NeuRA
Discover. Conquer. Cure.

SCHIZOPHRENIA LIBRARY

# SCHIZOPHRENIA Factsheet

**March 2019**

## What is magnetic resonance spectroscopy (MRS)?

MRS is a specialised imaging technique that utilises magnetic resonance imaging to investigate biochemical alterations within tissues. Two notable methods of MRS are 1H-MRS (proton-MRS) and 31P-MRS (phosphorus-MRS). Each technique is sensitive to different metabolic compounds. 1H-MRS can be used to measure N-acetylaspartate (NAA), an amino acid that is used as a marker of neuronal viability. Decreased levels are associated with neuron death or dysfunction. 1H-MRS is also used to measure Creatine (Cr), a compound involved in energy metabolism, Glutamate (Glu), a neurotransmitter, and Glutamine (Gln), a metabolite of glutamate. 31P-MRS is used to measure phospholipid levels, such as phosphomonoesters (PME) and phosphodiesters (PDE). These phospholipids provide information about cellular energy metabolism and membrane synthesis.

## What is the evidence for MRS?

Moderate and moderate to high quality evidence suggests NAA levels are reduced in people with schizophrenia compared to people without schizophrenia in the frontal lobe, temporal lobe, thalamus, hippocampus, cerebellum, and cingulate cortex. Lower quality evidence suggests NAA may also be reduced in the parietal lobe, basal ganglia, and occipital lobe (white matter only). NAA may be increased in the striatum and lenticular nucleus in people with schizophrenia. There are NAA reductions in the anterior cingulate and hippocampus of first-degree relatives of people with schizophrenia. People at clinical or genetic high-risk of schizophrenia show NAA reductions in the thalamus and NAA/Cr ratio reductions in the prefrontal cortex.

Moderate to low quality evidence suggests small to medium-sized reductions in glutamate, and increases in glutamine levels in the frontal cortex of people with schizophrenia, which may progress with age.

Moderate quality evidence suggests decreased prefrontal PME levels in people with schizophrenia. There are decreased PME levels and increased PDE levels in the prefrontal and temporal lobes of people with first-episode psychosis. There is also reduced prefrontal PME levels and increased prefrontal PDE levels in first-degree relatives of people with schizophrenia.

**For more information see the technical table**

NeuRA
Discover. Conquer. Cure.

*NeuRA (Neuroscience Research Australia) is one of the largest independent medical and clinical research institutes in Australia and an international leader in neurological research.*

*Diseases of the brain and nervous system pose the greatest health, economic and social burden of any disease group because they are chronic, debilitating and have no known cures.*

*Medical research is the cornerstone of efforts to advance the health and wellbeing of families and the community. Our dedicated scientists are focussed on transforming their research into significant and practical benefits for all patients.*

*While we hope you find this information useful, it is always important to discuss any questions about schizophrenia or its treatment with your doctor or other health care provider.*

## HOW YOUR SUPPORT HELPS

We are able to make significant advances due to the generosity of countless people. Your donation allows us to continue to work towards transforming lives. For information on how you can support our research, phone **1300 888 019** or make a secure donation at **neura.edu.au/donate/schizophrenia**.

NeuRA (Neuroscience Research Australia) Foundation
**T** 1300 888 019 **F** +61 2 9399 1082
ABN 57 008 429 961

**Margarete Ainsworth Building**
Barker Street, Randwick NSW 2031
PO Box 1165 Randwick Sydney NSW 2031 Australia

neura.edu.au