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SCHIZOPHRENIA Factsheet

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What is the hippocampus?

The hippocampus is located deep within the medial temporal lobe and has extensive connections, largely to cortical association areas including the sensory modalities. This widespread connectivity facilitates multimodal integration of sensory information, and likely contributes to the role of the hippocampus in generating memory and facilitating spatial navigation. The medial temporal lobes, particularly the hippocampus and the surrounding cortical regions, have been implicated as crucial facilitators in the formation of new declarative memories.

What is the evidence for changes in the hippocampus?

Structural changes

Moderate or high quality evidence found hippocampal and parahippocampal grey and white matter reductions in people with schizophrenia and in people at risk of schizophrenia compared to controls. People at high clinical risk (with subclinical symptoms) showed decreases in the left hippocampus and the right parahippocampus. People at high genetic risk (relatives) showed increases in the right hippocampus and decreases in bilateral parahippocampus. There were decreases in the left parahippocampus in people at high genetic risk compared to people at high clinical risk.

Compared to people with bipolar disorder, there were small reductions in hippocampal subregions in the left cornu ammonis (CA)1, left CA2/3, left CA4/dentate gyrus, right presubiculum, and right subiculum of people with schizophrenia. There were overlapping grey matter volume decreases (when compared to controls) in the right parahippocampus of people with schizophrenia and people with autism.

Functional changes

Moderate quality evidence found decreased activation in the left hippocampus of people with schizophrenia compared to controls at rest. There was increased activity in the hippocampus during auditory hallucinations, and decreased activation in the retrosplenial/hippocampus during external auditory stimulation. There was decreased activation in the hippocampus during memory encoding and retrieval tasks, increased activation in the left parahippocampal gyrus during episodic memory encoding, and increased activation in the right parahippocampal gyrus during episodic memory retrieval compared to controls. There was increased activation in the left hippocampus and decreased activation in the parahippocampus during emotion processing tasks. During implicit, but not explicit threat processing, there was decreased activity in bilateral amygdala extending into the putamen, hippocampus and parahippocampal gyrus. There was increased activity in the parahippocampus and hippocampus during emotionally neutral tasks. There was increased activation in the left parahippocampal gyrus during emotion tasks of first-degree relatives compared to controls. There was increased activation in the left parahippocampus of people with schizophrenia during facial emotion recognition tasks compared to people with autism.

For neurometabolites, there was reduced hippocampal N-acetyl aspartate/creatine (NAA/Cr) and choline/creatine (Cho/Cr) ratios in people with schizophrenia. NAA/Cr was also reduced in first-degree relatives. There was reduced translocator protein in the hippocampus of people with schizophrenia.

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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 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.

For more information see the technical table

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**.

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