



NeuRA

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SCHIZOPHRENIA Factsheet

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What is the thalamus?

The thalamus is a midline structure located directly on top of the brainstem, surrounding the third ventricle. It is thought to be primarily involved in relaying information from the brainstem and subcortex into the cortex, particularly sensation, special sense and motor signals. Every sensory system except olfaction utilises a thalamic relay to the associated cortical region. The thalamus has also been implicated in autonomic functions such as the regulation of consciousness, sleep and wakefulness. The thalamus may have higher cognitive functions, being implicated in some emotional processing as well as memory propagation.

What is the evidence for changes in the thalamus?

Structural changes

High quality evidence found bilateral thalamus grey matter reductions in people with schizophrenia, which is of larger magnitude in those with first-episode schizophrenia than chronic schizophrenia. Moderate to high quality evidence found increased grey matter volume in the right thalamus of people at clinical high-risk for psychosis compared to controls.

Functional changes

Moderate quality evidence found reduced connectivity at rest within the thalamus network, and between the thalamus network and the ventral/attention and frontoparietal networks. Moderate to low quality evidence found increased activity in the thalamus after cognitive remediation training.

There was decreased activation in the left mediodorsal thalamus of people with schizophrenia during executive function tasks compared to controls. During episodic retrieval, there was decreased activation in the bilateral thalamus along with increased activity in the right thalamus. There was decreased activation in the right thalamus during cognitive control tasks and bilateral thalamus during explicit threat processing and auditory stimulation. There was decreased activation in the left thalamus during reward anticipation tasks. People with schizophrenia showed decreased activation in the left thalamus during facial emotion processing compared to people with bipolar disorder.

There was increased activation in the right thalamus and decreased activation in the left thalamus of first-degree relatives of people with schizophrenia compared to controls during executive functioning tasks. There was increased activity in bilateral thalamus of relatives during working memory tasks.

Moderate to high quality evidence found decreased NAA levels in the thalamus of people with first-episode or chronic schizophrenia and in people at high-risk of schizophrenia. Moderate to low quality evidence found decreased N-acetyl aspartate/creatine ratio in the thalamus of people with chronic schizophrenia and increased glutamate/glutamine ratio in the thalamus of people with first-episode schizophrenia. Moderate to high quality evidence finds a medium-sized decrease in glutamate in the thalamus of people at clinical high risk for psychosis. There were no differences between patients and controls in glutamate, creatine, choline, and dopamine receptor availability.

For more information see the technical table



NeuRA

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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 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.