cancer Council SA, Aboriginal Health Council of South Australia (AHCSA) and Cancer Services SA.

Centre for Research Excellence (CRE) for Reducing Inequalities in Heart Disease

Wardliparingga contributed to this CRE through the employment of a Research Officer to focus on data analysis and a specific study associated with this national centre hosted by Baker IDI. Significant analysis of available secondary data and preliminary analysis of the outcomes of the primary data has been completed. The focus is around supporting the implementation of evidence based standards across Australia.

South Australian Childhood Rheumatic Heart Disease Project

The SA Childhood RHD Project (SACRHD) aims to screen up to 2,000 Aboriginal children of school age for rheumatic heart disease. This condition predominantly affects Aboriginal people in Australia. The consequences can be fatal if the damage to the heart is not identified and managed early. This study is the first to be conducted in South Australia. It is funded by Verizon, a US telecommunications company that is also providing an innovative platform technology that allows for results from regional areas to be read in real-time by an Adelaide-based specialist. After extensive negotiation with authorities and schools, eighty children were screened (November and December 2015). The funding is administered through SAHMRI and the project is being conducted in collaboration with the SA Department of Education and Child Development, SA Health and a number of Aboriginal Community-Controlled Health Services.

ESSENCE II

The Essential Service Standards for Equitable National Cardiovascular care project (Phase II) was completed during 2015, with indicators developed for the standards and a guide for primary care implementation of the standards.

South Australian Aboriginal Heart and Stroke Plan

This plan will describe the evidence-based and culturally safe strategies to reduce the gap in cardiovascular-related health outcomes for Aboriginal people in South Australia. It has included extensive analysis of the data on the heart and stroke health of Aboriginal people across the state, mapping available services, and the activity by Aboriginal people. The work has been commissioned by the Aboriginal Health Branch of SA Health and is being developed in conjunction with a wide range of stakeholders including the community, service providers and policy makers. The project is guided by a Steering Committee with representation from services and the Aboriginal community. The plan is due for completion in June 2016.

South Australian Aboriginal Diabetes Strategy

This strategy will describe the evidence-based and culturally safe services and approaches to prevent and manage diabetes and its complications in the Aboriginal population. In 2015, an audit was completed of approaches to care across the State, particularly the care delivered by the Aboriginal community-controlled sector. In addition, a comprehensive mapping of the diabetes and related services available in all regions was also completed. The work has been commissioned by the Aboriginal Health Branch of SA Health and is guided by a Steering Committee that includes all stakeholders in diabetes services and care, and members of the South Australian Aboriginal community. The strategy is due for completion in June 2016.

Communicate

This project explores the experiences of urban, rural and remote Aboriginal and Torres Strait Islander cardiac patients, their families and health care providers and identifies specific improvements in regard to patient communication at all points of interaction through the hospital journey. The findings will be compared to current guidelines and will become the basis of recommendations to the Heart Foundation to develop culturally appropriate solutions that will endeavour to improve the health literacy of patients.

SA/NT Stroke Study

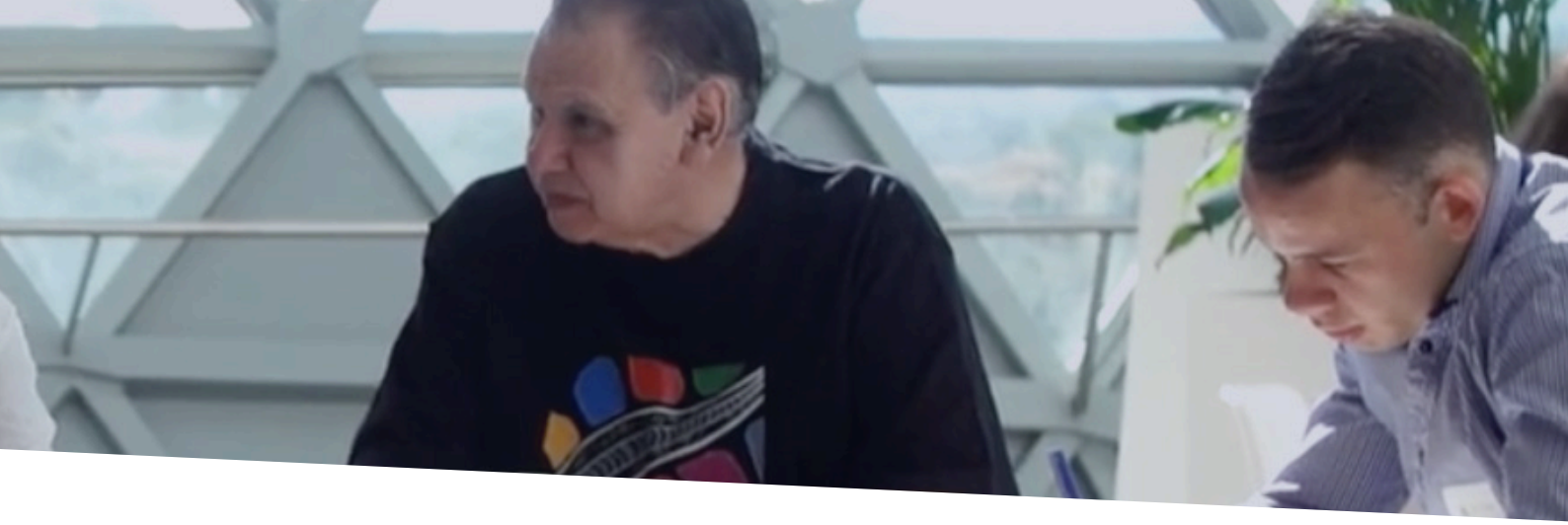
The study aims to understand the impact of stroke on Aboriginal and Torres Strait Islander people in South Australia and the Northern Territory, outlining barriers to care and identifying critical targets to influence health system enhancement and change that will ultimately result in best practice health care and improved health outcomes for Aboriginal and Torres Strait Islander people.

Centre of Excellence in Indigenous Chronic Disease Interventions in Primary Care

This project was extended by the Australian Primary Health Care Research Institute (APHCRI) for a further year to complete important work in the primary care sector. Of note was the finalisation of a wellbeing framework to be utilised in a practical way to guide the delivery of services to better manage chronic disease for Aboriginal communities. A number of publications of the results from the project were also completed.

In 2015, the Kanyini Vascular Collaboration (KVC) focused on knowledge translation and exchange activities with three main objectives:

1. Maintaining and where possible, building on existing stakeholder networks
2. Disseminating and translating evidence on work that has already been completed
3. Completing the Home Based Outreach Chronic Disease Management Exploratory (HOME) study



Rural Primary Health Care Research Capacity Building

The Capacity Building in Indigenous Chronic Disease Primary Health Care Research in Rural Australia project developed two research master classes (Understanding Research and Undertaking Research) to build the capacity of staff working in Aboriginal Community Controlled Health Organisations (ACCHO) and their peak bodies, in primary healthcare chronic disease research. Twelve Research Master Classes had been facilitated with a total of 126 participants in urban and regional locations across nearly all states (Western Australia, South Australia, Victoria, New South Wales and Queensland) and all territories (Northern Territory, Australian Capital Territory).

The South Australian Aboriginal Health Landscape

The South Australian Aboriginal Health Landscape is a population level study of the health of Aboriginal people in South Australia and the social conditions that affect their health at a local level to better understand their needs and help plan for services to be available where they are most needed. The report under development will focus on health, health risk indicators and related social conditions in each of 18 areas (called landscapes) of South Australia where most Aboriginal people live. The Aboriginal community will have a strong influence over what is reported and how information is presented. An advisory group of Aboriginal people are guiding the project on the most important information to report and how best to report it for the benefit of the Aboriginal community. Information will not be published where it might risk identifying an individual.

ENHANCeD

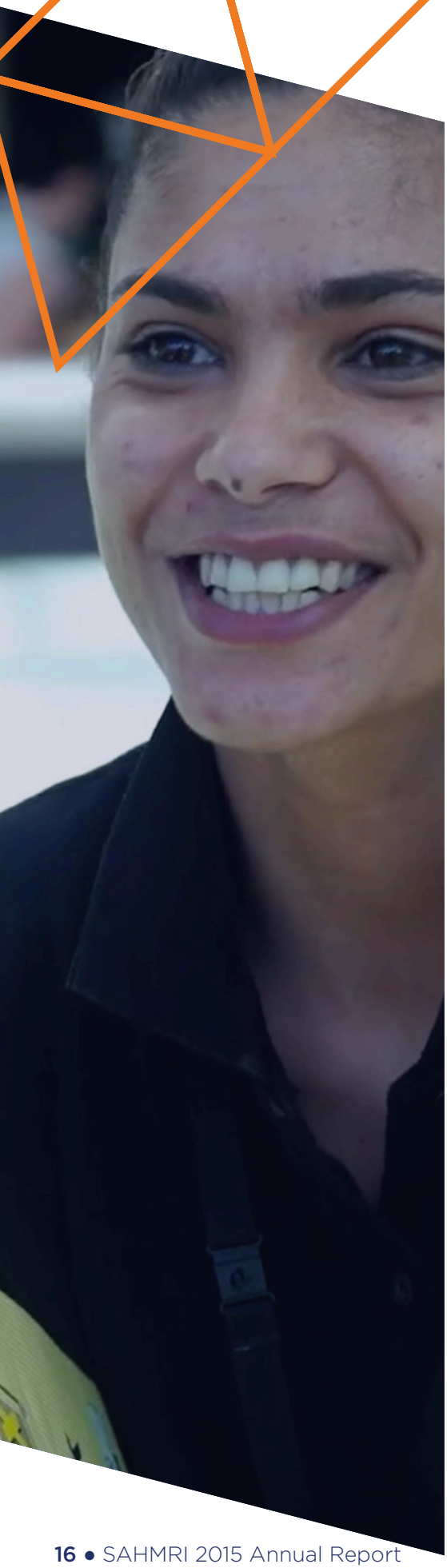
Professor Alex Brown won the prestigious Senior Medical Research Fellowship awarded by the Sylvia and Charles Viertel Charitable Foundation at the end of 2012. The award funds a major program of work investigating biological, psychological, behavioral and social impacts on development and progression of cardiovascular disease (CVD) in Aboriginal communities. Very little is known about the inter-relations among candidate biological, psychological, behavioural and social influences and their change over time, despite there being a critical need to better explain and mitigate these factors, particularly in Aboriginal and Torres Strait Islander populations. The ENHANCeD Project is building this foundation of clinical and public health significance. By establishing a unique prospective cohort, ENHANCeD will investigate these biological, psychological, behavioral and social correlates of CVD and their impact on the development and outcomes of cardiovascular disease in Aboriginal and Torres Strait Islander communities. It represents the most comprehensive, integrated study of the biopsychosocial pathways to adverse outcomes in Aboriginal and Torres Strait Islander patients with co-morbid depression and CVD conducted to date, and aims to identify key intervention targets for future application.

Central Australia Heart Protection Study

The Central Australian Heart Protection Study (CAHPS) tested the effectiveness of a nurse-led, family based education and assessment program for reducing the incidence of poor outcomes following a hospital admission for an acute cardiac event. The CAHPS study is expected to reduce major coronary events in the study group, and to engage families in care, while improving community outreach, continuity and journeys through the healthcare system.

Older Aboriginal People

During 2015, Wardliparingga commenced discussions on research into ageing in the



Aboriginal community in response to issues raised by Aboriginal Elders and other opinion leaders from the Aboriginal community. Early work has been completed on literature reviews (supported by Helping Hand Aged Care). Links with the Council of Aboriginal Elders SA, Helping Hand, Alzheimer's Australia and the Aboriginal aged care organisation Aboriginal Community Care SA assisted in grounding the research in practical ways and the partnership is being developed for future work.

Evaluations - Various Clients (Northern Adelaide Local Health Network, Institute for Urban Indigenous Health, SA Health)

During 2015, Wardliparingga was approached to conduct a number of evaluation and review projects. These evaluations included single program, small scale projects, through to strategic, multi-project reviews.

Each project was designed to meet the needs of the client. Within Wardliparingga there is extensive evaluation experience, both in terms of program design/implementation and in policy development and review. The capacity to undertake economic evaluations was possible through the inclusion of a health economist in the team – Dr Brita Pekarsky.

A TOTAL OF 32 PAPERS WERE PUBLISHED BY THE WARDLIPARINGGA ABORIGINAL RESEARCH UNIT IN 2015

cancer

Precision medicine remains the main focus of research within the Cancer theme. This is where therapy is specifically tailored to the patient and their disease, rather than a one size fits all approach. This often involves advanced technologies including genomics, proteomics and functional imaging to identify the specific characteristics of an individual cancer.

The major research groups within the Cancer Theme are:

- Leukaemia
- Myeloma
- Prostate Cancer
- Colorectal Cancer
- Stem Cells

In February 2015, Professor Tim Hughes was appointed Cancer Theme Leader and Professor Deborah White was appointed Deputy Cancer Theme Leader.

About the theme

The theme has made important contributions to the dramatic progress being made internationally in relation to the understanding of the mechanisms of cancer development, our capacity to control cancer progression, and where possible, our ability to cure cancer. The Group Heads are Professor Deborah White, Associate Professor Lisa Butler, Professor Andrew Zannettino, Professor Stan Gronthos, Associate Professor Agnes Yong and Dr Dan Worthley, who are all leaders in their fields in Australia and have received both national and international recognition for their achievements.

One of the Cancer theme's priorities in 2015 was to build stronger collaborations with other cancer research groups working in Adelaide. The Cancer Research Translational Meeting held monthly meetings to share emerging research findings received strong support across Adelaide.

Research Highlights

The Leukaemia Research Group, headed by Professor Deborah White and Professor Tim Hughes, continued their work in the areas of both Chronic Myeloid Leukaemia (CML) and Acute Lymphobastic Leukaemia (ALL). In CML, the main focus is cure. There now exist very good targeted therapies available but to date the majority of CML patients remain dependent on their kinase inhibitor therapy to maintain disease control long-term. Hence, it is critical to understand what factors underpin the ability of some patients to remain disease-free off therapy while others relapse rapidly when the drug is removed. In ALL, the Leukaemia Research Group is leading the exploration in this country of new high risk subtypes of this disease which excitingly may be amenable to targeted therapies with drugs currently available in the clinic. This work will change the treatment paradigm for high-risk ALL and the importance of this project is best exemplified by its inclusion in the NHMRC Genomic Translation Targeted Call for Research, a $25 million grant.

Mesenchymal Stem Cell laboratory

Adult bone marrow contains a non-haematopoietic, stromal stem cell population with the ability to form clonogenic, adherent colonies comprised of fibroblast-like cells (CFU-F: colony forming units-fibroblast). The ex vivo expanded progeny of CFU-F have been shown to develop into different stromal cell lineages (myelosupportive stroma, adipocytes, smooth muscle cells, myoblasts, chondrocytes and osteoblasts) and are thought to arise from a common, self-replicating multi-potential stem cell referred to as mesenchymal stem cells (MSC) or bone marrow stromal stem cells. The Mesenchymal Stem Cell Laboratory, headed by Professor Stan Gronthos, examines the transcriptional and epigenetic factors that regulate MSC self-renewal, proliferation and differentiation. In addition, research efforts have focused on identifying the factors central to MSC mediated regulation of haematopoiesis, angiogenesis and immune cell modulation. Importantly, many of these molecular processes are considered underlying mechanisms that influence tumour cell development. A new collaboration with Dr Dan Worthley and Professor Andrew Zannettino is investigating a unique skeletal progenitor cell that gives rise to bone and cartilage in the context of bone fracture and osteoarthritis. Other collaborations with Professor Peter Anderson, and Professor Andrew Zannettino are exploring the development of novel drug targets to treat craniosynostosis or premature fusion of the coronal sutures in the cranium of children suffering with Saethre-Chotzen Syndrome. Clinically, MSC are considered as novel therapeutic agents with the potential for repairing damaged connective tissue due to trauma, disease or congenital conditions. Together with Professor Andrew Zannettino and commercial partner, Mesoblast Ltd, (founded in 2004, based on SAHMRI's intellectual property), Phase II/III is beginning on human clinical trails for orthopaedic, cardiovascular, immunotherapy and cancer applications. The group's continuing research

into the basic properties of MSC will help develop effective and safe therapeutic strategies in the future for a wide variety of clinical indications.

Myeloma Research Group

The Myeloma Research Group, headed by Professor Andrew Zannettino studies multiple myeloma, a blood cancer characterised by the clonal expansion of malignant plasma cells. Myeloma affects approximately 86,000 people around the world each year. Myeloma is almost always preceded by an asymptomatic form of the disease known as monoclonal gammopathy of uncertain significance (MGUS). The factors that trigger the progression from MGUS to myeloma remain unknown. The laboratory is using state-of-the-art genomics to identify the genetic drivers of disease progression. In collaboration with Dr Worthley, the laboratory is investigating the role of bone marrow mesenchyme in myeloma disease development. Specifically, the team are investigating the role of the mesenchymal stem cell secreted factor, Gremlin-1, in myeloma disease establishment and disease progression. Collectively, these approaches will enable the identification of new molecular markers of disease risk and lead to the design of novel therapeutics.

Prostate Cancer Research Group

Prostate cancer is a major public health issue in Australia and a leading cause of morbidity and mortality in men. The most important issues in prostate cancer research are:
(1) to develop more effective and targeted therapies for metastatic prostate cancer,
(2) to improve the ability to distinguish indolent from aggressive forms of prostate cancer at diagnosis in order to prevent unnecessary over-treatment and;
(3) to develop more accurate ways of monitoring response to therapy.

Research performed by the Prostate Cancer Research Group, led by Associate Professor Lisa Butler, is making significant impacts on these key priority areas in the field. A cornerstone of her research has been the development of a novel pre-clinical model of prostate cancer that utilises human tissue cultured as explants, enabling generation of data that few others in the world are able to achieve. Importantly, because this model provides highly clinically relevant data that is not achievable with traditional cell line or animal models, work performed with the explant model will greatly enhance selection of drugs and biomarkers which progress to clinical trials. Her work is using this model to assess the clinical potential of new drugs which target heat shock protein 90 (Hsp90), identifying novel targets to use in combinatorial treatment approaches to improve the efficacy of standard androgen receptor targeting drugs. A Movember Revolutionary Team Award project headed by A/Professor Butler is also using this model to identify lipid biomarkers that can be used to improve diagnosis, treatment and molecular imaging of prostate cancer.

Colorectal Cancer Group

Dr Dan Worthley's Gastrointestinal (GI) cancer biology group has been developing new preclinical models to manage gastrointestinal

cancers, particularly bowel cancer. They have focused on three main areas. Foremost has been the establishment of the Australian Living Organoid Alliance (ALOA), which is a network of Australian researchers including SAHMRI, Walter and Eliza Hall Institute (WEHI) and Monash, to coordinate national, multi-institutional colorectal organoid research and practice across Australia. Organoids are a living, preclinical bridge to allow validation of new cancer targets and new cancer therapies in the lab. We hope to establish an accredited laboratory in the near future that will allow individual patients to have their tumours tested for sensitivity against different chemotherapeutic options being tested in the lab, before being treated in the clinic. SAHMRI will also be focusing on growing organoids from benign bowel polyps to identify new ways to the prevent the development of bowel cancer in the first place. Secondly, the group has a number of mouse models of bowel cancer, that are studied in the group's mouse colonoscopy suite and theatre in the state of the art SAHMRI animal facility. The Colorectal Cancer Group plans to run randomised controlled trials in a mouse hospital shortly. Finally, the group are interested in the cells that support cancer growth, the surrounding cancer-associated fibroblasts. Utilising a number of approaches, an activated mesenchymal signature is being identified, to suggest new treatment targets in the stroma, the surrounding tissue that acts as an accomplice to cancer growth. In another stream of research, Dr Worthley and his team have a number of projects studying other stromal tissues, in particular the bone and cartilage and osteoarthritis. At first glance, this seems an unusual fit for a gastroenterology laboratory, but it highlights the common relationship of different clinical diseases to fundamental scientific areas such as stem cell biology. Having discovered two new connective tissue stem cells, one in the bowel and one in the bone, has allowed the funding and studying of seemingly disparate fields of skeletal and intestinal disease.

A TOTAL OF 47 PAPERS WERE PUBLISHED BY THE SAHMRI CANCER THEME GROUPS IN 2015

heart health

Overview

Cardiovascular disease (CVD) is the leading cause of death and the single largest drain on public health expenditure. These observations continue to support the concept that prevention, detection and treatment of CVD remains a major focus of research efforts designed to improve health outcomes in the community. Efforts to address CVD must appreciate that it spans across a broad range of disease states. These concepts and the broad CVD research community within South Australia led to the establishment of the Heart Health theme, led by Professor Stephen Nicholls, as an inclusive, collaborative department reaching to all clinical cardiovascular fronts within the state. The Heart Health team brings together laboratory based scientists, clinical researchers and clinical trialists to develop translational research programs that will seek to improve our ability to tackle the major challenges of diseases of blood vessels, diseases that lead to heart failure and electrical disorders of the heart.

What we do

The mission of the group is to develop new strategies to reduce the risk of heart disease involving a translational program spanning preclinical human and clinical trial research. The Hearth Health theme interests span basic research (predominantly focusing on targeting mediating pathways implicated in the genesis of vascular disease and brain injury in stroke), clinical research (with internationally regarded excellence in cardiovascular imaging and invasive studies of the coronary arteries and electrophysiology), clinical trials (spanning from evaluation of novel therapies through to health services research), clinical registries, network biology, population/public health (aiming to influence public policy influencing CVD prevention) and medical education (dissemination of information). The ability to consolidate these activities within theme's broad research agenda, individually led by national leaders in their fields, has rapidly established SAHMRI as the most comprehensive translational research program in the field of cardiovascular medicine in Australia.

The theme consists of the following research groups:

- Vascular Research Centre – led by Professor Stephen Nicholls
- Centre for Heart Rhythm Disorders – led by Professor Prash Sanders
- Stroke Research Group – led by Professor Simon Koblar
- Cardiac Imaging Research Group – led by Professor Joseph Selvanayagam
- Adelaide Clinical Research (now SAHMRI Clinical Research) – led by Professor Stephen Nicholls
- Health Systems Research – led by Professor Derek Chew
- Adelaide Institute of Sleep Health (AISH) – led by Professor Doug McEvoy and Associate Professor Nick Antic
- Makinen Group (network biology and systems thinking) – led by Dr Ville Makinen
- SAHMRI Population Health – led by Associate Professor Caroline Miller
- Cardiac Innovation Centre – Medical Education – led by Professor Philip Aylward

Research Highlights

It was a productive year for the Heart Health theme researchers.

Professor Stephen Nicholls and Heart Health Clinical Research were awarded the leadership and operational control of an international multicentre study entitled CARAT (CER-001 Atherosclerosis Regression ACS Trial).

The study is assessing the impact of ten intravenous infusions of CER-001 (a HDL mimetic) vs placebo in 292 patients, given at weekly intervals, on atherosclerotic plaque volume as measured by coronary Intravascular Ultrasound (IVUS) administered to subjects presenting with Acute Coronary Syndrome (ACS) with significant plaque volume. Changes to plaque volume will be measured via a secondary coronary IVUS at the end of the course of the infusions. The study has sites in Australia, Hungary, Netherlands and the United States and commenced recruitment in August. It is expected to complete recruitment in mid-2016.

The theme, in collaboration with Aboriginal Health, have received funding for an Investigator led PCSK9 inhibitor study – IMPACT-LDL.

The study is a randomised, multi-centre, placebo-controlled study to determine the effect and adherence of Proprotein Convertase Subtilisin Kexin type 9 (PCSK9) inhibitor administration in participants of Aboriginal background with hypercholesterolaemia that fulfill existing evidence based guidelines for lipid lowering therapies. It is expected to commence recruitment mid 2016.

CAAN – AF trial

CAAN-AF requires 590 subjects with an implantable CRT device (CRT-D) to be enrolled and randomised to either an ablation or medical management. There are 18 Australian and 4 New Zealand sites participating in the study and a total of 85 subjects have been randomised. The aim of the trial is to determine whether there is a difference in mortality and heart failure events between the two groups (CRT-D alone vs CRT-D plus AV node ablation). There has been widespread interest from international Electrophysiologists to participate in the study and we anticipate that by mid-2016, 5 German sites and one Malaysian site will be participating in the trial. In this same time period an additional three Australian sites will also be part of the team. It is anticipated recruitment will cease in January 2018.

A TOTAL OF 98 PAPERS WERE PUBLISHED BY THE SAHMRI HEART HEALTH THEME IN 2015

Cardiovascular Magnetic Resonance GUIDEd management of mild-moderate left ventricular systolic Heart Failure (CMR GUIDE HF)

Professor Joseph Selvanayagam and his Cardiac Imaging Research Group were successful in receiving funding for an important study to test the hypothesis that among patients with mild-moderate heart failure, a routine CMR guided management strategy of implantable defibrillator (ICD) insertion is superior to a conservative strategy of standard care. This international, multicentre clinical trial has received a research grant of $3.1 million and $4.8 million in devices from Biotronik. The study commenced recruitment mid 2015.

Administration of TicagRElor in pAtients with ST elevation myocardial infarction treated with pharmacological Thrombolysis (TREAT trial)

This study is examining Ticagrelor compared with Clopidogrel administered in the first 24 hours for ACS patients and may result in a change in guidelines. This investigator initiated global study is coordinated by the Research Institute of HCor in Sao Paulo Brazil and will involve 209 sites in 11 countries, including Australia and New Zealand. The study is aiming to recruit patients who suffer a myocardial infarction in a regional/rural setting who are treated with pharmacological thrombolysis and are then transferred to a city hospital with Percutaneous Coronary Intervention (PCI) capabilities. The study is also looking to develop research networks and collaboration between country and city hospitals. In Australia, TREAT will be conducted at 20 regional/rural and city hospitals with a total of 200 patients to be recruited. Professor Stephen Nicholls is the National Coordinator for Australia and the SAHMRI Clinical Research team will be managing the project. The study is looking to enrol its first Australian patient in April 2016.

Launch of the Centre for Nanoscale BioPhotonics

A partner launch of the Centre for Nanoscale BioPhotonics (CNBP) and SAHMRI, with Mark Hutchinson, Director CNBP - the University of Adelaide, Andrew Abell - CNBP Chief Investigator and Node Director, the University of Adelaide and Stephen Nicholls was held in September. The CNBP presented SAHMRI with a plaque recognising SAHMRI's contribution to the centre. The launch was an important milestone in the Heart Health theme's collaborations to develop novel approaches to sensing blood vessels.

Adelaide Clinical Research

Adelaide Clinical Research has been consolidated with registries across SAHMRI under the SAHMRI Clinical Research platform. It was a privilege to attract Liddy Griffith to SAHMRI. In her role as Senior Manager, SAHMRI Clinical Research Platform she will provide leadership and coordination of clinical research activities for the Heart Health theme and SAHMRI.

The Cardiac Procedure and Device registries are beginning to thrive. A great deal of work has been performed by the Health Systems Research group to develop, design and operate these registries. The registries as important as cardiovascular disease remains a leading cause of morbidity and mortality in the community. Management involves the use of increasingly complex interventional and surgical procedures and implantation of a wide variety of devices.

healthy mothers, babies & children

Overview

The Healthy Mothers, Babies and Children (HMBC) theme commenced in August 2013 with the appointment of Professor Maria Makrides as Theme Leader. Professor Makrides was already established in Adelaide, leading a successful research program in maternal child nutrition at the Women's and Children's Health Research Institute as well as serving as the Acting Director of the Institute while it underwent a transition from being a small independent medical research institute to a controlled entity of the University of Adelaide.

The Healthy Mothers, Babies and Children theme is proud to be embedded in hospitals. The team passionately holds the view that the best way to evaluate health practices is to engage with the clinicians and consumers directly involved, and for young families this mostly means engaging with maternity and paediatric services. In Australia, almost all women attend several antenatal visits and deliver their babies in a hospital, offering maximum opportunity to engage with all young families, as well as the full range of health professionals associated with the care of young families. It is for this reason that the headquarters of the SAHMRI Healthy Mothers, Babies and Children theme is located at Women's and Children's Hospital (WCH). Because a large part of the theme's work involves the conduct of large-scale multicentre trials, there are also SAHMRI staff located at Flinders Medical Centre (FMC), Lyell McEwin Hospital (LMH) and Werribee Mercy Hospital in Victoria (WMH), as well as the Waite Campus of the University of Adelaide. The theme's extended regional and international network includes 16 perinatal centres in Australia, New Zealand and Singapore.

While this poses a number of geographical and logistical challenges, the potential impact and rewards associated with the science that can be delivered is worth the effort.

The theme has a special expertise in assessing nutritional interventions during the first 1,000 days of life, the period between conception and a child's second birthday. The first 1,000 days is considered a critical period for nutrition because of the very

rapid growth and development that occurs during this period, also setting up health and developmental trajectories that predict outcomes at a later age. The nutrition intervention trials run by the theme focus on enhancing the cognitive outcomes of children, achieving optimal growth, reducing preterm birth and preventing allergic diseases in young children, with a particular attention on vulnerable and disadvantaged groups.

The theme's expertise in the field of early life nutrition has been transferred from the Child Nutrition Research Centre (CNRC), which was formerly part of the Women's and Children's Health Research Institute. In keeping with the recommendations of the Shine-Young review that led to the establishment of SAHMRI, the research of the Women's and Children's Health Research Institute will be officially amalgamated with SAHMRI in January 2016. The Healthy Mothers, Babies and Children Theme has the CNRC at its core. From this strong core, the group are building other units (such as the Aboriginal Children and Families Research partnership) that are strongly integrated or overlapping with the CNRC so that they can all draw on the combined expertise of the group.

What we do

The Healthy Mothers, Babies and Children theme's mission is to assess and implement effective interventions that improve the health of mothers and their children.

The theme's nutrition intervention trials continue to focus on enhancing cognitive outcomes, achieving optimal growth, reducing preterm birth and preventing allergic diseases in young children, with a particular attention on vulnerable and disadvantaged groups.

The majority of the theme's research is funded by the NHMRC. Currently, the largest ongoing study is the NHMRC- funded ORIP (Omega-3 fats to Reduce the Incidence of Prematurity) trial which is looking to recruit 5500 pregnant women under 20 weeks gestation to investigate whether taking a fish oil rich in the omega 3 fat docosahexanoic acid (DHA) during pregnancy helps prevent very premature delivery.

Along with her theme leader role, Professor Maria Makrides was also Director of Research at the Women's and Children's Health Research Institute (WCHRI), located at the Women's and Children's Hospital which is where the theme's headquarters are based.

Research Highlights

By December 2015, the ORIP trial officially became the largest clinical trial of omega-3 supplementation during pregnancy in the world, with more than 2,500 pregnant women having been recruited. During the year, recruitment commenced in two new centres – the Mercy Werribee Hospital (Melbourne) and the Mater Mothers' Hospital (Brisbane) to overcome a slower than anticipated recruitment in the Adelaide centres. The ORIP study will answer the question of whether omega-3 supplementation in pregnancy can reduce the risk of premature delivery.

Recruitment for the N3RO (N-3 fatty acid for Respiratory Outcomes in preterm infants) trial exceeded its required sample size with 1273 enrolled across 13 neonatal intensive care units in Australia, New Zealand and Singapore. This trial is investigating whether the omega 3 fish oil docosahexaenoic acid (DHA) given to very preterm babies (those born more than three months early) can help prevent bronchopulmonary dysplasia, a serious chronic lung condition which occurs in about 40 – 50 percent of these babies. Results are expected to be available in the second half of 2016.

A partnership was developed with Clover Corporation to produce and supply the DHA-based emulsion (and matching placebo) used in this N3RO trial. The joint intellectual property was licensed to Premneo Pharmaceuticals in October 2015.

The seven year follow-up of the DINO (DHA for Improvement in Neurodevelopmental Outcomes) children was completed in 2015 and published in BMJ Open. With collaborators from Brisbane, Melbourne, Perth and Adelaide, and the generous commitment of the DINO families, developmental assessments were conducted on over 600 children around Australia and overseas. This study was designed to determine if giving extra DHA to premature babies improves mental development at 18 months of age. Some benefit for the infants was found at this time and their objective was to see if the effect was sustained to the early school years. Findings from the seven year follow-up showed that, while the vast majority of the children were performing well, differences between those who got the extra DHA and those who didn't had waned. In the long term, the effect of the family and environment may have a greater influence on cognitive outcomes.

The CAKE study was designed to find out whether, for children with existing egg allergy, regular inclusion of baked egg in their diet helped them to outgrow their egg allergy more quickly. This CAKE 'treatment' study showed, for egg allergic children, regularly eating baked egg does not change the rate at which they develop tolerance.

For babies without existing egg allergy, the STEP trial aimed to test if regular inclusion of egg when solid foods were first introduced, prevented egg allergy developing. Enrolment was completed in Adelaide and Perth of 820 infants for this STEP 'prevention' trial and the follow up phase progressed well. Results are pending.

The DOMInO (DHA to Optimize Mother Infant Outcome) study was conducted some years ago to find out whether, when supplemented the diet of pregnant women with the omega 3 fish oil DHA, there were benefits for the health of the women or their babies. One of the assessments was to see if there was an effect on allergies in babies and also in school age children. The six year follow up of children in the trial was completed during 2015 and found that DHA had no effect on whether six year old children developed eczema, wheezed or had hayfever. However, it was found that it did reduce their sensitivity to a common type of house dust mite.

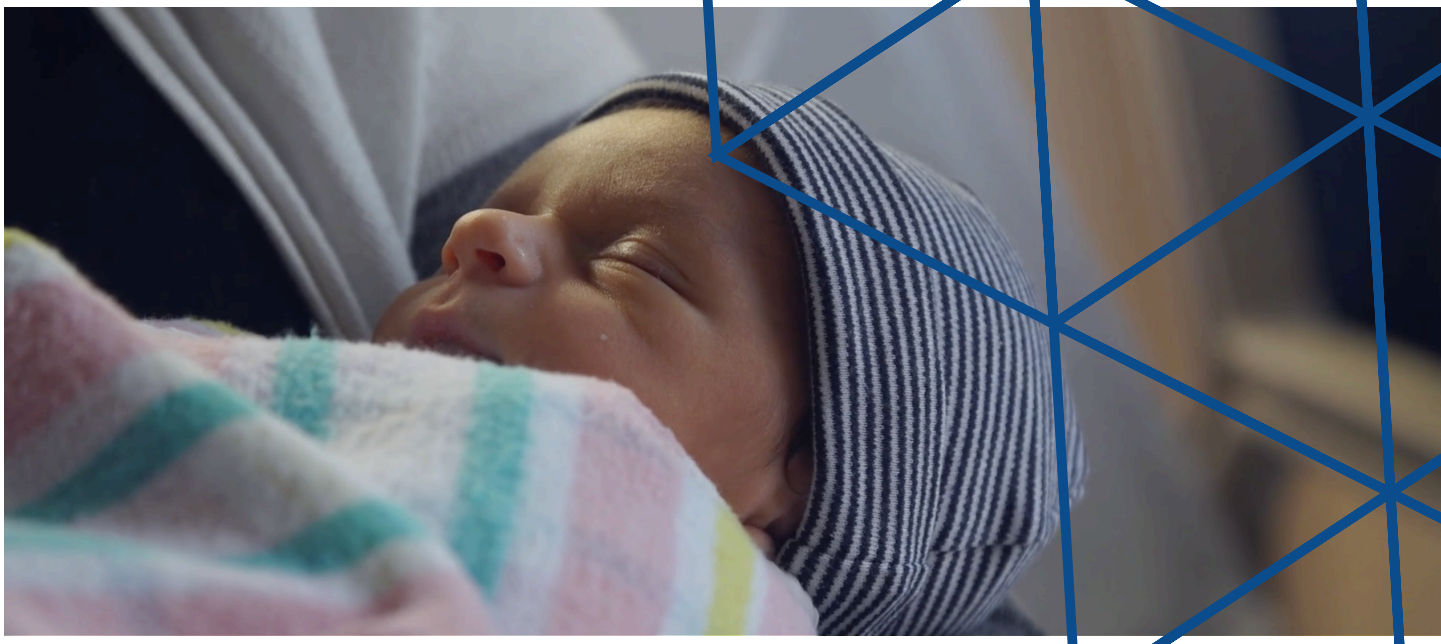
The seven year follow up of the trial progressed well during 2015, and is nearing completion.

A highly successful Aboriginal babies, children and families workshop was held at SAHMRI in May. This workshop was run jointly by the Wardliparingga Aboriginal Research Unit and the Healthy Mothers, Babies and Children theme. The aim was to bring together a wide range of expertise in Aboriginal health and maternal/child health in order to shape a dynamic research program based upon community health priorities for Aboriginal families in urban, rural and remote South Australia.

Researchers, clinicians, health care workers, policy makers, community members and elders from urban and regional South Australia contributed to the day. The Steering Committee took the information from the workshop and created a key priorities document. They are now working together to create the Aboriginal Families Health Research Partnership, comprised of members from SAHMRI and other South Australian health and/or research organisations. The intention of the partnership is to create and govern three streams focusing on:

- Maternal and Child Health
- Strong Families
- Healthy Young People

A TOTAL OF 22 PAPERS WERE PUBLISHED BY THE SAHMRI HEALTHY MOTHERS, BABIES & CHILDREN THEME IN 2015



nutrition & metabolism

Overview

The Nutrition and Metabolism theme's mission is to seek to understand the links between nutrition, metabolism and human health. The theme is led by Professor Chris Proud, who was appointed inaugural theme leader in August 2014.

What we do

The theme's research - which spans basic science, clinical research, and epidemiology - studies the links between nutrition, metabolism and human health and includes researchers from the University of Adelaide's Centre for Nutrition and Gastrointestinal Disease Research, CSIRO Food and Nutrition and the Lysosomal Diseases Research Unit, as well as SAHMRI's Cell Signalling and Gene Regulation Group.

Nutrition and Metabolism has particular interests in: the mechanisms, consequences and management of obesity and type-2 diabetes (T2D); inflammatory and functional disorders of the gut; and diseases caused by defects in lysosomes, the cell's recycling centre.

Specific areas of investigation include the regulation of appetite, the signalling mechanisms triggered by nutrients, the molecular mechanisms of nutrient detection and signalling by gut hormones, immune function and pain-sensing in the gut, interactions between nutrition, circadian rhythm and metabolic disorders, metabolism in liver, muscle and adipose tissue, the role of lysosomes in neurological diseases and defining optimal strategies for the prevention and management of obesity and T2D.

Cohort studies investigate the association between diet and sleep, cancer, anaemia, cardiovascular disease, osteoporosis and mortality. A major goal is to develop and validate innovative diets to promote health and wellbeing.

Research Highlights

In 2015, the current work of the Cell Signaling and Gene Regulation Group, led by Professor Chris Proud, concerned signalling pathways and protein kinases that regulate protein synthesis and other metabolic processes. The major focus concerns eukaryotic elongation factor 2 kinase, the MAP kinase-interacting kinases (MNKs) and mammalian target of rapamycin signalling. Current work focuses on their roles in metabolic and cardiovascular disease, in neurodegeneration and processes related to ageing. Another major area of current interest is the regulation of protein synthesis in cancer cells, and its role in both protecting such cells against nutrient starvation and in cell migration. Recent work has revealed an important role for the MNKs in controlling protein synthesis in neurons and in the migration of cancer cells.

In the Centre for Nutrition & Gastrointestinal (GI) Disease Research (the University of Adelaide), the Obesity and Molecular Metabolism Group, which focuses on type 2 diabetes mellitus, particularly on understanding the molecular and physiological basis of obesity and its co-morbidities in humans is led by Associate Professor Leonie Heilbronn. The group recently completed a clinical study comparing intermittent fasting diets with the more traditional daily energy restricted diets. Their data showed that intermittent fasting achieves greater reductions in insulin and blood triglycerides, as well as levels of ALT, a marker of liver health. These findings suggest that intermittent severe energy deprivation may provide better health benefits than moderate daily restrictions. Further study is required to understand the molecular mechanisms underlying these health improvements and whether these diets are sustainable.

Obesity is extremely resistant to behavioural intervention and pharmacological approaches have therefore had limited efficacy or unacceptable adverse effects. The satiety signal from the gut involves the integration of both gastric and intestinal feedback signalling and offers an attractive peripheral target for the treatment of obesity. The Vagal Afferent Research group, led by Associate Professor Amanda Page, aims to improve understanding of gastrointestinal vagal afferent function under different states of nutrition, thereby providing peripheral targets for the treatment of obesity.

Dr Richard Young and the Intestinal Nutrient Sensing Group, undertakes research focused on the form and function of the intestinal sweet taste system that senses intestinal glucose, and can regulate control of gut hormones and glucose absorption. They discovered increased capacity and signalling of a gut signal, serotonin, in patients with obesity and metabolic syndrome, while a reduction of this signal was found following weight loss surgery. These findings led to a new collaboration and a grant from the Australian Research Council and the pharmaceutical industry to better understand how these signals are triggered in humans. His studies also showed clinical benefits of preserving signals that increase glucose absorption in an animal model, with the aim being to improve delivery of nutrients to critically ill patients.

In 2015, Associate Professor Stuart Brierley's Visceral Pain group, which focuses on pain arising from the gut with particular emphasis on Irritable Bowel Syndrome (IBS), signed major multi-year agreements with Ironwood Pharmaceuticals Inc. and Takeda Pharmaceuticals Inc. to develop novel treatments for irritable bowel syndrome. The group also published their findings on a novel strategy for identifying and targeting specific (GABAB) receptors located on the peripheral nerve endings in the colon that initiate pain sensations. The goal is to develop new ways to treat chronic visceral pain.

Dr Patrick Hughes and the GI Neuro-immune Interactions Group, which looks at the communication between the nervous and immune system, and particularly how this is relevant in diseases of the lower gastrointestinal tract including Inflammatory Bowel Disease and Irritable Bowel Syndrome, demonstrated that interleukin-2 excites pain-sensing colonic nerves via NaV (sodium) channels and this occurs more often in a model of post-inflammatory pain. They also showed that Cognitive Behavioural Therapy is beneficial for a subset of patients with Inflammatory Bowel Disease, and are currently investigating the effects this treatment has on immune function. Dr Hughes received funding from Ironwood Pharmaceuticals in 2015.

Associate Professor Grigori Rychkov and the Liver Metabolism Group are seeking to define the basic molecular mechanisms that control the activation and regulation of store-operated Ca2+ channels and transient receptor potential channels in the liver, establishing the role of these channels in generating responses in primary hepatocytes to hormones that regulate metabolism and transport of bile salts, and studying the role of these channels in liver pathology. In 2015, they investigated the role of store-operated Ca2+ channels (SOCs) in the development of non-alcoholic fatty liver disease. His group have shown that fat accumulation in hepatocytes is associated with reduced hormone-initiated intracellular Ca2+ signalling and impaired Ca2+ entry through SOCs. The inhibition of SOCs in lipid-loaded cells was due to increased activity of an enzyme called protein kinase C and the resulting phosphorylation of the molecular components of SOCs – STIM1 and Orai1 proteins.

Dr Zumin Shi and the Nutritional Epidemiology group are studying of the relationship between nutrients patterns, specific nutrients and subjective and objective sleep and disorders of sleep in men; the health consequences of bisphenol A and phthalate exposure and the relationship between nutrient patterns, specific nutrients and chronic disease/cancer risk and outcomes. In 2015, the group showed that phthalate exposure is widespread and positively associated with lifestyle risk factors, such as smoking, obesity and insufficient physical activity, in urban-dwelling Australian men. Dietary intake is a major route of phthalate exposure, with carbonated soft drinks being important contributors.

After a 13-year follow-up of nearly 9,000 Chinese people aged 80 years or over, the group found that diet and lifestyles are related to mortality. The frequency of the intake of fresh fruit and vegetables is inversely associated with all-cause mortality, however, the opposite is true for the consumption of salted vegetables. Undertaking physical activity is beneficial for the prevention of premature death.

The Diet, Lifestyle and Health Substantiation Group (CSIRO) led by Dr Nathan O'Callaghan worked on the development, commercialisation and launch of the Impromy health and weight loss program, which attracted 20,000 people. Following its launch the CSIRO Health Diet Score questionnaire was completed by more than 80,000 people and the Total Wellbeing Diet online program has attracted more than 10,000 subscribers.

infection & immunity

Overview

The theme's vision is to address key health issues at the intersection of infection, immunity, chronic disease and community. This inevitably involves a collaborative approach across the theme, institute, and externally.

This vision is underpinned by a strategy to develop immunology, bioinformatics, microbiome and clinical platforms. The theme has utilised these platforms to develop programs of work examining areas such the impact of microbiota on vaccine responses, chronic lung infections, the gut brain axis, networks in cancer and sexually transmitted infections (STIs) and blood borne viruses (BBVs) in Aboriginal communities.

What we do

SAHMRI's Executive Director, Professor Steve Wesselingh is the Infection and Immunity Theme Leader. The theme also includes three group leaders: Associate Professor Geraint Rogers, Director of Microbiome Research, Associate Professor David Lynn, EMBL Australia Group Leader and Associate Professor James Ward, Head of Infectious Diseases Research Aboriginal Health.

Associate Professor Lynn's group investigates the complex web of molecular and cellular interactions that regulate our immune response using advanced experimental and computational approaches.

Associate Professor Rogers' groups focus is on the interaction of our microbiome, the community of microorganisms that share our bodies, with the immune system.

Associate Professor Ward's work aims to address the long standing and disparate rates of STIs and BBVs, and other infectious diseases prevalent in the Australian Aboriginal population.

All the groups in the theme collaborate extensively with each other, with other SAHMRI teams, nationally and internationally.

All members of the leadership team have significant profiles and are regularly invited to speak at national and international

conferences and play major national leadership roles.

The theme has a significant national profile in the following areas:

- Systems biology platform for the computational analysis of innate immunity networks/pathways
- Microbiome research, particular in relation to the respiratory tract and gut dysbiosis
- STIs and BBVs among Aboriginal and Torres Strait Islander people.

The Infection and Immunity theme is co-located at SAHMRI and at the School of Medicine in Flinders University.

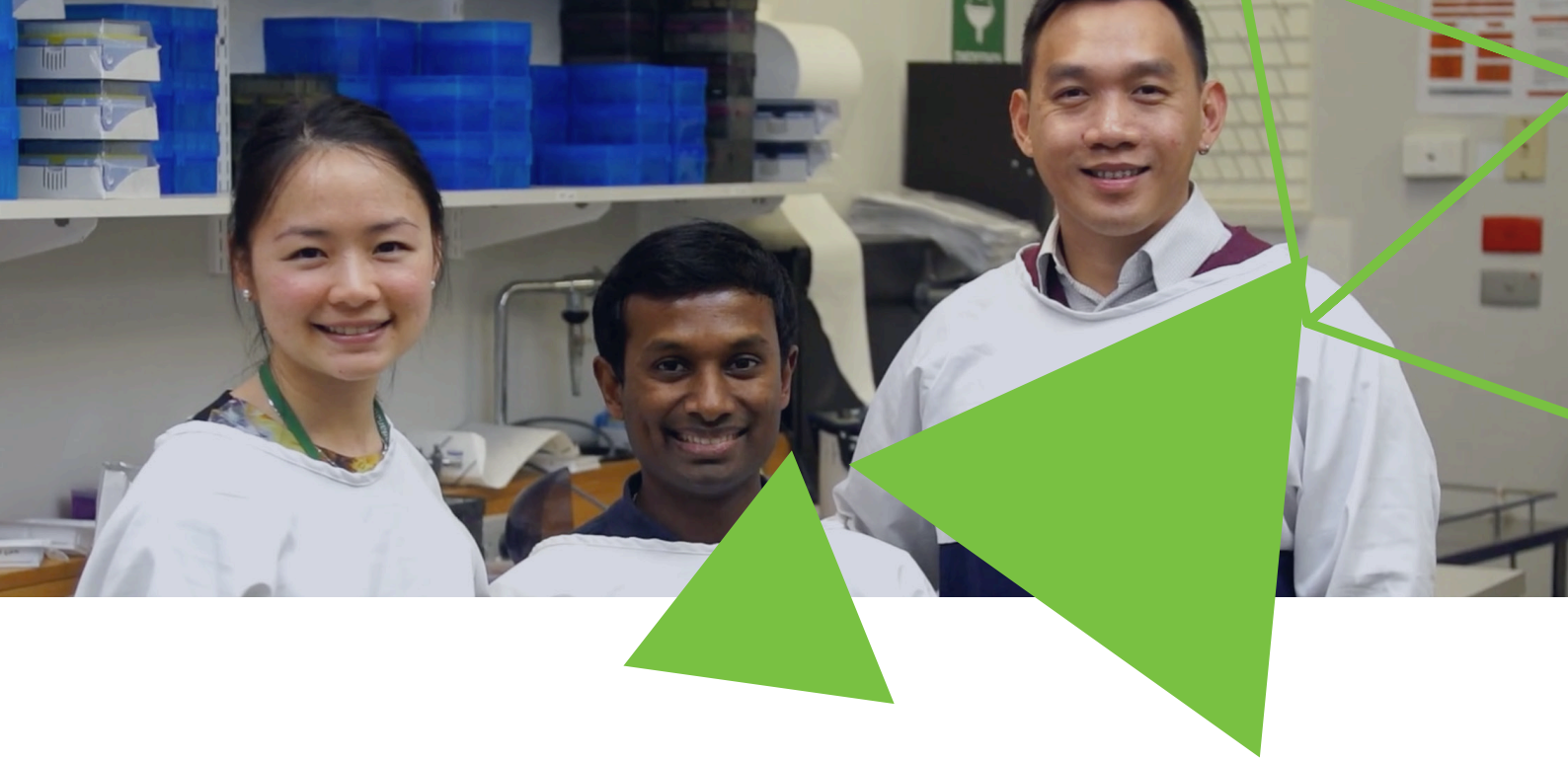
Lynn Group

The Lynn Group's primary research interest is investigating the regulation of the immune system from a genome-wide or systems level perspective. To do this, on the wet-lab side, the group employs in vitro and in vivo (mouse) experimental models coupled with systems biology approaches to investigate the regulation of innate, and more recently, adaptive immunity. Recently, the group has become particularly interested in the interplay between the microbiome and the immune system and this is becoming a major focus for the lab. The group is currently investigating how dysregulation of the (mouse and human) neonatal gut microbiome impacts subsequent immune responses (e.g. to childhood immunisations). The group is also developing a strong interest in vaccine non-specific effects (effects vaccines have on mortality and morbidity not explained by explained by the prevention of the targeted diseases) and how certain vaccines can epigenetically train innate immune cells to be more responsive to subsequent unrelated antigens.

On the bioinformatics side, the group leads the development of InnateDB.com, an internationally recognised systems biology platform for the computational analysis of innate immunity networks/pathways. Associate Professor Lynn also leads the computational biology aspects of a €12 million European Commission funded project, investigating how to model and subsequently therapeutically target networks in cancer. To facilitate this work the group has developed several novel pieces of software freely available for network and pathway visualisation and analysis.

2015 HIGHLIGHT: THE IMPACT OF THE NEONATAL MICROBIOME ON SPECIFIC VACCINE RESPONSES:

In their first months of life, infants worldwide receive vaccinations providing protection against many serious infectious diseases. However, vaccine efficacy varies substantially among individuals and clinical trials show consistently lower vaccine immunogenicity in developing world populations. One potential, but poorly considered, contributor to this variation is the intestinal microbiome. The gut hosts an enormous abundance and diversity of microbes, which perform a range of essential and beneficial functions. In neonates, the gut microbiome is rapidly



established and, in vaginally-born infants, its composition is strongly determined by the maternal microbiome. However, up to 40% of neonates are exposed to antibiotics, either directly or maternally, during the perinatal period and this has been documented to lead to a dysregulation of the normal development of the microbiome, causing dysbiosis. It is increasingly well-established that the consequences of dysbiosis can be long-lasting and extend far beyond the gut, leading to a dysregulation of systemic metabolism and immunity. The Lynn Group hypothesise that antibiotic-induced intestinal dysbiosis, particularly in this critical neonatal period, could lead to impaired immune responses to routine infant immunisations, which commence in close proximity to perinatal antibiotic exposure. This has now been proven to be the case in a neonatal mouse model, where we have demonstrated significant impairment of antigen-specific responses to three different routinely-administered infant vaccines. They are currently conducting a range of experiments to determine the mechanism by which early-life dysbiosis leads to impaired vaccine responses. These experiments include a large number of flow cytometry assays to identify whether there are any immune cell populations that are associated with impaired responses.

Preliminary data suggests some differences in B cell and regulatory T cell populations between the antibiotics exposed and unexposed groups. The group are currently conducting RNAseq in PBMC and mesenteric lymph node samples to identify genes in these tissues that correlate with antibody responses. Sequencing is currently underway at the SAHMRI genomics core. It has recently been reported that vaccination of adult TLR5-/- mice with the trivalent inactivated influenza vaccine resulted in reduced antibody responses due to a failure to sense flagellin from the microbiome. The group vaccinated four week old TLR5-/- mice at SAHMRI with the BCG and PCV13 vaccines to determine whether this pathway is also important for the vaccines that have been observed impaired responses for. An important step towards translating this work is to identify strategies to mitigate the impact of perinatal antibiotic exposure on vaccine responses. To that end, the group has established a collaboration with CSIRO to investigate whether a diet supplemented by a modified resistant starch can partially rescue the dysbiosis associated with antibiotic exposure. A preliminary study has been completed and they are awaiting the 16S rRNA gene sequencing results. If this preliminary study is positive, the group will investigate vaccine responses in mice fed this diet during and after antibiotics exposure.

Rogers Group

Led by Associate Professor Geraint Rogers, the aim of the group's microbiome research is to improve our ability to understand and treat bacterial infection and dysbiosis.

The microbiome is the community of microbiomes that exist in our bodies. Researchers have become increasingly aware that the microbiome plays an incredibly important role in our overall health. When a patient's microbiome is disrupted (dysbiosis), for example by taking antibiotics, there are long-term impacts on our health.

Ward Group

Led by Associate Professor James Ward, the Infectious Disease Research Group, Aboriginal and Torres Strait Islander Health, aims to be the leading research group in Aboriginal and Torres Strait islander infectious diseases Australia wide, developing world class research and knowledge to generate change in Aboriginal and Torres Strait islander communities.

OVERVIEW

Despite significant advances in the prevention, treatment and management of sexually transmissible infections (STIs) and blood-borne viruses (BBVs), the burden of these diseases among Aboriginal and Torres Strait Islander populations is much higher than in other populations in Australia. Improving access to health services and improving health systems is still required to achieve best practice in STI and BBV control in Aboriginal communities.

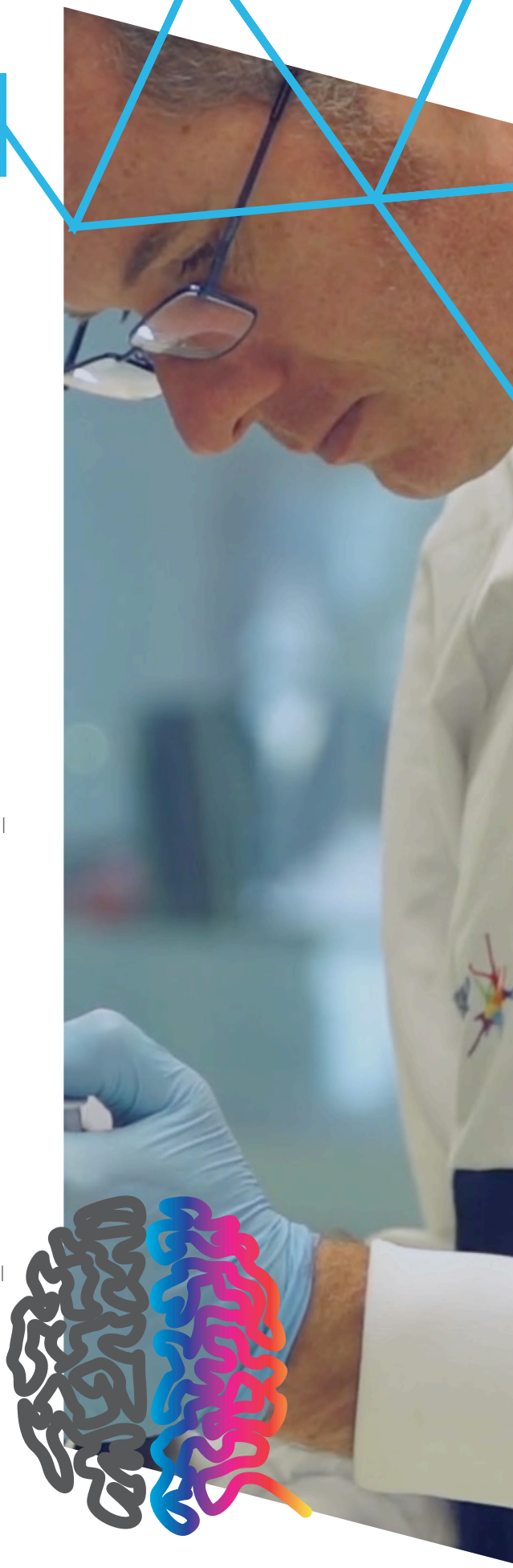
This group conducts a program of research that is broad in scope, but unified around the goal of improving health outcomes in the areas of STIs and BBVs among Aboriginal and Torres Strait Islander people. Their research will investigate the ability of strategies, both novel and current best practice, to control STIs and BBVs in Aboriginal primary health care services, while addressing policy and clinically-relevant questions, translating these into policy and practice as well as building the next generation of researchers in this area of Aboriginal health.

WHAT WE DO

- Population health research, health services research, epidemiological research
- Work with Aboriginal communities and health services nationally
- Subject areas: Sexually transmissible infections, blood borne viruses, Vaccine preventable diseases, offender health, health promotion, illicit drug use, harm reduction

A TOTAL OF 34 PAPERS WERE PUBLISHED BY THE SAHMRI INFECTION & IMMUNITY THEME IN 2015

mind & brain



Overview

Led by Professor Julio Licinio, the Mind and Brain theme focuses on the continuum of mental health from major depression to wellbeing and resilience. They are interested in depression, mechanisms of antidepressant response and outcomes of antidepressant treatments, including the interface with metabolic syndrome and obesity. On the other end of the spectrum they also want to promote wellbeing and resilience. As a new direction, addressing a consumer-driven initiative, Mind and Brain has developed an exciting and conceptually novel program on molecular imaging of the spinal cord that not only advances diagnosis and prognosis of spinal cord injuries, but also provides an imaging infrastructure to our program. That project exemplifies consumer-driven research and is called Project Discovery. The Theme's translational research program can be conceptualised as having four major topics. These topics support a strong program in depression (including stem cells), wellbeing, and spinal cord injury

The Wellbeing and Resilience Centre aims to decrease mental illness by building mental health assets at scale, and moving the population curve from mental illness towards mental health. It is at the prevention end of mental illness and the strength-building end of mental health.

Current Projects

- An Australian genetic database study of functional genetic variants and environmental factors in major depression
- Microbiome: a novel pathway in the brain response to stress
- Subtype classification study of major depression based on clinical and genetic data
- Chronic fatigue syndrome: leptin, interleukin 6 and clinical symptoms
- Stress, depression and obesity
- Stress induced hippocampal atrophy
- Can reducing inflammation ameliorate progression of Alzheimer's Disease?

- The role of stress in cancer initiation and progression
- Evaluation of novel genetic and pharmacogenetic targets in depression
- Links between the immune system and psychiatric disorders: therapeutic approaches that targeting key mediators of the immune system
- Exogenous IL-1 signalling blockade in diet-induced obese mice
- Wellbeing and Resilience Centre Measure and Build Resilience and Wellbeing in different cohorts around Australia.

THEME LEADER
Professor Julio Licinio

DEPUTY THEME LEADER
Professor Ma-Li Wong

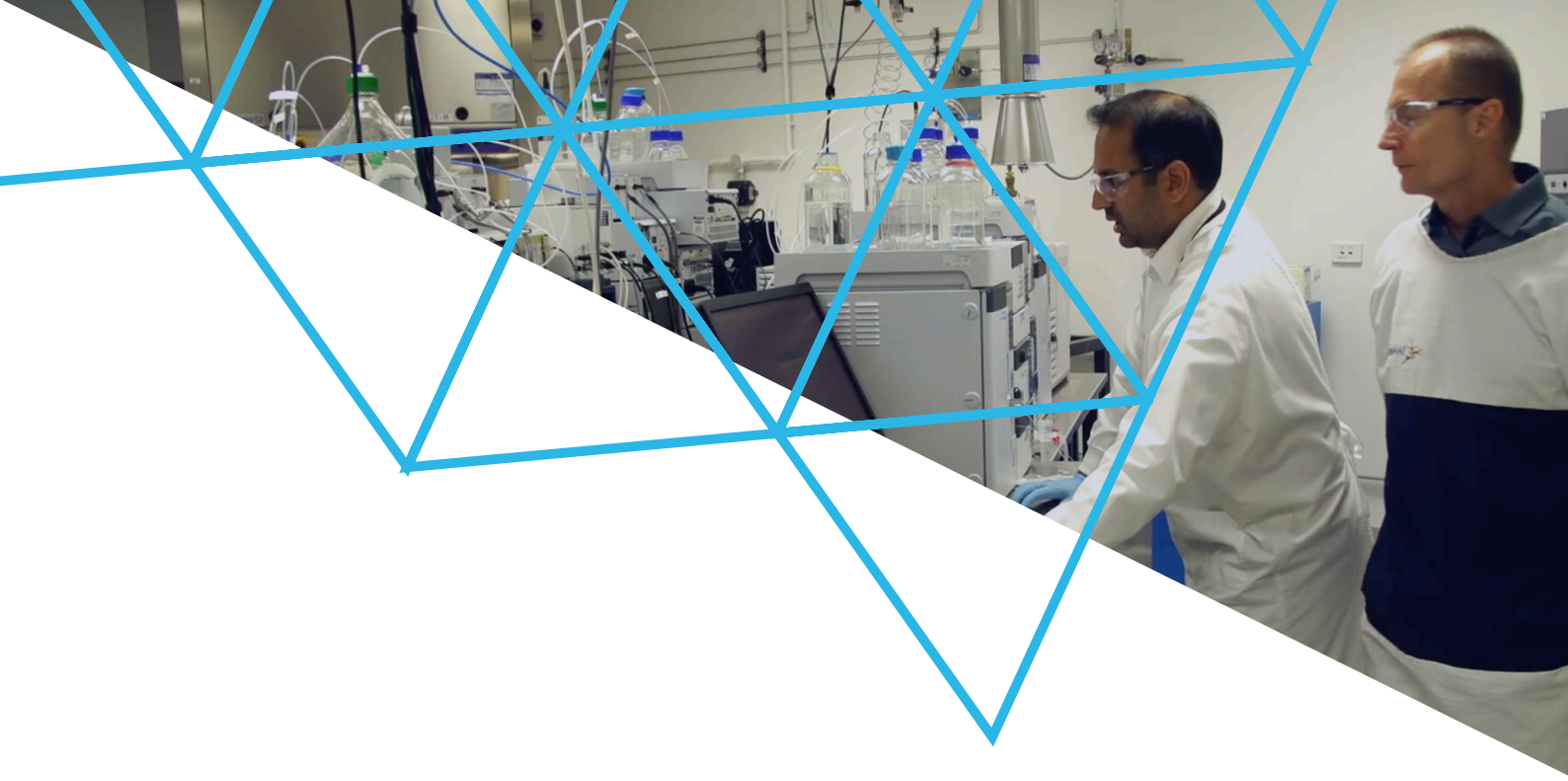
DIRECTOR, WELLBEING AND RESILIENCE CENTRE
Gabrielle Kelly

HEAD, PERSONAL HEALTH INFORMATICS GROUP
Professor Niranjan Bidargaddi

HEAD, CHONGQING-SAHMRI COLLABORATIVE PROGRAM
Professor Peng Xie (Principal Research Fellow at SAHMRI Mind and Brain and Vice-President, Chongqing Medical University, China).

2015 Research Highlights

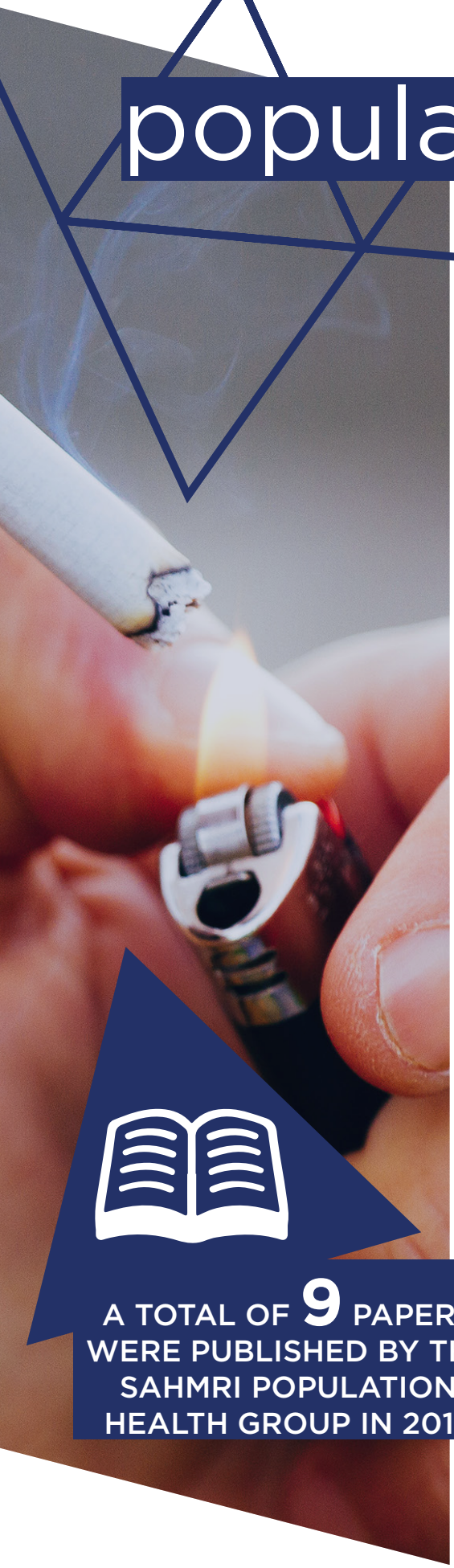
- The Mind and Brain theme developed two new NHMRC funded projects (one in genetics and one in animal models of weight gain following antidepressant exposure).
- They continued to establish ongoing collaborations across areas and themes, including translating their funded animal research to the population level (in partnership with the University of Adelaide), developing a new line of work on the interface of the microbiome, behaviour and mental health, thanks to the leadership of SAHMRI's Infection and Immunity team.
- Mind and Brain partnered with the Neil Sachse Foundation to establish Project Discovery, a research program conceptualised by Professor Julio Licinio and aimed at using the tools of molecular imaging to better diagnose and guide the treatment of spinal cord injury. They are collaborating with SAHMRI's Molecular Imaging and Therapy Research Unit (MITRU) to use not only 18F-FDG, which is generated routinely at SAHMRI, but are also working to develop a new ligand to detect areas of nervous system inflammation. This will not only support Project Discovery, but will provide an imaging platform to the theme that can be applied to their ongoing depression studies.
- Two of the largest and most important health care challenges of our age are depression and obesity, which are often



co-morbid. That co-morbidity is seldom addressed despite having immense translational and clinical impact. This is addressed in an NHMRC-funded project on the metabolic outcomes of antidepressant treatment and the psycho-social level. Mind and Brain has partnered with the Department of Psychology at the Royal Adelaide Hospital to develop an evidence-based cognitive-behavioural treatment (CBT) manualised treatment approach for depression that co-morbid with obesity. There are well-established CBT approaches to either depression or obesity. However, to our knowledge no other group has developed a CBT approach to depression and obesity.

- Funding was received for 'Lead, Measure, Build and Research Wellbeing and Resilience', totalling $1.2 million for 2015. These projects are focused on ageing, disadvantaged youth, and transitioning auto industry workers.
- The SAHMRI Wellbeing and Resilience Centre held Techwerks resilience training for 260 participants from a broad range of organisations including Corrections, Country Heath, Bendigo Bank, SA Health, Ageing organisations and the local government.
- The Theme awarded the second Samuel Gershon Medal for Lifetime Achievement in Translational Neuroscience. This medal was created by the Mind and Brain theme to recognise exceptional and outstanding contributions to the field of Translational Neuroscience, including innovative and original basic or clinical research that has led to significant advances in translational neuroscience, with commensurate international recognition.

population health



A TOTAL OF **9** PAPERS WERE PUBLISHED BY THE SAHMRI POPULATION HEALTH GROUP IN 2015

Vision

The vision of the SAHMRI Population Health Research Group is to maintain its strength and relevance in tobacco control, to become recognised in the emergent field of application of a public health approach to food policy and obesity prevention. The group is developing a specialist niche in sugar-sweetened beverage consumption – an area identified by the World Health Organization as significant issue. The groups also plans to build its capacity in quality of life and psychosocial patient reported outcome measures for cancer (and potentially other) registries.

Overview

The Population Health Research Group, directed by Associate Professor Caroline Miller and working across the Cancer and Heart themes, specialises in behavioural research and policy research to inform interventions, aimed principally at whole populations and population sub groups, to prevent and reduce the impact of non-communicable diseases (NCDs). The group achieve research translation by engaging with policy makers and non-government agencies, providing evidence to inform policies for improved health outcomes.

With expertise in behavioural science, economics and public health, the group brings together researchers with strengths in the areas of tobacco control and unhealthy weight and excessive alcohol consumption risks, all of which are critical for prevention of cancer and heart disease. The group works on: the science and psychology behind social marketing campaigns; plain packaging and health warning labels on tobacco; community understanding of health recommendations and risk factors for disease; community support for public health policy measures; as well as monitoring rates of smoking, healthy weight, physical activity and alcohol consumption.

The Research Group has formal research collaborations with the University of South Australia Centre for Population Health Research, the University of Adelaide School of Public Health, Flinders University School of Health Sciences, Curtin University School of Psychology, Cancer Council SA and Cancer Council Victoria.

The Group have a strong record of research translation into evidence-based policy and programs which they achieved by working closely with end-users – policy makers in government and non-government agencies.

Tobacco control - The group incorporates the Tobacco Control Research and Evaluation Program (SA Government funded since 1999). The group specialises in evidence for tobacco control policy interventions (e.g. smoke-free laws, e-cigarette regulation, plain packaging and warning labels); community interventions (Aboriginal tobacco control, Quit Campaigns, mental illness settings); population level and sub-group monitoring of smoking rates knowledge and antecedents of behavioural change.

Obesity prevention and public health - The group has expanded from tobacco control into obesity; applying the science and strategies from tobacco control and public health, where Australia is a world leader, to the field of obesity, where Australia is lagging. The group has collaborative projects in food labelling and social marketing, and is leading projects targeting reduced sugar-sweetened beverage consumption.

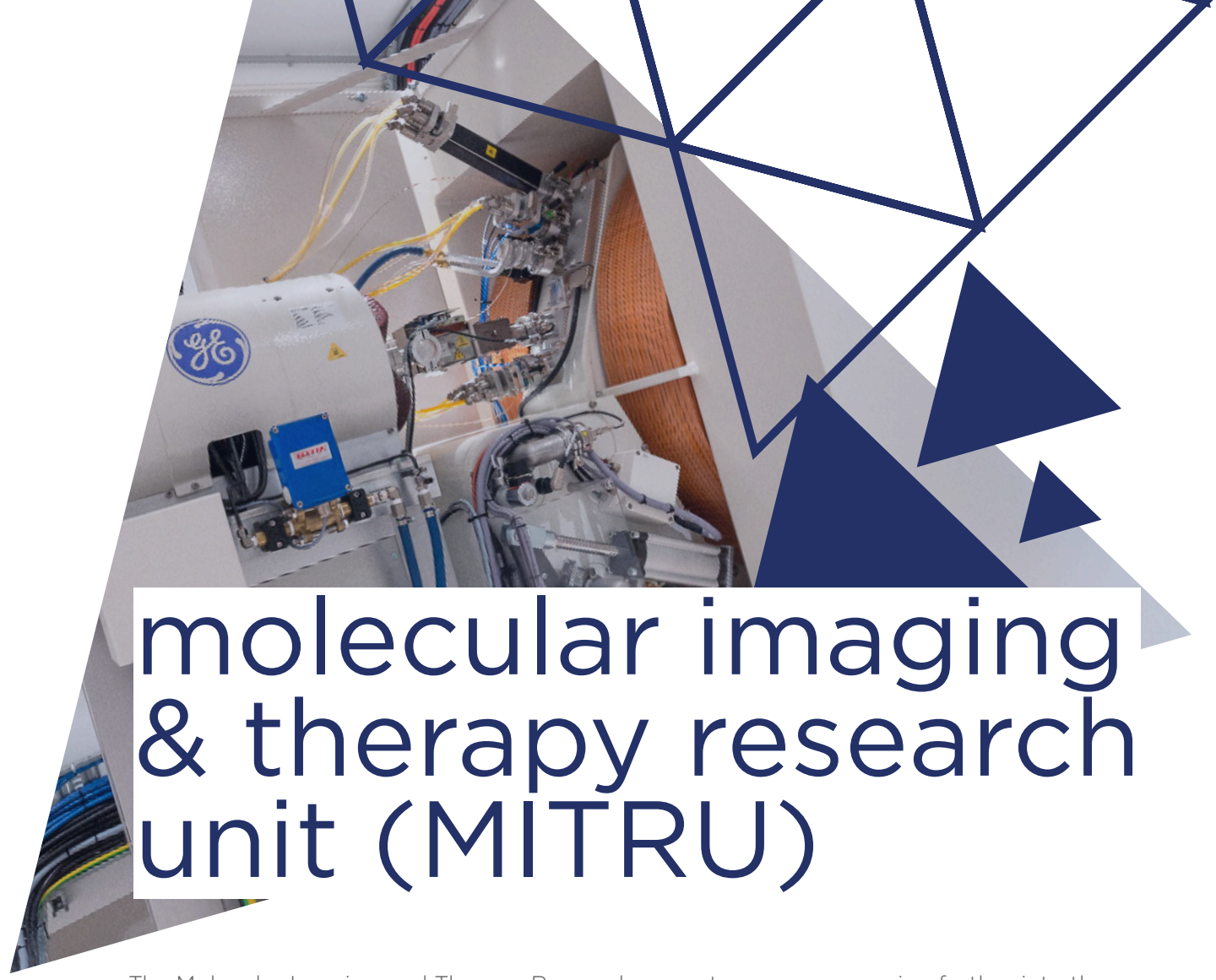
Psychosocial PROMs and Cancer Registries - The group collaborate on a range of initiatives in cancer registries with Professor David Roder (University of South Australia). The Group is a node of the Movember-funded Prostate Cancer Health Outcomes Research Unit (with Monash and University of South Australia, initiated in 2015), which is the research arm of the Movember ANZ Prostate Cancer Outcomes Registry. The group is leading research to develop Patient Reported Outcome Measures (PROMs) to assess Quality of Life and psychosocial outcomes for men with prostate cancer. They also administer the Central Coordination unit of the South Australian Clinical Cancer Registry (with University of South Australia, Cancer Council SA since 2014) and provides support to the Northern Territory Cancer Registry (since 2014).

2015 highlight: Survivorship and Prostate Cancer: Improving Quality of Life and Psychosocial Outcome

A particular focus for the Population Health Research Group in 2015 was the new research project 'Survivorship and Prostate Cancer: Improving Quality of Life and Psychosocial Outcome'.

This project investigated the impact of prostate cancer and side effects from treatment on the quality of lives of men, with a clear vision to reduce these burdens. The research involved a series of interviews with men (and some of their partners) who had been diagnosed with prostate cancer in the past two years. The interviews covered experiences of prostate cancer and known potential impact on physical functioning, as well as exploring specific areas of stigma, blame and responsibility, social isolation, sense of wellbeing and information and support seeking.

Results found that participants' descriptions of psychological distress, social isolation and anxiety demonstrated the emotional and social impact of prostate cancer. The research concluded that prostate cancer can cause considerable emotional and social burden for some men, and stigma and social isolation may contribute to this burden. Furthermore, men are unlikely to seek or receive help for such issues, and experience a degree of unmet need, particularly post-treatment. Further large-scale studies are being developed to quantify these emerging issues to enable the formation of recommendations to assist in reducing the impact of prostate cancer.



molecular imaging & therapy research unit (MITRU)

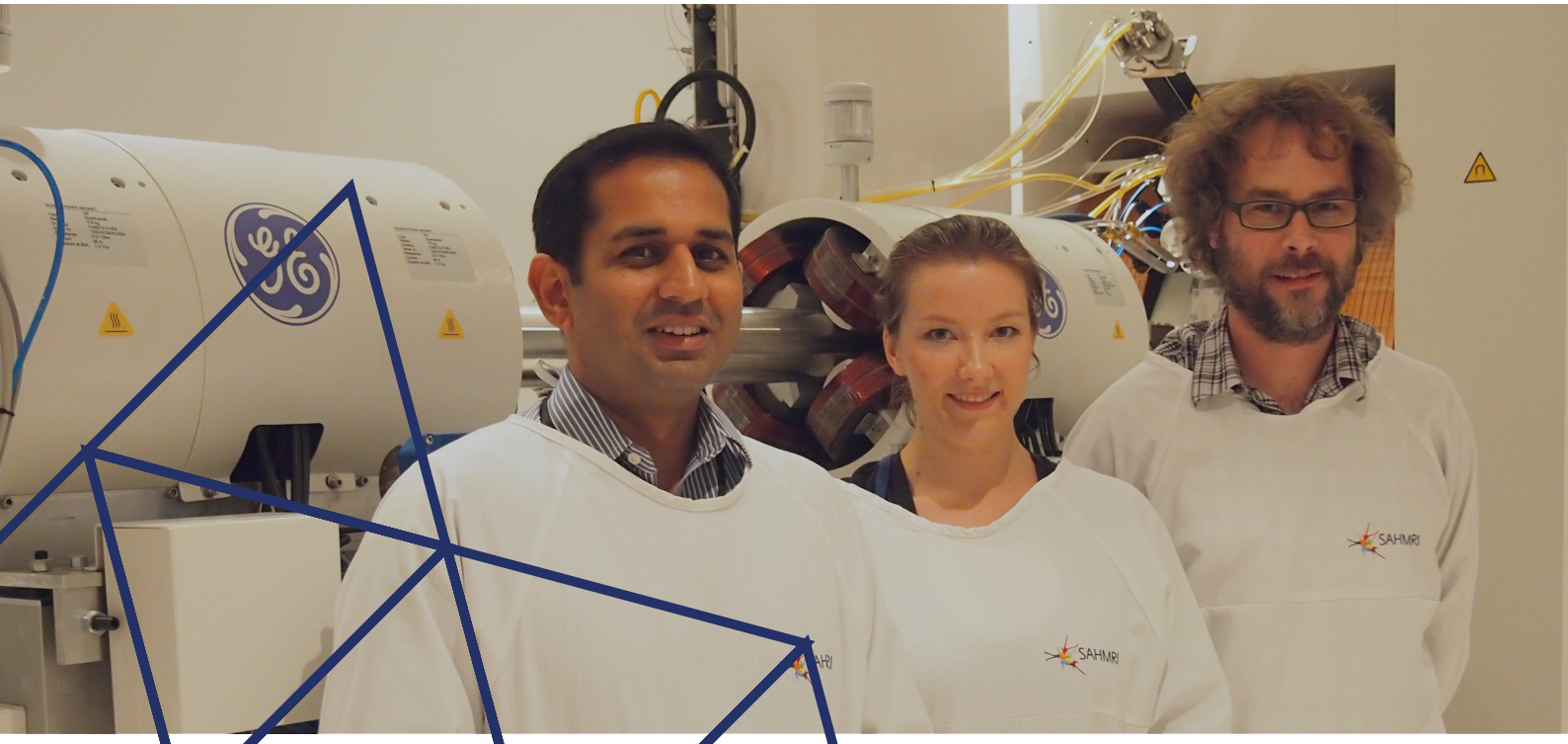
The Molecular Imaging and Therapy Research Unit (MITRU) is a pharmaceutical production and research unit focused on developing tracers for molecular imaging centred on incorporating radiation. The site began the task of becoming a Therapeutic Goods Administration (TGA) manufacturing facility when the SAHMRI team moved in to the new SAHMRI building at the end of 2013. Eight months later, they had their first federal inspection and achieved a TGA licence to provide a radiopharmaceutical called FDG (Fluorodeoxyglucose), a cancer diagnosis imaging tool, for patient administration across Australia. The unit began providing FDG for South Australian imaging facilities soon after, allowing patients to no longer have to rely on this tracer being imported into the state. The demand for FDG has begun to grow slowly in South Australia, limited currently by the lack of scanners in the state. However, SAHMRI has been able to obtain smaller scanners to utilise this, and agents that are developed in the future, through research funding.

The unit has expanded its work to include PET-generator based products to ensure expansion further into the radiopharmaceutical field and recently using the particle accelerator, GE Cyclotron, into generating further isotopes that could be provided regularly across Australia forging new research grounds. The unit is currently developing radioactive tracers that have shown promise in neurology in early diagnosis detection of Alzheimer's, various dementia models and spinal cord injuries as and when funding is secured. It is further involved in commercial process for labelling safely radio-therapeutic drugs for several cancer to allow access across Australia using ANSTO developed materials.

MITRU is a commercial facility, able to conduct research when required, that has obtained the highest manufacturing standards to allowing their current and future developments to be moved into clinical practice sooner. The timeframes for projects are often smaller as they have a unique funding model where costs are recuperated through sales once initial funding is obtained to ensure that there is a further demand. Overall this reduces the costs and adds a demand focus to the units' endeavours.

The unit hopes to develop further tracers to ensure small animal trials to understand mechanism of disease and use this to move quickly into human work, as seen with Ga68-PSMA for prostate cancer where in less than 6 months from initial donation to patient injection was possible. Work has begun to align and work together with facilities globally by developing satellite radiopharmaceutical and imaging centres using common protocols. The unit continues to expand its TGA licence and it is hoped in the near future. This will ensure testing of pharmaceuticals used in cold kits for SPECT imaging and implementation of new global diagnostic PET-agents for examination in Australia safely.

MITRU received a $250,000 grant from the Lifetime Support Authority in September, to be used to study innovative solutions to positron emission tomography scanning of spinal cord injuries. In partnership with the Neil Sachse Foundation as part of Project Discovery, the research will utilise SAHMRI's cyclotron. The technology focuses on spinal cord inflammation and may lead to improved scanning of affected areas, better surgical intervention and improved patient outcomes.



lysosomal diseases research unit (LDRU)

Overview

The Lysosomal Diseases Research Unit is world renowned for its seminal contributions to elucidating the role and function of the lysosome in health and disease, and the development and commercialisation of novel treatments for children affected by disorders of lysosome function.

What we do

The lysosome is the cell's clearing house, ridding it of waste to prevent toxicity. Its dysfunction has long been known to be associated with inherited disorders of childhood, with symptoms that can range from bone and skeletal deformity through to severe mental incapacity, but it is only recently that its contribution to more common adult diseases, such as stroke, heart disease and dementia are becoming more widely accepted. In 2015 the Unit completed a strategic realignment of its scientific platform to take full advantage of its unique expertise in lysosomal biology research and to apply it to investigating its role in these later-onset disorders.

While the future research of the Unit will primarily focus on later-onset dementia, such as Alzheimer's Disease, it will continue to maintain a core interest in lysosomal disorders that arise in childhood, particularly in understanding the mechanisms which lead to pathology and whether they can be reversed or prevented.

Research Highlights

Dr Tim Sargeant relocated to Adelaide from Cambridge University in January to take up the role of Head of Neurobiology. During the year, his group established cell and mouse models of dementia to examine how inherited mistakes (mutations) in lysosomal genes act as risk factors for Alzheimer's disease, and examining the genetic variability of the lysosomal network and its relationship to the clinical variation that is evident in Alzheimer's disease.

The CNS Therapeutics Group, under the leadership of Dr Kim Hemsley, continued its work to evaluate novel therapeutic strategies for treating brain changes in a neurodegenerative childhood lysosomal storage disorder known as Sanfilippo syndrome, and to examine how the disease affects the brain's structure and function.

The Mass Spectrometry Facility, headed by Dr Marten Snel, continued to support research programs across SAHMRI. Analyses of small molecule drug concentrations have continued to grow, and the Facility is building on its established strength in targeted lipid analysis to expand into the field of untargeted metabolomics and lipidomics.

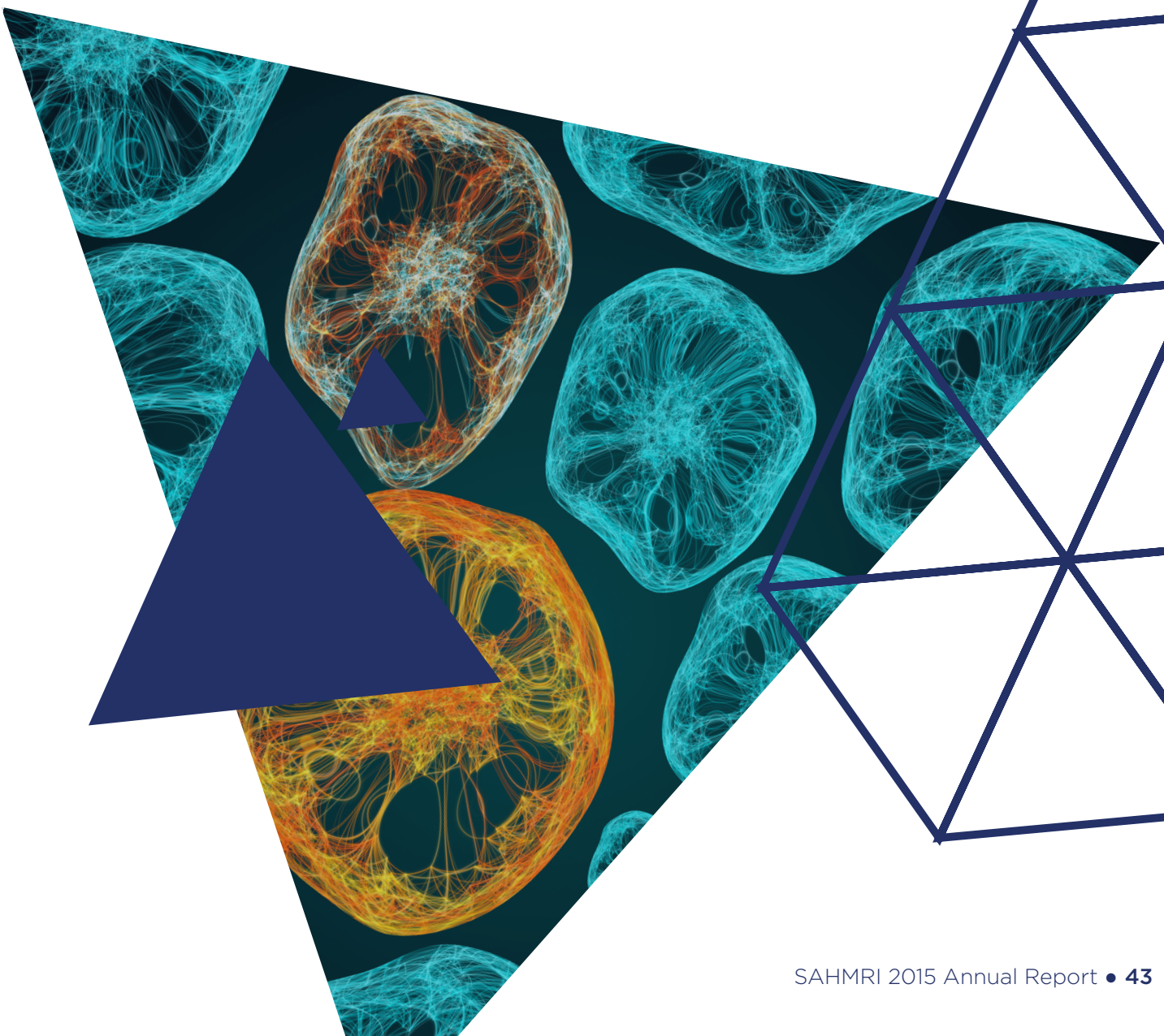
The Confocal Microscopy Facility, under the management of Dr Makoto Kamei, saw a higher level of interest in this technology and its application across the Institute. The

first manuscript describing data obtained using this instrument was published in 2015 (Centenera et al. Endocrine-Related Cancer 22:805-818).

The Unit appointed Dr Pirjo Apaja from McGill University (Montréal, Canada) as EMBL Group Leader of the Unit's Organelle Biology group. Dr Apaja will join the group in April 2016.

Professor John Hopwood retired as Director of the LDRU in December 2015. John will be succeeded by Professor Chris Proud, Nutrition and Metabolism Theme Leader, who will commence in January 2016. The LDRU will become part of SAHMRI's Nutrition and Metabolism Theme from that date.

The Unit, in association with the Oliver family, hosted the inaugural Bowen Oliver Oration at SAHMRI on 29 July 2015, which was facilitated by Professor Ian Frazer, who spoke on Delivering on the promise of health and medical research. Bowen was affected by a degenerative lysosomal disorder known as MPS VI. He received the first-ever treatment for this disorder that had been developed by scientists in the Unit, and his quality of life improved immeasurably. Bowen was healthier and more vibrant than ever when he passed away unexpectedly at 21 years of age. This annual Oration honours Bowen's life: he has left an indelible mark on those who knew him, and his life and experiences teach everyone a great deal about the ability of medical research to deliver life-changing health care outcomes.



fundraising highlights

Research at SAHMRI has again benefited from the generous support of our wonderful donors. These are the people who value the potential outcomes of health and medical research and willingly support our efforts. Philanthropic support comes from a number of sectors within the community and we recognise their gifts under a number of categories.

This year we are most grateful for generous support from the following people:

Mr David Gunn

Mr Rodney Detmold

Mr and Mrs Frank Seeley

Mr & Mrs Raymond Spencer

Mrs Susan Hoopmann

Professor and Mrs John Hopwood

SAHMRI also wishes to thank and acknowledge the following organisations:

Government of South Australia

James & Diana Ramsay Foundation

AHA (SA Branch)

National Health and Medical Research Council (NHMRC)

Wyatt Trust

Thyne Reid Foundation

Next Generation Fund

SAHMRI Founding Ambassadors

This unique group of only 50 people forms SAHMRI history, as those recognised for financially supporting SAHMRI from the very beginning.

We thank our new Founding Ambassadors:

Ron and Janet Forster

Ian and Pam Wall

Teresa Girke and Steve Wesselingh

Loretta Reynolds

SAHMRI Corporate Champions

Many thanks to our 2015 Corporate Champions:

Ricoh Australia

Dimension Data Australia

Flinders Clinical Trial Services

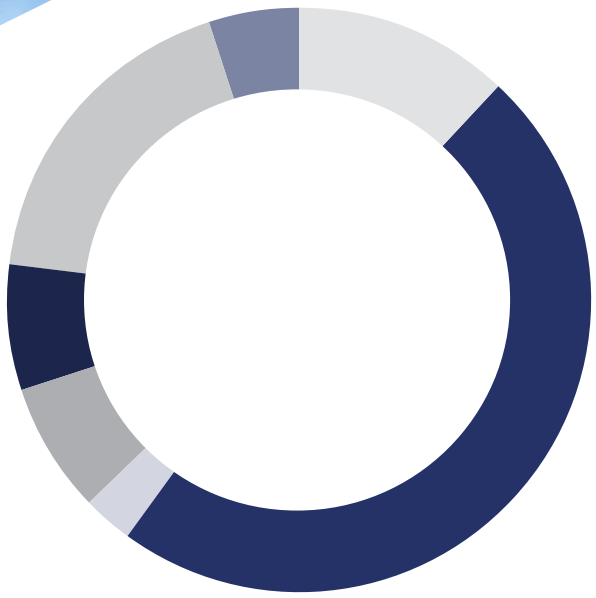
We would welcome the opportunity to confidentially discuss your wishes regarding a gift to SAHMRI. We also invite you to consider including SAHMRI in your estate planning. A bequest is a crowning gift that enables future researchers to carry on their work.

For a highly confidential discussion, please contact Tony Ashdown:

P 08 8128 4019 **M** 0428 951 211 **E** tony.ashdown@sahmri.com

financial highlights

Income



- State Government operating grant **12%**
- Research Grants **48%**
- Fundraising **3%**
- Rental income **7%**
- Royalties **7%**
- Service and clinical income **18%**
- Other income **5%**

Expenditure

- Employee Expenses **61%**
- Equipment and IT Expenses **5%**
- Building Management Costs **7%**
- Research Support **15%**
- Travel and Accomodation **3%**
- Other Expenses **10%**

Consolidated Statement of Profit or Loss
For the year ended 30 June 2015

	2015 $'000	2014 $'000
Operating revenue and other income		
State Government operating grant	4,986	5,262
Research Grants	19,434	16,751
Fundraising	1,340	1,788
Rental income	2,694	882
Royalties	2,814	1,773
Service and clinical income	7,153	5,292
Other income	2,108	2,649
Total operating income	**40,529**	**34,397**
Operating expenses		
Employee expenses	(24,672)	(18,635)
Equipment and IT expenses	(1,902)	(913)
Building management costs	(2,837)	(1,761)
Research Support	(6,169)	(4,883)
Travel and accommodation	(1,042)	(716)
Other expenses	(4,090)	(3,178)
Total operating expenses	**(40,712)**	**(30,086)**
Results from operating activities before depreciation and amortisation expense	**(182)**	**4,311**
Depreciation and amortisation expense	(8,537)	(4,857)
Total depreciation and amortisation expense	**(8,537)**	**(4,857)**
Results from operating activities	**(8,719)**	**(546)**
Commonwealth Government capital grant	-	16,000
Total non operating grants	**-**	**16,000**
Surplus/(deficit) for the year	**(8,719)**	**15,454**

SAHMRI

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