NeuRA
Discover. Conquer. Cure.

the NeuRA magazine

Issue 29 | **Winter 2019**

The diagnosis that changed Jeanne Little's life

- New insights on managing dementia symptoms
- Rethink of chest clips on child restraints
- Why we need Brain Banks
- Research breakthrough in schizophrenia

Message from our CEO

Professor Peter Schofield AO

Prof Peter Schofield AO

This issue features Jeanne Little's journey with Alzheimer's disease, as told by her daughter Katie Little. Katie speaks about her support for NeuRA researchers in discovering, conquering and curing this devastating disease. We stand with Katie and believe, with the help of our supporters and the community, we can move dementia research forward and make a difference to the lives of people living with dementia and their families.

Our researchers continue to make breakthroughs and you can read about them in this issue. Associate Professor Tom Weickert and Professor Cyndi Shannon Weickert recently identified changes in inflammation-related biochemical pathways in schizophrenia. These changes interfere with proper brain nerve cell communication. This discovery provides important new pieces of the complex puzzle that schizophrenia presents, underpinning new approaches for the development of medications to treat schizophrenia and its symptoms.

In other news, we were recently joined by the NSW Minister for Health and Medical Research, the Hon Brad Hazzard MP, to announce the latest results from the Transurban Road Safety Centre. The research, led by Professor Lynne Bilston, has shown a potential safety benefit in using plastic chest clips on child car restraints to keep shoulder straps together. The research used high-tech crash test dummies and could lead to a change in Australian safety standards allowing chest clips to be used here.

I hope you enjoy this issue of NeuRA Magazine. Thank you for your continued support.

Prof Peter R Schofield AO *FAHMS PhD DSc*
CEO

Cover photo: Australian entertainer Jeanne Little, her daughter Katie, and grandchildren

Remembering Professor James Waldo Lance AO CBE *FAA FRACP FRCP MD*

29 October 1926 – 20 February 2019

It is with great sadness that NeuRA reports the death of Professor James Lance aged 92. He was an exemplary neurologist, a true clinician scientist and the academic leader for many neurologists and other physicians and scientists in Australia and also overseas.

Jim Lance helped set up the Prince of Wales Medical Research Institute (POWMRI), later renamed as Neuroscience Research Australia (NeuRA), which was the first medical research institute devoted exclusively to neuroscience in Australia.

NeuRA researcher wins prestigious NHMRC award

Prof Jane Butler

NeuRA research into respiratory health has been recognised at the 2018 National Health and Medical Research Council (NHMRC) Research Excellence Awards. NeuRA researcher, Professor Jane Butler, has been honoured with a NHMRC 2018 Research Excellence Award for outstanding contributions to health and medical research. Each year, the NHMRC recognises the individual achievements, leadership and exceptional contributions of Australian researchers to their fields of research.

Professor Butler is internationally recognised for her work on the neural control of human respiratory muscles in health and disease. Her research aims to improve respiratory health in the critically ill and those with tetraplegia through the completion of novel clinical trials to improve respiratory muscle function. Professor Butler's current studies include the investigation of the behaviour of single motor units in respiratory muscles and respiratory neural control during normal breathing and in patients with sleep apnoea, chronic obstructive pulmonary disease, and methods to improve respiratory function and health after spinal cord injury.

New insights into managing dementia symptoms

The conclusion of a twelve-month research project into the reduction of behavioural and psychological symptoms of dementia (BPSD) suggests the quality of life for dementia patients can be increased through non-pharmacological methods.

The research program, titled BPSDPLUS, was developed by Dr Moyra Mortby from NeuRA and UNSW Sydney.

"We've seen promising initial results in relation to the provision of care, with care staff experiencing an increase in feelings of empowerment, and a better understanding of the complexities between dementia and BPSD," said Dr Mortby.

"By enhancing the relationship between staff and residents, carers are now better placed to respond to the needs of residents with dementia and BPSD."

Dr Moyra Mortby

Research funding for brain disorders in Australia

The 2019 Federal Budget has delivered a win for people living with brain disorders in Australia, with a $7 million funding boost for research aimed at developing improved models of care.

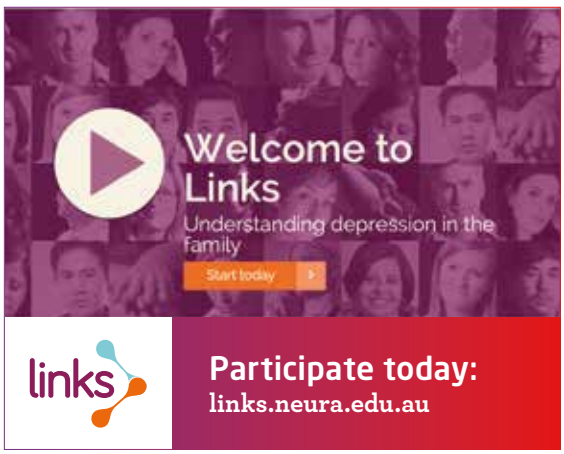
The clinical and research translation program, led by the Mindgardens Neuroscience Network (Mindgardens), will build new models of care to address the staggering burden of brain disorders in Australia.

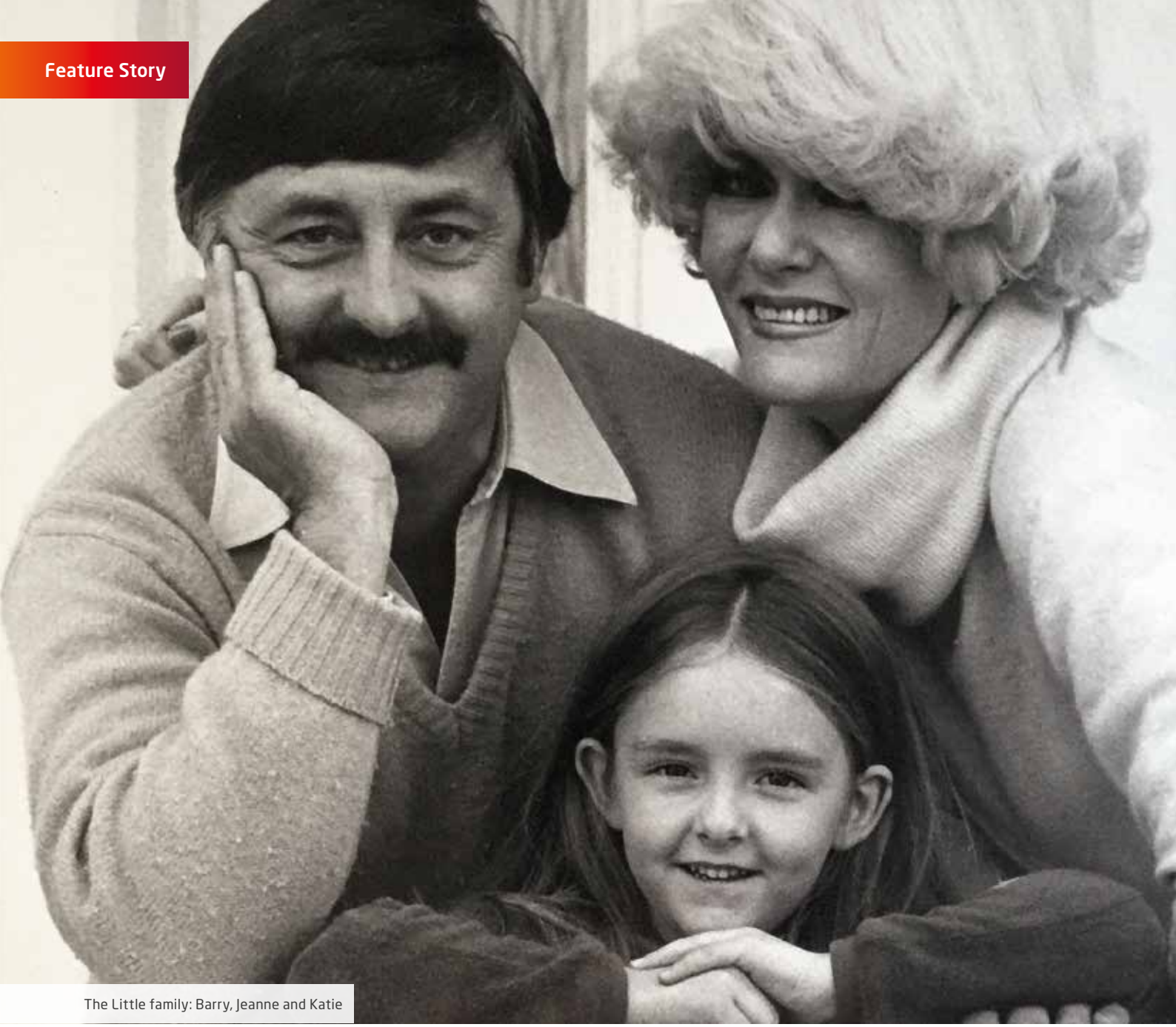
"Our aim is to become an international leading precinct for innovative research and compassionate healthcare for all brain disorders," said NeuRA CEO and Interim Co-CEO of Mindgardens, Professor Schofield AO.

Website puts fears about depression genes into perspective

A new interactive website launched by NeuRA and UNSW researchers enables people with a family history of major depressive or bipolar disorders to work out how likely it is that they – or any of their offspring – could develop these mental illnesses.

The website was developed by UNSW, NeuRA and collaborators at other universities to address a gap in treatment that is currently not available to people concerned about their own or family members' vulnerability to depression.





The Little family: Barry, Jeanne and Katie

A message from Katie Little

Katie is the daughter of Australian television icon and Gold Logie Winner Jeanne Little. Katie has written a book about her mum called *Catch a Falling Star*.

My mum, Jeanne Little, has Alzheimer's disease. She has had it for thirteen long years, with eleven of those in full time care.

What strikes me the most is the difference between mum in life, and mum today. When we visit it is like I'm visiting a different person – a shell of the person she was who looks at me through a blank and distant stare.

Alzheimer's stole my mum.

Even Tom, my young son – mature beyond his years – says she wouldn't want this, and he's right. Who would?

One million Australians will have dementia by 2050 – that's one in three of us! I feel it is our responsibility to rid our community of this beast. No one deserves their final years – any years for that matter – 'living' like this. That's why I'm supporting NeuRA and their 1,000 Brains Study.

NeuRA's research in preventive lifestyle measures together with the 1,000 Brains Study makes me feel hopeful they can break the back of this insidious disease.

Katie at the 2019 Food for Thought dinner

Video Story Online
neura.edu.au/magazine/neura-magazine-29

NeuRA is where all the smart people are, so we all need to get behind them and help them as much as possible. With your help, they can find out how to prevent and cure this illness, so no one in future generations has to lose someone they love, like my mother Jeanne Little.

Alzheimer's is awful. It has robbed me and my family of so many things. But the one thing it will not take is my sense of humour - the tougher life is the darker it gets.

Jeanne Little

Outrageous, flamboyant, iconic – Jeanne Little captivated Australians everywhere with her unique style, cockatoo-shrill voice and fashion sense.

"Mum wasn't just the life of the party, she was the party," said Katie Little, Jeanne's daughter.

Jeanne was born in Sydney, Australia and made her television debut on Network Ten's The Mike Walsh Show in September 1974. She was diagnosed with rapid-onset Alzheimer's Disease in 2009, and is now being cared for in a Sydney nursing home.

Researchers suggest a rethink of "banned" chest clips on child car restraints in Australia

Research using child-sized crash test dummies has shown, for the first time, a potential safety benefit in using plastic chest clips on child car restraints, as they keep shoulder straps together, reducing the risk of serious injury in a crash.

Despite chest clips being widely used in the United States, they do not meet Australian safety standards due to concerns they may cause neck injuries in a crash. However, researchers at the Transurban Road Safety Centre at NeuRA have found no sign of serious injury related to the chest clips when tested on Australian child restraints.

Researchers reviewed real-world data from an American crash database to see if there were any signs of injury in children up to the age of four.

"We found that there was actually a reduction in the risk of moderate to serious injury of all types in children under one when chest clips were used properly," said Professor Lynne Bilston, Senior Principal Research Scientist at NeuRA.

Seniors and seat belts

This review of American data prompted Professor Bilston to study the performance of Australian car seats in crash tests using the same type of chest clips used in the US. Professor Bilston and her team conducted crash tests using small child-sized crash test dummies at the Transurban Road Safety Centre based at NeuRA.

"We tested chest clips in frontal crashes, using a crash test dummy that represents the smallest child who would normally be forward facing," said Professor Bilston.

The crash tests were done at 49 km/hr in a frontal direction, both with a tight harness and with a looser harness. Analysis of high-speed crash test footage showed the plastic clips tended to slide down the straps during the crash, meaning they are unlikely to be forcefully touching a child's neck. There was no difference in the neck forces with the clips in place.

The results of this research will be submitted for consideration by the Australian Standards Committee to determine whether plastic chest clips might have a net benefit, allowing them to be supplied with Australian child car restraints.

Video Story Online
neura.edu.au/magazine/neura-magazine-29

NeuRA has developed an information brochure on the correct use of seat belts for seniors, in partnership with the Transurban Road Safety Centre. This follows research that shows, on average, 250 Australians aged over 65 die every year in car crashes, and more than 4,000 are hospitalised.

Injuries sustained by older drivers are more severe than those in younger age groups. It is estimated that injury risk is nine times higher per kilometre travelled in drivers 85-years-and-over, compared to drivers between 25 and 69 years-of-age.

The goal of this brochure is to bring greater awareness to the importance of good seat belt fit and deliver tips on senior driver safety.

To request a FREE copy of the Seniors and Seatbelts Brochure visit foundation.neura.edu.au/seatbelt

The 1,000 Brains Project

Dr Claire Shepherd

The 1,000 Brains Study is a ground-breaking research project to identify the elements in the brain that cause life-changing neurodegenerative diseases like Alzheimer's disease, Parkinson's disease and other types of dementia. This study will focus on the key unresolved question: why do some of us develop devastating neurodegenerative diseases, while others retain good brain health?

The study will not only compare the genomes of people who reached old age with those who have died from neurodegenerative disease, but it will also conduct post mortem examinations to compare the brain tissue in these groups as well. Collecting and researching brain tissue takes place at NeuRA's Sydney Brain Bank.

The Director of the Sydney Brain Bank at NeuRA, Dr Claire Shepherd, said Brain Banks are essential to underpin research into neurodegenerative disorders.

"We can collect brain tissue and do our own research on this in the hope that we can find a cure or a treatment for these diseases and disorders," said Dr Shepherd.

The 1,000 Brains Project is about understanding the genetics behind neurodegenerative disorders.

"We hope to sequence the genome of these people and understand what genetic risk factors and genes contribute to the disease process," said Dr Shepherd.

Holding the genetic information as well as the clinical information and the brain tissue greatly enriches the research outcomes that can be achieved.

"Research organisations like NeuRA are at the forefront of neuroscience research that's why I support them because dementia is going to affect so many people and it's not just the person who gets it, it affects the whole family and the community."

Janet Cameron, a NeuRA Financial Donor

Video Story Online
neura.edu.au/magazine/neura-magazine-29

Why do we need Brain Banks in Australia?

- Researchers rely on brain banks to **access well-characterised brain tissue** to drive dementia research efforts
- Brain banking is essential to **confirm dementia diagnoses**, which is used to further educate clinicians making diagnoses during a patient's life
- Brain banks **supply both the healthy control and disease case tissue** for research that may eventually lead to potential treatments for dementia
- Advances in dementia research will **reduce the cost of dementia** in Australia, which is estimated to reach $36.8 billion by 2056
- Some types of dementia research that require **access to brain tissue** are **only possible through bank banks**

Over the last five years at the Sydney Brain Bank:

133
Tissue requests **approved** and tissue **supplied**

Countries where **brain tissue** has been sent:
UK, USA, SWEDEN, KOREA, CHINA, FINLAND, NEW ZEALAND, BELGIUM

Number of tissue samples supplied: 18,656

Currently
623
brains in storage

The number of scientific **publications** or **presentations** generated from **tissue requests**
186

TISSUE SUPPLIED TO STUDIES IN:

- Parkinson's disease
- Frontotemporal lobar degeneration
- Multiple system atrophy
- Alzheimer's disease
- Motor neurone disease
- Huntington's disease
- Healthy Ageing

Food for Thought Dinner

On 16 May, NeuRA held its annual *Food for Thought* dinner at the Margarete Ainsworth Building. The night was dedicated to raising funds for dementia research, with proceeds going to the 1,000 Brains Project. The NeuRA Foundation was thrilled to host 145 guests and to begin fundraising efforts for the $5 million needed for the project.

Katie Little

The highlight of the evening was guest speaker **Katie Little** who shared her story of growing up with her mother and Australian television icon, **Jeanne Little**. In 2009, Jeanne was diagnosed with Alzheimer's disease and since then life has changed significantly for the star and her family. Katie spoke about Jeanne's journey and the hardship of watching her mother's decline. Katie closed the night with a message of hope about the collective research effort to "discover, conquer and cure" this devastating disease, as well as highlighting the importance of funding research and "getting behind all the smart people at NeuRA".

A gift for discovery


L-R: Prof John Niland AC, Dr Carmel Niland and Prof Schofield AO

Joan Hume passed away at 69-years-old after having lived as a quadriplegic for 46 years. All her life she was active in advocacy for people with disabilities. Joan believed in innovative research and the impact it could have in providing benefits for people living with spinal cord injuries. She even volunteered for a number of NeuRA's spinal injury research projects.

Joan's belief in the power of research will live on through a legacy gift left in her Will. The gift will support researchers at NeuRA working on spinal injury research.

"Joan would like her gift to support out-of-the-box research," said Joan's sister, Carmel.

By leaving a gift in your Will, you too can influence the future development of significant and life-changing medical research.

To discuss leaving a gift in your Will, please contact NeuRA's Gifts in Wills Manager, Stephanie Grove on +61 2 9399 1270 or by email s.grove@neura.edu.au

Get your colour on

One in five Australians will experience a mental illness each year. Australia's mental health crisis demands our attention. NeuRA is launching a new event to raise funds for mental health research, called Colour Your Hair for Mental Health. All funds raised will support research into depression, anxiety, bipolar disorder and schizophrenia.

Keep an eye out for the website, ColourYourHair.com.au, which launches on June 30. In the meantime, please contact the team at events@neura.edu.au for more information.

NeuRAtalks is a **free online platform** that brings you the latest developments in neuroscience from our very own researchers.

Featured NeuRAtalk

Dr JUSTINE GATT

The neuroscience of resilience

The neurobiology of resilience is complex. But neuroscience research is revealing an understanding of the biological mechanisms behind resilience to help guide healthy emotional and cognitive functioning.

Resilience is not something we are born with. It is a series of steps that you can take to deal with stress and thrive. Resilience is important because it helps protect you against the development of mental health problems throughout your life.

Dr Justine Gatt's quest is to decode resilience in the brain. **Watch her NeuRAtalk to find out about the simple steps you can take to build resilience and improve your mental wellbeing.**

Visit neuratalks.org

WATCH OUR Video Stories Online THIS MONTH

Follow these easy steps to enjoy more of these stories online.

STEP 1. Go to the **NeuRA website** neura.edu.au

STEP 2. Click **News and Events**

STEP 3. Click **Magazines**
You will see our Magazine #29 to explore the video content from this issue

Hope you enjoy our online stories with a cup of tea!

DONATION & RESEARCH VOLUNTEER FORM

All gifts over $2 are tax deductible

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☐ Yes, I am interested in participating in research at NeuRA

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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

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☐ Visa ☐ Mastercard ☐ American Express ☐ Diners

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Expiry Date:

Cardholder's Name:

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- 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.

Neuroscience Research Australia Foundation, PO Box 1165, Randwick NSW 2031 ABN 57 008 429 961

Inflammation linked to chemical imbalance in schizophrenia

NeuRA researchers have identified changes in inflammation-related biochemical pathways in schizophrenia that interfere with brain nerve cell communication. Professor Cyndi Shannon Weickert, Associate Professor Tom Weickert and their research partners have found the first direct evidence in support of increased kynurenic acid production in the brain, which is known to block a key glutamate receptor.

This discovery paves the way for better targeted therapies with fewer side effects for people with schizophrenia.

Elevated levels of kynurenic acid found in the brains of people with schizophrenia suggests an overproduction in response to inflammation, which could be detrimental to brain function.

"This is exciting for the field of schizophrenia research, because in addition to our previous findings that point to the immune cell's role in schizophrenia, we have now identified another cell target in the brain," said Professor Cyndi Shannon Weickert from NeuRA and UNSW Sydney.

"This provides a better understanding of the molecular and cellular mechanisms underlying the deleterious effects of neuroinflammation."

It has long-been suspected that metabolism of the amino acid tryptophan, commonly known to produce the *"feel-good"* neurotransmitter serotonin, is involved in schizophrenia.

During inflammation, tryptophan is broken down into kynurenine, which can then can go down one of two avenues; one that forms a chemical compound called quinolinic acid and one called kynurenic acid. There is debate about which avenue leads to brain pathology in schizophrenia.

But now researchers have narrowed down the culprit to increased kynurenic acid production. Kynurenic acid plays an important role protecting brain cells from overstimulation by blocking NMDAR, a key glutamate receptor. However, NMDAR blockade can also lead to psychosis.

This study also demonstrated that biochemical changes in blood can reflect the changes in the brain related to schizophrenia, such as volume loss of the prefrontal cortex and attention impairment. This suggests that the kynurenine pathway may be a viable target for the development of a clinical blood biomarker to help predict brain and cognitive changes in schizophrenia.

Researchers have been seeking a biomarker of schizophrenia for a long time said lead author Associate Professor Thomas Weickert from NeuRA.

"Our work suggests blood kynurenine and tryptophan levels may be able to quickly and simply inform clinicians of the brain and cognitive status which could provide a more personalised approach to treatment with new drug therapies," said Associate Professor Weickert.

Thank you for your support

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

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