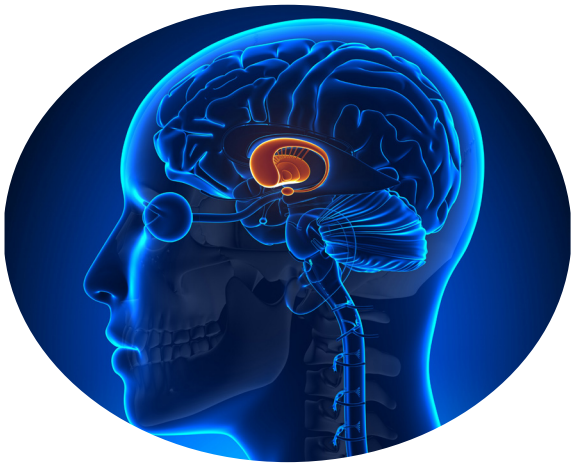

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SCHIZOPHRENIA Factsheet

October 2020

What is the basal ganglia?

The basal ganglia is a group of sub-cortical nuclei thought to be involved in motor control and learning. The nuclei comprising the basal ganglia include the caudate, putamen, globus pallidus, the subthalamic nucleus, and the substantia nigra. The caudate and putamen together form the striatum, while the globus pallidus (including the ventral pallidum) and the putamen together form the lenticular nucleus. The striatum is the principal input centre, receiving afferents primarily from the cortex, but also from the substantia nigra, thalamus, and external globus pallidus. There are two primary pathways ('direct' and 'indirect') from the striatum through the basal ganglia, which incorporate different components of the basal ganglia circuitry, and play different roles in controlling and planning movements and cognition.

What is the evidence for changes in the basal ganglia?

Structural changes

Moderate to high quality evidence found increased globus pallidus volume in medicated people with schizophrenia compared to controls. In mediation-naïve patients, the caudate nucleus was reduced. Moderate quality evidence found increases in the left caudate head of people with schizophrenia, but decreases in the left caudate head in those with persistent negative symptoms.

In people with first-episode schizophrenia, there was decreased grey matter in the bilateral caudate head (but not nucleus) and increased grey matter in the left putamen compared to controls. There was also increased grey matter in the left putamen of people with schizophrenia (not necessarily first-episode) compared to relatives of people with schizophrenia. Moderate to low quality evidence found greater reductions in the bilateral caudate in first-episode treatment-naïve patients (vs. controls) than in first episode treated patients (vs. controls). Moderate to high quality evidence suggests increased antipsychotic use was associated with increased basal ganglia volume over time (>2 years).

Moderate to low quality evidence found similar grey matter volume decreases in the right putamen in people with schizophrenia and people with an autistic spectrum disorder compared to controls.

Functional changes

Moderate quality evidence found reduced activity in the right putamen of people with schizophrenia during executive functioning and timing tasks compared to controls. There was increased activation in the left putamen during emotionally neutral tasks. Moderate to low quality evidence finds increased activation in the right caudate of relatives of people with schizophrenia compared to controls during cognitive tasks, and increased activation in the left lentiform nucleus during emotion tasks.

Moderate quality evidence finds unmedicated people with schizophrenia have a medium to large increase in choline in the basal ganglia. Moderate to low quality evidence found no differences in D2/D3 receptor availability in the substantia nigra of unmedicated people with schizophrenia compared to controls, and no differences in GABA levels in the striatum 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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