THE POWER OF THOUGHT

Professor Clive May channels a brilliant idea

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Is junk food addictive?

New research reveals brain changes commonly seen in drug addiction are also observed in animals fed a diet high in fat and sugar – similar to common fast foods like burgers, pizza and confectionary.

This work is the first to show that addiction and compulsive overeating share similar brain processes.

The work, headed by the Florey’s Dr Robyn Brown, a Peter Doherty Research Fellow funded by the NHMRC, also involved scientists from Monash University and the Medical University of South Carolina in the US.

Animals were fed a tasty diet full of fat and sugar – similar to common fast foods like a soft drink or hamburger.

This brain region, called the Nucleus Accumbens, is ‘hijacked’ by addictive substances, and the animals in this study showed the same brain changes seen in animals addicted to cocaine.

Dr Brown and her team are still unsure why some rats, and people, seem predisposed to overeating and addiction while others do not.

Dr Brown advises people who have issues with overeating to consider psychological and medical support to break a cycle of unhealthy eating and maintain a healthy weight.

“Society judges people who are obese quite harshly. But people with obesity need to say, ‘Hang on, I could have what is more like a drug addiction, rather than a lack of willpower.’

“Framing the issue in this way means we will require a rethink of the entire health policy-ecosystem, from food advertising standards, to medical treatment for people with compulsive eating habits.

“We know that there are pharmacological therapies that work in drug addiction. These therapies will be tested to see if they work for overeating.

“The good news is that these drugs are already approved and on the market so if they do work on people who overeat, we can get them out sooner.”

Dr Brown is quick to emphasise that, like humans, only a third of the obese rats showed brain changes similar to addiction. Despite the “obesogenic environment” many of us live in, driving to the shops, school and work, sitting down all day and being exposed to saturation advertising of fatty, sugary, refined, processed foods, we can all try to improve our individual choices.

Much like the “every cigarette is killing you” advertising campaign, we should think hard about whether we really need that sugary soft drink or hamburger.

Dr Brown advises people who have issues with overeating to consider psychological and medical support to break a cycle of unhealthy eating and maintain a healthy weight.

“Not everyone who uses drugs will become an addict: it’s the same thing with food. Not everyone exposed to food that’s high in fat and sugar, will become addicted.”

Dr Brown explains that an obese individual can get them out sooner.

Professor Dominique Cadilhac has been recognised by Monash University for her outstanding contribution to stroke prevention and treatment. Her contribution to the Victorian Stroke Telemedicine program was recognised, especially for its support of health workers and medical practitioners in remote communities who now have access to Melbourne-based neurologists. Prof Cadilhac received the Vice-Chancellor’s Excellence Award.

This award follows another for Prof Cadilhac relating to rural hospital healthcare. While attending the International Stroke Conference in Nashville, she won first prize in the prestigious American Stroke Association’s Progress and Innovation Award for research presenting a new approach to data analysis with far-reaching implications for human health.

M any readers of Brain Matters will remember the days when Emeritus Professor Fred Mendelsohn AO, was the Director of the Florey. Prof Mendelsohn is still very active and attends many scientific events including, most recently, the Australasian Neuroscience Society’s meeting in Cairns. At this international gathering, Prof Mendelsohn was recognised by his peers for “an outstanding contribution by an individual to neuroscience in Australia”.

Among his achievements over the course of his career are more than 300 publications, many of which were in leading journals including Nature and the Proceedings of the National Academy of Sciences.

His work has been cited more than 10,000 times and he has an h Index of 56. Over 20 of Prof Mendelsohn’s papers have been cited more than 100 times, a clear indication of the impact of his work.

His research has focussed mainly on neurological and their receptors, processing enzymes and actions, especially angiotensin and related peptides.

Congratulations to a great Australian.

Dr Robyn Brown
Cover Story

Moving with the power of thought

Florey scientists have helped develop a unique device to be implanted next to the brain’s motor cortex — without the need for major brain surgery.

The device, a stent-based electrode known as a stentrode, could one day help paralysed people move their limbs. People with spinal cord injuries would use thought to wirelessly control their bionic limbs, wheelchairs, computers or when walking in powered body armour, known as an exoskeleton.

The stentrode, about the length of a matchstick, will be implanted in a blood vessel that sits over the brain. It will record high-quality signals emitted from the motor cortex, and will turn these signals into electrical commands.

The work, a major collaboration between the Florey, the Royal Melbourne Hospital and the University of Melbourne, was published in February in the journal, Nature Biotechnology.

The initial idea for the breakthrough device came from Royal Melbourne Hospital neurologist, Dr Tom Oxley, a Research Fellow at the Florey and the University of Melbourne. Dr Oxley is interested in vascular systems and electrophysiology and has worked with senior Florey researcher, Professor Clive May since 2011. "Tom came to see me with this idea of creating a device which could be implanted in a blood vessel via the jugular vein," says Prof May, head of the neurocardiovascular lab. "It was one of those brilliant moments when you realise a great young mind has come up with something quite unique.

"I realised we had to support the project and make it work."

Major funding from the US Defense Advanced Research Projects Agency, and Australia’s National Health and Medical Research Council followed. Dr Oxley then involved 39 great minds from 16 groups to develop the device with a vascular biocatheter lab set-up at the Florey.

ENGINEERS, neuroscientists, surgeons, doctors and scientists have responded to Dr Oxley’s call. Four years of design, development and testing has delivered an ingenious stent device which can be implanted in a simple day procedure, according to fellow inventor, biomedical engineer Dr Nick Opie. “With our device, you’ve essentially connected an electronic limb to the patient’s brain, but they have to learn how to use it.”

Moving with the power of thought

Fast-forward four years and the device is ready to be tested in humans.

It is expected that three candidates will be chosen from a specific patient cohort in 2017. The surgery will take place at the Royal Melbourne Hospital.

Stroke and spinal cord injuries are leading causes of disability, affecting 1 in 50 people. There are 20,000 Australians with spinal cord injuries, with the typical patient a 79-year-old male. About 50,000 Australians are left severely disabled after stroke.

The device has applications far beyond assisting those with paralysis. The stentrode could be used to record brain waves for people living with epilepsy, helping them predict when they are about to have a seizure. People living with movement disorders like Parkinson’s disease, multiple sclerosis or motor neuron disease may also benefit in years to come.

Quadriplegics in the human trials will be similar in cost to the cochlear implant — around A$15,000 to A$20,000 and will be ready for commercial use by 2022.

It is also hoped the stentrode will be as important to medicine as the cochlear implant, which was invented in Australia. Professor Terry O’Brien, head of the Department of Medicine at the Royal Melbourne Hospital said the development of the stentrode has been the “holy grail” for research in bionics.

"To be able to create a device that can record brainwave activity over long periods of time, without damaging the brain is an amazing development in modern medicine," Professor O’Brien said.

Florey Director and neurologist, Professor Geoffrey Donnan, has welcomed the advance and believes it is a great example of the power of collaboration in the Parkville precinct.

You can read the abstract of the Nature Biotechnology paper on www.nature.com/articles/nbt.3428.html

Dr Tom Oxley

Prof Clive May
Heroes, great and small

After spotting Dr Turner and his lab on the TV news the night before, Declan made contact, visited the lab and asked some impressive questions for a grade 6 student. Declan went on to score the top mark for his project and even organised an ice bucket challenge at his school assembly, dazzling his teachers and principal in the height of his mates. This event raised nearly $2,500 for the Cure for MND Foundation which he kindly donated his masterpiece to Dr Turner's lab. We congratulate this young man on tackling this challenging project and raising much-needed funds and awareness.

Participants wanted for Alzheimer's disease (pre) clinical study

If you are healthy and between the ages of 65 and 85, you could be eligible to participate in a new trial called The A4 Study, which aims to prevent memory loss caused by Alzheimer's disease.

About The A4 Study

The Anti-Amyloid Treatment in Asymptomatic Alzheimer's study (The A4 Study) is a pre-clinical trial to test a new drug on older individuals who may have a family history of Alzheimer's disease (pre) clinical study.

Interested?

A screening process will be carried out to identify suitable participants. This will involve examining a variety of factors relevant to the trial, such as memory measures, health assessment and brain scanning. We are particularly interested in screening people who are in the 70-75 year age group, who have a normal memory, but who are worried about either getting dementia or who might have a family history of Alzheimer’s disease.

CONTACT US TODAY FOR MORE INFORMATION, VISIT WWW.FLOREY.EDU.AU OR CALL 1000 443 203

This study has been approved by the Austin Health Medicine Research Ethics Committee

Photo: Alana Landsberry / bauersyndication.com.au

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FREE PUBLIC LECTURES

**Concussion in sport**
Its impact on the brain - from young kids through to elite athletes
*Speaker*: Associate Professor Paul McCrory
*Date*: Wednesday April 6

**Active memory: use it or lose it!**
Sorry, this lecture is booked out
*Date*: Wednesday May 4

**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

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**News & Events**

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**Thank You**
The Florey thanks our recent donors who kindly donated $500 or more between Oct 2015 and Feb 2016.

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**Donations in celebration of**
70th birthday of Sally Beavis  
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70th birthday of Colin Wise

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

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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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