The key to staying young at heart
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Apply sunscreen every day
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Can we expect an influx in Ross River fever cases?
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Many years ago, I decided to devote my life to medical research. Like the 900 other scientists, support staff and students at Queensland’s own medical research institute, I am determined to find the answers to the terrible diseases that cause so much suffering to families in Queensland, Australia and the world.

As you can see from this edition of LIFELAB, we are making progress on many of the diseases that continue to plague us.

Cardiovascular and heart disease is the leading cause of death worldwide. It claims the life of an Australian every 12 minutes. Dr James Hudson is making remarkable progress on treatments for heart disease and the irreversible damage that occurs following a heart attack. Read more on page 4.

Here in the Sunshine State it’s never been more important for us to heed the advice presented by the new sunscreen policy, detailed on page 6. We now have clear evidence on the benefits of daily sunscreen use and urge Australians to apply sunscreen as part of a daily routine.
On page 8, we recognise the recent flooding devastation experienced by our friends in Far North Queensland as a result of Tropical Cyclone Oma. With a year’s worth of rain falling in one week, we investigate what this means for mosquito populations and whether we can now expect an influx in Ross River fever cases to follow.

Every day our scientists are striving to make better lives for families like yours. Will you help them today?

Thank you for your support. I look forward to updating you on the impact of your generosity and assure you that 100 percent of your donation goes directly to fund our dedicated scientists.

Professor Frank Gannon
Director and CEO
After a person endures a heart attack, as much as one quarter of the heart tissue dies, never to be repaired again.

Suffering a heart attack is scary and confusing. They occur when plaque builds up within the arteries of the heart, creating a complete blockage. All the heart tissue downstream of this blockage is cut-off from blood supply and rapidly begins to die.

Currently, there is no medicine or medical procedure that can reverse the damage to the heart and restore the lost heart cells. The damage that occurs is irreversible.

What if Queensland researchers could discover a way to fix this and keep your heart alive and well?

Dr James Hudson and his team of researchers at QIMR Berghofer are making inroads on this project, to see whether the damage sustained after major heart injury can be reversed.

‘Current medicines on the market treat the disease, but do not fix the underlying problem — the loss of heart cells.

‘The heart needs to work harder to pump the same amount of blood around the body.

‘In many cases this will lead to heart failure, and there’s no cure for their heart once this happens... They would need to undergo a heart transplant to survive,’ Dr Hudson, Group Leader of the Organoid Research Laboratory, said.

‘Our research project aims to restore the lost heart cells, reversing the damage sustained from major heart injury, such as a heart attack,’ he said.

After years of research, Dr Hudson has found a way to create miniature human heart tissue from stem cells, which is helping to fast-track this research.

Every week his team makes hundreds of human heart tissues using stem cells that replicate the beating movement of a human heart.

In a culture plate as big as your hand, they can grow nearly one hundred miniature human heart tissues that flex and move just like muscles in the body. These tissues also grow and strengthen with exercise.

‘They give us the ability to perform experiments on human heart muscles outside of the body, in a petri dish at our laboratory,’ Dr Hudson said.

‘We are using these miniature tissues to find out how the heart works, and to perform experiments that test new medicines for treating various heart diseases,’ he said.

Previous research has discovered that in newborn mammals the heart can fully recover its function after suffering a heart attack. Unfortunately, as the heart muscle matures and ages, it loses this ability.
Dr Hudson has used human heart tissues made from stem cells to show that the young human heart may also possess the ability to regenerate.

‘This is a ground-breaking finding because it shows that human heart muscle does have the capability to regenerate and recover after an injury, before it undergoes maturation.

‘Our research project aims to restore the lost heart cells, reversing the damage sustained from major heart injury, such as a heart attack.’

- Dr James Hudson

‘The founding principle of our research is to unlock the memory of the cells to reactivate this function in the adult human heart,’ he said.

The Organoid Research Lab has now reached a pivotal point in their research.

‘We have recently partnered with a pharmaceutical company to screen 5000 drugs on the miniature human heart muscles, including the mature heart tissues which are the most unlikely cells to respond to treatment,’ Dr Hudson said.

‘We have narrowed the sample size down to two key compounds that have worked in mature heart tissues.

‘These compounds have proven to be effective in initial testing, so will now be further developed and progressed into pre-clinical and clinical trials.

‘If we could uncover the medicine compound that allows adult heart tissue to regenerate, we could help millions of people currently experiencing cardiovascular disease,’ he said.

Cardiovascular and heart disease is the leading cause of death worldwide. In Australia, it claims a life every 12 minutes, and affects more than four million people.

Age, obesity, high blood pressure and cholesterol, smoking, alcohol and diabetes all contribute to a person’s increased risk of suffering a heart attack and developing heart disease.

Sadly, the burden of heart disease is expected to increase over the next couple of decades, proving the need for a treatment is of the utmost importance to help treat patients in Queensland, Australia and around the world — and alleviate the pain of their suffering families.

You can help support Dr Hudson progress this ground-breaking research into clinical trials by making a tax-deductible donation today.

Dr James Hudson
Group Leader of the Organoid Research Laboratory at QIMR Berghofer
In Australia, it is difficult to avoid sun exposure as we go about our daily lives. In recent years, it has become clear that the DNA damage that causes skin cancer and melanoma accumulates with repeated small doses of sunlight.

To think, stepping out to meet a friend for morning tea, walking to the bus stop in the morning or simply hanging out washing in the back yard can cause damage to skin cells that could eventually lead to a deadly problem.

‘Up until now, most public health organisations have recommended applying sunscreen ahead of planned outdoor activities but haven’t specifically recommended applying it every day,’ Associate Professor Rachel Neale said.

‘If you can stop the accumulation of sun exposure over time, you are going to reduce your risk of skin cancer.

‘We have clear evidence on the benefits of daily sunscreen use and urge Australians to apply sunscreen as part of a daily routine,’ Associate Professor Neale said.

The easiest way to do this? Incorporate sunscreen into your morning routine. Brush your teeth, brush your hair, and apply sunscreen — every day.

New sunscreen policy

The new sunscreen policy was initiated at the national Sunscreen Summit (held at QIMR Berghofer in Brisbane on 19–20 March 2018), where representatives from some of Australia’s leading research, medical, public health and advocacy bodies examined the current evidence on sunscreen use.

The policy recommends Australians and New Zealanders apply sunscreen with a sun protection factor (SPF) of at least 30+ every morning when the maximum UV index is forecast to be three or higher.

For much of Australia, this means people should apply sunscreen all year round, but in areas like Tasmania and Victoria there are a few months over winter when sunscreen is not required.

Associate Professor Neale says to be cautious about relying on makeup products, because many do not have the required level of SPF.

QIMR Berghofer researchers, Professor David Whiteman and Associate Professor Rachel Neale, led the way in getting Australia and New Zealand’s peak bodies to reach a consensus on changing their sunscreen policies. The new policy recommends applying sunscreen daily as a part of a regular morning routine — and Associate Professor Rachel Neale says it’s never too late to start.
Reducing the risk of melanoma

The new sunscreen policies have been updated just as Australia has regained the unenviable title of having the world’s highest rates of invasive melanoma.

Professor Whiteman’s research shows that if Australians applied sunscreen regularly, the number of melanoma diagnoses over the next 20 years would be reduced by one third.

He found increased regular sunscreen use by older Australians would have the greatest overall impact on melanoma rates in the short-term.

‘The burden of melanoma is highest in the older population, so the most effective sunscreen intervention to reduce melanoma is within that population,’ Professor Whiteman said.

Currently, the number of melanoma detections remain high in 50 to 70-year-olds, while those under 40 are reaping the benefits of decades of warnings about sunburn.

Encouragingly, Associate Professor Neale says that it is never too late to start this new daily routine.

‘Trials of sunscreen use have shown that even adults who have experienced skin damage earlier in their life can reduce the risk of cancer by applying sunscreen daily.

‘We should never assume that the damage is done and it is too late to start applying sunscreen daily. Applying sunscreen daily can still reduce your risk of developing skin cancer in the future,’ she said.

QIMR Berghofer researchers have found that if all Australians applied sunscreen regularly, the numbers of melanomas over the next 20 years would be reduced by one third. If you are concerned about your risk of developing melanoma, check yourself now using the Melanoma Risk Predictor online test at www.qimrberghofer.edu.au/melanomariskpredictor.

Clinical trials have found that people who use sunscreen daily have the same levels of vitamin D as those who don’t apply sunscreen daily. Read more about Vitamin D on page 15.

The new Sunscreen Policy Guideline has been published online and can be viewed here https://onlinelibrary.wiley.com/doi/10.1111/1753-6405.12873

“We should never assume that the damage is done and it is too late to start applying sunscreen daily.”

- Associate Professor Rachel Neale

Associate Professor Rachel Neale
Group Leader of the Cancer Aetiology & Prevention Laboratory at QIMR Berghofer

Dr David Whiteman
Group Leader of the Cancer Control Laboratory and Deputy Director of QIMR Berghofer
The Head of the Mosquito Control Laboratory at QIMR Berghofer, Associate Professor Greg Devine, explains what residents should expect in the wake of the North Queensland flooding phenomenon.

‘As conditions dry and the sediment settles, there will be lots of pools of water around. Those mosquito and midge (sandfly) species that breed in fresh water and muddy sediments will be given optimal conditions for development and they will come out in large numbers,’ he said.

‘Obviously, with the increasing number of mosquitoes and midges there will be a lot of nuisance bites which, if they break the skin, can cause secondary bacterial infections, particularly around polluted water.

‘The main thing with post-flood events is to make sure people are very careful not to get bitten,’ he said.

QIMR Berghofer recommends residents take the usual measures to avoid all biting critters, which includes wearing long sleeves and long trousers, applying lots of repellent that contains either DEET (N,N-Diethyl-meta-toluamide) or picaridin and be especially vigilant at dawn and dusk when mosquitoes are most active. Use mozzie coils and surface sprays around the house.

If you are bitten, don’t scratch.

‘Avoiding bites will help prevent secondary infections, which is common particularly in children who constantly scratch at them,’ he said.

Risk of increased Ross River virus cases

QIMR Berghofer’s Mosquito Control Laboratory is the largest in the southern hemisphere, allowing Associate Professor Devine and his team to play a key role in research on mosquitoes and the diseases they carry.

‘The most common mosquito-borne virus we need to worry about in North Queensland at present is Ross River virus, which is transmitted by Culex annulirostris and other types of mosquitoes whose populations will be boosted by the huge increase in available habitat,’ he said.

But it’s very hard to predict what will eventuate in terms of the spread of disease post-flood.
Researchers have tried to find evidence to support a link between whether flooding events are related to the prevalence of RRV, and they have yet to be able to find any clear correlation.

‘We can’t say there is an increased transmission disease risk, because it’s not related simply to mosquito populations or the number of bites received. It is a complex mosquito-borne disease that largely depends on whether the mosquitoes have bitten native wildlife that already carry the virus,’ he said.

QIMR Berghofer researchers named the virus in 1963 after isolating it from the mosquito Aedes vigilax found near Townsville, but we know surprisingly little about which other mosquitoes are the key carriers and which animals (or even birds) are responsible for its abundant spread. Without that understanding, we cannot predict the disease patterns that we see or their relationship to our changing and increasingly urban environment.

In 2015, Australia saw its largest RRV outbreak in many decades, largely unrelated to weather events, with an increasing number of cases unexpectedly turning up in metropolitan areas. The Mosquito Control Lab is working on better ways to characterise the transmission patterns, the hosts and the mosquitoes that are responsible for them.

‘Thankfully, mosquito-borne diseases are probably going to be a minor part of what the local residents will have to deal with in the aftermath of the flood event, but mosquitoes and midges will certainly cause a considerable nuisance,’ he said.

Can we do anything to prevent mosquitoes breeding?

There is plenty you can do post-flood if you recognise you are breeding mosquitoes in standing pools of stagnant water on your property or if you feel your house is under attack.

‘If you can identify where freshwater is pooling you can certainly treat those areas with environmentally friendly chemicals, such Bacillus thuringiensis israelensis (Bti) or monomolecular films,’ Associate Professor Devine said.

‘Bti is a bacterial insecticide, commonly sprayed across the Queensland coast to control against salt marsh mosquitoes. It kills all mosquito larvae and is completely safe for humans and all aquatic and other wildlife. It is often available under trade names like “Mosquito Dunks”.

‘Whereas monomolecular films spread a thin layer of oil across the water surfaces that prevents mosquito larvae from breathing and are available from many hardware stores,’ he said.

Homeowners can also reduce the numbers of resting mosquitoes around their homes by using residual surface sprays.

The Townsville City Council has also been provided with 35 000 units of a new product called Mozzie Mesh, a vapour active device for inside the home. The product is odourless and provides protection against biting mosquitoes 24 hours a day for up to four weeks.

It is currently the subject of a major trial in Mexico, funded by The United States Agency for International Development (USAID), and led by Associate Professor Devine, who is evaluating its impact on the dengue mosquito Aedes aegypti.●
Everyday Heroes

Summit for Sarcoma 2019: Trekking the Himalayas

While many 12-year-old boys are obsessed with Fortnite, the latest online video game, and what their mum is cooking them for their next meal, it is hard not to be humbled by Ben O’Connor, who has his eyes firmly set on a much bigger prize.

Introducing Ben O’Connor, a 12-year-old Sunshine Coast school student who is raising money to help fund much needed research into sarcoma cancers at QIMR Berghofer.

‘Someone very close to me is batting with a rare type of cancer called osteosarcoma. This type of cancer is more common in kids and does not get as much attention or funding for research,’ Ben said.

‘This is not fair and I want to make a change and a difference. I’m lucky that I’m healthy and I want to help other kids that have this disease,’ he said.

Sarcoma research is greatly underfunded. Less than one per cent of cancer research funding is allocated towards sarcoma and yet this rare group of cancers makes up 20 per cent of cancers in children, predominantly young boys like Ben.

To help make a difference, Ben and his dad, Andrew O’Connor, have launched the Summit for Sarcoma 2019. They aim to climb Mera Peak (6476m) in the Himalayas to raise funds for sarcoma research. They recognise the physical and mental challenges in attempting the climb, but they are confident they can do it (they have been trekking in Nepal before).

With just over five months until Ben and Andrew head to Nepal to start their trek, they have already started a strict training regime, which includes scaling Mt Coolum every day!

They are also focussed on reaching their donation target of $64 760 which equates to $10 for every metre Ben climbs up the mountain. All money raised will benefit QIMR Berghofer and help Professor Mark Smyth continue his vital research into finding a cure for sarcoma.

‘We found QIMR Berghofer has a smart doctor who is working on a cure, but he needs more money so he can finish his work. Imagine if we could raise enough money so he can find a cure… We can help these sick kids,’ Ben said.

Cancer campaigner rides in the Rockies

That most people now lead long, healthy lives well into their 80s is surely one of our greatest achievements. But still too many people’s lives are cut needlessly short. David Hassum is certainly thinking: Why don’t we have a cure for the most aggressive forms of breast cancer yet?

His partner, Veronica ‘Vee’ Best, was first diagnosed with triple-negative breast cancer in December 2016. She fought bravely for two, long years. They thought she had the cancer beaten in September last year, but it metastasized to other parts of her body and took her life a few short months later. She was only 53.

Such a bright personality, Vee was a worldly, American-born woman, who led a fascinating life through several diverse careers. First, as an undercover cop in the drug squad in the USA, then a top fashion model and actress in Atlanta, and finally settling in Newstead, Brisbane where she entered a career in real estate. In her final years, she was frequently seen down at the Newstead dog park where she spent much time with her beloved fur baby, Moses.

In memory of Vee’s adventurous spirit, David has embarked on a solo ride to conquer a 1800 km northern stretch of the famous Great Divide Mountain Bike Route (GDMBR) in North America.

He will commence the ride in Banff, Canada and finish in Jackson Hole, Wyoming, USA... the same distance as riding from Cairns to Byron Bay! He hopes to raise $180 000 — $100 for every kilometre he rides.

He estimates he’ll be on the road between 32 and 35 days. David jokes he will need to get bear spray once he arrives in Canada as there will be times where he is out in the open Rocky Mountain wilderness!

He is fundraising for triple negative breast cancer research at QIMR Berghofer. Associate Professors Andreas Moller and Michele Teng will be the benefactors, who are doing vital research on triple-negative breast cancer.

Donate to David’s ride in the Rocky Mountains by visiting www.4vee.net/donate.

Do you have the drive to Canoe the Carpentaria, Drive the Desert or Run the Road? Become an Everyday Hero and fundraise for an area of medical research at QIMR Berghofer. To find out how, contact us at supportus@qimrberghofer.edu.au.
The greatest wealth is mental health

Dr Justin Chapman believes exercise, nutrition and creating a sense of community holds the key to improving health and wellbeing for people with mental illness. Through collaborative work with QIMR Berghofer and Police-Citizens Youth Clubs (PCYC) Queensland, Dr Chapman is researching more effective ways to help people with mental illnesses make healthy lifestyle changes.

Whether you realise it or not, chances are you know someone living with a mental health condition. Mental illness is real and needs our attention. One in five people experience a mental health condition in any given year, and a staggering one in two will experience a condition at some stage during their lifetime.

A mental illness significantly affects how a person feels, thinks, behaves and interacts with others. Mental illnesses often vary in duration: some can be a single episode, some can come and go in phases and some are lifelong.

People with mental illnesses are also at higher risk of developing preventable physical conditions, such as cardiovascular disease and diabetes, which can lead to a shorter life expectancy of between 10 and 20 years.

People living with a mental illness typically face significant barriers to getting started with exercise and a healthy diet. Low mood, low motivation, low self-esteem, social isolation and psychiatric medications can make healthy living seem like an impossible challenge.

From research to implementation

Dr Justin Chapman’s research spans the medical research, public health and community sectors. He leads a randomised control trial of different physical activity programs, testing their effectiveness in adults living with mental illness, while also working with non-government organisations and public mental health services on policy development.

Through a partnership between QIMR Berghofer and PCYC Queensland, his research is being applied in practical programs that are being delivered across the state.

PCYC Healthy Bodies, Healthy Minds (HBHM) is one such example. It’s a community-based fitness program specifically designed for people experiencing long-term mental illness.

‘Programs like PCYC Healthy Bodies, Healthy Minds supports simultaneous improvements in physical health and mental health,’ Dr Justin Chapman, PCYC HBHM program manager and QIMR Berghofer mental health researcher, said.

Dr Chapman says the program focuses on three lifestyle factors inherently linked to mental health: physical exercise, group support and nutritious food.
The eight-week program brings groups of 6-10 participants together every week for group-based exercise and nutritional education and cooking in a welcoming environment. They meet at their local PCYC Queensland gym and exercise together with the support of an exercise physiologist and dietitian.

‘We’ve found the key to helping people get active and stay active is to implement a personalised, local program,’ Dr Chapman said.

Dr Chapman’s practical programs are currently being evaluated in a randomised controlled trial with Metro North and Metro South Mental Health Services, and implementation has started with the Primary Health Network in Far North Queensland.

Glimmer of light in the darkness

The PCYC Healthy Bodies, Healthy Minds program truly is breaking down barriers and helping people live more fulfilling lives. David, one PCYC HBHM participant, recalls the daunting experience of trying to exercise without the program.

‘I joined a gym, but I got overwhelmed with all of the people. I felt like I was getting judged,’ he said.

‘No one judges each other here in the program. I’m not thinking “What’s that other person thinking?” or getting paranoid or feeling anxious,’ he said.

‘I think the program is good for my mental state too — I’m getting out and about and I’m doing things. I feel happier.

‘And I’ve lost some weight by using the cooking guide and trying to eat healthier and less,’ he said.

A second participant, John, shows the social side is every bit as important as the exercise.

‘People living with a mental illness often feel socially isolated, so this program also promotes social connections and support, which can improve confidence.’

- Dr Justin Chapman

‘I found at the start I didn’t know any of the participants, but as the weeks went by we tended to help each other out with the different exercises and the banter was quite good between everybody,’ John said.

Sally, a third participant, says the group activity was the key.

‘I liked having the motivation to attend training as a group activity, creating a sense of community. It helped me see that when I have assistance with transport and motivation I am capable of more than I realise,’ she said.

‘Justin was very dedicated to making us all feel comfortable and I think his empathy and understanding made things easier for me.‘
He even transported us to the venue when he could,’ she said.

In the last three years, the program has been rolled-out across 14 PCYC Queensland clubs, benefitting more than 267 people with mental illness. It also won several awards at the 2018 Open Minds Mental Health Week Achievement Awards.

‘I liked having the motivation to attend training as a group activity, creating a sense of community.

-Sally, participant

The need is great; the need is now

Dr Chapman would like to see research-to-implementation programs grow. He says there is still a huge potential for the programs to expand to other regional and urban centres across Queensland.

‘My vision is to see holistic evidence-based lifestyle interventions readily available and widely used for people recovering from mental health issues state wide,’ he said.

In addition to expanding their reach, Dr Chapman is testing the effectiveness of different physical programs in adults living with mental illness.

‘Further research is needed into the impact different kinds of exercise and intensities have on mental and physical health function. This knowledge is vital for updating the community programs to improve the direct impact we can have on people’s lives,’ he said.

He also has plans to develop different versions of the program, adapting it to suit the preferences of different groups of people experiencing mental health issues. With your help, tailor-made programs could be available for young people, Indigenous people, older people and people with other disabilities.

With the help of Dr Chapman’s research, the future certainly is looking brighter for many Queenslanders living with mental illness.

You can help support Dr Chapman move his research into the real world by making a tax-deductible donation today.
Vitamin D is not a vitamin

Interestingly, vitamin D is not actually a vitamin. A vitamin is a compound that is required in the diet because it cannot be manufactured by the body. This is not the case for vitamin D, which is produced in the skin upon exposure to ultraviolet radiation. There are only a few foods that contain substantial amounts of vitamin D, the best source is oily fish. Most Australians obtain the majority of their vitamin D from the sun.

Vitamin D is important for maintaining bone health

Adequate vitamin D is important for healthy bones. Most organisations suggest maintaining a blood vitamin D concentration of 50 nanomoles per litre (nmol/L) for good bone health, but this is a controversial topic because other organisations recommend values ranging from 25 nmol/L to over 100 nmol/L.

Vitamin D and other health outcomes: the million dollar question

Vitamin D deficiency has been linked to over 100 different health outcomes, such as cancer, heart disease, infection and autoimmune disease. However, it is possible that low vitamin D is just a marker of poor lifestyle or ill health and doesn’t itself influence these diseases. And even if the link is causal, there is very little consensus about how much vitamin D we need.

Enter the D-Health Trial

To determine whether Australians should routinely take a vitamin D supplement to improve overall health outcomes, we are conducting a study called the D-Health Trial. Over 21,000 adults aged over 60 have been recruited into this study, where half were randomly assigned to take vitamin D and half to take a placebo tablet for five years. Participants complete surveys each year about their health, and we also obtain information from Australian health databases. We will compare the proportion of people who get different diseases (such as cancer) between the two groups. We are also studying outcomes such as mood, sleep and bacteria in the gut. D-Health will thus provide holistic information about the effect of taking a vitamin D supplement. The results of this trial are expected in 2020.

What to do while awaiting the results of the D-Health Trial?

The controversy surrounding vitamin D makes it very difficult for doctors and their patients to know whether to have a vitamin D test or take a vitamin D supplement. The information below may change when the results of the D-Health Trial are published.

Testing: Vitamin D testing has increased more than 100-fold in the past two decades and is costing the health system over $100 million per year. The Australian Government has advised that vitamin D testing should not occur routinely, and should be restricted to people who have a clinical reason to be tested.

Supplements: The Australian guidelines state that adults aged under 70 years who receive very little sun exposure should take 400 international units (IU) of vitamin D per day to avoid being vitamin D deficient. Those aged over 70 years should take 600 IU per day.

In summer, most Australians receive enough sun exposure through everyday activities to avoid being vitamin D deficient without supplements (according to the current definition of deficiency). In winter, people should try to spend time outdoors in the middle of the day, allowing their skin to see the sun most days. If this is not feasible, a supplement may be required.

1 The molecule measured is 25 hydroxy vitamin D.
One area of your research is looking at giving immunotherapy to patients before surgery to improve survival, in the early stage of cancers. Why would this help, and what have been your findings?

Immunotherapy uses the body’s immune system to fight cancer. My laboratory completed a pre-clinical cancer trial and demonstrated, for the first time, that giving immunotherapy before cancer surgery to remove a tumour (called neoadjuvant immunotherapy) was much more effective in eradicating the cancer, compared to performing surgery first then giving immunotherapy (called adjuvant immunotherapy).

Many of our clinical colleagues, nationally and overseas, have set up new clinical trials in different cancer types to see if our findings hold true in humans. Excitingly, a number of clinical trials have reported positive results validating our pre-clinical findings although this has to be confirmed with larger trials.

We, as a scientific community, still have so much to learn about immunotherapy, and my group is currently investigating why giving immunotherapy before surgery is more effective.

You currently have two appointments: one as a group leader at QIMR Berghofer, and one as an Associate Professor in the School of Medicine at the University of Queensland. What advice do you have for women wanting to succeed in the scientific research industry?

If you want to be the best at what you do, it involves continuous hard work and sacrifice. I liken it to trying to win an Olympic medal! Each scientist has to decide what level of involvement is appropriate for him or her to be able to satisfy his or her career aspiration. Research organisations, universities and government also have a role in fostering a research ethos to ensure that the best scientists, regardless of their gender and family situation, are recognized and supported.
Community fundraisers, Ben O’Connor and David Hassum, are raising much needed funds for your research in some of the most aggressive and heartbreaking forms of cancer, osteosarcoma and triple-negative breast cancer. Why is research into these cancers most needed?

Osteosarcoma is a rare cancer and, compared to other more common types of cancer, is grossly underfunded in Australia. Nevertheless, osteosarcoma is the most common type of bone cancer and accounts for about 3 per cent of cancers that present in children. Sadly, the prognosis of a patient with osteosarcoma is relatively poor and 5-year survival rates have not improved in decades.

Triple-negative breast cancer (TNBC) is one of the most aggressive forms of breast cancer. It is characterised by higher rates of relapse, greater potential for the cancer to spread to other parts of the body, and shorter overall survival compared with other major breast cancer subtypes. Unlike other types of breast cancers, there is no specific treatment option for TNBC and it remains the most challenging type of breast cancer to treat.

For both cancer types, there is an urgent need to develop biomarkers capable of accurately diagnosing these two types of cancer at a very early stage and to develop new treatment options that can improve the overall survival of these patients.

What does it mean to have passionate fundraisers supporting your research?

I am very grateful to fundraisers like Ben and David who, because of their personal experiences, feel compelled to make a difference in improving outcomes for osteosarcoma and TNBC respectively.

With the significant decline in federal and state funding for medical research, scientists in Australia are becoming more and more dependent on philanthropic funds raised by amazing people like Ben and David. Ben is a courageous 12-year-old training to climb 6476 km up to Mera Peak in Nepal, with his dad Andrew. David will be riding solo and self-supported on a 1800 km northern stretch of the famous Great Divide Mountain Bike Route, commencing in Banff, Alberta and finishing in Jackson Hole, Wyoming. These are big challenges, which take special individuals to undertake them! The commitment displayed by Ben and David is very inspiring and it spurs me and my team on to continue carrying out our research in osteosarcoma and TNBC.

What was one of the biggest obstacles you faced with your research, and how did you overcome it?

I have not yet overcome the biggest obstacles I face in my career. Due to the steep decline in funding from the federal and state governments, it has been increasingly difficult to secure sufficient grant funding for my research. Even though I have been successful in obtaining grants and generating research outcomes, I spend a great deal of my time trying to find money for my team to do research. This is frustrating when there are options to accept lucrative research support packages in other well-developed countries.

However, I want to stay in Australia and contribute to improving the health of Australians. I am not unique in this situation — many of my colleagues are in the same boat. Australia has fallen well behind the rest of the developed world when it comes to basic medical research funding.

I would ask the public to advocate the government increase funding for all areas of research from basic to translational to ensure scientists are given the stability and resources necessary to make breakthroughs in research.

The other major obstacle to my research (that all researchers face) is the increasing compliance burden placed on researchers which ultimately rewards administration, but hinders research output. Science is a creative process. Researchers have a finite amount of time each day; having to consistently secure funding for one’s salary and research takes us away from doing the job we were trained to and want to do.

What is your hope for the future of immunotherapy?

In the next decade, I hope we can treat most cancer types with immunotherapy, and further increase the number of patients that respond long-term and safely to the treatment. I also hope that immunotherapy will be affordable for the average Australian family, to minimise the financial burden for cancer patients.
The View From Within

The eve of World Science Festival in Townsville also marked the launch of *Tiny Worlds: The View From Within* at the Museum of Tropical Queensland. The art exhibition gives visitors a look through the eyes of our scientists to see just how small, yet how large, this fascinating world can be. The collection is on display at the museum until the end of July 2019.

Public Forum on Dementia

QIMR Berghofer recently held a public forum on dementia, welcoming a full house to the Institute’s largest auditorium. Guests enjoyed an informative evening as five leading researchers presented the latest research in the field, including early diagnosis, assessing younger patients and the latest insights from the QIMR Berghofer-led Prospective Imaging Study of Ageing (PISA).

While there is still no cure for dementia, John Quinn and Glenys Petrie opened our eyes, showing us that people can still lead a rewarding life while living with dementia.

‘I started to show an interest in research about positive lifestyle considerations that would impact on my wellbeing and provide a focus for living well with dementia. I’m continually learning about what I need, because unfortunately dementia doesn’t stand still,’ John Quinn said.

It was great to see so many friendly and familiar faces joining us for the event.
QIMR Berghofer scientists travelled near and far once again this year, joining the World Science Festival and presenting some of our most exciting science to Queenslanders. The month-long celebration brings together more than 100 scientists, explorers, researchers and innovators to share their thousands of brave new ideas.

As an official program partner, our staff engaged in demonstrations at Street Science! and thought-provoking conversations at panel events.

In Brisbane, the Street Science! precinct was the pinnacle of the festivities, as we inspired the next generation of scientists at our stall. Everyone took a close-up look at what cancer and other diseases look like under the microscope.

It would be hard to imagine a world of science and medical research without microscopes. But what happens when they don’t turn on?

We call Dr Nigel Waterhouse, whose daily work includes managing the microscopy facility and making sure all of the microscopes are working correctly. He was thrilled to talk about the tiny worlds that come to life under the microscope as he discussed his amazing job with everyone at Brisbane’s Street Science! event.

Children and families could also view the ultraviolet (UV) beads, where they could see the effects of sunlight, and specifically the UV rays that cause deadly melanomas and other skin cancers, by making a UV bracelet.

The festival’s regional program provided Queenslanders — especially those living outside the southeast corner — the opportunity to get involved by joining events and discussions with leading scientists. Internationally recognised skin cancer researcher, Professor Adele Green AC, presented the Pioneers in Science forum at Gladstone and Chinchilla, a new event on the WSF programme.

Dr Ash Haque presented at Cool Jobs in Gladstone, where he entertained an auditorium of schoolchildren by sharing inside information about his life as a scientist.

‘I found a cool job! I lead a research team that studies the body’s immune system. The hope is that we will find new ways to improve immunity to diseases, such as malaria and cancer,’ he said.
Crossword Challenge

ACROSS
1 Dr James Hudson is investigating treatments for this organ
2 Everyday Hero David Hassum is riding to raise funds for what type of triple-negative cancer research
3 Associate Professor Rachel Neale is leading the _____ D study
4 Post-flood conditions are perfect breeding for which insect
5 Australians are being advised to apply this every day
6 Tiny Worlds: The _____ From Within exhibit name

DOWN
1 Mental health program name: PCYC _____ ____, Healthy Minds (2)
7 Environmentally friendly mosquito pesticide (abbreviation)
8 Three letter abbreviation for Ross River virus

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