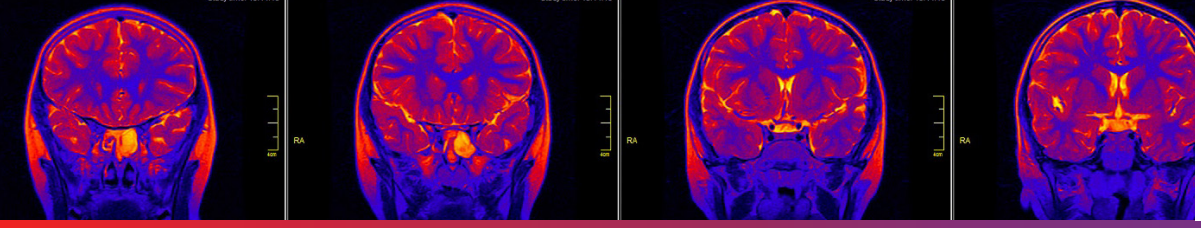

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SCHIZOPHRENIA Factsheet

March 2019

What is the evidence from functional magnetic resonance imaging (fMRI) studies on schizophrenia?

During emotion processing, moderate quality evidence shows decreased activation in people with schizophrenia when compared to controls in the amygdala, parahippocampus, lentiform nucleus, frontal lobe, occipital lobe, and fusiform gyrus, and increased activation in the parietal cortex, anterior cingulate cortex, temporal lobe, lingual gyri, insula, and amygdala. During motor inhibition tasks there is decreased activation in the basal ganglia and the inferior frontal cortex, and increased activation in the superior temporal gyrus. During executive functioning and working memory tasks there is decreased activation in the frontal lobe, parietal and occipital cortices, bilateral claustrum, fusiform gyrus, cerebellum, right putamen, hippocampus, and the left mediodorsal thalamus, and increased activation in the anterior cingulate cortex, temporal lobe, parietal cortex, lingual gyri, insula, and amygdala. During memory encoding tasks there is decreased activation in the medial frontal gyri and the hippocampus, and during memory retrieval tasks there is decreased activation in the medial and inferior frontal gyri, the cerebellum, hippocampus, and the fusiform gyrus, with increases in the anterior cingulate cortex and the medial temporal gyrus. During auditory hallucinations there is activation in Broca's area of the temporal lobe, the insula, hippocampus, left parietal operculum, left and right postcentral gyrus, and the left inferior frontal gyrus of people with schizophrenia. During external auditory stimulation there is decreased activation in Broca's area, the left middle temporal gyrus, left premotor cortex, anterior cingulate cortex, and left superior temporal gyrus in people with schizophrenia compared to controls. Following cognitive remediation (40 session over 10 weeks), there is increased activation in the left middle frontal gyrus, left inferior frontal gyrus, left superior frontal gyrus, pre- and postcentral gyrus, bilateral insula, parietal lobe, and medial frontal gyrus of people with schizophrenia.

Moderate to high quality evidence shows decreased activation in the left inferior frontal gyrus and the left medial frontal gyrus across a range of tasks in people at clinical high risk of psychosis who show attenuated symptoms compared to people not at risk. First-degree relatives of people with schizophrenia show increased activation in the right posterior and anterior superior temporal gyrus and decreased activity in the left thalamus and left cerebellum. Analysis of structural and functional anomalies in relatives demonstrated decreased grey matter with increased activation in the left inferior frontal gyrus and the amygdala, and decreased grey matter with decreased activation in the left thalamus. During executive functioning tasks relatives show increased activation in the right frontal gyri, right thalamus, left inferior parietal and precuneus, while cognitive control tasks are associated with altered activity in the dorsolateral prefrontal cortex, parietal, thalamus, and left middle frontal gyrus. Working memory tasks are associated with altered activity in the dorsolateral prefrontal cortex, ventrolateral prefrontal, parietal cortices, cerebellum, right thalamus, inferior parietal cortex, middle frontal gyrus, and left precuneus in relatives, and during language processing, relatives show altered activation in the right ventrolateral prefrontal cortex and the parietal cortex. During emotion tasks relatives show increased activation in the left sub-gyral (parietal), right superior frontal gyrus, left lentiform nucleus (lateral globus pallidus), left parahippocampal gyrus, left precuneus and right middle temporal gyrus, and decreased activation in the right precentral gyrus, right inferior parietal lobule, left medial frontal gyrus, and right frontal gyrus.

Moderate quality evidence suggests that during facial affect processing people with schizophrenia show greater engagement in bilateral posterior associative visual cortices and less engagement in the left thalamus than people with bipolar disorder. Compared to people with autism spectrum disorders, there is decreased activation in schizophrenia in the anterior cingulate, superior temporal, and left posterior cingulate, and increased activation in the cerebellum, left inferior frontal, left parahippocampus, left inferior parietal, and right inferior occipital regions. During theory of mind tasks there is decreased activation in schizophrenia in the right insula, and increased activation in the right medial frontal, left frontal paracentral lobule, and left posterior cingulate cortex than in people with autism spectrum disorders.

During rest, there is decreased activation in the ventromedial prefrontal cortex, left hippocampus, posterior cingulate cortex, lower precueus and the precuneus, and increased activation in bilateral lingual gyrus in schizophrenia compared to controls. Conversely during rest, people with major depression show increased activation than controls in the ventromedial prefrontal cortex, left ventral striatum, and left thalamus, and decreased activation in the left postcentral gyrus, left fusiform gyrus, and left insula.

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 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**.

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