



The
Westmead
Institute
FOR MEDICAL RESEARCH



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DISCOVERY



Message from the Director

– Professor Philip O'Connell

I am delighted to welcome you to this, the second issue of WIMR's *Discovery* magazine. It is the first issue since I have taken up the role as Executive Director of WIMR.

I am humbled and honoured to have been selected to lead WIMR. I wish to acknowledge the outstanding work of my predecessor, Professor Tony Cunningham AO, and it is my aim to build on this legacy and to nurture WIMR's enormous wealth of talent, dedication and knowledge. The work undertaken at WIMR is life-changing and it is unique in that it has a direct impact on patient care. Together, all of us at WIMR will continue the pursuit of our purpose – to liberate people globally from the burden of serious diseases.

For a long time, I have admired the vision and leadership of Professor Cunningham. To be stepping into the shoes of the person who essentially created this outstanding Institute from the ground up is both daunting and exhilarating. We all owe him a tremendous debt of gratitude and I will work tirelessly to build on Professor Cunningham's legacy.

As someone who has been a member of WIMR for more than 20 years, I feel its values and culture make it such a special place to work. The level of organisational structure and emphasis on cross collaboration has been a strong driver for innovation. These are the values that I know will nurture us as we move forward.

WIMR is a world-class Institute, making research discoveries that are changing the future of health and medicine. As we move into this new decade, I expect that some of WIMR's greatest contributions will be in the areas of cell therapies and personalised medicine.

Cell therapies involve introducing cells into a patient, where they work to fight infection; boost immunity; treat disease; regenerate tissue;

or stimulate organs to improve their function and output. I believe the greatest strength of cell therapy is its potential to be applied in the treatment of many serious illnesses.

Already, WIMR's work in cell therapy is diverse. From using cells to improve the process for, and outcomes of bone marrow transplants; to using stem cells to regenerate heart tissue following heart failure; to my own team's work, pioneering research into a procedure where pancreatic islets (a groups of cells, including insulin-producing pancreatic beta cells) are transplanted into patients living with type 1 diabetes. This procedure has already saved the lives of hundreds of type 1 diabetics worldwide.

Similarly, the implementation of a 'personalised' approach to the treatment and prevention of some diseases is already saving lives globally. Essentially, personalised medicine sees a move away from a 'one-size-fits-all' approach to treating disease. Instead, it uses information from our own, individual genetic make-up to not only help to accurately predict disease risk, but guide a tailored, personalised, and more effective treatment plan. I like to think of it as changing our focus from treating illness to treating individuals.

WIMR is pioneering several new discoveries that will help to develop personalised and effective treatment options for cancer. In this issue, you can read more about our research into a low-cost test called PROSPER-2 which helps to identify the best treatment option for a person diagnosed with breast cancer, and the work of our ovarian cancer researchers who are leading the INOVATe study.

I hope you enjoy this edition of *Discovery*, and I look forward to the opportunity to share some of WIMR's achievements, as well as our challenges, with you in future issues.

If a friend, family member or colleague is interested in WIMR's work, please encourage them to sign up to receive their own quarterly issue of *Discovery* at www.westmeadinstitute.org.au/contact, or email discoverymag@westmeadinstitute.org.au.

Breaking News: WIMR's Latest Discoveries

New target identified in bid to improve outcomes for acute kidney injury

For the first time, WIMR research has shown how a protein receptor known as CD47 can alter the body's cellular 'waste disposal and recycling system', contributing to the potential development of acute kidney injury (AKI). The next step for this research is to find ways to block CD47, leading, in the long-term, to the development of a new treatment for AKI.

New treatment for heart attack scar could address heart failure

A new study has shown that a protein therapy – recombinant human platelet-derived growth factor-AB (rhPDGF-AB) – could improve outcomes following heart attack. Research will continue to see how rhPDGF-AB might be used as a treatment option, potentially alongside existing treatments to improve outcomes for heart attack patients.

Scientists closer to solving mystery of why lean people get fatty liver disease

WIMR researchers have discovered how fatty liver disease develops in lean people. Lean fatty liver patients have a very distinct metabolism compared to non-lean ones, which can explain some of the differences in how the disease progresses. Researchers will now use this information to investigate the development of potential treatments for these patients.

WIMR is proud to be playing an integral role in the global effort to find ways to prevent, treat and cure COVID19. Soon, we will be sharing a special COVID19 issue of *Discovery* magazine, outlining the vital research being carried out at WIMR, and answering some common and important questions relating to the pandemic.

If you haven't already signed up to receive *Discovery* magazine, be sure to do so at www.westmeadinstitute.org.au/contact, so that you receive the special COVID19 issue and future issues of this quarterly publication.

To read more about these, or any of WIMR's discoveries, visit www.westmeadinstitute.org.au

Researcher Awards

WIMR's Dr Han Shen recently received a research grant from The DIPG Collaborative.

Dr Shen will use the funding to research potential new therapies for Diffuse Intrinsic Pontine Glioma (DIPG) – a rare and incurable brain tumour that arises in the brainstem of children, mainly aged between six and nine. Unlike many brain tumours, DIPG cannot be removed through surgery due to its sensitive location.

We are incredibly proud of Dr Shen's work to improve outcomes for this highly-aggressive cancer.

Thank you to the DIPG Collaborative and The Cure Starts Now for supporting WIMR's work, and to the wonderful donors who made this grant possible.

Congratulations to Professor Anna deFazio and her research team, who recently received a Translational Program Grant from Cancer Council NSW. The grant will fund research into the personalisation of treatment for Australian women with ovarian cancer. Read more about Professor deFazio and her work on pages 4 and 5.

There are many ways that you can help to support WIMR's life-saving research. To find out more, visit www.westmeadinstitute.org.au or call (02) 8627 3000.

Teaming up to tackle cancer

For more than 20 years, Professor Anna deFazio and Dr Dinny Graham have worked side-by-side at WIMR, united in their daily fight against deadly cancers.

Recently, these gifted and passionate researchers were appointed as leaders of WIMR's Centre for Cancer Research – Professor deFazio as Director and Dr Graham as Deputy Director. So, we sat down with the pair to find out more about their research and their successful working partnership.

Patients are at the heart of everything that WIMR's Centre for Cancer Research strives to achieve. According to Dr Graham, one of the centre's greatest strengths is its links to the clinic. She says, "All of the work in the Centre for Cancer Research here at WIMR has strong links to the clinic. Our research is directly tied to clinical questions and involves our clinical colleagues. This means we are able to see our findings benefit patients, and then work closely with the clinicians to continue improving on these outcomes."

Professor Anna deFazio (left) and Dr Dinny Graham (right)



“ We have a lot of enthusiastic people researching what they are passionate about, and Dinny and I are working to ensure that this atmosphere can continue and flourish.

– Professor Anna deFazio

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Professor deFazio agrees, and adds that she is also proud of the diversity of research conducted by the WIMR team.

“We have a number of independent groups, each asking independent questions relating to their cancer specialty. We have a lot of enthusiastic people researching what they are passionate about, and Dinny and I are working to ensure that this atmosphere can continue and flourish,” she said.

The diversity and passion that fuels the Centre for Cancer Research is underpinned by a very positive atmosphere of collaboration and sharing. This spirit of inspiration and collaboration is perhaps best encapsulated by the working relationship between Professor deFazio and Dr Graham.

While Professor deFazio focuses on improving outcomes for ovarian cancer, Dr Graham's work (which you can read more about in this issue on pages 8 and 9) seeks to improve outcomes for those diagnosed with breast cancer. Yet, the two scientists collaborate often, constantly talking about their work and using the other as a sounding board for new ideas.

Having worked together for so many years, and now as leaders of WIMR's Centre for Cancer Research, Professor deFazio and Dr Graham continue to rely on each other's counsel, and see a lot in each other that they admire.

Professor deFazio says of Dr Graham, “I admire Dinny because she is quick to implement new techniques and ideas and isn't fazed by them. I also admire that she is a can-do person. There is no negativity. She just gets on with it.”

Dr Graham adds, “I admire how amazingly organised Anna is, and how much she manages to achieve. She has a huge group of people to oversee, but she's always so well-informed about current research directions and has a really good 'big picture' perspective on the science. If I have a question, or there's something I need explained – whether it's about science, or funding, or whatever – I ask Anna and she always knows the answer. She is such a great mentor.”

“ Our research is directly tied to clinical questions and involves our clinical colleagues. This means we are able to see our findings benefit our patients, and then work closely with the clinicians to continue improving on these outcomes.

– Dr Dinny Graham

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Allie and Evan's wedding day



Volunteers at the Galston500

On track to improve outcomes for MS

"I went to the doctor with an odd symptom and he told me it was all in my head. Well, the joke's on him – it really was in my head. I have Multiple Sclerosis."

Allie Thackray can joke about her Multiple Sclerosis (MS), but her diagnosis and the daily reality of living with the disease is no laughing matter.

On 1 July 2013, Allie woke up in the morning and, as she stepped out of bed, she landed face-first on the floor. She called a neighbour who took her to emergency. After a myriad of tests, doctors informed Allie that they thought she had a series of mini strokes.

"I turned to the neurologist and said, "You're the same doctor who diagnosed my sister with MS, aren't you? Do you think maybe I have MS as well?" He went away to check, and when he returned he confirmed that he was the same doctor, and that I too had MS," explains Allie.

"This wasn't the first time I'd had similar symptoms, but previously they had always been attributed to other things, like stress or the flu or something else."

Unfortunately, this is a common thing with MS.

"We actually worked out that I had been symptomatic since I was 17, and I was 38 when I was finally diagnosed. My sister was also diagnosed with MS seven months before me, and she was twelve weeks pregnant at the time."

For Allie, MS impacts her life each and every day, although some days are worse than others.

"Do you know how it feels when you've got the flu and everything hurts, and you're really tired and just don't want to move? That's what I feel most of the time," says Allie Thackray.

"Along with that, you also have the mental fatigue, and there's also the physical aspect. I have shaky hands and severe pins and needles down my hands and feet. Everything I touch or walk on feels like I'm touching or walking on pins."

A new treatment has helped to improve Allie's day-to-day, and is partly the inspiration behind her fundraising goals.

"The new medication I'm on now helps to keep my progression under control. I took the tablets over a number of days, but then that's it – no medication for 12 months. With a bit more research, they might be able to find one that helps to keep the

progression at bay for 10 years. Or better still, reverse the disease progression."

Allie and her husband Evan decided they wanted to play a part in improving treatment outcomes for people living with MS. So each year, they organise the Galston500, with support from members of the Hornsby Model Engineers Co-op Ltd. This event challenges a collection of five inch scale model locomotive teams to complete a combined total of 500 laps of the picturesque one kilometre track at the Galston Valley Railway in Sydney. All in just 12-hours.

"Evan and I love the Galston Valley Railway so much, we got married there. And yes, I arrived at my wedding on the back of a miniature train!"

Since its inception in 2018, the Galston500 has raised more than \$21,000 for MS research, and in 2021, Allie and Evan hope to double that amount. Funds raised at next year's event will support MS research carried out at WIMR.

Obviously, Allie's reasons for wanting to help raise funds for MS research are very personal.

"I want to get back to how I was. Also, in the back of my mind is, my sister has three young children.

I don't want their young lives being spent looking after their mum, and then have the risk of them also being diagnosed with MS later in life.

"If we can find what the trigger is, we can stop these young kids getting it in the future. If we can find something that reverses the symptoms, my sister and I could have our lives and our function back. My sister could enjoy her kids, and any future grandkids."

For more information, visit www.galston500.com



Predicting the future of breast cancer

Decades of medical research have improved outcomes for women diagnosed with breast cancer. More recently, personalised medicine has revolutionised the way we treat some of the most serious disease challenges of our time, including breast cancer.

So much so that, according to the Australian Institute for Health and Welfare, a woman diagnosed with breast cancer in its earliest stage has an expected five-year survival rate of greater than 90%. However, if diagnosed in the late stage of the disease, and for breast cancers that return, the expected five-year survival rate drops to 32%. Predicting the outcome of breast cancer treatment for each individual, so that the most effective treatment can be selected early, is an important part of ensuring that survival rates continue to rise.

A new test, spearheaded by Dr Dinny Graham and her team at WIMR, is currently in development. Called PROSPER-2, it is a low-cost test that will help to identify the most effective treatment option for each person diagnosed with breast cancer, giving them the best chance of a cancer-free future.

Dr Graham says, "Predicting treatment outcomes is challenging as there are various subtypes of breast cancer. This means the response to each treatment option differs between patients.

"However, multi-gene based predictive tests have the power to predict a breast cancer patient's likelihood of relapse, as well as their response to certain treatments. They can help guide a personalised treatment regime for each patient, based on their own tumour.

"The PROSPER-2 test analyses the activities of a combination of genes in a tumour to give a read-out of how aggressive a tumour is, and whether a patient is likely to relapse following standard endocrine treatment. Endocrine treatment is the standard therapy in around ¾ of breast cancers, so the impact of this test could be significant."

Dr Graham and her team have discovered two new gene signatures (a pattern of genetic characteristics that identify a particular cell, tissue or disease), and have shown that these signatures could be applied to different subsets of breast cancer patients.

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Predicting treatment outcomes is challenging as there are various subtypes of breast cancer. This means the response to each treatment option differs between patients.

– Dr Dinny Graham

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Currently, there are tests that provide similar analysis of breast tumours. However, while they are accurate, they are not always locally available, and they are expensive, putting them out of the reach of many patients.

So far, Dr Graham and her team have shown that the PROSPER-2 test accurately groups breast tumours into risk groups.

"The test is performing as well, or better than existing commercial tests," said Dr Graham.

"As an immediate next step, we plan to validate PROSPER-2 with extensive clinical evaluation. We will then adapt the test for clinical application through the public pathology system. This means that our highly accurate test will be available at a fraction of the cost of the commercial alternatives."

Dr Graham and her team will do this by verifying the performance of the new gene signatures in cohorts of breast cancer tissues, and by working with colleagues in the clinical diagnostic lab to streamline the test for the public health system.

She says, "I believe that the widespread availability of the PROSPER-2 test will mean that more women will be prescribed the most appropriate treatment from the outset. By improving the likelihood of successful treatment of the disease, and preventing relapse, we will be improving breast cancer survival rates.

"Ultimately, that's our goal. To stop women from dying of breast cancer."

If you would like to support the PROSPER-2 research project, please visit the WIMR website www.westmeadinstitute.org.au or phone (02) 8627 3000.



Dr Dinny Graham

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Ultimately, that's our goal. To stop women from dying of breast cancer.

– Dr Dinny Graham

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WIMR recently received much needed funding support from the Goodridge Foundation for an important piece of research equipment produced by Becton Dickinson. The equipment will be housed within WIMR and will be used by our researchers, as well as those from the Westmead Research Hub, and other partners.

This equipment will be particularly useful in identifying rare cell populations, such as circulating tumour cells. It will dramatically enhance the quality of cell imaging and screening, and ultimately improve the accuracy of research. Most importantly, it will improve patient health outcomes.

We express our sincere gratitude to the Goodridge Foundation for supporting WIMR's vital and life-saving research.

If you would like to support WIMR through the purchase of equipment, or by providing funding for a research project, please contact the WIMR Foundation team on 02 8627 3000.



Dave Hutchison (right) and his team at WIMR

Have You Met...?

Dave Hutchison – Facilities Manager

Since 2016, Dave Hutchison and his team have overseen the maintenance of all WIMR's operating elements, including the equipment, building maintenance, stores facilities and reception administration.

Dave's team can't really plan their day too far ahead, as anything can happen. They manage more than 25 servicing companies and their technicians, respond to reports of issues with equipment around the building, help WIMR's specialised labs function 24/7, manage daily reception duties and are involved in managing the surrounding precinct redevelopment on a daily basis.

Needless to say, Dave and his team are very busy! "The building is obviously very large and equates to approximately two and half football fields in floor space. We need to check and maintain a lot of areas and equipment within the building, which can be quite time consuming. Particularly when it comes to the maintenance part of our work, my motto is 'prepare for the worst and hope for the best.'"

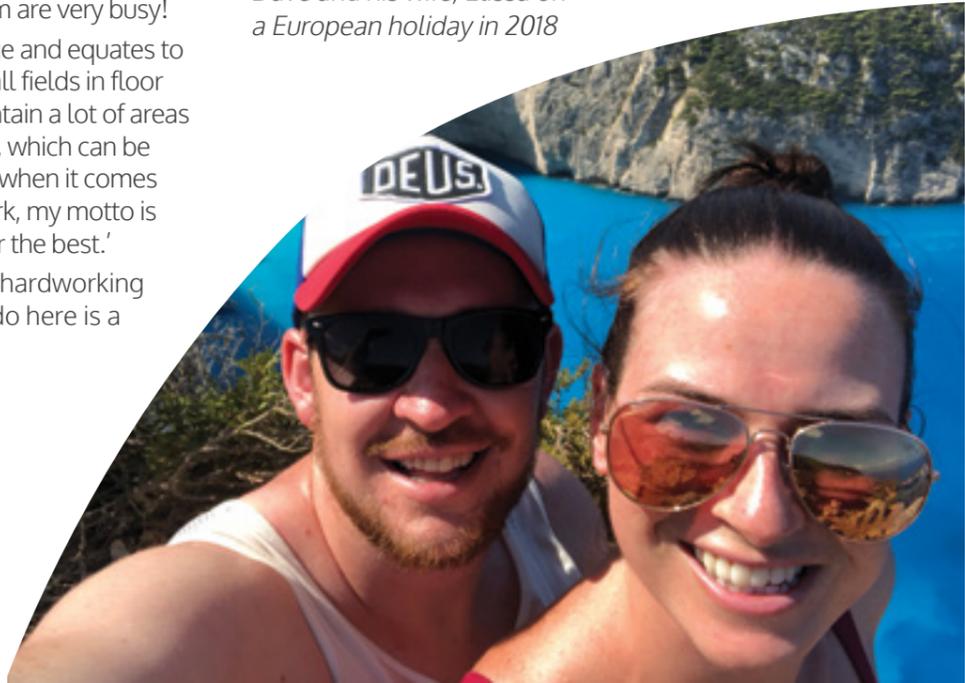
"Thankfully, I've got an amazing, hardworking team behind me. Everything we do here is a huge team effort."

Dave enjoys knowing that he and his team are contributing to the amazing research at WIMR. "The research here is so interesting, and I'm glad to just be involved in some way."

Dave admits that he's very rarely away from WIMR. On the occasions when he is home, how does he wind down?

"In my free time, I like to watch American basketball or a good movie. I also enjoy eating out at great restaurants with my wife and our families. I really just relax," he said.

Dave and his wife, Elissa on a European holiday in 2018



Q&A

Q: Where does WIMR get its funding?

To answer this question, we asked the CEO of the WIMR Foundation, Katrina Dowling.

A: WIMR relies on funding from a number of sources to ensure that its life saving research can continue. The National Health and Medical Research Council (NHMRC) is a vital source of funding. Although grants are extremely competitive (only around 13% of Investigator grants were successful in 2019, and approximately 11% of Ideas grants), WIMR continues to perform well year-on-year.

However, even those WIMR researchers who do receive NHMRC grants also need to rely on other funding sources, like State Governments, Trusts and Foundations, and corporate and individual donors, to ensure the future of their promising projects.

In fact, some of WIMR's most important research discoveries have only been made possible by philanthropic and individual donations.

Philanthropic support is critical to the ongoing delivery of research projects and encourages innovation. Donations are also essential for the purchase of cutting-edge equipment and technology required for even the most basic medical research.

There are many ways to support WIMR's life-saving research. To find out more, visit www.westmeadinstitute.org.au or phone (02) 8627 3000.

Student News

Two Honours students based at WIMR have received awards at this year's Australian Society of Immunology NSW Branch Meeting.

Jessica Merjane and Erica Longmuir-Vine from WIMR's Centre for Virus Research both received prizes for best oral presentation.

Jessica presented her research on the herpes simplex virus (HSV-1), which aims to discover whether an antiviral protein, known as interferon, can stop HSV-1 from exiting the sensory nerve cells.

If it's successful, a treatment could potentially be developed to block HSV-1 from causing an active, contagious infection. This could also prevent its spread, stopping new cases of infection.

Erica's research looks at the sexual transmission of HIV, particularly the early interactions of HIV and immune cells found in the human colon and rectum. She is researching macrophages, a type of immune cell that has, historically, been overlooked in transmission, and determining if it can facilitate the infection of key HIV target cells.

Congratulations to both Jessica and Erica!

Jessica Merjane (left) and Erica Longmuir-Vine (right)



We save lives. You can too.

WIMR's life-saving research is only possible thanks to philanthropic support. There are many ways to support WIMR's work including major gifts, regular donations, workplace giving and corporate sponsorship, community fundraising and leaving a gift in your Will. We welcome the opportunity to discuss the different options available to you and the various ways you may choose to show your support for medical research conducted at WIMR. Please contact the WIMR Foundation team on 02 8627 3000 or email development@westmeadinstitute.org.au for more information and to chat further. We hope to hear from you and engage you in our work.



Donation form

Donate to medical research and improve the health of current and future generations

You don't have to be a medical researcher to have a positive impact on health outcomes for people in our local community, across Australia and throughout the world. When you choose to support WIMR's vital work, you can be assured that every donation, no matter what size, makes a real difference.

Thank you for your consideration and generous contribution.

Your contact details:

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I would like to donate the following amount to help fund vital breakthroughs at WIMR:

\$25 \$50 \$100 \$250 \$500

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If you would like to make this a regular, monthly donation, please indicate when you would like the donation to be made:

- The 1st of every month
- The 15th of every month

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- I'd like to receive information about WIMR's Meet the Researcher seminar series
- I'd like to receive information about giving to WIMR in my Will
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How would you like to hear from WIMR?

- Yes, via Email please
- Yes, via both Email and Mail please
- Yes, via Mail please
- No thank you. Please do not send me any regular correspondence

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There are many ways to support WIMR's work. To find out more, contact the WIMR Foundation team at development@westmeadinstitute.org.au or phone (02) 8627 3000.