

News from the Florey Institute of
Neuroscience and Mental Health

BRAIN MATTERS



RESEARCH UNLOCKS HEALTHY BRAIN AGING



Director's Report

How will we reflect on 2020 in years to come? The challenge presented by COVID-19 to the world, our community, ourselves and the Florey has been profound.

For myself, when I think about 2020 I see positives despite the very real difficulties. It will likely come as no surprise to you that the Florey has been negatively impacted by COVID-19; financially with donations being affected, our productivity as more than 75% of our staff remain working from home, and unfortunately we expect the impacts on the careers of our younger researchers particularly those who conduct clinical studies to continue for some time.

And yet, the positives are real. We have been exceptionally fortunate to be categorised as a 'permitted workplace' allowing our essential laboratory based research to continue. Our researchers, students and support staff have remained connected and committed to our important mission to solve the greatest brain and mind challenges of our time. We are also grateful for the continued support of our community, including our supporters like yourself.

Importantly, this year researchers at the Florey have turned their attention to how their expertise can contribute to the health challenges of COVID-19. Dr Yugeesh Lankadeva, an early career researcher in our pre-clinical critical care research unit, explained recently, "We feel an obligation to help wherever we can."

As well as having multiple research projects into COVID-19 underway, I can report that we recently held an internal think tank where our scientists shared their vision of new research avenues to explore. These included approaches to understand the possible neurological impacts of COVID-19, trialling drug discovery approaches that we've successfully used in other illnesses, and using our scientific expertise in understanding the impacts of the virus on multiple organs in the body.

We have big news in this space coming – but unfortunately it narrowly missed the deadline for this issue of Brain Matters. I hope by the time this issue is in your hands you'll have seen this important Florey research reported in the media or on our website and social media pages. If not, please reach out to a member of our fundraising team who'll be very pleased to discuss it with you. Thank you for your ongoing support of the Florey.

Steve

Professor Steven Petrou PhD FAHMS

Director, Florey Institute of Neuroscience and Mental Health

In & About



With schools and kinder closed, Aga Falkner from our HR team working and schooling from home with her children. May '20.



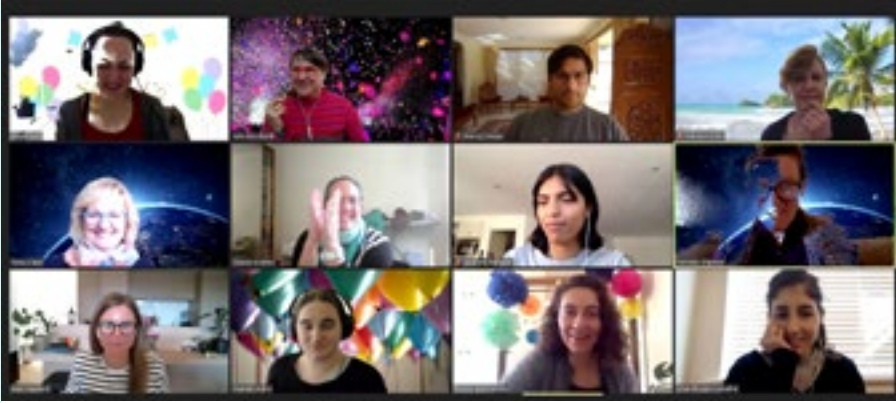
The Florey's animal care team enjoying having lunch together with their tables appropriately distanced. June '20.



A thank you from our researchers to all the wonderful donors who gave to the Florey's Winter Appeal. July '20.



Helen Carter finds social distancing easy at our Heidelberg campus with most colleagues working from home. March '20.



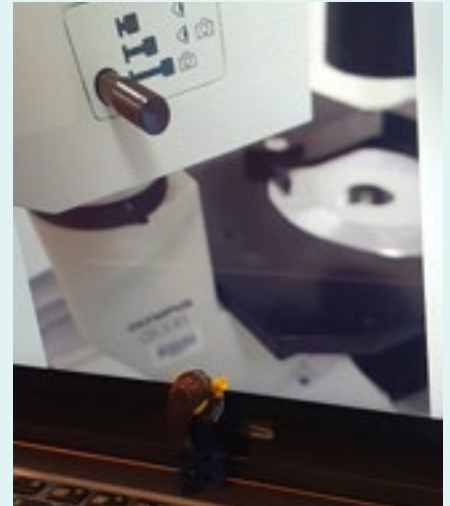
Ruby Lipson-Smith's team holding a virtual celebration as she submits her PhD thesis. May '20.



Senior Research Assistant Shanshan Li snaps our building entrance in Parkville looking a bit different with hand sanitizer & social distance markers in place. June '20



Dr Lilian Wong captures an Autumn sunset over Parkville saying it reminded her we can always focus on the good in any situation. May '20.



Research Assistant Clare Cuddy takes a humorous approach to missing being in the Florey's labs. May '20.



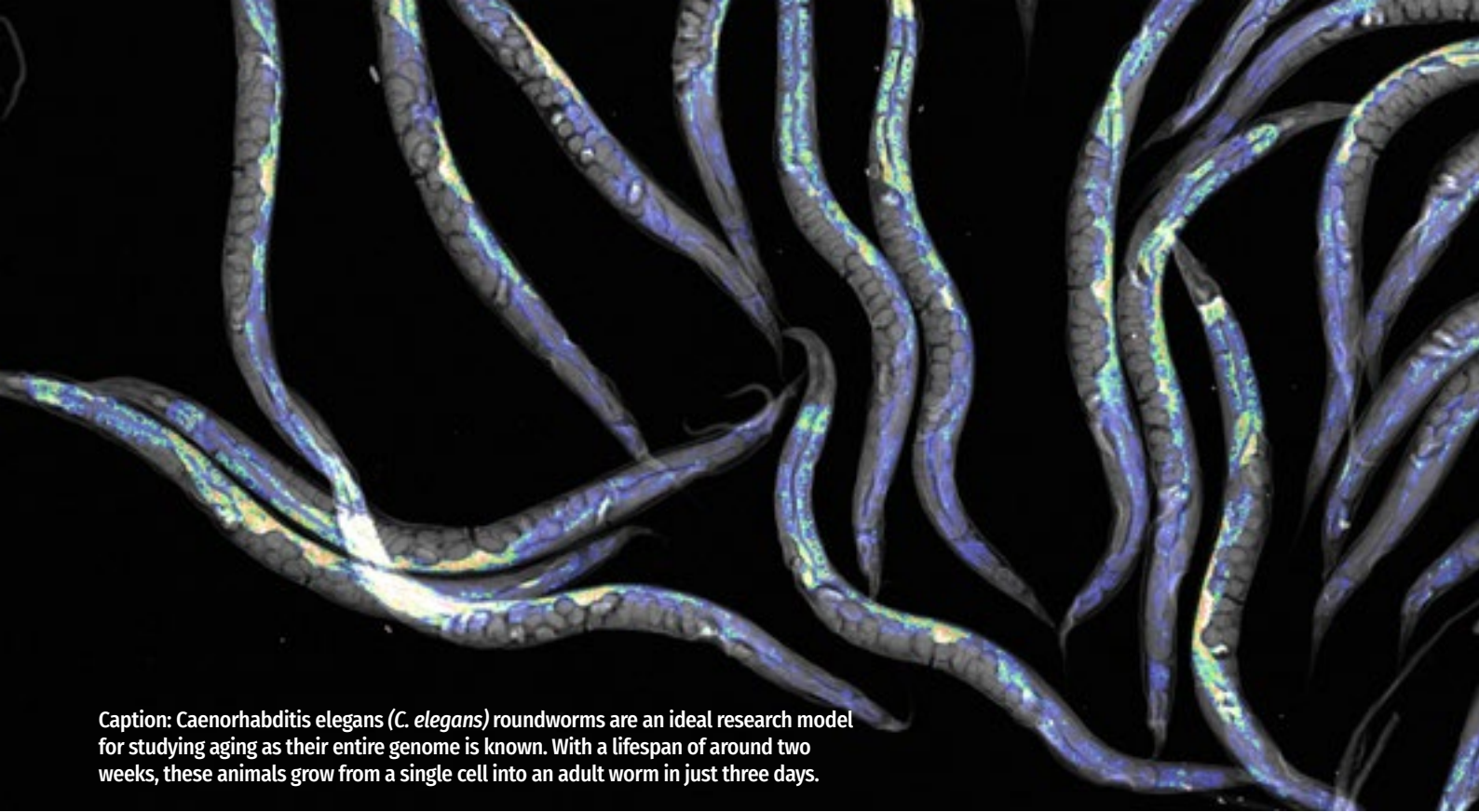
Lead researcher Professor Graeme Jackson interviewed on the ABC 7.30 Report about the inspiring work of the Australian Epilepsy Project. July '20.



Masters Student Chloe Love captures empty lab coat hooks with researchers staggering their time in the lab to maintain social distancing. June '20.



Students of the Florey keeping connected by holding their regular 'Scientific Friday Talks' on zoom. June '20.



Caption: *Caenorhabditis elegans* (*C. elegans*) roundworms are an ideal research model for studying aging as their entire genome is known. With a lifespan of around two weeks, these animals grow from a single cell into an adult worm in just three days.

New research unlocks healthy brain aging approaches

Florey researchers Dr Gawain McColl, Dr Nicole Jenkins and Professor Ashley Bush have uncovered a major role for iron in the aging process.

Studying the classic *C. elegans* model of aging, the team showed that lowering iron levels improved the health of the animals in advanced age, opening new prospects for healthy aging and treatment approaches for neurodegenerative diseases.

Head of the Florey's dementia research theme, Professor Ashley Bush, explained that iron is a vital mineral that plays a crucial role in cell self-defence.

"When cells become infected or cancerous, they can metabolise iron stores and 'self-destruct' through a process known as ferroptosis. However, as cells age, ferroptosis can be triggered unnecessarily and is believed to contribute to age-related diseases such as Alzheimer's disease and stroke", he said.

In one line of investigation the team successfully stopped iron-induced lipid damage using a special antioxidant, and in the other, limited iron accumulation using an iron removal compound.



Dr Nicole Jenkins, Senior Research Officer in the Florey's Molecular Gerontology Lab

"We found that by blocking ferroptosis the animals not only lived longer, they were also fitter for longer. We saw evidence of reduced frailty in the animals and most impressively, we were able to double the length of their typical lifespan," shared Dr Gawain McColl, Head of the Florey's Molecular Gerontology Laboratory.

"Our profound understanding of what happens to cells as they age means we are now able to explore ways to limit cellular damage and decrease the risk of age-related disease. This is an exciting time in medical research," Dr McColl added.

[Read more about this research online and find out how your donations help by visiting our website.](#)

The research, funded by the Australian Research Council, University of Melbourne and The Miller Foundation, was made possible through international collaboration between Melbourne Dementia Research Centre, the Florey, ANSTO Synchrotron and the Institute of Metabolism and Cell Death in Neuherberg, Germany.

"To understand processes as complex as aging and neurodegeneration requires truly multidisciplinary research. I feel fortunate to work alongside world-class scientists at the Florey where such research is possible," said Dr Nicole Jenkins.

The researchers now plan to further investigate ferroptosis-blocking compounds in the hope that early therapeutic intervention may hold benefits in reducing the prevalence of neurodegenerative diseases.

Professor Bush is currently investigating a compound called deferiprone in treating iron overload in a clinical Alzheimer's disease trial, which works in a similar way to the iron-limiting compound in the *C. elegans* model.

Connecting to the Parkinson's Community

From May to August 2020, the Florey opened its virtual doors to the Parkinson's disease community through a bespoke interview series by the Florey and Parkinson's Australia called 'Parkinson's Chat'. The series meets a number of Florey researchers working to better understand, diagnose and treat Parkinson's disease and brings authentic insight into their inspiration to work in Parkinson's and their most up-to-date efforts.



PhD Candidate Leah Beauchamp discusses her latest research looking at loss of smell in Parkinson's disease, highlighting two studies in which she is investigating if loss of smell could be used as a pre-clinical marker of the disease.



Associate Professor Lachlan Thompson discusses recent advances in stem cell-based treatments in Parkinson's disease and progressing the technique to a point where clinical trials may be possible.



Professor Kevin Barnham shares his expertise in developing drug treatments for Parkinson's and other neurodegenerative diseases. He explores new ways forward to improve earlier diagnosis and clinical intervention in Parkinson's disease.



Dr Scott Ayton speaks about the different ways he is investigating potential treatments for Parkinson's disease. This includes translating lab-based findings into clinical trial approaches and also bringing clinical observations back to the lab for investigation.

[Watch all the full episodes on the Florey's YouTube channel. Don't miss A/Prof Thompson taking viewers on a virtual tour of his team's stem cell laboratory.](#)



Jodette Kotz, CEO of Parkinson's Australia, interviewed Florey researchers who are unified in their goal to improve the lives of people living with Parkinson's disease.



Dr Laura Vella shares her work that centers around extracellular vesicle cell 'bubbles' as a tool to investigate the link between gut inflammation and motor impairment in Parkinson's disease among other studies.



Professor Clare Parish discusses her first-of-its-kind research investigating if stem cell and gene therapies together could be used to repair motor function in Parkinson's disease.



Marie and John Campbell generously left a bequest in their wills to support the Florey's work in schizophrenia

A gift of hope for those affected by schizophrenia

“Mum and dad were very generous people who were heavily involved in community life. In fact, they met through the scouting movement. They both had an ethic of giving back to society. They sat on committees for the Uniting Church, worked with Bayside community groups and had a tradition of giving a portion of their income to different charities” recalls Phil Campbell.

Sadly, Phil and his brothers lost both their parents over the last year. Their passing so close together made it a particularly difficult time for their remaining family.

One of the couple's final acts of generosity was leaving a gift in their wills to the Florey to carry out schizophrenia research.

Phil was not surprised to learn that both his mum and dad had made bequests to the Florey in their wills, as he explains.

“They had a child with a mental illness that affected their lives – this is one way they could help to prevent others going through the same suffering. Schizophrenia affects families profoundly. It's too late for our brother but not for others.”

Phil remembers the tragic passing of his brother Steve at age 28, as being a challenging time for the family.

“Steve was studying Forestry at university interstate in Canberra when he was first diagnosed with schizophrenia in his late teens. Living away from home meant the usual support networks weren't available to him – people were less connected back then than we are today. He battled the illness for nearly 10 years and managed to complete a Diploma in Horticulture and earn a living during this time.

The Facts

Up to one in 100 people will experience schizophrenia.

It starts young: schizophrenia most often develops between the late teens and early 30s, although it can start later, especially in women.

30 years ago, it was such a different landscape. There was also so much stigma around mental health. All most people knew about schizophrenia back then was that old cliché related to it being a split personality type of thing. Today, we know it's a lot more complex than that.”

Phil and his brother Ian first connected with the Florey in March this year. "It was around the time we all went into lockdown. We told our story to Nola, the Florey's Bequest Executive, and Ashley Bush, a Division Head and researcher at the Florey, over Zoom. They talked us through the work being done at the Florey and it sounded like there were some exciting things on the brew. It was good to hear how the funds from the estate might be used. We felt inspired after the meeting."

Professor Ashley Bush says that the Florey is committed to increasing understanding of schizophrenia. With several research projects underway, he is hopeful about the prospect of breakthroughs.

"In one Florey project, we have identified a cell death process that resembles Alzheimer's disease in the brains of people who died with schizophrenia. This involves an increase of iron causing the death of brain cells. This may account for the brain shrinkage, known as atrophy, that inevitably occurs in the chronic phase of schizophrenia. This is a completely new aspect of the damaged brain in schizophrenia that lends itself to exciting new drug possibilities".

"Mental health research has been a neglected area for so long. If their gift can contribute in a small way to finding a better treatment or even a cure for this debilitating illness our parents would be so pleased,"
said Phil.

For now though, Phil is feeling positive knowing that COVID-19 has brought much needed attention and created public discourse around mental health in general.

As a father of three, he is concerned about the pressures his own children face. "I really hope that this short-term focus that we are having on mental health through COVID-19, galvanises into a greater push which raises awareness and places more emphasis on wellbeing," Phil concludes.

If you are interested in learning more about our work in schizophrenia or are considering leaving a gift in your will like Marie and John, kindly reach out to Nola Wilmot on 9035 9710.

Schizophrenia research projects underway at the Florey

- 1** Understanding possible molecular changes in the brains of people with schizophrenia to identify potential treatments.
- 2** Developing diagnostic tests to allow early and accurate diagnosis of schizophrenia, preferably before symptoms occur.
- 3** Defining the mechanisms by which antipsychotic drugs reduce the symptoms of schizophrenia. Despite these drugs being available from the 1950's, we still do not know how they bring about their therapeutic benefits.
- 4** Studying the mechanism by which aspirin improves the treatment outcomes when added to antipsychotic drugs.
- 5** Investigating why oestrogen seems to lessen symptom severity and delay the age of onset of schizophrenia.

How you can improve lives through brain and mind research



If someone you love has a brain disease or disorder, you'll appreciate how important it is to prevent illness, advance treatment and bring to light cures for the one in four people affected.

A gift in your will to the Florey will support the great minds of tomorrow discover the secrets of the brain.

For more information about including a gift to the Florey in your will, contact Nola Wilmot – Gifts in Wills on 03 9035 9710 or nola.wilmot@florey.edu.au.

Stay connected with our online Public Lectures

Our much-loved public lecture series has moved to an online format due to restrictions around public gatherings in Victoria. Visit our website or our YouTube channel for recent public lectures on stroke, Alzheimer's Disease and sleep disorders. Look out for our upcoming lecture on Parkinson's disease.

If you would like to receive email notifications about our public lectures, please email Alison Smith at fundraising@florey.edu.au.

Thank you

The Florey thanks our recent donors who kindly donated \$250 or more between 25 April 2020 and 3 September 2020:

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Donations in celebration of birthday:

Helen Corcoran | Josip Dijani


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Keep an eye out for our supporter survey coming your way. We look forward to hearing what you have to say, why you support us, what interests you, what is important to you and how you can help.

Your words are important to us.

Together we can find the causes – and the cures.

Keep up to date with all our research news by visiting the Florey website and following us on social media.


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 The Florey Institute of Neuroscience and Mental Health

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About the Florey

The Florey Institute of Neuroscience and Mental Health is the largest brain research centre in the Southern hemisphere specialising in diseases of the brain and mind. Over 4.7 million Australians each year are directly affected by the illnesses we study. We are a world leader in discovery science, imaging technologies, clinical trials, population studies, data analytics and more. Our scientists share a common goal – to improve the lives of people through our brain and mind research.

We study:

- Addiction
- Alzheimer's disease
- Anxiety
- Autism
- Bipolar disorder
- Cardiovascular disease
- Concussion
- Depression
- Epilepsy
- Huntington's disease
- Motor neurone disease
- Multiple sclerosis
- Parkinson's disease
- Schizophrenia
- Stroke
- Traumatic brain & spinal cord injury