

Brain Matters

News from the Florey Institute of Neuroscience & Mental Health



THE WELLNESS EDITION

Meet three 'healthy agers' and learn how to keep your brain in top top condition.

PAGE 4

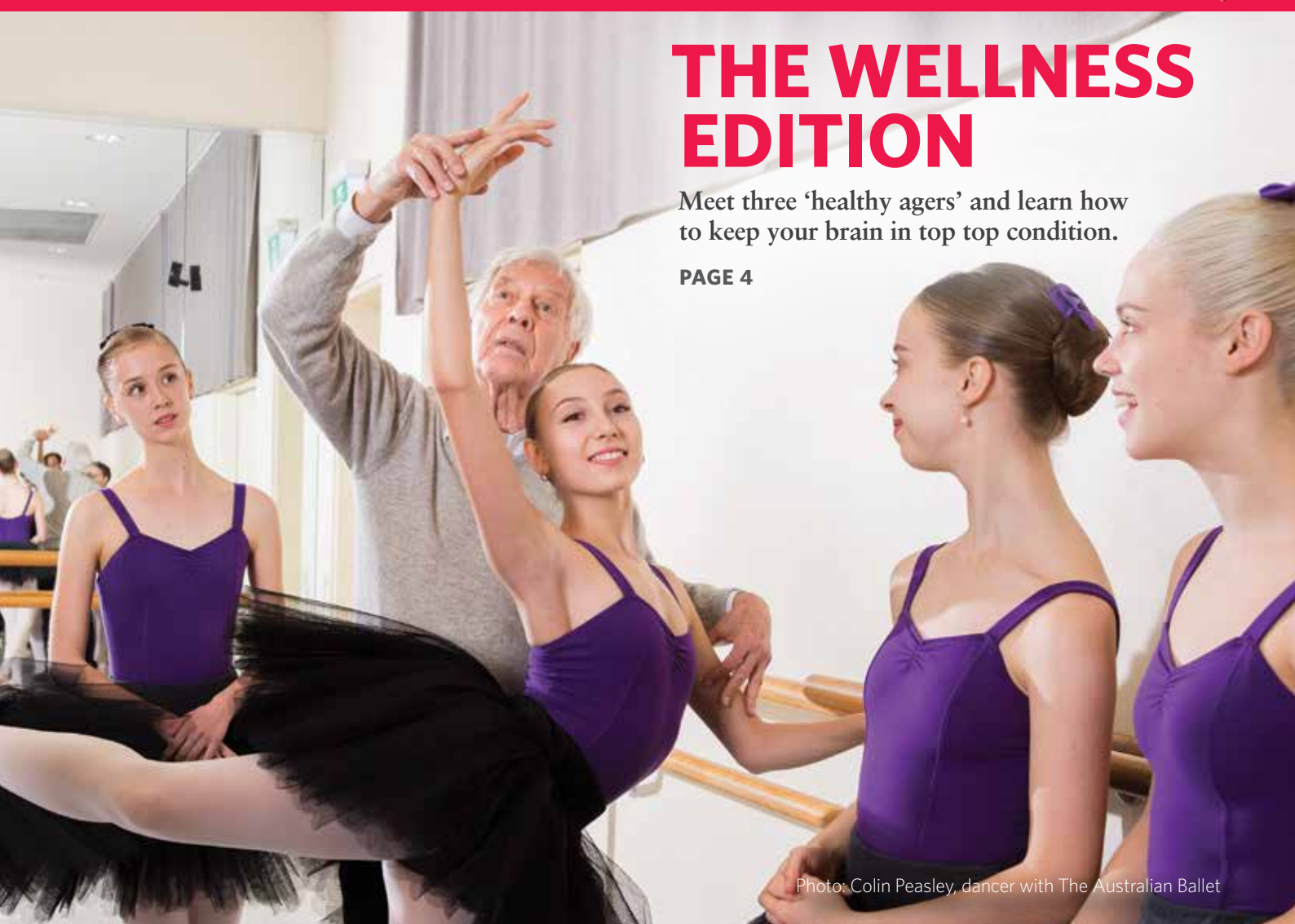


Photo: Colin Peasley, dancer with The Australian Ballet

Director's Report



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

Welcome to the Winter edition of our very warm and hearty Brain Matters.

This edition is dedicated to living well. As you will read, our scientists are regularly revealing new ways to live long and to live well.

Of course, most of our workforce is dedicated to finding cures and ways to prevent very serious neurological diseases like Alzheimer's, Parkinson's and Huntington's. There is very little we can do to avoid these disorders and so our energies, as researchers, must focus on discovering why the brain fails us in these most devastating ways. There are 97,000 Victorians living with Alzheimer's – and it is certainly no one's fault. It's simply terribly unlucky. There is a build-up of proteins and metals in the brain that shouldn't be there. Biology has taken a fork in the road. Our job is to find out why – and to stop it from happening.

There is emerging evidence, however, that those of us who age normally can take action to delay or prevent typical problems associated with the passing years.

This edition of our magazine takes an in-depth look at some remarkable older Australians who defy the stereotype. The Florey is a key player in a major national study of older people that has been monitoring the ageing process for 10 years. As our wonderful 1112 volunteers age, they are tested every 18 months. Some develop neurological problems and some stay well. We want to identify those with problems as early as possible so we can intervene and stop disease from progressing. Amongst this group of 1112 people is a small group who defy all expectations. In fact, they are simply ageing well as they enter their eighties and nineties. They offer us a reminder that old age does not necessarily mean dementia. These older Australians are still vital, mentally sharp and active.

I'd recommend you visit pages 4 and 5 to be inspired.

In the meantime, I am off for a run or, as my daughter describes my style, I'm off for a shuffle around the park.

Warm regards,

Geoffrey Donnan

A message from our chairman



Mr Harold Mitchell AC
Chairman, the Florey Institute of Neuroscience & Mental Health

As Chairman of Australia's most dynamic team of brain researchers, I am very pleased to announce that we have two new members joining the Board of the Florey Institute of Neuroscience and Mental Health.



Lyndsey Cattermole AM was the founder and managing director of Aspect Computing, the largest Australian software and services organisation. She also spent many years at the Royal Children's Hospital, where she became Vice President and then inaugural Chairman for the Women's and Children's Health Care Network. Ms Cattermole was also instrumental in forming the Murdoch Children's Research Institute, one of Australia's largest biomedical research institutes.

Ms Cattermole has been at the forefront of the IT Industry, including the Australian Computer Society, the Prime Minister's Science and Engineering Council, the Federal Government Electronic, Electrical and Information Industry Board, the Multimedia Advisory Committee, State Development Committee and The Premier's Business Round Table. She is currently a Board Member of Treasury Wine Estates, Tatts Group, PACT Group, the Melbourne Theatre Company, Melbourne Rebels Rugby Union and immediate past Chairman of MLC.

Mr Ross Oakley AM is well known to many Victorians who, as the Chairman and CEO of the troubled Victorian Football League back in 1986, transformed the game to become an Australian competition. In 2009, Mr Oakley was inducted into the AFL Hall of Fame. His career includes management of insurance companies, including AAMI, and as CEO of Royal Insurance. He was the CEO of the Melbourne Rebels in 2010 during a time of tumultuous change. Mr Oakley holds an MBA from the Melbourne Business School and is a former Adjunct Professor at Deakin University's Faculty Business and Law where he also lectured.



Mr Oakley is the Chairman of the Florey's Foundation Council, overseeing fundraising with a dedicated group of high-powered volunteers from the business sector.

I'd like to personally thank Lyndsey and Ross for joining our dedicated Board of Directors. The Florey is at an exciting time of growth and we look forward to their wise counsel as we continue to expand.

Ageing with Excellence



Barry Dimelow, a star of the AIBL study, with his wife Margaret.

Faster than a speeding zimmer frame. More powerful than a cup of strong tea. Able to leap a tall gutter in a single bound. Yes, they walk among us: a group of 80 or even 90 year olds who are living large and enjoying their lives, blowing apart any fears we might have of what it means to age.

How do you think of the future, peering to a time where you're in, say, your eighties? Do you worry about being in a nursing home, your mind fading, your legs gone, your breathing raspy? Then you need to spend some time with healthy agers.

Florey Institute clinical neuropsychologist Dr Jo Robertson admits that she feared old age, right up until she found herself co-ordinating a study into ageing six years ago, and unexpectedly discovered the 'super normals': so named because they have remained healthy, fit, mentally alert and active, continuing to live, well, normally, despite their age.

Jo is a co-ordinator on the ambitious AIBL study (the Australian Imaging Biomarker and Lifestyle flagship study of ageing). Originally funded by the CSIRO, the study began more than a decade ago, testing and tracking a group of more than 1000 people, already over 65 years old then, to see if and when they developed Alzheimer's disease, or dementia,

and to then be able to look back at their records to search for common factors that might have a connection to the disease.

Jo remembers thinking this would be a depressing task, charting the descent of her subjects into inevitable dementia and other 'old people ailments'.

Which is why she laughs, six years later, at the relief with which she now lives her life, knowing that old age should actually be healthy and rewarding after all. "The people left (in the study) are the ones who are not unwell," Jo explains. "They're super healthy. It's exciting and promising that normal ageing doesn't have to mean you lose the propensity to do everything that you love to do in your life.

"We attribute a whole lot of things to 'getting older' but it doesn't necessarily mean that you have to slow down. These people are kicking goals at life."

The study's original group of 1112 subjects is now down to about 500, of varying degrees of wellness, but with each year Jo has been more astonished by the outlying super-healthy subjects. 'They were 65-plus when we started, 10 years ago, so they weren't young then. But they continue to live beautifully! They have a wide range of engagement, they are active in the



We attribute a whole lot of things to 'getting older' but it doesn't necessarily mean that you have to slow down. These people are kicking goals at life."

community, they help people less fortunate. Rather than 'winding down', they keep going,' she said.

But how? Jo's simple explanation is that Alzheimer's and many other conditions we associate with old age are exactly that: illnesses. If you're lucky enough not to have them, then life can roll along, uninterrupted.

She warns that there's no magic formula but the Florey can say that there are several modifiable factors that give ageing people a better chance of avoiding dementia and other conditions.

Most of them are the basics. The 'healthy agers' don't drink much, and don't smoke. They eat well, watching their diet and eating lots of fruit and vegetables. They exercise so that they have healthy hearts and they are socially active, remaining engaged in their community. Flexing the muscles of the brain and remaining active in life would appear to be as important as keeping the heart and other muscles moving.

Jo says, "In the AIBL database we have charted over 900 pieces of variable information," such as whether coming into the study with a certain level of education and IQ affects where people begin in the study's tests. "It's only a fraction of the data you could potentially collect because humans are the most complex system we know of. We don't yet fully understand how the variables integrate with each other but we know they exist.

"I thought this job would be horrendous and depressing when I started, but it's been fantastic. I no longer dread retirement. I think we make a lot of excuses for older people. We attribute a lot to ageing when we shouldn't.

"People who lose the capacity to do the things important to them have something going wrong with them. That's encouraging for everybody who doesn't. And there are things we can do to give ourselves the best chance."

"If someone thinks they have a problem, they need to try and seek some help."

[SEE PAGE 4 & 5 FOR CASE STUDIES](#)

Active lifestyle, healthy brains

Two recent large scale, long term studies indicate that physical exercise is a key factor in keeping your brain healthy.

The first study looked at 876 people in the Cardiovascular Health Study (CHS) in the U.S., who were an average age of 78 years old. People who performed physical activities including swimming, aerobics, jogging, tennis, walking, gardening, mowing, raking, golfing, cycling, and dancing had larger volumes of brain cell tissue in key regions of the brain involved in cognition. This study also showed that high levels of physical activity reduced the amount of brain loss in a subset of people in the study who had Alzheimer's.

The second group examined people in the Cardiovascular Risk Factors, Aging and Dementia (CAIDE) study in Finland. Over 1500 people with an average age of 50 were asked how often they did 20-30 minutes of vigorous physical activity. Those who had high activity levels had a lower dementia risk in their late 70s than those who did moderate or low amounts.

Importantly, those who had low or moderate levels of activity at the start of the study in midlife, but increased them over the next 28 years also reduced their dementia risk, showing that it's not too late to start. [Read more](#)

Case studies

AGEING WITH EXCELLENCE



Colin Peasley, 81

Colin was a dancer at the birth of Australian television in 1956 and then found his way to ballet in his mid-20s. He has been with The Australian Ballet since its inception in 1962, and has danced with all the greats. He admits now that almost everybody he danced with at the start of it all has passed away, yet Colin remains, as a semi-retired dancer who still delights in teaching the rising stars of the company.

"The dancers here, they're 18,19, or 22, 25," he says. "Everybody is really nice. They treat you as being one of them, not as some old person. When I go in and teach, I'm treated as though I'm still a 30-year-old."

Colin says the respectful acceptance of the younger brigade has been essential for his mental and physical health. "It keeps your mind active. You talk and think about things that are important to young people. I'm not with other old people, asking 'when are you going back to the doctor, how's this or that ailment, or was the spoon cold?'"

Colin and his fellow dancers laugh a lot and, as professional performers, eat very well, although Colin admits he loves the occasional wine with his meals. His spine is reportedly past the days where he could dance fluently, yet he refuses to leave the ballet world. "Everybody accepts I'm officially retired except for me," he admits. "I adore teaching and I adore being part of this, just being here."

As for what the rest of 2016 holds? Judge a dance competition in Kuala Lumpur, tour London in a guest on-stage role with the Australian Ballet Company and then take a river cruise from Moscow to St Petersburg. As you do, rising 82.

“Do you want to know the secret? Mix with young people.” That’s 81-year-old ballet dancer Colin Peasley’s simple elixir to living very well, deep into old age.



Barry Dimelow, 87

Happily married to Margaret, who also looks extremely well, Barry is a star of the AIBL study, performing better than 95 per cent of people his age in several of the testing areas. In his everyday life, Barry shines. He walks the dog twice a day, line-dances for an hour here or there, is involved in community activities and maintains a large, thriving vegie patch where his turnips and capsicums are everything you would expect from a man who used to be deputy principal of the Burnley Horticultural College.

Some of his vigour, despite his age, he can put down to the teachings of his mother, a strong believer in a mixed diet featuring fresh fruit and vegetables. But other lifelong blessings came through unexpected scare campaigns.

The Coles Book Arcade illustrated picture book was a staple of Victorian homes for decades and Barry still remembers the double page spread which featured allegedly identical twins. One was strapping, handsome and strong. The other, spindly and scrawny, was deemed to be a smoker, long before anybody had really twigged to the health dangers of smoking. The striking images were enough to put young Barry Dimelow off cigarettes for life. Likewise, a school campaign by the Temperance Society, which showed a worm dying an agonising, horrific death in alcohol, was enough to ensure little Barry would never become anything more than a moderate drinker.

So that's part of it, but by no means all. Pressed for the underlying reason for his health and contentment, Barry says one word: 'Hope'. A fervent Christian, Barry believes it is his certainty that there is a life beyond this one and that, therefore, old age and death are not to be feared as 'The End', prevents an anxiety he sees in others.

He also admits to feeling relief, at this stage of his life, that he no longer has to try and 'make it'. He can read, enjoy his leisure, go about his life without worrying about climbing the corporate ladder or impressing anybody. That, plus two married daughters, six grand children, his wife and his spiritual belief power Barry along and look like they might for a while yet.

“I’ve obviously inherited a good genetic deal,” Barry Dimelow smiles. He’s reflecting on his remarkable health and mental alertness at the age of 87.



Mollie Heywood, 86

Mollie might be in the basement of the local library, sorting books, for charity book sales or distribution to other libraries. Or, she might be attending one of the two social justice groups she belongs to, or having dinner and listening to a speaker at the Olive Club, or working as a volunteer at Centre 81, a drop-in house for the less fortunate. That's assuming she isn't busy helping out at the church's new opportunity shop, or writing a stern letter to a politician. Or she might be out for lunch with her old workmates from Winlaton youth training centre, where she worked for decades. Or having lunch with her old buddies from 25 years as a volunteer helper at the Melbourne Zoo.

And all of this is assuming Mollie Heywood, 87 years young in July, isn't at the gym, where she works out three times a week.

You're probably feeling tired just reading this.

Mollie attributes her energy, mental alertness and general health to some basic formulas. 'I think my diet has always been pretty good,' she said. Originally a farm girl from New Zealand, Mollie grew up eating fresh fruit and vegetables and has never stopped. She's never smoked, drinks in moderation and has now been a gym regular for more than 40 years.

"What's that saying...?" she asks. "...use it or lose it."

Mollie is realistic about her health. She can feel herself slowing down, at least by her standards, occasionally struggles to remember things, and has days where she just feels, well, old.

But mostly she has no trouble maintaining the large garden at her house, or catching up with friends or family, or heading out to her many social and volunteer activities. She spent last Christmas in Bali and is planning further travel. Life is there to be lived. [Read more](#)

The joke among Mollie Heywood's family is that it's almost impossible to find her at home. And given she's not overly diligent about checking her mobile phone, it can be tricky to actually get in touch.

Fighting fatigue after stroke



Dr Toby Cumming.

Most people are by now familiar with the most common debilitating after-effects of a stroke. Speech difficulties and perhaps a paralysed limb or even one side of your body can make daily activities a huge challenge. But there's another after-effect that few people are aware of until they or a loved one suffers a stroke - extreme fatigue.

Fatigue is experienced by around 50% of stroke survivors, according to a recent analysis of over 20 journal articles in the field conducted by Dr Toby Cumming. Toby is a neuropsychologist with the Florey's

stroke rehabilitation team who studies the less well-known complications of stroke such as depression and fatigue.

Toby's research aims to discover if physical activity can overcome this fatigue.

"Not only is fatigue after stroke common, it tends to persist even after other stroke symptoms have resolved," Toby says. "The numbers fluctuate according to which study you look at, but overall it seems that about half of all stroke survivors suffer this debilitating fatigue.

"People typically report feelings of lethargy and of an overwhelming need to rest, even

Toby hopes to identify an exercise intervention that allows stroke survivors to return to normal daily living.

if they have not been exerting themselves. Obviously this is extremely frustrating for stroke survivors and their families. Unlike the more visible stroke symptoms, fatigue is largely 'hidden', but the impacts on everyday activities and returning to work are very real."

Beyond measuring this fatigue using the 'Fatigue Assessment Scale', Toby and the stroke rehabilitation team are testing various interventions to try to alleviate it.

Given what we know about the beneficial effects of exercise for the brain (see page 4), Toby is running a randomised clinical trial investigating if physical activity can alleviate post-stroke fatigue. All participants are given a mobile phone pre-installed with the 'Starfish' app, which uses the phone's in-built accelerometer to measure physical activity levels. The phone automatically sends the data back to the research team, allowing continuous monitoring of activity levels.

The project is a collaboration with Dr Lorna Paul, a researcher from the University of Glasgow who developed the 'Starfish' app. Another Glasgow researcher, computer scientist Andrew Ramsay, is refining the app based on Toby's participants' feedback.

Another beneficial partnership with "Better Life Mobile", headed by Russel Barnes, allowed this novel trial to proceed. When Russel heard that Toby needed smart-phones to give to participants, he generously provided them at cost price.

So far 12 stroke survivors have been recruited from the Austin hospital stroke unit. Toby hopes to recruit another 44 before the end of the year, allowing him to publish his findings early next year.

"At present, we do not have evidence-based strategies for managing post-stroke fatigue. I hope to identify an exercise intervention that allows stroke survivors to overcome their debilitating fatigue, and return to normal activities of daily living," Toby says.

"It turns out that people with multiple sclerosis also report much higher levels of fatigue than the general population, so this might become a part of the treatment regime for MS too." 📌



Bridging the divide between nature and nurture

We know that stress or trauma inflicted by dramatic events can affect subsequent generations in various ways.

Grandchildren of adults affected by the Dutch famine in 1944 were significantly underweight, and babies whose mothers were traumatised by the September 11 terrorist attacks while pregnant were more stressed than usual as infants.

But how can this be? Can our experiences directly impact the DNA of our offspring?

Professor Anthony Hannan's Neural Plasticity laboratory focuses on understanding gene-environment interactions. His team has been investigating transgenerational epigenetics - how major environmental factors and the impact of a range of experiences on a parent may be transmitted down through the generations. For Anthony and his colleague Dr Terence Pang, who heads the group's epigenetics research, the question is not 'nature versus nurture' but the bridge between them.

Epigenetics, which means "above or over" the genome, is the mechanism by which a gene is marked in such a way that leads to long-term changes in how that gene is expressed.

"It's like an encyclopaedia in which each gene is a word, made up of letters of DNA, that can be highlighted, italicised, underlined or marked in bold by epigenetic modifications," Anthony says.

Photo: Florey stroke researcher Dr Liam Johnson (R front), with his father Colin (L front) and new-born son Xavier. Ms Katie Fennell, Dr Terence Pang, and Dr Annabel Short (L-R rear) have identified factors above the genome that could transfer environmental influences from grandfather to grandson.

"One of the revolutions that Terence has been spearheading is the newly discovered fact that exposures to environmental factors can affect the epigenetics in sperm and lead to changes in the offspring," Anthony says.

"Focusing on environmental exposures of fathers, and epigenetic effects on their offspring, is a very new area," he says.

The team has just published new work by Dr Annabel Short and Katie Fennell, guided by Anthony and Terence, showing that raising stress hormone levels in male mice leads to changes in behaviour of the next two generations of offspring. These changes suggest a predisposition to anxiety and depression disorders.

"We have evidence that this occurs through a type of epigenetic mechanism in sperm called 'microRNAs' that are known to influence embryonic development, brain function and behaviour.

The team discovered that stress significantly changed the levels of several microRNAs in sperm, and this was associated with altered expression patterns in two key genes involved in anxiety and depression behaviours, namely Igf2 and Bdnf. This finding provides tantalizing support for one way by which a father's stress can indirectly influence the behavior of his offspring.

Terence says that we are entering a renaissance of genetics. "Epigenetics has enabled us to discover new aspects of inheritance that until recently only existed in speculation or theory. I hope that our work will lead to improved health outcomes for future generations."

At the moment, health advice around conception mainly focuses on healthy lifestyle and diet in women. This new work emphasises the need to also optimise the father's environment in order to positively influence his child's health outcomes. There could be major socioeconomic implications from the team's findings, which seek to minimise the risk of future generations developing anxiety, depression and other stress-related mental health disorders.

Dr Liam Johnson, who researches how exercise aids stroke rehabilitation at the Florey, is a first time dad to baby Xavier. For Liam's father, Colin, Xavier is the 10th grandchild. Liam says, "I'm so lucky to have a dad who has loved and supported his kids and grandkids. I only hope I can be as good a parent, and perhaps grandparent, as my dad has been, to give Xavier the best start for a healthy and happy life. Terence and his team's research really opened my eyes to how important it is to make sure that the whole family is supported." 📌

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News & Events

MELBOURNE BRAIN SYMPOSIUM

Melbourne Brain Symposium, including the Inaugural Mendelsohn Student Lecture, award presented by Prof Frederick Mendelsohn

Date: Thursday 13 October 2016

FREE PUBLIC LECTURES

Time: 6.30pm-7.30pm

Where: The Florey, Kenneth Myer Building, 30 Royal Pde, Parkville (opposite Royal Melbourne Hospital)

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

Public transport: Tram 19, stop 11 heading away from the city.

Queries: 1800 063 693.
Email info@florey.edu.au

Register: www.florey.edu.au

Lectures are recorded and available on our website within a few days of each event.

Alzheimer's disease

The latest research and a search for a cure

Speaker: Professor Paul Maruff

Date: Wednesday July 6

What causes Parkinson's disease?

We discuss brain changes and possible symptoms

Speaker: Professor Malcolm Horne

Date: Wednesday August 3

Major depression

An update on the latest research with a world leader in the field

Speaker: Professor Patrick McGorry AO

Date: Wednesday September 7

Recovery after stroke

Latest research from the Florey

Speaker: Professor Julie Bernhardt

Date: Wednesday October 5

Parkinson's disease

Through the researcher's lens

Speaker: Professor Malcolm Horne

Date: Wednesday October 26

Improve your brain health

Hear how you can keep your brain healthy and in peak condition

Speaker: Professor Anthony Hannan and an expert panel

Date: Wednesday November 9

Thank You

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*Correct at time of publication.