Brain Matters

NEWS FROM THE FLOREY INSTITUTE OF NEUROSCIENCE & MENTAL HEALTH

DR AKHTER HOSSAIN: HOW THE GUT TALKS TO THE BRAIN

Controlling the way we eat

STROKE CARE IN THE BUSH
Florey launches stroke telemedicine (see page 6)

SPRING 2014
DIRECTOR’S REPORT

Gut molecule controls appetite

A molecule produced in the colon has been found to control appetite, a Florey discovery which could help the future treatment of conditions such as obesity and anorexia nervosa.

While the existence of the molecule was known, its purpose had remained a mystery to scientists around the world. But an international team of researchers from the Florey and Cambridge University established the molecule – known as insulin-like peptide 5 or InsL5 – plays a key role in telling the brain when the body is hungry or full.

Significantly, the research team also managed to make an artificial version of InsL5 in the laboratory, meaning scientists are on the way to being able to produce a drug capable of influencing appetite.

Such a treatment could either stimulate appetite for patients needing to gain weight such as those undergoing treatment for cancer or AIDS, or to suppress appetite in patients with type 2 diabetes or people wishing to lose weight.

“While it is still in the laboratory, meaning scientists are on the way to being able to produce a drug capable of influencing appetite, the research reveals that mechanisms going on in the gut are working hand in glove with the brain to control how you react and respond to food,” Florey lab head, Dr Akhter Hossain said.

Establishing the role it plays in appetite adds to growing evidence that peptides in the gut “talk” to the brain and influence the body’s behaviour, reinforcing the idea that the gut is “the second brain”.

Outlined in the journal Proceedings of the National Academy of Sciences, the findings mean future drugs would not have to cross the difficult-to-penetrating blood-brain barrier, as is the case with many obesity treatments.

“The beauty with InsL5 is that it does its business in the gut and then the gut talks to the brain and so it doesn’t have to get through the blood-brain barrier which will make a huge difference in the logistics involved with developing a drug,” the head of peptide and protein chemistry, Prof John Wade, said.

Australia is a world leader in health and medical research. I believe the Federal Government’s budget initiative of a $20 billion endowment fund for medical research would have a transformational impact on the long-term future of health and medical research in Australia. The health of our nation will improve and the health system will be more efficient and effective. Providing annual funding of $1 billion by 2022-23, the fund would effectively double the government’s annual investment in health and medical research.

Every day, as the director of the Florey, I witness the talent and drive of our researchers. It is critical that Australia has a home-grown capacity to address the health priorities relevant to our own population. Our scientists are well and truly working with this goal in mind. We meet with people living with Parkinson’s and motor neuron diseases, we talk to others who have lost loved ones to suicide and we are driven to address these terrible illnesses. We are on the way to understanding dementia and ways to slow its progress. Solid funding is essential to secure our talented researchers and to improve the health of future Australians.

At the same time, we need support now. And this is where our valued donors come in. We are regularly inspired and humbled by your support. Please help us keep the innovations coming – what Canberra thrashes out long-term solutions. We recently hosted the Federal Health Minister, Peter Dutton, who launched our Victorian Stroke Telemedicine program. The Florey initiative is a great example of the way our researchers take novel science and convert it into everyday health care.

Now, thanks to this program, country patients who suffer a stroke can receive expert neurological assessment without leaving their hospital bed. City neurologists can work with rural-based doctors in emergency departments to accurately diagnose stroke. The patient may then be a candidate for a special clot-busting drug that can be life-saving.

The program is a huge difference in the logistics involved with developing a drug,” the head of peptide and protein chemistry, Prof John Wade, said.

Here at the Florey, we are keen to improve awareness of major depressive disorder so people know to seek help. Suicide kills more Australians each year than the national road toll, HIV/AIDS and accidental drug overdoses combined, accounting for approximately 2,500 deaths per year. It is the major killer of young men but the tragedy is that it is potentially preventable. Between 75-85 per cent of all people who suicide have a major mental disorder at the time. These disorders include major depression, bipolar affective disorder (“manic-depression”) and schizophrenia. However, only about 10-15 per cent of people with these disorders commit suicide. So what are the factors that predispose certain people to take their lives?

There may be biological markers that indicate a propensity to suicide that is distinct from the underlying disorder. This idea might help explain why some people are at greater risk of suicide compared to others with the same disorder. The identification and verification of protein changes in the blood creates an opportunity to develop a biomarker that could be used to predict susceptible individuals. This would allow doctors to discuss with affected individuals and their families the potential future risk of suicide and to work out the type of interventions that could be used to prevent this tragic outcome.

Although this is still an ambitious goal, my team and I have access to a valuable resource that could go a long way to determining the feasibility of this aim. Both with our own clinical studies in Melbourne and as part of a national collaboration, we have over 1500 blood samples from people with and without suicidal behaviour from a range of mental disorders. If funding allows, we plan to examine a number of proteins in these bloods that we believe may be potential candidates as biomarkers to help predict those who may be at risk of suicidal behaviour.

It will be possible to combine these data with clinical and genetic information to ultimately develop a test that can be used by doctors when people present with mental disorders. This type of test could alert patients, families and health professionals to the level of risk a person may have to engage in suicidal behaviour and thus allow early intervention. This remains an aspirational goal at this time but clearly has the potential to save lives.

Helping those at risk

Major depression (or major depressive disorder) is a serious medical illness that is estimated to be one of the four main causes of disease burden in Australia. Here, Associate Professor Suresh Sundram discusses the issue and his work at the Florey which may, one day, provide a blood test to help identify those at risk of suicide.

To set the scene, it’s important to identify the characteristics of major depression so we know when to seek help.

It can be described as a persistent, pervasive and deep sadness accompanied by a loss of pleasure. Other symptoms include appetite and weight change, sleep disturbance, concentration and memory impairment, thoughts of worthlessness, hopelessness and guilt which often culminates in thoughts of death and suicide.

These symptoms often vary depending on the person’s age, gender and cultural group. It’s interesting that irritability and anger are especially present in many young men. These features distinguish major depression from normal human experiences of sadness, grief or loss. When you know these symptoms are persistent, it will help affected people, their family and friends know that it’s time to seek medical help. It’s important to seek help because it is unlikely to solve itself for months or years, treatments are generally effective and straightforward and finally, many untreated people die.
Professor Ashley Bush is the winner of the prestigious 2014 Victoria Prize for Science and Innovation. Ashley has made an outstanding contribution to translational neuroscience and is the most cited neuroscientist in Australia. He discovered the importance of metals in degenerative disease, particularly in Alzheimer’s and he is actively working to develop new and improved disease-modifying drugs as well as drug tests to help diagnose and monitor disease progression. Ashley is also a practising psychiatrist.

Dr Udina Ratnayake has won a coveted Victoria Fellowship. Dr Ratnayake will travel to the US and study schizophrenia and ways of ‘seeing’ its impact inside the brain. Current treatment relies on antipsychotic drugs which often cause intolerable side effects. Udina will be representing the Florey team as she works with Massachusetts Institute of Technology collaborators to develop novel treatments and a better way to understand the underlying causes. She will be using a revolutionary technique called CLARITY which allows, for the first time, simultaneous imaging of molecular markers and network structure in the intact brain.

Professor Ingrid Scheffer has been recognised as this year’s Bethlem Griffiths Research Foundation Medal recipient in recognition of the profound difference her research has made to the understanding, diagnosis and treatment of epilepsy, particularly for children and families. A child neurologist and clinician scientist, Ingrid’s work has shifted our understanding of the genetics of epilepsy, especially in severe childhood cases. The work demonstrates that these disorders, which result in progressive deterioration in areas such as learning, behaviour and motor control, are frequently genetic and typically arise from a new mutation, rather than inherited from their parents.

Candace Wu has been selected by the Australian Academy of Science and Royal Society, UK, as one of seven PhD students to represent Australia at the First Commonwealth Science Conference, to be held in Bangalore, India. The Royal Society has provided financial support for Candace to participate, meet with several key speakers (including Nobel laureates) and present her own research.

Dr Rachel Hill is on a roll. She has just won an American NARSAD Young Investigator grant and was recently awarded a highly competitive NHMRC Career Development Fellowship, one of only 42 awarded from 308 applicants across all medical research fields. Rachel and her team are trying to address memory deficits linked to schizophrenia. Learning and memory problems appear early in disease progression, before the first psychotic episode and the adolescent period is critical. This four-year fellowship provides support for Rachel to expand her research and recognises her significant contribution to the field.

Dr Tobias Merson has been awarded an NHMRC Project Grant to investigate new approaches to prevent nerve cell damage in multiple sclerosis (MS). Damage to the axons of nerve cells begins early in MS. Toby will examine how the death of oligodendrocytes, specialised cells that insulate axons in the central nervous system, contributes to this damage. His research will test the novel concept that disruption of energy flow from oligodendrocytes starves axons of a vital energy supply at the earliest stages of disease. The three-year project will provide critical insight into the degenerative mechanisms that ensue after oligodendrocyte death, research that could reveal new targets to prevent irreversible injury to nerve cells.

Dr Blaine Roberts has received a Challenge grant from the US Alzheimer’s Drug Discovery Foundation to help the Florey validate preliminary findings in the Australian Imaging and Biomarker Lifestyle study of ageing (AIBL). AIBL is one of the largest studies of Alzheimer’s disease in the world. His goal is to develop a screening tool for the early detection of Alzheimer’s before symptoms are obvious. The team has discovered three proteins in the blood that have the potential to provide an early diagnosis of Alzheimer’s disease. They are also measuring biomarkers in other neurodegenerative diseases such as Parkinson’s, motor neuron disease and frontal temporal dementia.

Dr Sherie Ma (far right) is about to head off to take up her Australian Government Endeavour Fellowship at the University of California in Berkley for four months. As an Endeavour Fellow, Sherie will research brain changes underlying various behavioural states such as sleep, arousal and vigilance. Sherie will study a brainstem region of the brain known as nucleus incertus. This area is the primary source of the neuropeptide known as relaxin-3, discovered by Florey scientists in 2002. By better understanding the role of nucleus incertus, Sherie and the Florey team, will move closer to understanding the role of relaxin-3 in brain processes.

Professor Derek Denton has been awarded the World Hypertension League’s 2014 Excellence in Dietary Salt Reduction. High dietary salt is one of the major global health risks and is estimated to cause over 3 million premature deaths a year. Hypertension, gastric cancer, kidney stones, osteoporosis, obesity and other serious illnesses are affected by salt. Prof Denton was recognised for his landmark scholarly book ‘The Hunger for Salt’, for his unequivocal demonstration that a high salt diet causes hypertension and finally, for his public advocacy that has helped to change dietary legislation in the USA and reduced the level of salt in baby food in Australia.

Congratulations to our high flyers

Professor Ashley Bush & Dr Udina Ratnayake

Professor Sam Berkovitz & Professor Ingrid Scheffer

Candace Wu

Dr Jess Nithianantharajah, Dr Xin Du, Dr Rachel Hill, Professor Ashley Bush, Dr Udina Ratnayake, Dr Blaine Roberts, Dr Candace Wu, Dr Toby Merson and Dr Sherie Ma

Dr Jess Nithianantharajah

Dr Xin Du won the inaugural Australian Neurological Society’s Mark Rove Award for excellence in a publication on Huntington’s disease.
We are thrilled to be reaching out to the Victorian community in such a practical way and we hope our work in stroke telemedicine provides a template for the nation.” - Prof Geoff Donnan.

Rural stroke – telemedicine to the rescue

Country patients suffering a suspected stroke can now receive expert neurological opinion from Melbourne – without leaving their hospital beds.

The Victorian Stroke Telemedicine program was launched by the Federal Health Minister, Peter Dutton, at the Florey in late August. The Federal government invested $238,000 back in 2013 so the Florey could expand the program to 16 regional and rural hospitals over five years.

The innovative program has been operating in Bendigo for three years, and is being progressively rolled-out across Victoria over the next two years.

The launch is the culmination of years of planning and piloting by neurologist and program director, Prof Dominique Cadilhac, Florey Director, Prof Geoffrey Donnan and the Victorian community.

“Due to the rapid onset of stroke symptoms, it is very important to get a diagnosis quickly. The introduction of stroke telemedicine has increased the time taken to treat a stroke patient once it arrives in the country hospital by about an hour.”

“Time-critical care can now be provided 24-hours a day across the state,” Prof Donnan says.

The number of stroke patients treated has increased by 40 per cent over the last two years. We’ve also seen considerable improvements in the time it takes to treat a stroke patient once it arrives in the country hospital.”

Other partners involved in the program include the Victorian Government, the Department of State Development, Business and Innovation; the Victorian Department of Health – Victorian Stroke Clinical Network, Ambulance Victoria, Loddon-Mallee Health Alliance, Gippsland Health Alliance, Latrobe Health Alliance, Bass Coast Health, Palliative Care Victoria, Geelong Health Network, the Loddon-Mallee Health Alliance, Bendigo Health, Millicent Base Hospital, Swan Hill District Health and Echuca Regional Health as clinical partners.

Rural stroke – telemedicine to the rescue

Cycling for Ben

De March 13, 2016, Andrew and Claire Heenan lost their son Ben after a long battle with mental illness. Despite being surrounded by a loving family and receiving extensive treatment from a team of mental health professionals, Ben could no longer cope with his illness and took his own life. Ben’s death was described by his loving parents as “the saddest day of our lives for our family and our friends.”

Andrew is now passionately fundraising to help the Florey research mental illness.

“It is obvious to me that we need a greater investment in mental health research in order to prevent others from suffering the same fate as Ben,” Andrew says. “There is a suicide in Australia every four hours.

“Mental illness is still poorly understood, it is unseen and largely ignored, and therefore treatment in this area is sadly underfunded by comparison with other illnesses.”

On a very significant date - 7th August, Andrew left from Perth and cycled across Australia to be in time for Dr Geoff Donnan’s National Stroke Research Institute, Florey Institute’s National Board of Directors’ dinner in Sydney.

“The ride is fully self-funded so 100 per cent of your donation will be directed to the Florey Institute.”

Andrew has invited donors and readers to follow his ride by joining the Cycle for Ben Facebook page. The ride is due to end on September 14. Good Luck Andrew!

The Florey thanks Andrew and Claire for this enormous effort and the huge number of donors who have helped make it so much already. Please see page 3 for news on our research into depression.

Barnstorming Bairnsdale

I’d lived nine years as a Flavio leader before Barnsdales talk about brain health but the community had never forgotten one very special speaker. A highly motivated community was formed in and around Bairnsdale some time before, some ages, to former Flavio director, Emeritus Professor Fred Mohamed.

Fred was invited to speak by the local University of the Third Age (U3A) which had established a group specifically to discuss and promote brain health. Fred arrived to deliver a lecture on brain health to about 100 people.

He spoke about the ways we can maintain a healthy brain as we age and recommended we exercise, eat well and keep our brains working and investing in our health.

The Flavio would like to thank the highly motivated Barnsdales who, with encouragement and coordinated the event. He also presented a very passionate dedication to the Flavio on behalf of US astronauts.

“I would very much appreciate your tax deductible donation via the Everyday Heroes website www.everydayheroes.com.au and search for Andrew Heenan or Cycle Ben.”

Please turn my support into hope for Alzheimer’s disease, stroke, Parkinson’s disease, schizophrenia and other mental illnesses.

**"It is obvious to me that we need a greater investment in mental health research in order to prevent others from suffering the same fate as Ben.**”

- Andrew Heenan

**“It is obvious to me that we need a greater investment in mental health research in order to prevent others from suffering the same fate as Ben.”**

- Andrew Heenan
**KENNETH B. MYER LECTURE**

**Planning to get fit for summer?** Then join us for The Sunday Age City2Sea – 5km or 14km running event.

**Date**  Sunday, November 16.

**Sign-up** at thecity2sea.com.au or Call lane for more information on 03 8344 1824.

If you want to help find a cure for Alzheimer’s disease, join the Albert Park Rotary Club team or if interested in running for mental illness research, join the One in Five team.

**Where** The Kenneth Myer Building, 30 Royal Pde, Parkville.

**Parking** Available under the building.

**Tram** 19, Stop 11 heading away from the city, right outside our building.

**Cost** This is a free public lecture.

**Time** 6-7pm.

---

**WHEN STROKE BECOMES DEMENIA WITH DR AMY BRODTMANN**

One in three stroke survivors – even those who make a good recovery – slides into dementia. It might take a few years to happen, but Dr Brodtmann wants to know why. She also will share advice on staying well.

**Date**  Wednesday, November 20 at 6.30pm.

**Where** The Kenneth Myer Building, 30 Royal Pde, Parkville.

**Parking** Available under the building.

**Tram** 19, Stop 11 heading away from the city, right outside our building.

**Cost** This is a free public lecture.

**Time** 6.30-7.30pm.

---

**THANK YOU**

The Florey thanks our recent donors who kindly donated $250 or more between March and mid-June.

Mr David Abraham • Mr Jean Adler • ANZ Banking Group Limited • Pauline Alford • Mr & Mrs Philip & Marguerite Aveyd • Mr Sara Bailey • Bell Charitable Fund • Professor & Mrs Sidney & Felicity Block • Mr John Bagg • Mr & Mrs Russell & Drena Byrd Mr & Mrs John & Chris Collingwood • Mr Kevin Coopram • Mr Mark Costello • Mr Geoffrey Cotterell • Mr John Coughlan • Mr Peter Coughlan • Mr Brian Dawes • Mr Craig Drummond • Mr Andrew Gribson • Estate of Mary Eva Kentish • Ms James & Mr Graeme Ferguson • Ms Nathan Folke • Mr John Royal • Mrs Helen Edmiston • Ms Rosemary Grout • Geoff & Helen Hambury Foundation • Mr C Norman Eustice OBE • Mr & Mrs Peter & Janet Gilbertson • Mr & Mrs Brian & Ian Gill • Mr Andrew Goldsmith • Mrs Louise Gourley OAM • Ms Susan Grant • Mrs Louise Gray • Mrs Lesley Griffin • Mr Ronald Hall • Mr Arnold Hancock OBE • Mr Ray Hackett • Mr Bill Henry • Ms Rachel Helps • Mrs Kristine Hildred • Mr Grant Hopper • Mrs Joan Jan • Inner Wheel District 62 • Mr Peter Kelly • Mr & Mrs Terry & Janet Kenneally • Mr John Kirchmayr • Mrs Pat Kneen • Ms gren Langlands • Mr Richard Law • Mrs Elizabeth Lane • Mr & Mrs Florence Le • Mr & Mrs Christine McGill • Macquarie Bank • Mr Ian Marks • Mrs Joan Matthews • Mr John Mackie • FM & Mrs Graeme & Audrey Miro • Mr Russell Mclachlan • Mr Rupert Murdoch AC • Mr Damien O’Shea • Dr Leigh Pagents • Pernonnell Trustee Austira Ltd • Ms Mary Pfeiffer • Mr David Pincus • Mr R G Pichler AM • Mr Ed Prendergast • Mr Valentine John Price • Mr Donald Read • Mr Alan Re • Mrs Judy Roach • RohMeare Foundation • Mr & Mrs Daniel & Katherine Rollins • Mr Mark Ryan • Mr Tamara Ryan • Ms Richard Skees • Say Family Foundation • Mr Gary Silveira • Mrs Robin Swan • The Abercrombie Family Foundation • The Bienen Foundation • The CASS Foundation Ltd • The Biker Foundation • The Patricia Daves Foundation • The Tingle Born Foundation • Lesley Thomas • Ms Lynelle Turner • Dr Michael Tiny • Mr Bruce Yarbrough • Ms Mariellen Turner • U3A Bairnsdale & District Inc • Mr David Vernon • Mr Ralph Ward-Amberley AM • Mr Philip Winkworth • Professor James Wiley • Mrs. Mudler