NeuRA
Discover. Conquer. Cure.

SCHIZOPHRENIA LIBRARY

SCHIZOPHRENIA Factsheet

October 2020

What is the cerebellum?

The cerebellum sits below the larger cerebrum of the brain, and is connected via the brainstem. The cerebellum is divided into two hemispheres separated dorsally by a midline zone called the vermis. It contains three primary lobes, the flocculonodular lobe, anterior lobe, and posterior lobe. Broadly, the cerebellum is thought to function in fine motor control (coordination and precision) and motor learning, balance, posture, as well as some cognitive and emotional capacity. The interaction of sensory, cognitive and motor functions may also contribute to proprioception (the awareness of self in space), planning movements, and evaluating information for action. The detailed functions of each region of the cerebellum are determined largely by their connectivity.

What is the evidence for changes in the cerebellum of people with schizophrenia?

Structural changes

Moderate quality evidence found grey matter reductions in the bilateral cerebellum of people with schizophrenia, particularly in medication-naïve patients, compared to controls. There were also white matter reductions in the bilateral cortico-ponto-cerebellum tract, and in the bilateral inferior and superior cerebellar penduculus. High quality evidence found no reductions in cerebellum volume over time (1-10 years).

Moderate to high quality evidence found better overall functioning was associated with larger cerebellum volume, and moderate to low quality evidence found reduced white matter volume in the cerebellum was associated with increased severity of neurological soft signs.

Functional changes

Moderate to high quality evidence found decreased functional activity in the right cerebellum (lobule VIII and crus I) and the left cerebellum (lobule IX), with no increases in functional activity. Functional connectivity strength was decreased in the left cerebellum (lobule IV/V) extending to the left fusiform gyrus (BA 30), and increased in the left cerebellum (crus I/II) of medication-naïve patients with first-episode schizophrenia compared to controls. Moderate to low quality evidence found increased activity in the cerebellum during auditory hallucinations in people with schizophrenia.

Moderate quality evidence found decreased functional activity in the left cerebellum of people with schizophrenia (vs. controls) during episodic memory retrieval. There was reduced activity in the right cerebellum lobule VI during explicit threat processing, and decreased activity in the fusiform gyrus extending into the cerebellum lobule IV/VI during implicit threat processing. There was decreased activity in the cerebellum during reward anticipation tasks. There was increased activity in the cerebellum during facial emotion recognition. Moderate to low quality evidence found decreased functional activity in the cerebellum of first-degree relatives of people with schizophrenia (compared to controls) during working memory and executive functioning, but not during cognitive control, long-term memory, or language processing.

Moderate quality evidence found decreased metabolic N-acetyl aspartate in the cerebellum of people with schizophrenia compared to controls.

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 enefits 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