



SCHIZOPHRENIA Factsheet

October 2020

What is single-photon emission computed tomography (SPECT)?

SPECT is a nuclear based imaging technique that uses radioactive tracers to visualise functional brain activity. SPECT imaging is frequently used in combination with anatomical imaging such as computed tomography (CT) or structural magnetic resonance imaging (MRI). Compared to positron emission tomography (PET) imaging, SPECT offers more limited spatial and temporal resolution, but is less expensive as it does not require a cyclotron in close proximity. The radioisotope tracers are coupled with a biological molecule such as glucose, which is used during cellular metabolism and can be used to highlight areas with changes in metabolic activity.

What is the evidence from SPECT studies?

Moderate quality evidence suggests elevated striatal dopamine synthesis and release capacities and increased striatal synaptic dopamine levels in people with schizophrenia compared to controls. The finding for elevated dopamine synthesis was apparent in treatment-responsive and treatment-naive patients, but not in treatment-resistant patients. There were no differences in dopamine D2/3 receptor or transporter availability. Within-group variability was similar for dopamine synthesis and release capacities, but there was greater variability in synaptic dopamine levels, and dopamine D2/3 receptor and transporter availability in the patient groups than in the control groups.

Moderate to low quality evidence finds associations between dopamine receptor occupancy and clinical improvements following treatment with antipsychotic medications. There is greatest dopamine D2 receptor occupancy with haloperidol (91.9%), then risperidone, olanzapine, clozapine, quetiapine, aripiprazole, ziprasidone, and then amisulpride (85%). First-generation antipsychotics in general are associated with higher receptor occupancy in the striatum and temporal cortex than second-generation antipsychotics.

Moderate to high quality evidence suggests significant reductions in functional activity in the whole brain of people with schizophrenia compared to controls. During cognitive tasks and rest periods, there is a medium to large effect of reduced functional activity in bilateral frontal lobes. Moderate quality evidence suggests increased functional activity in the left temporal lobe during cognitive tasks, but no differences between patients and controls during rest periods.

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 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.