HARRY PERKINS INSTITUTE
OF MEDICAL RESEARCH

Issue 1 2018

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HARRY PERKINS INSTITUTE
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The Harry Perkins Institute of Medical Research is Perth's largest medical research institute dedicated to fighting the major diseases affecting adults.

perkins.org.au

YOUR IMPACT IN RESEARCH BREAKTHROUGHS AT THE PERKINS

TREATING CANCER DOWN TO THE VERY LAST CELL

IF YOU were diagnosed with cancer today, a sample of your tumour would be analysed to determine the best treatment for the type of cancer you have. Your treatment would hopefully destroy the cancer, but if tiny amounts of cancer cells are left in your body, there is a chance the tumour will regrow. The future of cancer research and treatment looks very different to this.

Thanks to a $1.75M grant awarded by the Australian Cancer Research Foundation (ACRF), the Perkins will establish the ACRF Centre for Advanced Cancer Genomics. This new centre will use next generation DNA sequencing equipment to examine each individual cell type within a tumour. The first step involves analysing cancer samples, down to a single cell level, to learn what genes are turned on and off.

In years to come, researchers will be able to look at the genetic make-up of each individual tumour and predict a tumour's response to drugs based on your personal genome. With that information, your doctor can design a treatment plan to treat every single diseased cell that makes up your individual cancer.

STEM CELL PROGRAMMING

NEW stem cell findings have taken researchers a step closer to achieving regenerative medicine. Perkins researchers have helped uncover key drivers in the process by which cells from mature tissues, such as skin cells, can be deliberately converted into stem cells to then become almost any cell type in the body.

Researchers nowadays are able to take some of your skin cells, grow them in a lab and then convert them into stem cells. One day it is hoped that such mature stem cells could then be used to regenerate your kidneys and other tissues. The ability for researchers to do this depends on the use of proteins called transcription factors which help switch specific genes 'on' or 'off'. Research at the Perkins has helped provide an explanation for how these transcription factors work to reprogram cells, helping efforts towards successful tissue regeneration.

WHY MILLIONS OF CATHETERS FAIL

MORE than one billion disposable intravenous (IV) catheters are used every year, but up to 50% of them fail, leading to a variety of problems such as increased risk of infection for patients. Perkins biomedical engineers have helped explain the high failure rate by looking at a range of factors and creating a computer simulation of catheter insertion and fluid entering the vein.

Factors such as the angle that the catheter is inserted, the position of the catheter tip, the catheter size and the speed at which fluid is injected into the blood stream can all impact the failure rate. If a catheter tip is pressed up against the far wall of a vein, and fluid is injected quickly, the impact can exceed normal forces by 3,500 times. This can damage the blood cells and the vessel wall, triggering a biological response such as inflammation or thrombosis, which could contribute to catheter failure. Perkins researchers hope to use their findings to create a simple look-up chart for clinicians, to help them choose the right catheter and improve the patient experience.

PUTTING THE STING IN BREAST CANCER

INNOVATIVE new research involving the use of bee sting venom as a potential treatment against aggressive breast cancer is being conducted at the Perkins. While effective drugs have been developed for some of the breast cancer subtypes, there are no drugs clinically available which specifically target triple-negative breast cancer cells.

Researcher Ciara Duffy (pictured) is using Perth honeybees which are some of the healthiest bees in the world, due to our isolation, and applying the venom to breast cancer cells to examine whether they can kill the cancer cells.

SERVICE FOR PERTH MELANOMA PATIENTS

PATIENTS who are diagnosed with complex and advanced cases of the skin cancer melanoma can access the team of experts at a centre within the Perkins.

The WA Kirkbride Melanoma Advisory Service (WAKMAS) provides a panel of melanoma specialists to review challenging cases. The panel includes skin pathologists, medical and radiation oncologists, plastic surgeons and dermatologists, who will each contribute to developing a specialised treatment plan for patients.

FAST FACTS

Melanoma represents 2% of all skin cancers, but causes **75% of skin cancer deaths.**

Melanoma is the **3rd most common** cancer in Australian men and women.

Source: Australian Institute of Health and Welfare 2017

FROM OUR DIRECTOR

WELCOME to 2018, and with it your new-look Perkins magazine!

We're eager to share with you our promising research breakthroughs, inspiring stories and to give you an in-depth look at how we're working hard to deliver better health for everyone.

And we want to hear from you! At the back of this magazine is a section where I welcome your feedback and questions. Our institute is full of bright sparks, with knowledge spanning many different areas of health and disease. Ask about cancer, or diabetes – or tell us what you think of our research, or our new magazine. Some of your questions will form a 'Put it to Perkins' feature in upcoming magazines, where we plan to highlight the areas that matter to you.

Whether you're writing in with your questions, signing up for a hands-on BioDiscovery class or sharing news of our discoveries with your friends and family – you are contributing to a better research environment here in Western Australia. Every bit helps.

Your input is making a difference. Just remember that medical research is a gift that keeps on giving. Every day, new discoveries are made that contribute to the global knowledge of how our bodies work and how we can improve the quality of life for everyone.

LOOKING BACK ON 2017

Our researchers made more than **82 notable scientific discoveries.**

Our trials facility, Linear Clinical Research, was awarded **49 studies in 16 different therapeutic areas.**

We collaborated with researchers from all over the world including **Canada, Sweden, USA & Singapore.**

This knowledge will never get used up, or wear out – every discovery is a step closer to better health and a future free from disease. So thank you for all that you've done for our institute and for your continued support of our work. Without you, *we* wouldn't be possible.

Peter Leedman
Director, Harry Perkins Institute of Medical Research

Thank you.

As a registered charity, we rely entirely on gifts, donations and research grants to fund our critical research. Thank you to everyone who contributes to our important work.

THE FLIGHT ATTENDANT TAKING CANCER RESEARCH TO NEW HEIGHTS

LANDING SOON

IN THE coming weeks, watch your mailbox for the incredible story of Jo – an ex-flight attendant with firsthand experience of cancer – who is helping esteemed cancer researcher and Woodside Professor Ruth Ganss in her quest to unlock the secrets of this terrible disease.

Jo's role as a community advocate is to assist Ruth in translating her research into language and concepts that are universally understood. Together, their partnership is supporting new discoveries that will impact real people facing cancer.

Jo's story is proof you don't have to wear a lab coat to make life-saving breakthroughs. People just like you are partnering with the Perkins to help researchers continue their vital work. Without research, there would be no medical breakthroughs and without you, there would be no research.

WOODSIDE PROFESSOR RUTH GANSS

SPREADING THE LOVE OF SCIENCE

JUDI'S STORY

JUDI LANE

AFTER a diverse career spanning multiple industries, a deeply personal experience prompted Judi Lane to dedicate her time to inspiring a new generation of medical researchers.

From teacher, to publisher, to life coach, to business development manager – Judi has practised an array of professions – but she was always drawn back to the health and education fields. Her path brought her to the Perkins, where she took up the role of Education Officer at the Lotterywest BioDiscovery Centre.

Judi facilitates the running of hands-on classes in the specialised teaching laboratory at the Perkins. The classes give students, corporate teams and community members authentic insight into the world of a medical researcher – an experience not offered anywhere else in Western Australia.

"I hope what we do in the BioDiscovery Centre enables those who come here to understand that medical research is about all of us. We all have a body and, unfortunately, sometimes things go wrong. We all have a vested interest in what the Perkins does," Judi said.

Judi said she has personally faced the devastating impact of disease, and knows the fire that can be lit by extraordinary loss.

"I have four family members who have passed away with cancer. They are my inspiration to work at the Perkins. Every day, when I walk through the doors of the building, they walk with me," Judi said.

"To lose my father, birth mother, brother and husband all to cancer is devastating. To witness my fiercely independent brother Glenn battle melanoma and watch my parents lose their youngest son was shattering. To lose my dad five short years later to lung cancer and then my birth mum to breast cancer was downright cruel. To watch my gorgeous husband Nick die of brain cancer in 2016 was beyond words."

"Without research, families like mine will continue to lose those they love. With current breakthroughs in the diagnosis and treatment of cancers like melanoma and breast cancer, and on-going research into other cancers, outcomes for other families may be very different. I know my loved ones would approve of my choice to work at the Perkins."

Judi said her personal experiences have been the driving force behind her passion for sharing medical research with the community.

"When I'm not in the BioDiscovery Centre, I'm often with community groups, speaking about the fantastic medical research happening right here in Perth," Judi said.

"I hope to be able to bring researchers and our broader community together to work side by side. We all need to be inspired about what the Perkins does and join together in the fight against disease."

If you would like to book a hands-on research experience in the Lotterywest BioDiscovery Centre, or you would like Judi to speak at your next community event, get in touch via email at education@perkins.org.au

TURNING PUPILS INTO PROFS

LAVANYA GOEL

THE Perkins Profs Academy at the Lotterywest BioDiscovery Centre has established a niche for educating passionate Perth students about medical research.

The unique program offers STEM (science, technology, engineering and mathematics) education to high school students by immersing them in real life applications of a typical medical science career pathway.

The 10-week after-school program, held in the Perkins teaching laboratory and run by medical research scientists, gives students an opportunity to work alongside bright minds and search for solutions to some of the most complex health issues facing Western Australians.

Lavanya Goel from Perth Modern School is currently undertaking the Perkins Profs Academy 1.0 course and said the laboratory work reinforces the scientific concepts she is learning at school.

"I have really enjoyed the course so far. The demonstrators have taught us both the practical lab skills and related it to the theory from the school curriculum," Lavanya said.

Lavanya and her academy classmates are mid-way through the intensive program, and will graduate at the end of the term with a strong grasp of lab techniques.

"So far we have learnt about cancer, including the changes it causes to DNA through to staining cells so they can be seen under the microscope. We have learnt how to detect cancer mutations so the right treatment can be given to patients with melanoma. Last week we learnt how nanoparticles can be used to treat cancer and how infectious diseases spread," Lavanya said.

Perkins Profs 2.0 steps-up the science by introducing the students to even more challenging subjects including epigenetics, bioinformatics and bioengineering.

Lavanya, who wants to study medicine at university, said she was drawn to the course by the opportunity to have hands-on experience in a medical research laboratory.

"I am interested in medicine and medical science and the Perkins Profs course offers a good introduction into this field," Lavanya said.

She said she was looking forward to the graduation ceremony at the end of the term, where she can demonstrate what she's learned to her parents.

"I am excited to share the knowledge about this course with others and to have a new perspective on the medical research field."

To learn more about the Perkins Profs Academy head to biodiscovery.org.au

Last year, more than **2,800 budding young scientists** donned lab coats to experience a day in the life of a researcher.

We've welcomed **students from more than 79 schools** from all across Australia.

RESEARCHER SPOTLIGHT: BIJIT MUNSHI

Me with a 3D printed model of a heart

Tell us about yourself.

I'm born and bred in Perth and graduated medicine from The University of Western Australia. I'm a surgical resident and I've been working at Fiona Stanley Hospital for the last two years. I'm currently doing a Master of Surgery plus research with VascLab at the Perkins.

What research do you do at the Perkins?

I'm working on a condition called aortic dissection, which is a tear in the inner wall of the major distributing blood vessel in our bodies. This causes patients a lot of pain and to become unwell very quickly. If the blood creates too much stress on the wall, it can cause a whole host of health problems, including death by aortic rupture.

Until now surgical decision-making in this setting has been based on signs like high blood pressure and pain, or certain appearances on CT scans. We are working to create an objective surgical decision-making tool by constructing 3D simulations based on computational models of aortic dissection. We analyse these models to identify the factors which will help a surgeon make clinical decisions.

How do you hope that your research will help people?

I hope that my research will create more certainty for surgeons, especially when making complex decisions where patients' lives are at risk. Doing research has definitely engaged my critical thinking skills, and I will take this approach back to my hospital work. I'd like to encourage my colleagues to similarly be involved in research to further contribute to science and the community.

Tell us something about yourself that people don't know.

I'm scared of heights but I love the mountains.

Me in the Swiss Alps. Don't look down!

STAR SUPPORTER: PAM BIRD

Tell us about yourself.

I was born in England, and trained in Nursing and Midwifery in England and Scotland. I worked in hospitals all across the UK, and in the Royal Army Nursing Corps in Germany.

I came to Australia in 1958, working in Melbourne for a few years. I moved to Kenya where I met my husband Dr Geoff Bird, a leading obstetrician-gynaecologist. We also spent seven years working in Papua New Guinea during the 1970s – finally settling in WA.

Why did you choose to support the Perkins?

I decided to support cancer research at the Kirkbride Melanoma Centre and recently visited the laboratory and met with researchers at the Perkins. I feel that giving even a small amount can make a huge difference.

I'm sure my late husband Geoff would be happy with me continuing his legacy by helping to support medical research.

How has medical research impacted your life?

I developed ovarian cancer ten years ago and received chemotherapy, followed by surgery with Professor Tony McCartney who established the WA Cancer Service at King Edward Memorial Hospital, where my husband Geoff once worked.

I am now 88 and cancer-free, which is amazing!

MELANOMA RESEARCHER, RIKKI BROWN, SHOWED PAM BIRD AROUND THE PERKINS LABS.

WALKING FROM THE DUBAI DESERT TO THE SWAN RIVER

IN THE cool of Dubai's early mornings, 58 year old Stacey Wilke makes her way to the desert as part of her remarkable training program for the Hawaiian Walk for Women's Cancer.

Stacey is an Australian citizen living in Dubai, but when she was diagnosed with ovarian cancer she became a fly-in, fly-out patient.

"My daughter is a GP in Perth and she really wanted me to undergo treatment with doctors she knew," Stacey said.

"Ovarian cancer is a day by day, week by week journey. I now feel I can do the Walk and it's giving me a focus and a clear goal."

"The Walk for Women's Cancer has become such an important part of recovering good health and the fundraising to support medical research at the Perkins feels right."

"Knowing that you're helping fund research that could one day discover a way to prevent or even cure this terrible disease genuinely lifts my heart."

Stacey will be walking with hundreds of other women in the Hawaiian Walk for Women's Cancer on Saturday 5 May 2018. Learn more at walkforwomenscancer.org.au

hawaiian
WALK FOR WOMEN'S CANCER
Perkins

Put it to Perkins

If you have a question or feedback you'd like to share, please write in the section below and post to: **Harry Perkins Institute of Medical Research, QEII Medical Centre, 6 Verdun Street, Nedlands, WA 6009**

To ensure we can respond to you, please fill out your contact details on the reverse of this form. The most popular question will be answered by Perkins Director, Professor Peter Leedman, and will feature in the August edition of the Perkins magazine. **Thank you.**

Thank you.

As a registered charity, we rely entirely on gifts, donations and research grants to fund our critical research. Thank you to everyone who contributes to our important work.

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AUSTRALIAN CANCER RESEARCH FOUNDATION

Add these dates to your calendar!

Learn more at perkins.org.au/events

Hawaiian Walk for Women's Cancer
– Saturday 5 May 2018

HBF Run for a Reason
– Sunday 27 May 2018

MACA Ride to Conquer Cancer
– Sat 13 & Sun 14 October 2018

Perkins
HARRY PERKINS INSTITUTE OF MEDICAL RESEARCH

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CHEQUE

Cheque or money orders – Please make payable to the Harry Perkins Institute of Medical Research and post to the PO Box listed above.

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