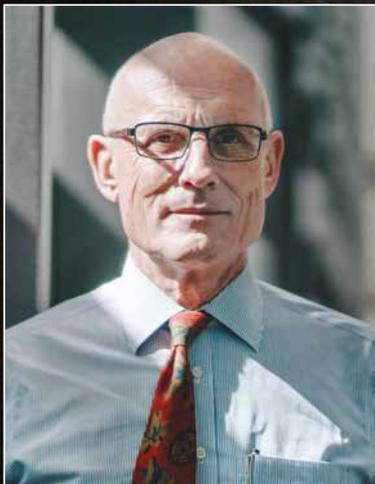


the NeuRA

magazine

Issue 21 | Winter 2017

Fighting for a Cure for Alzheimer's



- NeuRA launches virtual Schizophrenia Library
- New research supports cerebral palsy children
- Looking for a better night's sleep?
- Unlocking the reasons for chronic back-pain
- Transurban Road Safety Centre opens at NeuRA



Message from our Executive Director

Prof Peter Schofield



Prof Peter Schofield

We recently celebrated the official opening by the Minister for Health and Minister for Medical Research, the Hon Brad Hazzard, of a series of new facilities at Neura which complete the staged fit-out of the Margarete Ainsworth Building. Made possible by a capital grant from the NSW

Government and our generous benefactors, Mrs Margarete Ainsworth and Mrs Betty Lynch OAM, these new laboratories will enable us to expand our neuroscience research to support community needs across a number of disorders of the brain.

The new Transurban Road Safety Centre has a state-of-the-art crash sled which will dramatically enhance our road safety research. Transurban's support of this facility will allow us to undertake new research into improving safety for the aged driver, and the motorcyclist, as well as our continued work on child restraints in cars.

The building and fit-out of the Gait Lab, for the study of falls prevention will focus on developing programs to train the brain to react quickly to situations which could result in a fall.

The John and Betty Lynch Seminar Room provides us with a beautiful new conference facility which will support the exchange of ideas between Neura researchers and visiting national and international experts, leading to enhanced collaboration. We have also expanded the storage facilities for the Sydney Brain Bank, which provides vital brain tissue to support researchers in Australia and overseas who are working to find a cure for diseases such as Alzheimer's and Parkinson's.

Our sincere thanks goes to Amanda Ayliffe and all our Australian participants who are working with us on a global clinical trial program aimed at preventing Alzheimer's disease. Families like Amanda's hold the key to this preventative approach, which we hope will allow the disease process to be slowed down before nerve cells are lost and symptoms develop.

As we approach the pointy end of this clinical research trial into Alzheimer's prevention, I want to thank each of you who have, or are considering, supporting our vital projects focused on conquering and curing disorders of the brain.

Prof Peter R Schofield *FAHMS PhD DSc*
Executive Director and CEO

NeuRA Events

John and Betty Lynch Seminar Room Opens



Prof Peter Schofield and Mrs Betty Lynch

Our sincere thanks to Mrs Betty Lynch OAM for her very generous donation which has enabled Neura to undertake the fit out of a light-filled and elegant conference facility which will enhance communication and the exchange of ideas, leading to enhanced collaboration.

Conquer Kokoda: Conquer Alzheimer's



Kokoda Walkers

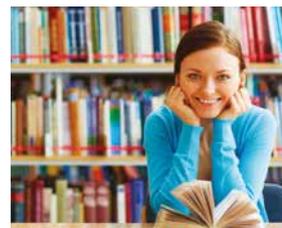
Join Conquer Kokoda and retrace the footsteps of the soldiers who fought to defend PNG and Australia during the Second World War

or sponsor one of our walkers! You can be part of a team raising vital funds to support Neura's vision of conquering and curing diseases and disabilities of the brain and nervous system.

Dates: 30 October - 9 November 2017

To sponsor a walker or to enquire more about this opportunity visit: www.inspiredadventures.com.au/events/NeuRA-Kokoda-2017

NEW Schizophrenia Virtual Library



Neura has just launched a new virtual library called the Neura Discovery Portal. Its first volume, focused on schizophrenia,

has been developed to support the community, practitioners, people living with schizophrenia and their families. The new online library opens up a world of fresh knowledge. Read more on pg 6.

New Research Partnerships

NeuRA has established a new research partnership with Transurban, launching a dedicated world-class research centre for road safety.



The Hon Brad Hazzard MP opens Transurban Road Safety Centre

The Transurban Road Safety Centre was officially opened by the Hon Brad Hazzard MP, NSW Minister for Health and Minister for Medical Research. The joint

venture brings together Medical Research, Business and Government into a partnership aimed at working together to reduce injury suffered on our roads.

"This vital research project will better shape road safety priorities and ultimately save more lives - not only on NSW roads but across the country," Mr Hazzard said.

Injury is the leading cause of death and disability for Australians aged between 1 and 45 years, and road trauma is responsible for a substantial proportion of this problem. The burden of road trauma in Australia is considerable, with around 1,300 deaths and 65,000 hospitalisations each year. Estimates suggest that road trauma costs the Australian government \$27 billion annually, however the human costs to families affected by road trauma is immeasurable.

The launch of the Transurban Road Safety Centre at NeuRA is an excellent example of the opportunities and benefits which partnerships can bring to the community, to make roads safer, protect passengers from injury, and ultimately save lives.



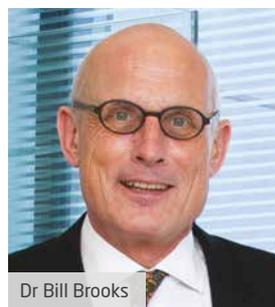
L-R. Prof Lynne Bilston, Prof Peter Schofield, Dr Julie Brown, Andrew Head, Mrs Betty Lynch, Mrs Margaret Ainsworth and Scott Charlton



Video story online

www.neura.edu.au/magazine/issue-21/

DIAN Study Gears up for 2018



Dr Bill Brooks

Dr Bill Brooks and Mirelle D'Mello co-ordinate the Sydney site for the DIAN trial. By the end of this year everyone in the worldwide study will have been on the double-blind phase of the trial for 2 years. Investigators will start examining the data

for evidence of success later this year. These results will frame the next phase of this ground-breaking research program in 2018 and beyond.

New Research Supports Children with Cerebral Palsy



Arkiev De Souza with research participant

A new study by Prof Rob Herbert and his team at NeuRA will investigate muscle contracture in children with cerebral palsy. Contracture is a stiffening of muscles, even when the muscle is passive. It is not yet known whether contracture is a result of changes in the muscle, changes in the associated tendon, or a combination of both. Around 53 per cent of children with cerebral palsy have contractures at the lower leg, which prevent normal joint mobility and can result in deformity.

Understanding the mechanism which causes contracture will help to guide intervention strategies and create new techniques to overcome these difficulties for children with cerebral palsy.



Unlocking the reasons for chronic back-pain

Dr Sylvia Gustin

Chronic pain is a significant problem worldwide and locally, impacting one in three Australians. It results in enormous suffering and costs to the individual, as well as their loved ones and society in general. Despite the availability of medications and other pain therapies, there is still no ideal treatment which benefits the majority of sufferers and most of the available therapies have significant side effects or risks of serious adverse events. Thus, there is an urgent need to identify, develop, and evaluate new chronic pain therapies.

Dr Sylvia Gustin's research program addresses this need by developing and evaluating treatments which can provide pain relief via the primary source of pain: the human brain. Her research has identified biochemical, structural and functional alterations within the thalamus that are now known to play a key role in the development and maintenance of chronic neuropathic pain.

The thalamus is a small structure within the brain located just above the brain stem and acts as a gateway to and from the cortex. Dr Gustin's new approach targets these thalamic changes to ultimately treat chronic pain.

In a new study these thalamic changes will be modulated, which Dr Gustin hopes will lead to significant pain reduction. This teaches individuals to gain control over their brain activity in a way which reduces their pain. An important part of the program is a nested mechanisms study which applies causal mediation analysis to state-of-the-art brain imaging data so that the precise brain processes which underlie therapeutic change can be identified.

Part of the reason behind our inadequate ability to provide satisfactory pain relief in people with chronic pain is our limited understanding of the pathophysiology underlying chronic pain. Consequently,

it is important that we determine the mechanisms underlying the development and maintenance of chronic pain.

Research has identified anatomical changes within the medial prefrontal cortex in chronic pain sufferers. The medial prefrontal cortex is the brain's major processing centre for emotions. In a new study, Dr Gustin will determine the nature of these anatomical changes using state-of-the-art brain imaging techniques.

The results from this study will provide vital information which will help to unlock the reasons for chronic back pain. In addition, it will provide new information which is needed to develop back-pain drugs which specifically target discrete brain regions.

Current back-pain medications are not targeted and therefore have significant side effects or risks of adverse events.



Dr Sylvia Gustin with research participant

NeuRA uses state-of-the-art brain imagery to explore brain processes relating to chronic back-pain

DIAN PROGRAM

NeuRA participates in global research program into Alzheimer's prevention

In conversation with Dr Bill Brooks



Dr Bill Brooks

Tell us about your work with families with the genetic form of Alzheimer's disease

I have been working with these families for over 25 years and we are involved here at NeuRA with a global research study called DIAN (Dominantly Inherited Alzheimer Network). This study set out to look for biological changes that occur in people before they develop the Alzheimer's symptoms such as memory loss. Over the last two years, we have been working on a clinical trial aimed at preventing the symptoms of Alzheimer's disease, by removing amyloid from the brain, before symptoms develop and before the nerve cells deteriorate. It has been a lot of work for us – and it's an even more demanding task for the clinical trial participants, but it is all going well so far.

What is the next big step in the DIAN program?

By the end of this year everyone in the study worldwide will have been on the double-blind phase of the trial for two years, so at the end of this year, we will start looking at the data to examine the evidence and results which will frame the next phase of this ground-breaking research program.

What does the next phase of the research look like?

The next phase of the DIAN trial, as far as the first two drugs are concerned, is that they will be reviewed

to see whether they have a significant influence on reducing amyloid deposition in the brain. If so, the trial participants will go on for another two years, to see if the trial can demonstrate an effect on people's memory and thinking. We also have plans to start a third drug arm this year. This process will roll on until a breakthrough is discovered which prevents the symptoms of Alzheimer's.

How do you feel being at the pointy end of science?

When I was a medical student there was no treatment or cure for Alzheimer's. It was not even on the horizon. It was thought probably to be one of those things which was just not treatable. Over the last couple of decades, we have seen gradual but major increases in our knowledge, and we are now in a position where we hope we can make the same inroads into Alzheimer's as we have into cancer, heart disease and stroke.

Here at NeuRA, we are really proud to be part of this international effort to find a preventative drug treatment for Alzheimer's disease. For me it's a culmination of many decades of work. To be stepping closer to discovery is what drives us all to keep pushing into the next phase of the DIAN research program.



Video story online

www.neura.edu.au/magazine/issue-21/

We need your help to keep the clinical trial running in Australia and to make sure that the next phase of the trial is completed. You can donate by using the donation form on pg 11 or at www.neura.edu.au/donate

DISCOVER a world of knowledge about Schizophrenia at NeuRA

NeuRA has officially launched a new virtual library on mental health called the NeuRA Discovery Portal. Developed to support the community, practitioners, people living with brain-related disorders, and their families, the new online library opens-up a world of fresh knowledge. The first virtual library launched is the Schizophrenia Library, with further content planned for Bipolar Disorder and Dementia over the coming years.

Developed by NeuRA scientist Dr Sandy Matheson, with a creative framework in conjunction with Prof Vaughan Carr (Research Unit for Schizophrenia Epidemiology, UNSW and NeuRA), the new online library found at www.library.neura.edu.au offers thousands of pages of information. It contains more than 2,000 downloadable fact sheets and technical evidence reports, some up to 50 pages in length. The Library also includes videos, podcasts, and interviews with leading scientific researchers in the mental health sector.

Commenting on the launch, Dr Sandy Matheson said due to the increasing



volume of worldwide research into mental health and brain disorders, there is a need to collect, collate, and synthesise these research findings in a free, online database.

“The virtual Schizophrenia Library allows the public, consumers, carers, researchers, clinicians and policy developers to better understand, investigate and manage these disorders,”

“It is a major step forward in NeuRA’s investment in helping all people discover more about brain-related disorders.” said Dr Matheson.

The ‘new look’ Schizophrenia Library provides reliable and up to date information from systematic reviews

on around 460 topics, all relating to schizophrenia.

There are two levels of information on each topic. The first is a brief Factsheet that provides general information describing the area examined and the evidence that is available. It’s relevant for the everyday person on the street.

The second is a Technical Commentary that provides more detail on each topic’s background, methods and results. Printable PDFs of factsheets and technical tables are available to download from each topic page.

Go to www.library.neura.edu.au



Video story online

www.neura.edu.au/magazine/issue-21/

Discover how you can support NeuRA’s PhD students in Schizophrenia



NeuRA is so fortunate to have many energetic PhD students working in the schizophrenia laboratory. These young men and women have chosen to dedicate their studies to schizophrenia research, and every day bring an enthusiasm that is contagious. To grow tomorrow’s leaders, we have a responsibility to nurture young researchers toward independence today, but because of the loss of a significant funding partner, their future is very uncertain.

We need your help to keep these researchers investing their talents into schizophrenia research, to aid in their mentoring, and to maintain our exciting momentum. You can donate by using the donation form on pg 11 or at www.foundation.neura.edu.au/appeal/futureleaders

Understanding the biological basis of Bipolar Disorder

Dr Jan Fullerton



INSIGHT:

Using state-of-the-art DNA sequencing, the team at NeuRA aims to improve our understanding of the causes and treatment of bipolar disorder, thereby leading to improved treatment and long term outcomes for people living with this illness.

Bipolar disorder is a severe and debilitating psychiatric condition, for which the specific causes remain largely obscure. The disorder is ranked in the top 20 most disabling disorders, and leads to severe social impacts, increased suicide risk, and poor general medical health for the approximately 250,000 Australians

affected. In Australia alone, the financial costs to government and societal sectors exceed \$3.3 billion per annum.

Dr Jan Fullerton and her team at NeuRA are conducting a number of studies to understand the biological basis of bipolar, to identify genetic signatures which may predict response or non-response to pharmaceutical treatments, and to determine whether future risk of bipolar can be predicted in young people who are at increased genetic risk.

Finding genes which contribute to bipolar disorder

Using large scale “next-generation” DNA sequencing, Jan’ team is identifying and characterising rare

DNA variants in the genomes of people with bipolar. The objective is to find that genes expressed in the synapse, the molecular communication system between neurons, which are enriched for damaging rare DNA variants in people with this condition. Together with collaborators at the Garvan Institute, the team is relating rare DNA variants to functional changes in the way genes are expressed using RNA-sequencing. Working with international collaborators, the team are also conducting studies to identify genes carrying common DNA variants which increase an individuals’ risk of bipolar. These studies are elucidating the genetic architecture of bipolar, and have identified several new risk genes, as well as providing additional support to the involvement of genes previously identified.

Predicting treatment response

Lithium is the most commonly prescribed mood stabilising drug used for the treatment for bipolar. However, the drug only works effectively in about a third of patients, and we currently cannot predict which patients are likely to respond. As part of the International Consortium on Lithium Genetics, we are actively pursuing the identification of genetic signatures which will facilitate targeted pharmaceutical therapies, enabling faster and improved medication response.



Dr Jan Fullerton with research participant



Video story online

www.neura.edu.au/magazine/issue-21/



Assoc Prof Danny Eckert



5 Minutes for a Better Sleep!

Assoc Prof Danny Eckert

Meet Assoc Prof Danny Eckert from the NeuRA Sleep and Breathing Lab. His team are about to partner with Brisbane-based company, Oventus Medical, on a major new Obstructive Sleep Apnoea (OSA) program. He tells us more about this study which could help us all have a better night's sleep.

What approach will this research take?

This research will target therapy for sleep apnoea using a novel personalised approach as a result of a successful Cooperative Research Centres Programme (CRC-P) grant application. CRC-P's are funded by the Commonwealth Government Department of Innovation, Science and Technology and are designed to support outcome-focused

collaborative research partnerships between industry, researchers and the community.

What is the key aim of this project?

This project aims to develop several technologies to establish an integrated, real-time sleep monitoring and treatment platform for OSA. NeuRA will lead the clinical research program for this collaborative project.

Is there an economic cost to business around sleep disorders?

In 2011, sleep disorders cost the Australian economy an estimated \$21.2 billion (Deloitte Access Economics: The economic cost of sleep disorders in Australia 2012). Effective treatment for OSA has been limited by poor tolerance of the main therapy and has been limited by accessibility and adoption of new technology for diagnosis and treatment.

Are there a range of factors that disrupt our sleep?

The Sleep and Breathing Lab at NeuRA has demonstrated that a range of factors impact the categorisation

of OSA. This new understanding of the underlying causes of OSA has unlocked new targets for therapy. However, diagnosis is still heavily reliant on the data from an overnight sleep study, which can be time-consuming and cumbersome. Treatment of OSA has traditionally been dominated by Positive Airway Pressure (PAP), developed here in Sydney. If used regularly, PAP technologies have a high success rate.



How will the clinical trials be structured?

My research team will conduct the clinical trials for the project to test and enable refinement of the technologies, and incorporate the techniques and advances in tailored therapy for OSA, pioneered by the NeuRA sleep and breathing team.



Assoc Prof Danny Eckert in the Sleep Lab with research participant

Clinical validation and refinement in this context will be critical to translating these concepts and technologies to provide new treatment options and improved outcomes for patients.

When will the trials take place?

The clinical sleep trials which will be performed at NeuRA in 3 stages (1 each year of the project) will test various treatment options singly and in combination. The milestones for the project are specifically set to revolve around patient outcomes from the 3 clinical trials, with the overarching goals of developing more effective, more reliable and more comfortable therapies compared with current technologies.

NeuRA is internationally renowned for its sleep and breathing research. Its clinical research team have an established track record in identifying the multiple causes of OSA and developing and testing new tailored therapies.



Video story online
www.neura.edu.au/magazine/issue-21/



Dr Anna Hudson

Young Researcher at Work

Dr Anna Hudson, Senior Postdoctoral Fellow at NeuRA, has been awarded the Lung Foundation Australia/Boehringer Ingelheim Chronic Obstructive Pulmonary Disease Research Fellowship. One in seven Australians over forty is affected by Chronic Obstructive Pulmonary Disease, a progressive disease which makes it hard to breathe and causes shortness of breath, progressing in its severity over time. People living with this disease usually experience coughing which produces large amounts of mucus, wheezing, shortness of breath, chest tightness, and other symptoms.

Commenting on her fellowship award Anna said, "my research work over the next two years will focus on looking at the way respiratory muscles are controlled in people with Chronic Obstructive Pulmonary Disease".

"For most of us we rarely think about breathing - it is an automatic process, but for people with Chronic Obstructive Pulmonary Disease, they are often short of breath."

"I am going to use my knowledge in the techniques to measure muscle and brain activity to detect impairments in the neural control of breathing in these people", said Dr Hudson.

This is a disease which affects the quality of life and the everyday living of people affected by it. By looking at how the neural control of their breathing muscles is affected, Dr Hudson hopes to identify new targets, therapies and techniques to support and improve the lives of people living with Chronic Obstructive Pulmonary Disease.



Dr Anna Hudson with research participant



Video story online
www.neura.edu.au/magazine/issue-21/

Bridge for Brains



The *Bridge for Brains Research Challenge* is a national event in support of NeuRA. The annual event has been held at bridge clubs across Australia

in the first week of May since 2004, with 130 clubs registered to participate in 2017.

NeuRA's Executive Director, Prof Peter Schofield said, "funds raised will support NeuRA researchers who are working on a global program called DIAN which is aimed at improving early diagnosis of dementia and developing treatments to prevent the disease altogether." said Prof Schofield.

Around 354,000 Australians are living with Alzheimers and other dementia-related illnesses and this figure is likely to rise to 900,000 by 2050, unless a treatment is found.

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Steve Thanks You



You might remember reading about Steve, who was only in his 30s when diagnosed with Parkinson's disease, the second most common

neurological condition after dementia.

The tragedy of Parkinson's disease is that up to 70% of vulnerable brains cells have been damaged by the time the first symptom appears. Recent research however has discovered that a special protein, found in people with a family history of the disease increases prior to symptoms. We want to learn more, and asked you to support research that seeks to identify who might be at risk of the disease, so that early action can be taken to stop the damage to the brain.

Steve would like to thank every one of our supporters who generously opened their wallets and gave in response, and so would we.

A Gift in Your Will



A gift in your Will is a very special way to support the work being conducted here at NeuRA, and it will make a lasting difference

to the health and quality of life of generations to come. Whether it is a large or small gift in your Will, it plays a vital role in funding research projects into a range of neurological diseases.

Gary McCarron made the decision to leave a bequest to NeuRA after watching firsthand the suffering of his wife, Colleen with Parkinson's. Living with his wife Colleen whom he married in 1978, Gary first noticed her Parkinson's in early 2000 when she developed a tremor in her left foot. He looked after Colleen lovingly but to the detriment of his own health and succumbed to bowel cancer in January this year. Gary had been giving regular donations to NeuRA to go towards Parkinson's research since 2011.

Gary decided to leave a bequest to NeuRA in his Will. This will go into NeuRA's endowment fund, providing income in perpetuity to support and fund new projects in neuroscience research at NeuRA.

If you would like to discuss a bequest, please call NeuRA on **1300 888 019** or email us at **foundation@neura.edu.au**

Lifting the Lid



NeuRA recently supported the regional coastal community of Nelson Bay participating in an evening forum

on the different roles needed for an effective mental health strategy in the Port Stephens area.

To address the issues of mental health, the forum featured Professor Cyndi Shannon Weickert, NSW Chair of Schizophrenia Research at NeuRA, who engaged in taking questions from the floor in an open session for close to two hours.

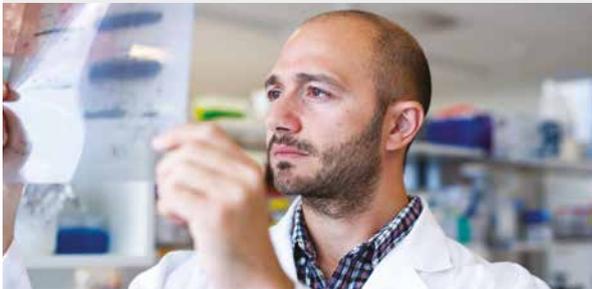
The value of medical research at NeuRA

Medical research is the cornerstone of our efforts to advance health and wellbeing for our families and our community.

For those affected by devastating diseases, medical research offers the only hope.

Please support our research by donating today.

Thanks to you for your support.



NEURA
ONLINE

www.neura.edu.au/magazine/issue-21/

We hope you enjoy our new look magazine. There is new content for you to enjoy including links to view extended interviews online, or hear from our trial participants like Amanda.

If you see this icon  you can now log onto our website and watch more stories on video go to www.neura.edu.au/magazine/issue-21/. You can also take a look at our new **NeuRA Discovery Portal** at www.neura.edu.au

Just look out for this  to tell you there is video content to accompany this story.

All content is housed on our NeuRA website so you only need to go to our website to find out more about our research projects, and hear from some of our lead researchers.

DONATION & RESEARCH VOLUNTEER FORM

All gifts over \$2 are tax deductible

- Yes, I would like to donate to research at NeuRA
 Yes, I am interested in participating in research at NeuRA

Title:

First Name:

Surname:

Address:

Suburb:

State:

Postcode:

Phone:

Best time & day to call:

Email:

Step 1: How I choose to give my gift:

- Please accept this one-off gift to support research at NeuRA
 I would like to invest in the future and become a *Discovery Partner* with a regular donation of \$ _____ monthly / quarterly (*please select*)

\$50 \$100 \$250 or

A cheque payable to the NeuRA Foundation is enclosed OR

I wish to make my gift by credit card:

Visa Mastercard American Express Diners

Card No:

Expiry Date:

Cardholder's Name:

Cardholder's Signature:

Please send me:

- Details about how I can support NeuRA in my will

- Mail this coupon in the reply paid envelope
- Call us on **1300 888 019** to make a donation over the phone
- Make a secure online donation at neura.edu.au/donate

A message from the NeuRA Foundation: The NeuRA Foundation may co-operate with other like-minded reputable Australian charities to promote our work to our respective donors. If you'd prefer that NeuRA does not share your information with other charities, please phone us on **1300 888 019**, email us at foundation@neura.edu.au or write to us using the enclosed envelope.

Thank you for generously supporting our research into diseases of the brain and nervous system.



Brain Bank Legacy

The Sydney Brain Bank at NeuRA aims to facilitate world class research and break throughs in ageing and neurodegenerative disorders. Globally it supplies tissue to 30-40 research projects a year, with many of these projects a collaborative effort between external research institutions.

Lead by Dr Claire Shepherd, recently appointed to the position of Director of the Sydney Brain Bank, the team has developed a new method that will allow them to inform the characterisation of one of the pathologies in Alzheimer disease. This will benefit research by providing a more cost effective and less labour intensive method without compromising on the quality and sensitivity of the diagnosis.

Says Dr Shepherd, "At the Sydney Brain Bank, we collect, characterise and store the brain tissue from individuals who have died from ageing or neurodegenerative disorders so that we can facilitate medical research."

The Sydney Brain Bank has been involved in setting the gold standard criteria for diagnosing some of these disorders alongside other global research facilities.

During 2017, Dr Claire Shepherd will travel to the UK to visit several British Brain Banks to work with their researchers in understanding their processes and to share ideas and techniques.

Thank you for your support

If you wish to update your preferred communications from NeuRA, please call 1300 888 019.

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