



THE UNIVERSITY
of ADELAIDE

150 YEARS

Annual Report 2023

Healthy children from the start

Robinson Research Institute



ROBINSON
RESEARCH
INSTITUTE

make
history.



Contents

Excellence in research and innovation / 3

Welcome / 4

Deputy Director and Advisory Board Chair overview / 5

Diversity, equity, gender and inclusion / 6

Governance / 6

Research Fellows / 7

Changing lives through research / 8

 Revolutionising the diagnosis of endometriosis / 8

 One breath at a time towards a better life with cystic fibrosis / 10

 Shining light on embryo health / 12

Prizes and awards / 13

Top publications / 14

Top research grants / 15



Excellence in research and innovation

The institute in 2023

Aspiring to solve the puzzle of healthy human reproduction and development, we focus on identifying what programs human health long before life is created, and strive to find new ways of preventing, treating, and curing childhood disease. Led by global leaders in their field, our researchers collaborate across four themes: Fertility and Conception, Pregnancy and Birth, Early Origins of Health and Child and Adolescent Health.

Our vision

Life-time health for all children and families, through research excellence.

Our mission

Deliver world-class advances in human reproduction, pregnancy and child health, informing clinical care, policy and practice to improve health across generations and global communities.



224
Publications



2 Australian
Museum Eureka
Prize winners

Welcome

The University of Adelaide's unwavering commitment to research excellence is reflected in the continued support of our Institutes as incubators of interdisciplinary, world-class research.

We are proud to reflect on the remarkable achievements of the Robinson Research Institute this year, which has once again highlighted its leading role in advancing health research in human reproduction and childhood development.

In 2023, the Robinson Research Institute celebrated several significant achievements. We were honoured to see two of its research groups awarded with prestigious Australian Museum Eureka Prizes in two categories, a testament to the groundbreaking work carried out by our researchers. These awards, among Australia's most distinguished accolades for scientific research, underscore the Institute's impact in shaping the future of health and medical science.

Major advancements have also been made in areas harnessing novel technology platforms and artificial intelligence. For example, our researchers have recently developed a machine learning-based medical imaging tool designed for rapid, non-invasive diagnosis of endometriosis. This is a debilitating condition that affects millions of women globally causing severe pain and reducing chances of falling pregnant. This new approach could be used to reduce delays in diagnosis, prevent unnecessary surgical interventions and allow for more effective and timely treatments leading to increased quality of life.

Our teams have also developed two novel imaging techniques, both breaking new ground – one in lung health imaging in young children and one in assessing embryo health, hoped to revolutionise fertility treatments and improving the chances of successful pregnancies. These achievements emphasise the Robinson Research Institute's capacity to take cutting edge science towards clinical implementation.

With the appointment of a new Institute Director at the end of 2023, the University of Adelaide remains deeply committed to future-proofing and supporting the Institute as it continues its quest to deliver world-leading research into reproduction, early life health and origins of disease. We commend the Institute's researchers, students, partners and staff for their unwavering dedication and pursuit of excellence.

We hope you enjoy reading the Robinson Research Institute's 2023 annual report.



Professor Anton Middelberg
Deputy Vice-Chancellor and
Vice-Chancellor (Research)
The University of Adelaide



Professor Laura Parry
Pro Vice-Chancellor
(Research Excellence)
The University of Adelaide

Deputy Director and Advisory Board Chair overview

Celebrating our 15th anniversary and building on more than 60 years of pioneering research at the University of Adelaide, the Robinson Research Institute (RRI) aims to generate new discoveries to advance the health of women and children across generations and global communities.

Enhancing excellence through researcher advancement is a priority for the institute. In 2023 RRI provided funding to research group leaders, early and mid-career researchers (EMCRs) and students for research development, engagement activities, and travel to conferences and institutions to present their work. Our funding aims to increase collaboration both globally and nationally, and to improve the scientific quality and competitiveness of external funding applications.

Connection

RRI's flagship events provided members, partners, stakeholders and the public with opportunities to come together and learn about research occurring across the institute and beyond.

Professor Mary Herbert, now professor in reproductive biology at Monash University, previously Professor of Reproductive Biology at the Biosciences Institute, Newcastle University and Scientific Director at Newcastle Fertility Centre, presented the 9th annual Lloyd Cox Memorial lecture titled: "Maternal transmission - a tale of two genomes" on her work towards preventing transmission of mitochondrial DNA disease.

The annual RRI Symposium focused on three themes: 'First 1000 days of life'; 'Precision medicine and the use of AI'; and 'Emerging technologies'. PhD students and EMCRs presented in two Rapid Fire sessions, and the day concluded with the announcement of the annual RRI awards. Following a COVID hiatus, 'New Frontiers for a Healthy Start to Life' returned. With

the aim of forging deeper and broader collaboration and partnerships, invited RRI members and non-members from Adelaide, interstate and international universities presented their work under the 'Planetary Health' theme and debated ideas for future research.

Engagement was supported by coverage of ongoing research in less formal settings such as the fertility and conception theme First Friday meetings and EMCR Third Thursday seminars. It has also been enlightening to hear from some of our researchers presenting their research journal at our Advisory Board meetings.

Achievements

We congratulate all our members on their continued successes evidenced by the multitude of grants, awards and prizes they have achieved. We are proud of our Eureka prize winners, IMAGENDO, led by Professor Louise Hull and the Cystic Fibrosis Lung Health Imaging project, and 2023 South Australian Scientist of the Year, Professor Helen Marshall AM.

Recruitment of a new Director of the RRI

During 2023, there was a global campaign to appoint a new director for the RRI.

After an exhaustive search, we are delighted that Professor David MacIntyre was appointed as the institute Director, taking up his role in 2024.

Currently at Imperial College London, Professor MacIntyre is a world-renowned reproductive biomedical specialist whose research is helping to improve health outcomes for mothers and babies. Professor MacIntyre's research has generated new insights how microbial communities in the female reproductive tract can affect the risk of miscarriage, premature rupture of membranes and preterm birth. He has led the development of new technologies for the rapid testing

of the vaginal microbiome and treatments designed to improve maternal and neonatal outcomes. Some of his findings have been translationally impactful, changing clinical practice around the globe.

The advisory board chair thanks Associate Professor Michael Stark for stepping in and providing leadership as Deputy Director of the RRI. Thanks is also extended to the RRI executive and to the Division of Research and Innovation for actively offering support during 2023, as we searched for a new Director.

Conclusion

We look forward to a new era in 2024 and beyond, working with Professor MacIntyre to shape the institute's strategy, direction and vision. A new strategy will be devised that boldly positions RRI as we move to the future. A strategy that supports our own to do their best work, deepens our links with consumers and other partners so we can deliver research that makes groundbreaking discoveries to lift women's and children's health.

We thank our Advisory Board, Executive Committee, and Early and Mid-Career Researcher Council members, academic leaders, and all our hard-working members for their dedication, innovative thinking and support of RRI. As a collective, we are improving the lives of families around the world.



Associate Professor Michael Stark
Deputy Director
Clinical Research



Professor Stephen Tong
Chair, Advisory Board

Diversity, equity, gender and inclusion

At the Robinson Research Institute (RRI), we recognise that diversity, equity, gender, and inclusion are not just values to be upheld, but essential pillars that drive innovation, enhance research quality, and promote a healthier, more equitable society.

Fostering a diverse, equitable, and inclusive environment is fundamental to achieving excellence in research and making meaningful advancements in women's and children's health. Our commitment to these principles is reflected in our leadership, where we proudly maintain a 50:50 gender

balance among our research leaders. This balanced representation is a testament to our dedication to fostering an environment where diverse perspectives and voices are not only heard but also valued and integrated into our decision-making processes.

The significance of diversity, equity, gender, and inclusion extends beyond our organisational boundaries. It influences the very nature of our research activities. We strive to address and dismantle health disparities by ensuring our research encompasses a broad spectrum of experiences and needs,

particularly those of marginalised and underserved populations. By embedding these values into our research practice, we enhance the relevance and impact of our findings, ultimately contributing to more inclusive healthcare solutions.

Our initiatives are designed to create an inclusive culture where every member feels valued and empowered to contribute their unique insights and expertise. We actively promote equitable opportunities for career development and support an inclusive work environment that respects and celebrates individual differences.

Governance

Advisory Board

Professor Stephen Tong (Chair)

Professor Ray Rodgers
(Interim Director – outgoing)

Associate Professor Michael Stark
(Deputy Director, Clinical Research – incoming)

Ellen Kerrins (Stakeholder and Consumer Engagement Advisor)

Professor John Lynch (Professor of Epidemiology & Public Health)

Professor Helen Marshall AM
(Professor of Vaccinology, Clinical Research Director WCHN)

Professor Laura Parry (Pro Vice-Chancellor (Research Excellence))

Executive Committee

Associate Professor Michael Stark (Chair)

Professor Darryl Russell

Professor Ray Rodgers

Dr Alison Care

Professor Gus Dekker

Professor Rebecca Robker

Professor Simon Barry

Professor Jenny Couper

Professor Helen Marshall AM
EMCR Representative (rotating)

Early and Mid-Career Researcher Council

Dr Rebecca O'Hara (Chair – outgoing)

Dr Jodie Avery (Chair – incoming)

Dr Anna Kontos (Deputy Chair – outgoing)

Dr Alexandra McCarron
(Deputy Chair – incoming)

Dr Clare van Eyk (Child & Adolescent Health Theme Representative)

Dr Nahal Habibi (Biomedical Representative)

Dr Dexter Chan (Biomedical Representative)

Dr Yasmyn Winstanley (Fertility & Conception Theme Representative)

Dr Ali Farajpour (Pregnancy & Birth Theme Representative)

Dr Rebecca Thomson (Early Origins of Health Theme Representative)

Avisak Bhattacharjee
(HDR Student Representative)

Kirsten Smith
(HDR Student Representative)

Professional Staff

Marcus Goddard, Business Manager (outgoing)

Dr Angela Noack, Institute Manager (incoming)

Franca Bergamaschi, Executive Officer

Sarah Eley, Research Engagement Manager (outgoing)

Loren Revell-Karutz, Research Engagement Manager (incoming)

Simone Dautel, Research Consumer Engagement Officer

Felicity Donald, Research Program Coordinator

Research Fellows

Future Making Fellows 2023

The University of Adelaide Future Making Fellowships support early-career and mid-career researchers of outstanding research calibre and potential.

Dr Alison Care

Dr Alison Care co-leads the pregnancy and birth theme and leads the Vascular Immunology research group at RRI. Her multidisciplinary research team brings together both immunology and vascular biology to understand what causes preeclampsia.

Associate Professor Catia Malvaso

Associate Professor Catia Malvaso is a senior research fellow with the BetterStart Child Health and Development Research Group in the School of Public Health and in the School of Psychology at the University of Adelaide. Her research is informed by an interdisciplinary perspective spanning criminology, public health and psychology.



Women's & Children's Hospital Foundation Postdoctoral Fellowship



Dr Mark McMillan

Dr Mark McMillan has been awarded the Women's & Children's Hospital Foundation Postdoctoral Fellowship. He is investigating the long-term effects of respiratory infections like COVID-19 and the flu in children and adolescents.

Dr McMillan leads the vaccine program evaluation in the Vaccines and Infectious Diseases group at RRI and the Women's and Children's Hospital.

JDRF International Postdoctoral Fellowship

Dr Ying Wong

Dr Ying Wong was awarded a highly competitive JDRF International Postdoctoral Fellowship of \$360,000 over three years to further advance her Type 1 Diabetes immunogenomics research conducted at the molecular immunology laboratory of Professor Simon Barry.



Changing lives through research

In 2023, researchers at the Robinson Research Institute brought about change. On a mission to achieve better health outcomes for mothers and children, our researchers strove to find and refine, diagnose and treat, prevent and improve.

Three projects are highlighted in our case studies which are destined to positively change the lives of children with cystic fibrosis, increase IVF success rates and revolutionise how endometriosis might be diagnosed in the future.



Revolutionising the diagnosis of endometriosis

In Australia, at least one in nine women, or those assigned female at birth, live with often debilitating symptoms caused by endometriosis. Endometriosis occurs when tissue similar to the lining of the uterus grows elsewhere in the body. The cause of patients' symptoms is often unknown to them for too long – the average timeframe for an endometriosis diagnosis in Australia is 6.4 years. Undiagnosed suffering not only comes with the physical symptoms of the condition such as strong period pain and heavy bleeding, bowel and bladder issues or infertility, it also takes a toll on the mental health and social life of those affected.

On track to provide non-invasive, fast and cost-effective diagnosis

The current 'gold standard' for diagnosis of endometriosis is invasive abdominal surgery by direct visualisation of lesions,

which has long wait times, high costs and the requirement for multidisciplinary, highly skilled surgical teams.

The IMAGENDO® team in the Endometriosis research group led by Professor Louise Hull, is well on track to revolutionise how endometriosis is diagnosed. Funded by an MRFF Primary Health Care Research Data Infrastructure Grant, an interdisciplinary team of endometriosis researchers from the Robinson Research Institute, artificial intelligence experts from the University of Adelaide's Australian Institute for Machine Learning, and specialist gynaecological and obstetrics imaging partners locally and around the globe, are working on technology that is set to improve the lives of many.

IMAGENDO® is an automated and guided diagnostic system for the

identification of specific endometriosis features that can be visualised in transvaginal ultrasound (TVUS) and magnetic resonance imaging (MRI) scans. An artificial intelligence algorithm that has been developed and trained by hundreds of images, locates and consolidates a specific set of endometriosis features and yields scores for the probability of a diagnosis of endometriosis and, if present, the likely severity.

Set to improve the lives of many

IMAGENDO® was awarded the prestigious 2023 ANSTO Eureka Prize for Innovative Use of Technology and if the new technology delivers on the promise, the benefits to patients and the public will be many. The rapid and cost-efficient diagnosis option will enable individualised care plans to



be established much sooner, without years of waiting. The need for invasive abdominal surgery will be reduced, and unnecessary surgery and some cases of repeated surgery will be avoided. Further, there is potential to safeguard the fertility of young patients with earlier diagnosis providing them the opportunity to freeze their eggs at a younger age. The technology will also help in training and up-skilling sonographers and act as an imaging data repository.

To pave the way for a clinical roll-out, the algorithm undergoes constant iterations to include more markers of endometriosis and expand to cover adolescents and young women. International collaborations are being expanded to further refine the technology and prepare for an international roll-out.



“ We currently see a 90% accuracy rate of the technology in being able to distinguish positive from negative cases. If the development continues as we expect, we hope to see the technology rolled out worldwide with an aim of having it available in clinics within the next two to five years.”

Dr Jodie Avery,
IMAGENDO® Program Manager

One breath at a time towards a better life with cystic fibrosis

Have you ever held your breath for longer than what feels comfortable? Could you feel the overwhelming urge to breathe? This is what people living with cystic fibrosis can feel. As the disease progresses, the feeling gets worse, breath by breath.

The Cystic Fibrosis Airway Research Group at the Robinson Research Institute, led by Associate Professor David Parsons and Associate Professor Martin Donnelley, has made it their mission to keep the genetically inherited, life-threatening disease at bay by developing a novel lung imaging technology that paves the way for early detection and precisely targeted treatment.

To treat children with cystic fibrosis, it is critical to know the location and extent of abnormal airflow in the lungs. However, this is the present knowledge gap, particularly when it comes to young children. Current lung function tests such as spirometry, or imaging methods like computed tomography (CT), come with big limitations. Spirometry generally cannot be performed reliably by young children under the age of six. CT scans deliver a high radiation dose and the images lack the precision required, meaning the beginning of disease in young children often goes undetected, robbing them of a chance at preventative treatments.

Closing the gap

X-ray velocimetry (XV) is set to close the gap. This novel imaging technology has been developed to deliver high precision 4D imaging of the lungs. 4D imaging combines three-dimensional (3D) images of the volume of the lungs with the added fourth dimension of time. This enables doctors to visualise where air is flowing inside the lungs – something that was not possible before.

Combining expertise across physics, medicine and engineering, the interdisciplinary team of researchers from the Robinson Research Institute in collaboration with the Women's and Children's Hospital in Adelaide, Monash



“**XV lung imaging holds real potential for detecting the earliest beginnings of lung disease in very young children with cystic fibrosis. Since XV can show exactly where in the lung disease is beginning, it means prevention of disease can become a reality, by precisely targeting treatment to just those areas affected, before disease can establish.**”

Associate Professor Martin Donnelley,
co-leader of the Cystic Fibrosis Airway
Research group



“

With conditions like cystic fibrosis, early detection of changes in lung function means that a lifetime of complications may be avoided.”

Associate Professor David Parsons,
co-leader of the Cystic Fibrosis Airway Research group

From left: Associate Professor David Parsons, Associate Professor Martin Donnelly, co-leaders Cystic Fibrosis Airway Research group.

University and industry partner 4DMedical Pty Ltd were awarded the 2023 Aspire Scholarship Eureka Prize for Excellence in Interdisciplinary Scientific Research, for their development and application of XV imaging to cystic fibrosis.

Real world impact

The technology can be considered a game-changer in lung imaging in general and it is particularly promising for young

children with cystic fibrosis. Although born with healthy lungs, cystic fibrosis lung disease rapidly causes lung damage in early childhood, initially affecting small patches of the lungs. X-ray velocimetry is capable of detecting the early stages of disease with unparalleled precision, allowing for highly targeted treatment.

Clinical trials have commenced at the Women's and Children's Hospital in Adelaide with a pilot study recruiting

children aged 3–18 years to have x-ray velocimetry lung imaging performed. The study aims to recruit 20 children with healthy lungs and 20 children with cystic fibrosis and is estimated to run until the end of 2024. A second study examining changes in lung function in children taking the new cystic fibrosis drug Trikafta is expected to commence soon and plans to expand trials across a range of paediatric lung diseases are in development.

Shining light on embryo health

Pregnancies assisted by in-vitro fertilisation (IVF) have doubled between 2002-2017, however, the IVF success rate has remained stagnant – something Associate Professor Kylie Dunning, leader of Robinson Research Institute’s Reproductive Success group, would like to change.

The current approaches of assessing embryo health by visual inspection or invasive biopsy have both failed to improve the IVF success rate which has remained stagnant for over a decade.

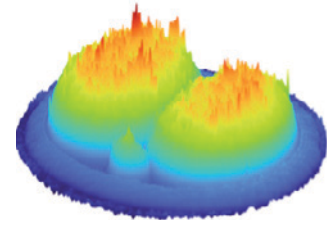
The novel approach that Associate Professor Dunning and collaborators from the University of St Andrews, Scotland, and the University of Adelaide’s Centre of Light for Life have developed, uses different colours of light to determine embryo health in an

accurate, objective and non-invasive way before transferring it into the womb.

Cell health in the spotlight

There are two distinct molecules in cells of an early-stage embryo which “glow back” when a minuscule amount of light, in a fraction of a second, is shone on them. Their glow, or lack thereof, provides insights into cell activity, which is considered an important factor in determining their health. Using this approach, a 3D hologram of the embryo can be generated, allowing embryologists to make an informed decision.

Ultimately, this technology is hoped to lead to increased IVF success rates and therefore also lower the emotional and financial toll on people undergoing the procedure.



3D hologram of a 2-cell embryo generated by the digital holographic microscope.

Since the initial study, the researcher team has been working on refinements of the technology to see more detail within the developing embryo. In a next step, the team will explore which colour of light is the safest to illuminate the embryo, aiming to have the technology available to roll out in the next five years.



“

For couples wishing to conceive, the quality, or developmental potential, of an embryo is critical as it dictates the success of their pregnancy and ultimately, the birth of their child.”

Associate Professor Kylie Dunning,
group leader Reproductive Success

Prizes and awards

Aspire Scholarship Eureka Prize for Excellence in Interdisciplinary Scientific Research

The Cystic Fibrosis Lung Health Imaging project from the Robinson Research Institute, Women's and Children's Hospital, Adelaide, 4D Medical Pty Ltd and Monash University was awarded the Aspire Scholarship Eureka Prize for Excellence in Interdisciplinary Scientific Research for their novel technology in lung imaging of children with cystic fibrosis.



From left: Caitlin Skinner (award presenter), Associate Professor David Parsons, Associate Professor Kaye Morgan, Associate Professor Martin Donnelley. Photo credit: Mel Koutchavalis, Australian Museum.

ANSTO Eureka Prize for Innovative Use of Technology

IMAGENDO, led by Professor Louise Hull from the Robinson Research Institute, was awarded the ANSTO Eureka Prize for Innovative Use of Technology for their project aimed at changing the way of how endometriosis will be diagnosed in future.



From left: Aisha Sirop, Dr Jodie Avery, Associate Professor George Condous, Professor Louise Hull, Dr Hu Wang. Photo credit: Tim Levy.

South Australian Scientist of the Year

Professor Helen Marshall AM has been named 2023 South Australian Scientist of the Year for her pioneering and life-saving research on meningococcal disease and immunisation



University of Adelaide awards

University Award for Outstanding Achievement: Associate Professor Zohra Lassi

David Hayman Prize for Genetics: Stephanie Iankov

University of Adelaide Medal: Olivia Robinson

Best Poster prize: School of Biomedicine, Darren Chow

Executive Dean Awards

Mid-Career Researcher Award: Associate Professor Zohra Lassi

Early-Career Researcher Award: Dr Bing Wang

Other awards

Distinguished Scientist Award, US Society for the Reproductive Investigation: Professor Sarah Robertson AO

AJRI Award (for research with clinical emphasis), American Society for Reproductive Immunology: Professor Sarah Robertson AO

Mentor Award (Asia-Pacific Region), International Society for Immunology of Reproduction: Professor Sarah Robertson AO

Luminary Award, Juvenile Diabetes Research Foundation: Professor Jenny Couper

PhD Excellence Award, Healthy Development Adelaide and Channel 7 Children's Research Foundation: Zahra Ali Padhani

MCR publication award 2023, Healthy Development Adelaide: Dr Clare van Eyk

Schools Communicator Award, Healthy Development Adelaide and Channel 7 Children's Research Foundation: Associate Professor Zohra Lassi

Brian and Heather Forster prize in biochemistry (honours): Olivia Robinson

Early Career Researcher Award, Human Genetics Society of Australasia SA Branch: Emmylou Nicolas-Martinez

Quality in Diabetes Care, Australian Diabetes Society: Dr Andrew Peel

2023 STEM Ambassador, Science and Technology Australia: Dr Jodie Avery; Dr Angela Noack

Ross Wishart Memorial Award, Australian Society for Medical Research (ASMR): Dr Cheow Yuen (Tiffany) Tan

Best Educational Poster, FSANZ: Dr Nicole McPherson

Best Clinical Poster ECR, ANZOS: Laurent Turner

Fran Baum Equity Scholarship, SA Public Health Association of Australia: Associate Professor Zohra Lassi

RRI awards

2023 Jeffrey Robinson Honours Scholarship: Stevie Young

2023 Repromed Reproductive Health Scholarship: Danielle Bailey

2023 Robinson Research Institute Director's Award: Professor Jozef Gécz

2023 Rapid Fire Presentation:

Best Presentation by PhD Student: Sarah Battersby

Best Presentation by Early / Mid Career Researcher: Dr Alexandra McCarron

Most Creative Presentation: Alison Deslandes

2023 Excellence in Consumer Engagement: Critical and Ethical Mental Health, Professor Jon Jureidini, Dr Natalie Aboustate and Dr John Walsh

Top publications

Deussen, A. R., Louise, J., & Dodd, J. M. (2023). Childhood follow-up of the GRoW randomized trial: Metformin in addition to dietary and lifestyle advice for pregnant women with overweight or obesity. *Pediatr Obes*, 18(1), e12974

There is little benefit of metformin, which is commonly-used in pregnant women who are overweight or obese, on reducing longer-term risks of obesity in the child.

Penn, A., McPherson, N., Fullston, T., Arman, B., & Zander-Fox, D. (2023). Maternal high-fat diet changes DNA methylation in the early embryo by disrupting the TCA cycle intermediary alpha ketoglutarate. *Reproduction*, 165(4), 347-362

Examination of parameters in the eggs and embryos mice fed normal or high fat diets before pregnancy found that disruptions in metabolic intermediates in the preimplantation embryo may provide a link between maternal obesity and programming offspring for ill health.

Tuckerman, J., K. Harper, T. R. Sullivan, A. R. Cuthbert, J. Fereday, J. Couper, N. Smith, A. Tai, A. Kelly, R. Couper, M. Friswell, L. Flood, C. C. Blyth, M. Danchin, and H. S. Marshall. Short Message Service Reminder Nudge for Parents and Influenza Vaccination Uptake in Children and Adolescents with Special Risk Medical Conditions: The Flutext-4u Randomized Clinical Trial. *JAMA Pediatr* 177, 337-44

This randomised clinical trial showed a parent SMS reminder nudge increased vaccination uptake, suggesting that parent-clinician nudges are more effective for optimizing influenza vaccine receipt than clinician nudges alone.

Azumah, R., K. Hummitzsch, R. A. Anderson, and R. J. Rodgers. Genes in Loci Genetically Associated with Polycystic Ovary Syndrome Are Dynamically Expressed in Human Fetal Gonadal, Metabolic and Brain Tissues. *Front Endocrinol (Lausanne)* 14 (2023): 1149473

Genes were dynamically expressed in the fetal tissues studied suggesting that these genes have tissue- or development-specific roles in multiple organs, possibly resulting in the various symptoms associated with PCOS. Thus, the fetal origin of a predisposition to PCOS in adulthood could arise via the effects of PCOS candidate genes in the development of multiple organs.

Perveen K, Quach A, Stark MJ, Prescott S, Barry SC, Hii CS, Ferrante A. PKC ζ activation promotes maturation of cord blood T cells towards a Th1 IFN- γ propensity. *Immunology*. 2023 Jun 20. Online ahead of print. PMID: 37340593

A significant number of babies present transiently with low protein kinase C zeta (PKC ζ) levels in cord blood T cells, associated with reduced ability to transition from a neonatal Th2 to a mature Th1 cytokine bias, leading to a higher risk of developing allergic sensitisation, compared to neonates whose T cells have 'normal' PKC ζ levels.

Dinh, D. T., Breen, J., Nicol, B., Foot, N. J., Bersten, D. C., Emery, A., Smith, K. M., Wong, Y. Y., Barry, S. C., Yao, H. H. C., Robker, R. L., & Russell, D. L. (2023). Progesterone receptor mediates ovulatory transcription through RUNX transcription factor interactions and chromatin remodelling. *Nucleic Acids Res*, 51(12), 5981-5996.

Stimulating ovulation rapidly reprogrammed chromatin accessibility in two-thirds of sites, correlating with altered gene expression. Findings highlight a novel PGR transcriptional mechanism specific to ovulation, providing new targets for infertility treatments or new contraceptives that block ovulation.

van Eyk, C. L., Fahey, M. C., & Gecz, J. (2023). Redefining cerebral palsies as a diverse group of neurodevelopmental disorders with genetic aetiology. *Nat Rev Neurol*, 19(9), 542-555.

Review of the current state of genomic testing in cerebral palsy highlighted the benefits for personalised medicine and the imperative to consider aetiology during clinical diagnosis. With earlier clinical diagnosis now possible, comprehensive and early genomic testing is a crucial component of the routine diagnostic work-up in people with cerebral palsy.

Crawford, T., Andersen, C., Marks, D. C., Robertson, S. A., & Stark, M. (2023). Does donor sex influence the potential for transfusion with washed packed red blood cells to limit transfusion-related immune responses in preterm newborns? *Arch Dis Child Fetal Neonatal Ed*, 108(5), 471-477.

Evaluation of the association of donor sex with transfusion-associated recipient immune responses in preterm newborns receiving unwashed and washed blood suggests that transfusion with unwashed PRBCs from female donors is associated

with an increased recipient immune response, an effect that can be ameliorated with pretransfusion washing. Larger randomised controlled studies to confirm this mechanistic link are warranted.

Price, Z. K., Lokman, N. A., Sugiyama, M., Koya, Y., Yoshihara, M., Oehler, M. K., Kajiyama, H., & Ricciardelli, C. (2023). Disabled-2: a protein up-regulated by high molecular weight hyaluronan has both tumor promoting and tumor suppressor roles in ovarian cancer. *Cell Mol Life Sci*, 80(11), 320.

There is a complex relationship of both pro-tumorigenic and tumor suppressive functions of DAB2 in ovarian cancer. In this study, DAB2 had a direct tumor suppressive role on ovarian cancer cells. The pro-tumorigenic role of DAB2 may be mediated by tumour associated macrophages, requiring further investigation.

Morizet, J., Chow, D., Wijesinghe, P., Schartner, E., Dwapanyin, G., Dubost, N., Bruce, G. D., Anckaert, E., Dunning, K., & Dholakia, K. (2023). UVA Hyperspectral Light-Sheet Microscopy for Volumetric Metabolic Imaging: Application to Preimplantation Embryo Development. *ACS Photonics*, 10(12), 4177-4187.

Phasor-based hyperspectral light-sheet (HS-LS) microscopy with a single UVA excitation wavelength was used to map metabolism in three dimensions. Dynamic changes in metabolic activity during preimplantation embryo development were captured using this approach, which overcomes the need for multiple excitation wavelengths, two-photon imaging, or significant postprocessing of data, and paves the way toward clinical translation, such as in situ, noninvasive assessment of embryo viability.

Wang, B., McDonough, J., Chen, G., Ong, J. J., & Marshall, H. (2023). Sociodemographic factors and attitudes associated with Australian parental acceptance of paediatric COVID-19 vaccination. *Vaccine*, 41(51), 7608-7617.

Parents' sociodemographic factors and vaccine perceptions were associated with different levels of acceptance toward paediatric COVID-19 vaccination, which may help to better understand how to "nudge" vaccine hesitancy. Creating a transparent and easy to understand platform to address health misinformation and vaccine hesitancy proactively might help us to better prepare for the next pandemic.

Top research grants

MRFF 2022 Genomics Health Futures Mission Grant (Awarded in 2023)

Professor Jozef Gecz, Dr Clare van Eyk, Professor Michael Fahey, Professor Iona Novak, Dr Catherine Morgan, Professor Roslyn Boyd, Professor Russell Dale, Dr James Rice, Dr Cathryn Poulton, Dr Sarah McIntyre, Miss Natasha Garrirty, Associate Professor Tracy Comans, Professor Jane Valentine, Professor Nadia Badawi, Dr Kathryn Friend.

Project: Genomic testing pathways for precision health in cerebral palsy, awarded >\$2.9 million

This project aims to define early, robust and accessible genomic testing pathways for cerebral palsy to improve health outcomes especially for children in the first years of their life.

WCH Foundation Bloom Research Program

Professor Simon Barry, Dr Veronika Bandara, Dr Tim Sadlon, Professor Michael Brown, Dr Micheal Osborn, Dr Lisa Ebert, **Mr Jerry Zheng, Dr Jason Gummow.**

Project: The SA Paediatric Cancer Immunotherapy Centre, awarded \$1.9m

Developing a new personalised immunotherapy for brain and central nervous system cancers, paving the way for the first SA paediatric clinical trials in immunotherapy for brain and central nervous system cancer.

Australian Government, Department of Health and Aged Care

Professor Louise Hull, Dr Beck O'Hara, Professor Helen Slater, Professor Niranjana Bidargaddi, Melissa Parker.

Project: Enabling the potential of the EndoZone digital health platform for endometriosis research and support, awarded \$1.42m

Ensuring the continuation of the Endometriosis Digital Health Platform EndoZone to improve health outcomes for those affected by endometriosis and supports collaboration among endometriosis stakeholders to undertake research.

NHMRC Ideas Grant (Awarded in 2023)

Dr Lachlan Jolly

Project: Overcoming Silence in Neurodevelopmental Disorder Gene Diagnosis, awarded \$1.34m

This research harnesses genome editing and cell reprogramming technologies to activate genes in patient skin samples to enable tests that provide diagnosis of neurodevelopmental disabilities of genetic origin.

NHMRC Ideas Grant (Awarded in 2023)

Professor Paul Thomas, Professor Robert Casson, Professor Theodore Wensel.

Project: Next-generation gene editing strategies to treat autosomal dominant retinitis pigmentosa, awarded \$922,058

Using next-generation gene editing strategies to treat common inherited eye diseases, that are currently incurable and often result in complete blindness.

NHMRC Ideas Grant (Awarded in 2023)

Associate Professor Kylie Dunning, Professor Kishan Dholakia

Project: Suspended by sound: A novel approach to grow developmentally competent oocytes in vitro, awarded \$1.38m

This project aims to help young cancer patients conceive following treatment, by using a new method to grow frozen and revived ovary tissue, which has been harvested before cancer treatment begins, to produce healthy eggs that can undergo IVF and restore fertility.

ARC Linkage Grant (Commenced in 2023)

Professor Megan Warin, Dr Tanya Zivkovic, Professor Jane Maree Maher, Mrs Danielle Abbott.

Project: Situating care: Addressing obesity in disadvantaged communities, awarded \$408,000

The project aims to drive a shift from top-down interventions that focus on obesity as an individual problem of diets and exercise, to collective solutions of care generated by families for families, empowering social change at a community level.

Leona M. and Harry B. Helmsley Charitable Trust Research Grant

Professor Jenny Couper, Dr Roger Gent, Dr Wayne Rankin, Dr Aveni Haynes, Professor John Wentworth, **Dr Megan Penno, Dr Helena Oakey, Mr James Brown**

Project: Pancreatic exocrine function and the progression to type 1 diabetes in young children in ENDIA, awarded \$316,027

Both pancreatic exocrine and endocrine function are recognised as being part of the process driving type 1 diabetes, but the interplay and relevance of the exocrine changes remain uncertain. Findings of this study are hoped to enhance stratification for the enrolment of children with early-stage type 1 diabetes in intervention trials and provide new therapeutic targets.

Further enquiries

Robinson Research Institute, The University of Adelaide, Ground Floor, 55 King William Road North Adelaide SA 5006

web adelaide.edu.au/robinson-research-institute

facebook facebook.com/RobsInstitute

X (twitter) twitter.com/RobsInstitute

linkedin linkedin.com/company/robinsonresearch-institute-uoa

Disclaimer The information in this publication is current as at the date of printing and is subject to change. You can find updated information on our website at adelaide.edu.au. The University of Adelaide assumes no responsibility for the accuracy of information provided by third parties.

Australian University Provider Number PRV12105
CRICOS Provider Number 00123M

© The University of Adelaide
November 2024. Job no. UA31246

Kaurna acknowledgement

We acknowledge and pay our respects to the Kaurna people, the original custodians of the Adelaide Plains and the land on which the University of Adelaide's campuses at North Terrace, Waite, and Roseworthy are built. We acknowledge the deep feelings of attachment and relationship of the Kaurna people to country and we respect and value their past, present and ongoing connection to the land and cultural beliefs. The University continues to develop respectful and reciprocal relationships with all Indigenous peoples in Australia, and with other Indigenous peoples throughout the world.