

Altered brain structural connectivity and association with neurological soft signs

December 10 2021



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Schizophrenia is a highly inheritable brain disorder. Previous studies have proved that neurological soft signs (NSS) are strongly associated

with the cortical-subcortical-cerebellum circuit, the main source responsible for the clinical and behavioral manifestations observed in patients with schizophrenia.

However, it is not clear whether a similar altered brain structural connectivity and association with NSS appear in patients with schizophrenia and their unaffected first-degree relatives.

Dr. Raymond Chan from the Institute of Psychology of the Chinese Academy of Sciences and his international collaborators have investigated the association of NSS with brain structural [network](#) in a group of 62 patients with first-episode schizophrenia, 25 unaffected first-degree relatives, and 60 healthy controls.

Their study was published in *Schizophrenia Research* on Dec. 4.

All the participants went through a structural brain scan inside a 3T brain scanner and then accepted a set of NSS assessment with the use of the abridged version of Cambridge Neurological Inventory.

Dr. Chan's team adopted the source-based morphometry (SBM) analysis to identify NSS related structural networks in patients with schizophrenia, unaffected first-degree relatives and healthy controls.

Their findings showed that two networks, one involving the superior temporal gyrus, inferior frontal gyrus and insular network, and the other involving the [parahippocampal gyrus](#), fusiform, thalamus and insular network, showed significantly gray matter volume reductions in patients with schizophrenia compared to unaffected first-degree relatives and healthy controls.

Interestingly, there were distinct NSS-related gray matter covarying patterns observed in patients with schizophrenia, unaffected first-degree

relatives and healthy controls.

In patients with schizophrenia, NSS were associated negatively with the hippocampus, caudate and thalamus network and the [superior temporal gyrus](#), [inferior frontal gyrus](#) and insular network. In unaffected first-degree relatives NSS were associated negatively with the caudate, superior and middle frontal cortices network. In healthy controls, NSS were negatively correlated with the hippocampus, caudate and thalamus network.

These findings not only support the altered cortical and subcortical network in schizophrenia and unaffected first-degree relatives, but also their partly different NSS-related gray matter covarying patterns.

The study also suggests that [brain regions](#) implicating genetic liability to [schizophrenia](#) are partly separated from brain regions implicating neural abnormality.

More information: Li Kong et al, Structural network alterations and their association with neurological soft signs in schizophrenia: Evidence from clinical patients and unaffected siblings, *Schizophrenia Research* (2021). [DOI: 10.1016/j.schres.2021.11.042](https://doi.org/10.1016/j.schres.2021.11.042)

Provided by Chinese Academy of Sciences

Citation: Altered brain structural connectivity and association with neurological soft signs (2021, December 10) retrieved 26 April 2024 from <https://medicalxpress.com/news/2021-12-brain-association-neurological-soft.html>

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