

SCHIZOPHRENIA BREAKTHROUGH

Major research discovery, Sydney Australia

Friday 14th September 2018: In one of the biggest breakthroughs in schizophrenia research in recent times, Professor Cynthia Shannon Weickert at Neuroscience Research Australia (NeuRA) has identified immune cells in greater amounts in the brains of some people with schizophrenia. The study published today in *Molecular Psychiatry* has the potential to transform global schizophrenia research and open new avenues for developing targeted immune cell therapies.

One in every 100 Australians lives with schizophrenia. No single cause of schizophrenia has been identified, and this has prevented the development of a cure. The current treatments for schizophrenia are designed to suppress symptoms rather than target underlying causes of the disorder. These drugs only partially relieve symptoms and can produce unwanted side effects.

To recognise the significance of this discovery Professor Shannon Weickert says you first need to understand most scientists have had a long held belief that immune cells were independent from the brain pathology in psychotic illnesses.

“In our study, we challenged this assumption that immune cells were independent of the brain in psychiatric illness and made an exciting discovery. We identified immune cells as a new player in the brain pathology of schizophrenia,” said Professor Shannon Weickert.

Current schizophrenia research has focused on the status of three brain cells: the neurons; the glial cells, which support the neurons; and the endothelial cells, which coat the blood vessels. Employing new molecular techniques allowed Professor Shannon Weickert and her team to identify the presence of a fourth cell, **the macrophage, a type of immune cell** in the brain tissue of people with schizophrenia who show high levels of inflammation.

Professor Shannon Weickert said immune cells have previously been ignored as they had long been viewed simply as travelers just thought to be passing by, undertaking surveillance work. They have never been a suspect until now.

“To find immune cells along the blood brain barrier in increased amounts in people with schizophrenia is an exciting discovery. It suggests immune cells themselves may be producing these inflammatory signals in the brains of people living with schizophrenia,” said Professor Shannon Weickert.

“We have observed in people with schizophrenia, the glial cells, one of the local residents, become inflamed and produce distress signals which change the status of the endothelial cells.

“We think this may cause the endothelial cells to extend sticky tentacles, so when the immune cells travel by some are captured. These cells may transmigrate across the blood brain barrier entering the brain in **greater amounts** in some people with schizophrenia compared to people without the disorder.”

This discovery shows that specific immune cells are in the brains of some people with schizophrenia in close enough proximity to the neurons to do damage.

Professor Peter Schofield, CEO of NeuRA said this innovative new research has the ability to alter the way in which we may be able to diagnose and treat schizophrenia.

"This breakthrough demonstrates the value of the NSW Government's support for Professor Shannon Weickert as NSW Chair of Schizophrenia Research, which has delivered new insights that the community seeks," said Professor Schofield.

Professor Shannon Weickert is encouraging a cross-collaborative approach between neuroscientists and immunologists globally, to work together to develop treatments targeting this abnormal immune pathology of schizophrenia.

"This opens whole new avenues for therapy, because it suggests that the pathology of schizophrenia could be within the immune cells and the immune cells could be contributing to the symptoms of schizophrenia," said Professor Shannon Weickert.

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CV overview:

Neuroscience Research Australia (NeuRA) is an independent, not-for-profit research institute based in Sydney, Australia. As a leader in brain and nervous system research, our goal is to prevent, treat and cure brain and nervous system diseases, disorders and injuries through medical research.

Professor Cynthia Shannon Weickert is the NSW Chair of Schizophrenia Research based at Neuroscience Research Australia (NeuRA) and the University of New South Wales (UNSW). Professor Shannon Weickert is also a Professor in the Department of Neuroscience and Physiology at Upstate Medical University in Syracuse, New York.

The research Paper was authored by: Helen Cai, 1st author and graduate student on the project; Maree J. Webster PhD; Cherrie Galletly MBChB, FRANZCP, PhD; Dennis Liu MBBS FRANZCP; Maryanne O'Donnell MBBS FRANZCP; Thomas W Weickert PhD; and Cynthia Shannon Weickert PhD.