Brain Matters

News from the Florey Institute of Neuroscience & Mental Health

FIGHTING MND

PAGE 4

THE FLOREY

WINTER 2017

Director's Report

Welcome dear reader, to a very exciting edition of *Brain Matters*.

I am constantly amazed by the support we receive from the community and our extended Florey family – people like you who help us research the brain.

We recently welcomed footy legend, Neale Daniher and founder of Cure for MND, Dr Ian Davis, to a day of celebration at the Florey. These two men continue to achieve extraordinary feats. Despite their own battles with motor neurone disease, they are raising funds, tirelessly, to fast track our research. We were incredibly grateful to receive $6.35 million on the day; money raised from the Big Freeze and through support from the Victorian Government. As a result, we are set to purchase expensive equipment and to recruit new members to our MND laboratory, headed by the very talented Dr Brad Turner.

It's worth thinking about the impact of donated funds. There is no doubt that donations result in faster results for patients. We see more scientists at the lab bench, or visiting patients, or scanning those with hard to diagnose neurological problems.

While we welcome large gifts as the one discussed on page 4, we are also so grateful for smaller donations. They provide support for our engine room of discovery.

In this vein, we welcome donors to visit and to see how their gifts help our researchers. If you would like to come and meet members of our talented team, please get in touch.

You might also like to come along to support the Florey at our annual Brain Game when Collingwood Football Club plays Geelong at the MCG. More details can be found next to this column. It should be a fun day and a serious reminder of the need for research into concussion of elite and amateur athletes. With so many young children playing sport including footy, rugby and riding horses, we are determined to increase our understanding of concussion and traumatic brain injury. We thank Collingwood for embracing this special day on August 19.

Thank you, as always, for your support of our science. Our researchers are making headlines around the world and you have helped to get them there.

Professor Geoffrey Donnan AO
Director, the Florey Institute of Neuroscience & Mental Health

The Brain Game: come along and help fund brain research

Once again, the Florey is partnering with the Collingwood Football Club for our annual Brain Game – to be held on Saturday August 19 at the MCG when the Magpies will play Geelong.

A massive crowd is expected. The Florey will be promoting brain health and the way families of all ages can live long and live well.

While we'll be celebrating brain health, we'll also pause to remember Collingwood club legend, Lou Richards, who died recently after six decades in the spotlight. Lou lost his beloved wife of 60 years, Edna, to Alzheimer's disease in 2008 after visiting her daily during her years in a nursing home.

Concussion will also be on the minds of those at the ground on the day. The Florey is a world-leader in this research with many former AFL players visiting for advice. The long-term effects of concussion remain unclear despite a lot of hype in the media. Florey researchers are determined to study sport-related head injuries using rigorous research techniques.

The results will influence the way athletes – from the under-12s to professionals – are treated after a knock.

Associate Professor Paul McCrory, Dr Gavin Davis and Dr Michael Makdissi have all been heavily involved in creating the latest Consensus Statement on Concussion in Sport, released in April. It describes our current knowledge around concussion, and was crafted after systematically screening over 60,000 published articles.

The meeting also updated and released new community concussion recognition tools which are freely and widely distributed to schools, sports clubs and community groups to ensure that anyone suffering a suspected concussion receives fast, appropriate treatment.

To support our research into brain disease including stroke, Alzheimer's, depression and concussion, come along to the game or donate using the form in this newsletter or by calling 1800 063 693.

Irons in the fire – a new trial for Alzheimer's

Professor Ashley Bush and his team are developing imaging-based biomarkers to predict Alzheimer's disease progression.

Victorians who are worried they may be destined to suffer Alzheimer's disease will soon be able to enrol in a clinical trial to see if lowering iron levels can slow the progression of dementia.

The 3D Trial (Delaying Dementia with Deferiprone) has arisen from new research by Dr Scott Ayton. Scott has found that people with early memory loss due to the Alzheimer's protein, known as amyloid, will decline faster if they also have high brain iron levels.

The trial leverages a cutting-edge magnetic resonance imaging technique that researchers hope will provide an affordable and efficient way to identify those at risk.

Professor Ashley Bush, head of the Florey's oxidation biology lab, sees the potential for this test to one day be as common as a mammogram, a prostate test or a colonoscopy. Once high iron levels are detected in the brain, a drug may be given to reduce the levels and the risk of Alzheimer's.

Ashley and Scott are taking a new approach to find biomarkers for Alzheimer's. They will use two MRI techniques to build up a picture of two chemicals in the brain that may accurately diagnose someone's risk of developing Alzheimer's.

Measuring levels of iron and the chemical glutathione will provide vital evidence of the likelihood of Alzheimer's developing within, say, five years.

Knowledge is power: knowing that you have a good chance of developing Alzheimer's would allow families to make early and pragmatic decisions about future care, create or update their wills and bequests, and make positive lifestyle changes.

On the optimistic side, such people would also become eligible for interventional trials, using a number of compounds either already being investigated, or new compounds yet to enter the Alzheimer's trials landscape. One existing drug, deferiprone, 'mops up' extra brain iron, which the Florey researchers hope will slow the progression of Alzheimer's symptoms. As researchers pursue early drug interventions, it is clear that we should all be aiming to maintain physical, social and brain health to reduce dementia risk. For instance, maintaining social connections, learning new skills that can challenge our brains, and keeping physically fit and active are known to be helpful.

This is the 'holy grail' of Alzheimer's research – identifying someone so early in the disease process that emerging treatments have enough time to stop brain cells from dying, preserving people's memories and personalities before they are damaged.

One such healthy ager is Peter Nelson, 76. Although he leads a very fit and active life down in Corio, Peter is slightly concerned about what the future might hold. His mum died with Alzheimer's when she was 96.

"I'm always excited when I hear about new research like this, that can maybe help diagnose people earlier by finding new biomarkers. I keep up to date with all the latest science news via the Science Show on the ABC, and in fact I've participated in other trials previously.

During my life I've always tried to keep fit. I still do gym-work, and I've run 113 marathons. When my legs 'retired' I switched to alpine trail running, completing the (infamous) "4 peaks Challenge" when I was almost 60, scaling four of Victoria's highest peaks in four days. I also grow veggies and catch my own fish, I suppose you'd describe me as a bit of an old hippy!

"I volunteered for the AIBL trial because of my mum's experience with Alzheimer's. I'm not really very much of a people-person, but if the team can identify new Alzheimer's markers I'd feel really good about helping other people. And if these new drug therapies can slow the progress of the disease, even better."

Registration for the 3D iron-reduction trial will open in the coming months, so keep your eyes on the website at florey.edu.au

Neale Daniher's big hope

Footy legend, Neale Daniher and his daughter, Bec.

> **"Until now, the research has been slow and the process of identifying drugs for clinical trials has taken a long time," says Neale. "When you're diagnosed with MND, time is a precious commodity."**

Patients living with motor neurone disease will witness a dramatic escalation in the search for better treatments, thanks to a major injection of funds to the Florey's MND team, led by Dr Brad Turner.

Footy legend Neale Daniher and his team from the Cure for MND Foundation visited the Florey recently to deliver new funding of $3.35 million – much of the money donated during their annual 'Big Freeze at the G', and other herculean fundraising efforts.

Victorian Minister for Health, Jill Hennessy, also popped in to celebrate a $3 million grant to help fast-track drug tests on human motor neurone cells.

As well, the Balcon Group Pty. Ltd. also generously contributed $500,000 to MND research at the Florey.

The new funding will speed up drug tests 160-fold using a state-of-the-art automated platform that quickly screens approved pharmaceuticals. A process that previously took months now offers hope to those with the disease who often only live 27 months from diagnosis.

"Until now, the research has been slow and the process of identifying drugs for clinical trials has taken a long time," says Neale. "When you're diagnosed with MND, time is a precious commodity," he says.

Existing drugs and compounds, many of which are used to treat other diseases, will be tested on Australian MND sufferers' motor neurone cells, grown in the Florey laboratory from stem cells extracted from small samples of their skin.

Neale and two other sufferers, foundation founder Dr Ian Davis and Cath Baker, will be the first to donate their skin samples as part of the fast-track project.

Cath, pictured on the cover with Neale, was the carer for Angie Cunningham who died from MND last year after spending a huge amount of time and energy raising awareness of the disease. Her husband, Pat Cunningham, has been a huge supporter of the Florey and the Cure for MND campaign.

Chief researcher, Dr Brad Turner, says the live motor neurone cells from MND patients will be exposed to 1000 drugs a week using fast-paced robotic screening. Until now, only six drugs a week could be tested.

"If we find a hit with any of these drugs, and they are already approved for use in humans with other diseases, we will be able to take them straight to the patient who is often desperate for a treatment."

According to Dr Ian Davis: "We'll be able to take it from the lab, straight to a phase-two clinical trial. For us, time is life".

Dr Bradley Turner with Graham and Carolyn, who recently attended the Florey and MNDVic's "Meet the Experts" information day.

Dr Bradley Turner has been selected to join the Research Committee of Motor Neurone Disease Research Institute of Australia, part of MND Australia.

It supports the best MND research with the greatest chance of developing effective treatments.

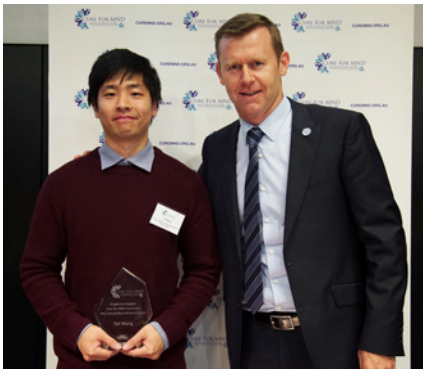
The committee reviews grant applications and determines the distribution of funds within the set policies, and according to the criteria for scientific assessment.

Brad heads the Florey's MND research team investigating the molecular basis of selective neuronal vulnerability in MND. They use biochemical and molecular approaches to study MND pathogenesis in patient-derived specimens and models, as well as transgenic and gene knockout animal models, with a strong focus on preclinical trials. Brad's research interests also extend to childhood spinal muscular atrophy and Kennedy's disease which are related to MND.

It is said that the qualities of a good PhD student are perseverance, tenacity, courage, and the ability to communicate.

The Angie Cunningham Cure for MND PhD scholarship honors the life and qualities of a woman who was the embodiment of all of these traits and more.

As a brilliant young tennis player, Angie reached the Wimbledon and Australian Open girls' doubles finals. As a wife and mother of two young girls, Angie lived life to the full after her MND diagnosis. The Florey's Ted Wang is the inaugural winner of the award which provides $350,000 over three years. Ted's project will focus on therapeutic targeting of a cell death pathway in MND called "necroptosis" using patient-derived cells and animal models, with a view to slow disease progression. Ted received the award from Angie's widower, Pat Cunningham.



Pat Cunningham (right) congratulates scholarship winner, Ted Wang.

Fast facts on MND

0
Number of drugs to cure or slow MND sufferers' deterioration

2
people at least are diagnosed daily in Australia with MND

2
people at least die daily in Australia from MND

50%
of people with MND die within the first 30 months of diagnosis

1 in 211
deaths in Australia in 2015 were caused by MND

And the good news...

$6.35 MILLION
for the Florey's research team to fast-track drug treatments for MND

1000
number of drugs to be tested every week

400
Victorian MND patients will have the chance to donate their stem cells for our research

Live. Learn. Enjoy. Come to a Florey lecture

"The Florey welcomes anyone and everyone to our lectures to hear more about the exciting research outlook on many different topics – covering brain health for the young and old."

Ask any Florey researcher how we can help our brains to age well, and the answer is likely to be: "Live. Learn. Enjoy." This also happens to be the catch-cry of the University of the Third Age network.

That's exactly why members of Melbourne City U3A – and hundreds of other Melburnians – fill the seats at our daytime and evening lectures. These talks feature our most talented scientists who speak on discoveries and advances in brain research.

Members of U3A and other motivated individuals are putting into action some of the key messages for healthy ageing. Our researchers have shown that engaging in activities that make you think and learn new things - like attending lectures, learning a new language or playing chess - will exercise your brain. An important side effect of learning in a group environment is that you stay socially active. Friends, conversation and a few laughs are good medicine!

The Florey welcomes anyone and everyone to our lectures to hear more about the exciting research outlook on many different topics – covering brain health for the young and old. Visit Eventbrite online or call us on 1800 063 693 for a brochure.

Our understanding of the human brain has come a long way in the last 30 years but there is a long way to go. You can help. The next time you revise your will, please consider a gift to the Florey. To find out more and to receive a copy of our new gifts-in-wills brochure, please call Irene on 03 8344 1478.

Depression after stroke

Dr Natalia Egorova is looking at the interconnected brain, to see if damage from a stroke induces mood changes, like depression, years later.

Doctor Natalia Egorova is on a quest.

Using brain scans from a group of 175 stroke patients and healthy volunteers, Natalia is trying to determine what happens to the brain's myriad networks after a stroke. Researchers and doctors already have sophisticated imaging techniques to reveal the extent of localised damage after someone has had a stroke. Determining how connected areas of the brain are affected is the focus of this latest research.

"We tend to think of a stroke as an isolated injury somewhere in the brain that disrupts your ability in particular functions," Natalia says. "But we also suspect that people experience general degeneration and cognitive decline associated with the stroke."

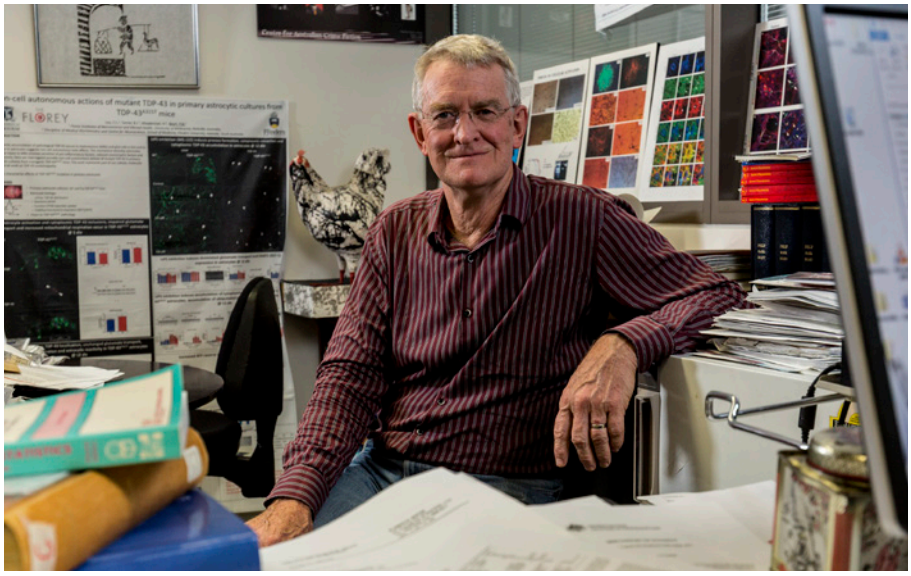
Natalia's ambitious longitudinal research project is part of Associate Professor Amy Brodtmann's larger stroke and dementia program. They are scanning the brains of stroke patients at three months, then one, three and five years after a stroke. So far the data is in for the three month and one year time-points.

"We've already observed depression in about 30 per cent of our stroke patients," she says. "The depression we are talking about is mild, but our data already shows us differences in the brain networks between stroke patients who are mildly depressed and those who are not," she says.

Natalia's major research question is to determine whether depression is caused by the physical brain damage after a stroke, or through general decline of brain networks.

"While the motor cortex is directly related to motor function for example, higher cognitive tasks such as long term memory, attention or decision-making are spread around the brain," she says.

Driven by curiosity



Phil believes a cluttered desk is a sign of a busy and healthy mind.

Professor Phil Beart wants to age well, if not always gracefully. (A dodgy back from playing too much basketball sometimes sees Phil laid up for a spell.) To that end, Phil is investigating how we might protect our brain cells from toxic molecules in a most unexpected way.

This superfit 69 year old is a passionate advocate of healthy diets and regular exercise. This partially explains his newfound interest in so-called 'super foods'. Could they really be good for the brain? Phil is delving into his background as a chemist to try and isolate the molecules that might have a positive impact on neurones.

The term "nutraceutical" was invented in 1989, to categorise foods that are healthy, but Phil has gone further, personally coining the term "neuro-nutraceutical" to define the naturally-occurring molecules that could arrest or reverse major brain disorders ranging from autism to Parkinson's disease.

Phil established in 2005 that naturally occurring antioxidants found in soy beans, red wine and tea could prevent brain cells from dying in cellular models of Parkinson's disease. Anti-oxidants, as the name suggests, "mop up" the toxic free radicals produced as natural by-products of cellular processes. As we age, these free radicals are produced in greater amounts, and are cleared away less efficiently.

"Funnily enough, I haven't really worked in this area before now, but this paper has been cited more than 200 times," he says.

In another of his many projects, Phil is enthusiastic about the power of the molecule called resveratrol found in the skin of red grapes. It appears to enhance the function of ageing brains and muscle. The problem, however, is that Phil estimates we would need to drink 300 glasses of red wine to see any benefit. Luckily, reseveratrol is now found in concentrated pill form.

His colleagues cannot see any sign of Phil slowing down. He's involved in several grant submissions heading into the new financial year; he mentors several younger Florey scientists and is the International Society of Neurochemistry's historian. This leads Phil to point out another healthy ageing tip – staying mentally and socially engaged as much as possible.

Professor Beart will deliver a public lecture on the benefits of neuro-nutraceuticals on 1 November 2017. For more details, please visit florey.edu.au

"Phil established in 2005 that naturally occurring antioxidants found in soy beans, red wine and tea could prevent brain cells from dying in cellular models of Parkinson's disease."

Phil's tips for Healthy Brain Ageing

Take:
the "red wine" ingredient, resveratrol, every day

Eat:
walnuts, sunflower seeds and pumpkin seeds as part of a healthy breakfast

Play:
vigorous weight bearing activities like basketball and surfing

Strengthen:
Your core with suitable workouts like modified yoga practice

Engage:
both mentally and socially with the world around you

Florey supporters who use the NAB Rewards credit card program can now contribute to positive change when making everyday purchases. Points earned when spending on the card can be converted into donations to the Florey, one of a hundred charities being supported. Through NAB's partnership with Good2Give, customers can choose to donate to the Florey or use their points as they always had, for goods and services.

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- Call our free call credit card donation line on 1800 063 693
- Fax your donation to us on (03) 9035 3107
- Online at www.florey.edu.au
- Send your donation to the Florey Institute of Neuroscience & Mental Health, Reply Paid 83037, 30 Royal Parade, Parkville, VIC 3052

Thank you for your valuable support. All donations are tax deductible.

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News & Events

The Florey walks for Alzheimer's

Jeanette and Madison Greenough walked to commemorate the loss of their beloved 'Nanny', Patricia.

The Florey recently walked in memory of loved ones lost to Alzheimer's disease, and to help the Alzheimer's Australia Memory Walk raise over $50,000. Congratulations to all those who participated, especially PhD student Leah Beauchamp. Leah was the highest individual fundraiser, commemorating the recent loss of both grandparents to dementia.

Come along to a free public lecture

Where: Ian Potter auditorium, The Florey, Kenneth Myer Building, 30 Royal Parade, Parkville (opposite the Royal Melbourne Hospital).

Parking: Reasonably priced parking (including disabled) is under the building with easy access to the auditorium.

Transport: Tram 19, Stop 11 heading away from the city, right outside our building. Look for the Dr Dax café sign and you'll know you're there.

Bookings: These public lectures are free. Bookings can be made by visiting www.florey.edu.au/events or by calling 1800 063 693.

Implantable brain devices with Professor Clive May

This presentation will illustrate the Florey's role in developing devices to help people move paralysed limbs and control problematic gut conditions.

Date: Wednesday, 21 June
Time: 6.30pm

Autism research & the human experience

Dr Emma Burrows will be accompanied by guest parent, Carmen Lahiff-Jenkins whose son has autism, for an exploration of the novel technologies being used to assess behavioural changes in models of Autism Spectrum Disorder, Attention Deficit Hyperactivity Disorder and Dementia with a focus on translation to the clinic.

Date: Wednesday, 12 July
Time: 6.30pm

Major depression and bipolar disorder

In this presentation Professor Michael Berk asks the question - can supplements change the way we think about mental health treatments such as major depression and bipolar disorder?

Date: Wednesday, 26 July
Time: 6.30pm

Addiction and its link to obesity

Back by popular demand, Dr Robyn Brown will again take a fascinating and informative look at addiction and its link to obesity.

Date: Tuesday, 8 August
Time: 6.30pm

Thank You

The Florey thanks our recent donors who kindly donated $100 or more between February 2017 and May 2017*

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*Correct at time of publication.

For more information contact the editor,
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FInd us on Facebook and Twitter at our website: florey.edu.au

The Florey Institute of Neuroscience and Mental Health conducts its research on the lands of the Wurundjeri people of the Kulin Nation. We pay our respects to the traditional owners of this country, their ancestors, their children and the lore of the creator spirit Bunjil.