BRAIN MATTERS

News from the Florey Institute of Neuroscience & Mental Health

STROKE: DAMIAN’S STORY

Life after stroke
Dear friends of the Florey,

We are moving into an extremely interesting phase of development at the Florey as our talented researchers diligently apply themselves, generating knowledge of the brain and mind.

As you may know, the Florey is a major contributor to international neuroscience advancement with our researchers collaborating, presenting at conferences and publishing. The influence of our scientific publications places us fourth in the world. Within a short time and with your support, we aim to be number one.

It is an exciting and stimulating time to work in neuroscience. The American President Barack Obama has committed $3 billion over 10 years to unravel the mysteries of the brain. At the same time, the European Commission is spending €1 billion on their own Human Brain Project. This sort of commitment indicates the era of neuroscience is here and represents an investment in the future. Our own Professor Graeme Jackson has been to the US recently and lashed with President Obama’s team, to provide vital linkages with our outstanding imaging program here at the Florey.

The Human Genome Project demonstrates the potential impact ambitious research programs like the Brain Initiative can have. From 1988-2003, the US Federal Government invested $3.8 billion in the Human Genome Project and has since generated an economic output of $796 billion—a return of $119 for every $1 invested.

To contribute to the international conversation—and to help the one in four Australians affected by a disorder of the brain or mind—the Florey must grow and prosper. We are actively campaigning at the federal level for the adoption of the recommendations made by the recently released McKeon Review into the future of medical research. A key recommendation included raising the investment in health and medical research to 3 to 4 per cent of the $315 billion health and medical expenditure. This is vital for delivering health outcomes, creating national wealth and ensuring the efficiency and sustainability of the health system.

It makes complete sense to have at least this level of research and development which would be considered below the minimum for almost any other industrial sector. The recommendation that medical research be embedded in the healthcare system resonates perfectly with our current location at the Austin and Royal Melbourne hospitals and our vision for the future.

Our Vision is: None in Five. Our Purpose is to: fund medical research to cure mental illness.

Our organisation was formed as a positive response to the tragedy of a young man taking his own life to escape the pain of mental illness. We are a volunteer run organisation with a unique focus. We believe that medical research will change mental illness, and that it is research which will contribute to finding a cure.

Mental illness research is not well funded. Despite at least one in five Australians suffering from mental illness and the fact that the total annual cost of mental illness in Australia annually is about $20 billion. Research into these illnesses receives only 9% of the government’s medical research budget. A recent review of the treatment of mental illness found that in the last 30 years there has been no improvement in the life expectancy of those living with mental illness.

John Mendoza, well known in this field, co-authored this report and sums up the situation:

“What we’ve really failed to do is what we’ve done so well in areas like breast cancer, where we invested very sensibly in research and developed the built our capacity and our knowledge to intervene much earlier.”

One in Five raises funds by running events during the year. Since 2004 we have raised over $1.7m for mental illness medical research. We currently support a research project at The Florey Institute of Neuroscience and Mental Health directed by Associate Professor Suresh Sundram.

I joined One in Five about 4 years ago when I was invited by the Wardlaw Family to assist them in their aspirations, as founders, to build a professional and sustainable not-for-profit.

Back then, I was stunned to discover that there was such limited research into mental illness—so stark contrast to other major diseases—such as cancer and diabetes. I am still motivated by what I can only describe as this strange twist of fate.

The outcome of this situation is that sufferers of mental illness don’t have the benefit of the medical discoveries that have changed the lives of those with diabetes, cancer, and stroke. Sufferers of cancer now have, on average, a 30% better survival rate – largely due to discoveries brought about by medical research.

Sadly, we still understand little about the medical causes of mental illness, and it remains difficult to diagnose as well as to effectively treat. One in Five is determined to change this.

Our next event is the 2013 Extreme Challenge! Come and join us and raise money for mental health research into mental illness. Check out the details on the event page.

There is no question that our successes have been the result of the very great work of volunteers, the board and our sponsors. We are also very fortunate to have continued support and inspiration from the Wardlaw Family and Friends who founded One in Five.

One in Five funding medical research to cure mental illness

By Julia Mason

The Florey is at the vanguard of rapid advances in our understanding of brain biology—including the development of cutting edge technologies to diagnose and treat brain disorders.

The Florey’s scientists are forging ahead into a future undreamt of just a generation ago. Associate Professor Steven Petrou, a Deputy Director of the Florey, and Co-Head of the Epilepsy Division, is at the forefront of new methods that aim to deliver the promise of precision medicine tailored to an individual’s genetic makeup.

Steve is integrating a diverse range of research disciplines to predict disease, enable new therapies and to characterize personal genomes in epilepsy and other neurogenetic disorders.

This will be achieved by amalgamating five key areas of investigation:

• Studying patients to identify genetic mutations responsible for epilepsy.
• By exploiting advances in human stem cell technology the team hopes to create a “brain in a dish” to work towards curing important brain disorders.
• Editing genomes—to take patient mutations and reproduce them in stem cell-derived neurons and to repair these mutations to understand how our unique genetic makeup alters the disease process.
• Measuring electrical activity in tens of thousands of neurons to provide a window into the inner workings of the brain.
• Using computers to classify network responses, with the dual aims of working out how a new drug works and diagnosing a patient’s genetic disorder.

Ultimately, the group would like to be able to generate a brain model with sufficient predictive power that within three to six months of a patient presenting in the clinic, they will be able to suggest a suitable drug therapy tailored specifically for that person, or devise an in vitro testing program for people at high risk of developing a genetic epilepsy.

Added to this modeling initiative, Steve’s group is working on combining imaging technologies, including very high field MRI scanning, and the “glass brain” technique called CLARITY, pioneered by this year’s Kenneth Myer Lecturer, Dr Karl Deisseroth (see page 8 for more information on this exciting upcoming event).

This allows the group to precisely chart any differences between healthy and diseased brains, and begins to tie together spatial and temporal processes that occur across many orders of magnitude, from the level of a single cell’s connectivity up to the network and brain region as a whole, and across time scales of microseconds for molecular events, to months and years for disease processes.

“These techniques allow us to peer within the brain, without having to slice it into sections first—thereby preserving the cells’ connections”

“We want to combine imaging methods with different computational modelling tools, to create a deep understanding of brain dysfunction in disease.”

Steve’s ultimate vision is to “amalgamate these developments for the creation of better therapies. We hit above our weight in (understanding) disease biology and by exploiting the unique opportunities provided by the concentration of clinical, basic and engineering sciences at the Florey, and surrounding precinct, we are planning to deliver better health for patients.”

This work is more than simply a dream for the future. Steve’s group has identified a potential therapy for anever-avertable mutant ion channel seen in a particularly debilitating form of epilepsy, characterized by severe intellectual disability and very poor quality of life.

The group has shown that a currently prescribed drug can return mutant function to normal, offering hope for patients and families.

Finally, Steve is extending his collaborative links across the globe, including with Duke and Harvard Universities in the USA and Nanyang Technological University in Singapore, expanding the Florey’s presence in Asia by providing those groups with invaluable mentoring and research guidance.

The Florey has an ambitious team of highly creative scientists, capable of developing brilliant solutions for serious health issues. It will be fascinating to see what the future holds for this group.

A glimpse into the future at the Florey

A field of fluorescently labelled hippocampal neurons prepared using CLARITY and imaged using multi photon microscopy. Credit: Gabriel Jones (PhD student in Steve Petrou’s Laboratory).

This report was prepared by the Florey Institute of Neuroscience and Mental Health for One in Five.

Damian Zammit and his baby, Adele (read story on page 4)

Associate Professor Steve Petrou

The Florey Institute of Neuroscience & Mental Health

None in Five

Our Purpose is to: fund medical research to cure mental illness
When changing a nappy is exciting

Damian Zammit, a young carpenter, suffered a stroke three years ago. The Florey’s unique approach to neurorehabilitation has transformed his life in more ways than one.

It’s been a tough road to recovery but every day Damian’s rehabilitation is helping him regain vital life skills.

One of the most wonderful things about his recovery has been his ability to be more involved with his new daughter Adele. Only six months old Adele, like all young ones, needs attention. As Damian continues his rehab, he can now hold her, change her nappies, dress her, and his wife Steph is able to go out and leave Damian in charge. They have learned to make small adjustments so Damian can be as involved as possible – even buying zip-up pyjamas so he can prepare Adele for bed.

Damian participated in a specialised rehabilitation program with Professor Leeanne Carey, Head of the Neurorehabilitation and Recovery Research Group in the Stroke Division at the Florey. Following his stroke Damian lost use of the full right side of his body, his speech and his ability to read and write. He also lost his sense of touch. He couldn’t feel when his hand made contact with everyday objects and so was unable to use his hand on a day to day basis.

Using the ability of the brain to recover, Professor Carey has helped Damian regain his sense of touch. The rehabilitation program, known as ‘Sense’ is carefully designed to enhance existing connections and forge new connections in the brain. Damian worked very hard during the program to make sense of any touch information that was coming through, until after only 3 weeks he said ‘for the first time since my stroke (18 months ago) I can now feel with my hand’.

After 6 weeks of training this improvement showed through with greatly improved scores on sensory tasks, better use of his hand in everyday activities, and evidence that Damian’s brain was changing the way it processed touch information... with success!

As Damian says, “it’s a slow process.” Now he is able to use his hands more and more every day and his legs are nearly completely recovered. He is also able to chat on the phone to his wife and daughter.

And Steph, is of course, one of his greatest supporters.

“Not only is Damian a brilliant, loving and caring husband and dad to Adele but he is the most determined and passionate person I know. Over the past three years Damian has accomplished so much, I think he underestimates himself at times. And even though he has achieved so much, life has its ups and downs. And overcoming his depressive moods can be a tough feat for us both.

And over all this time he has not let go of his passion of carpentry. With assistance he has helped friends renovate their homes, build carports, decks and an outdoor area that he has added to our family home.

With Adele as his new motivation, I watch him, in awe, as he picks himself up and soldiers on hoping that one day he will return to his job.”

The brain is plastic. With specialised rehabilitation a person can learn new skills and recovery even months and years after their stroke. Armed with these skills they can then continue to drive their own recovery in the everyday tasks that matter to them! Damian’s story is evidence of this.

Honour for MS leader

Professor Trevor Kilpatrick has won the Bethlehem Griffiths Research Foundation Medal for his international contribution to multiple sclerosis research and leadership over these decades.

Professor Kilpatrick’s pioneering work has been instrumental in establishing the Florey and the University of Melbourne as a world centre for MS research.

Professor Kilpatrick is the leader of the MS Division at the Florey and the Director at the Melbourne Neuroscience Institute at the University of Melbourne and the Centre for Neuroscience.

“In the 1970s care of neurological patients was either somnolent or palliative,” Professor Kilpatrick said. “As a young researcher I could see that we were on the cusp of a revolution in imaging and genetics that might just change all that. I wanted to stop this potentially devastating progressive disability affecting young people.”

“The quality of care we can now offer patients has dramatically improved as a result of our research although much remains to be done to remove the stigma and risk of progressive MS. Hope is on the horizon though as a major pharmaceutical company is now testing the efficacy of one of the growth factors we have identified that protects the nerve system against immune attack.”

“We have also made strides into the genes that drive MS and are using this knowledge to develop novel therapeutic approaches. Other work has established the potential importance of Vitamin D deficiency which is now the basis of clinical trial testing to determine whether Vitamin D supplements might have benefits.”

The Bethlehem Griffiths Research Foundation was established in 1994 to fund Victorians researching life-threatening neurological illnesses. Some $43.5 million has been provided to researchers over nearly 20 years.

Madness: a memoir – a look into a life dealing with a mental illness

by Kate Richards

No-one ever wakes up one morning and thinks, today I’ll go mad, lose my job and friends, and end up odd-looking and living on the streets, anymore than they think today I’d like to get cancer.

Mental illness happens to people who are living ordinary, good lives, just like my family and me when I first became ill at the age of 16.

Without warning, I woke up one day with a firm belief that there were a group of people living in my head who wanted to harm me and who told me over and over to harm myself. Over the next 15 years I had many hospital admissions and could no longer continue a career in medicine due to episodes of psychosis and depression. It was a terrifying kind of life. I never knew when I woke up each morning if I’d make it through the day.

Mental illness is the third-highest cause of disability and premature death in Australia and one in four of us will experience mental illness in our lifetime. But because neuroscience is an extremely young field, there is so much about the functioning of the brain that we still don’t understand. This is true for neurological function and psychological function and for the delicate connections between the two.

We know that the major mental illnesses – schizophrenia, bipolar disorder, major depression and anxiety – are biological illnesses. The symptoms result from neurochemical imbalances in the brain. The cause of the neurochemical imbalances is multifactorial: genetics, brain structure, personality, social environment, vulnerability to stress. But we don’t know why some people get these illnesses and not others.

We still don’t know how to diagnose these illnesses accurately. And current treatments only have a 70% likelihood of long term success.

I’m very grateful to be living in a country where medication and therapy are mostly available and affordable. However even in Australia, we are still not caring for the most vulnerable members of our communities. Those who through no fault of their own are not as lucky as I have been to respond to current medication or be able to afford to find the right kind of therapy. These people are of all ages and backgrounds, and we ignore their suffering because most of us don’t understand their ways of seeing the world or we are afraid of their difference or embarrassed by their appearance and because we can’t see their injuries.

With the help of The Florey we could have very specific, molecularly targeted treatments for mental illness similar to those already in use for cancer. Compliance with current medication is a real problem because of the many intolerable side effects. Research into psychosocial interventions including supportive care and psychotherapy remains equally valuable.

For the families, friends and carers of people with mental illness it is particularly hard because the illness can take away our ability to know that we are loved, and we often find it hard to love back in conventional ways. The illness isn’t all of who we are, but without a correct diagnosis and the right treatment, the symptoms of the illness can become almost all that people see of us.

Kate’s story is the feature of this month’s donor update letter and the full story Madness: a memoir is published as an e-book and in print by Penguin Books Australia 2013.

The Florey Institute of Neuroscience & Mental Health

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Kate Richards, author of the book Madness: a memoir.
I had a choice to become a medical doctor. As a medical doctor, you help each patient that comes to you, but as a scientist, I thought that if I can find a cause of disease, or a cure for a disease, I could help more people generally than just one person at a time.

Wah Chin Boon is only distracted for a moment; she’s on task, her mind is ticking over and she’s balancing it all. “I have a choice to become a medical doctor, or I could help more people generally than just one person at a time. I could help more people generally than just one person at a time.”

Wah Chin Boon is also a PhD supervisor for seven students past and present, and her role does not end there. She is actively involved with the Florey’s EQIS (Equality in Science) cause of disease, or a cure for a disease, and as a reflection of this, all her students are female. As she says herself, “I’m kind of harsh for females to succeed in research because women are more reserved and not so much in chest-beating as men.” Wah Chin’s advocacy extends to the Florey’s EQIS (Equality in Science) group, which she has co-chaired with Dr Karen Aherne and of which she is currently the President.

Wah Chin Boon is a Senior Research Fellow at the Florey Institute of Neuroscience & Mental Health, and a recipient of the 2013 Michael J. Fox Foundation Award. Since coming to the Florey five years ago, she has also been involved in a number of projects to further her research.

Wah Chin’s science journey began as an undergraduate in molecular biology at the University of Geelong. After graduating with a Bachelor of Science from the University of Geelong in 2002, she moved to Sydney in Australia to complete her PhD research in neuroscience. A trained hormone which regulates sodium levels in the blood, post-PhD, Wah Chin spent the next 10 years at Prince Henry’s Institute; this is where she began her investigation into the effects of estrogens on the brain and related behavioral changes, issues she continues to work on at the Florey today.

Scientific stories and anecdotes are still arriving as a result of the first Florey reunion on 17 July. More than 30 scientists swapped notes on past research and discussed over dinner at level 5 of the Kenneth Myer Building on the Parkville Campus.

Derek Denton, Professor John Coghill, and Professor Fred Mendelsohn, past and present Directors of the Florey, welcomed the returning members of the Institute of Neurosciences, who had come together to celebrate their shared experiences and the progress made by their research.

Professor Geoff Tregear (of relaxin fame) welcomed everyone back and took them on a journey of how far we have come in 50 years of science. How this all began, and how it still continues today, at the Florey Institute of Neuroscience & Mental Health.

The Florey’s Professor Colin Masters and Associate Professor Derek Denton guided the group on how far we have come in 50 years of science.
Clarity of Mind: Optical Deconstruction of Fully-Assembled Biological Systems By Karl Deisseroth
17th Kenneth B Myer Lecture 2013

Date: 28th October 2013, 6.00pm
Where: The Plenary Room, Melbourne Convention Centre, 2 Clarendon Street, Southbank, Victoria
Bookings: via www.florey.edu.au

Free public lecture.
Dr. Deisseroth is an Associate Professor of bioengineering and psychiatry at Stanford University.

As a psychiatrist, Stanford University’s Karl Deisseroth treats patients with depression, schizophrenia, and other serious mental health disorders. But early in his career he bumped up against the limitations of the field. Brain disorders are chronic, hard to treat, and sometimes fatal. Drugs often don’t help.

“We just don’t understand them,” Deisseroth says of mental illness and other brain disorders like Parkinson’s disease. He has developed and applied novel technologies for controlling (optogenetics) and imaging (CLARITY) specific elements within intact biological systems, and continues to develop and apply new technologies to study physiology and behaviour in health and disease, as well as train researchers around the world.

Art Exhibition Tim Blashki: Beyond words
A psychoanalytic/existential exhibition experience

Date: Thursday 7 November 2013 – Sunday 24 November 2013
Opening: 6.00–8.00pm, Thursday 7 November 2013
Where: The Plenary Room, Melbourne Convention Centre, 2 Clarendon Street, Southbank, Victoria
Bookings: via www.florey.edu.au

Free public lecture.

Beyond words is monumental in scale, comprising a series of multi-panel works, the largest of which stretches over 15 metres. Employing a minimalist informed aesthetic, Blashki uses symbolic imagery to depict aspects of the mind and states of un/consciousness.” This fascinating and multi-leveled exhibition will run from 7 – 24 November and is accompanied by a richly illustrated catalogue containing an extended essay by the artist.

For images and queries: please contact Tim Blashki at timblashki@iame.com

Feel like an extreme challenge?
Be part of the action and join the One in Five Extreme Challenge team. Want to get fit, meet new people, join old friends – all while supporting mental health research at the Florey?

This year’s team looks like being the biggest with over 60 people already entered for one or both of the following events.

September 21: The Surf Coast Century covers 100km as a trail run in Anglesea, Victoria. You can participate as a member of a relay team or for the truly brave, you can tackle it solo.

October 13: The Melbourne Marathon offers a range of options – from the 3km walk to the VERY EXTREME 42.2km marathon.

Perhaps you will enter both events?
If you are tempted, need convincing or simply want some more information please email olivia@oneinfive.com

Matt’s marathon for mental health research

Congratulations to Matt Harry, who is leading up to his English Channel Swim raised over $35,000 for mental health research! And, his employer’s foundation – The Western Union Foundation – has agreed to match! Please visit Matt’s blog if you want to read more about his story, http://marathonforthemind.wordpress.com/

Thanks Matt for all your hard work.

Bookings in memory of
Maple-Brown Abbott • Chris Abbott AM • Abercrombie Family Foundation • Albee Pty Ltd • Charles Allen AO • Nancy & Vic Allen Stroka Prevention Endowment • Pauline Allen • W J Bailey • Paul Bartlett • John & Lorraine Bate • Bill Charitable Fund • Berry Creek Opportunity Shop Incorporated • Evangelos Bladros • Jack Dawson Foundation • CASS Foundation Ltd • John & Colin Geoffrion • Ernest F Dawes OBE • Dowd Foundation • Ross Downes • K & M Doyle • Drummond Foundation • East Family Trust • Meg Elcome • Epilepsy Action Australia • Andrew Erikson • Leo & Mina Erikson Fund • Erikson Foundation • Neill & Garnett Gervais • Peter Gilbertson • Isabel & John Gilbertson Charitable Trust • Louise Gourlay • Lesley Griffin • Helen Groves AO • Ronda Hall • Geoff & Helen Handbury Foundation • Hotel Skyla • Peter Huyser • The Ideal Consultancy • Janet Elia & David Elia (Mel) Melbourne Inc • H & K Johnston Family Foundation • Estate of the late Pauline Marie Johnston • Anne Kelso AO • Pam Knott • Landmark Foundation • Blake Langdon • Alison Leslie • Allan Leslie Foundation • Elizabeth Lloyd • Donna Lowe • M P Lowe • Scolee & Claire MacKinnon Trust • Arthur Merton • One in Five • Judith Overbeek • Nigel Peck • Frisbee Foundation • R G Pitcher • Ed Pendergast • Heather Purdy • Ed Riley • Geoffrey Roppelt • Alan Rix • Maria Rous • Mark Ryan • Shannon Ryan • Tamara Ryan • Paul Saunders • Say Family Foundation • ShareGift Australia • Mark Simcock • Nell & Hermon Slade Trust • Gary Sinise • Stoux & Staff Constructions • Gary Tennant • Marjorie Todd • G W Vowell Foundation • Richard Wall • Ralph & Barbara Watt • James Wiley • Karen Wiley • Yagibara Foundation

Mobility in memory of
Nathan Black • Kenneth Verle Connolly • Jenny Coughlan • Marian Ekdahl • Muriel Gardner

For more information contact the Editor, Amanda Place: amanda.place@florey.edu.au or +61 411 204 526

Thank you to everyone who has contributed to the Florey in so many ways.

The Florey thanks our recent major donors

The Florey Institute of Neuroscience & Mental Health is the amalgamation of the Howard Florey Institute, the Brain Research Institute, The Mental Health Research Institute and The National Stroke Research Institute.

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