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July 2020

What are NMDA receptors?

An N-methyl-d-aspartate (NMDA) receptor consists of several subunits; the NR1 subunits that bind coagonists glycine and d-serine, the NR2 subunits that bind the neurotransmitter glutamate, and the NR3 subunits that bind glycine. The NMDA receptor is activated by binding glutamate and a coagonist.

Glutamate is the major excitatory neurotransmitter in the brain and is crucial to normal brain function. In schizophrenia, there may be changes in levels of glutamate and its metabolites (e.g. glutamine), and changes in levels or activity of mechanical components of the NMDA receptor system, such as the receptors that 'receive' glutamate, or the transporters that 'remove' it.

What is the evidence for changes in NMDA receptors in people with bipolar disorder?

Moderate to low quality evidence suggests significant, medium to large increases in glutamate+glutamine in people with bipolar disorder compared to controls across all brain regions, and in a separate analysis of frontal regions. Non-significant medium to large trend effects were also found for increased glutamate alone and glutamate+glutamine/creatine ratio across all brain regions combined, but no increases were found in the analysis of frontal regions. There were no differences between people with bipolar disorder and controls in glutamate/creatine ratio levels, or in any analyses contained to children and adolescents.

Moderate quality evidence suggests people with bipolar depression showed a medium-sized trend effect of higher glutamate+glutamine in the anterior cingulate cortex than controls, while people with unipolar depression showed a large, significant effect of lower glutamate+glutamine in the anterior cingulate cortex than controls.

For more information see the technical table



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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 bipolar disorder 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.

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