

Epigenetic changes in blood samples may point to schizophrenia

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In a new study, researchers at the Swedish medical university Karolinska Institutet have identified epigenetic changes – known as DNA methylation – in the blood of patients with schizophrenia. The researchers were also able to detect differences depending on how old the patients were when they developed the disease and whether they had been treated with various drugs. In the future this new knowledge may be used to develop a simple test to diagnose patients with schizophrenia.

Schizophrenia is one of our most common chronic psychiatric diseases and affects 1% of the population. It is already known that the risk of developing [schizophrenia](#) increases if one has close family members who have had the disease. At the same time, studies on identical twins, who therefore have the same genetic make-up, show that 50% of the disease risk can be explained by genetic factors. This in turn suggests that environmental factors, which include [epigenetic changes](#) to the genome, account for the remaining 50% of the cause of the disease.

"Epigenetics involves small reversible chemical changes, for instance in the form of methyl groups that bind to certain DNA sequences in the genome, that can consequently modify the function of the DNA. The research results we are now presenting suggest that epigenetic mechanisms are of great importance in mental illness. It is particularly interesting that these changes can also be linked to age at disease onset," says Professor Tomas Ekström, who has directed the study at the Center for Molecular Medicine (CMM).

The current study, which is published in the scientific journal *FASEB Journal*, shows that the methylation levels in DNA in the white blood cells from individuals who suffer from schizophrenia are substantially lower than normal and that the degree of methylation is related to age of disease onset and the severity of the disease. The researchers also compared the degree of methylation in samples from patients who had been treated with various types of drugs. It emerged that treatment with one type of antipsychotic drug could influence the levels of DNA methylation in the blood cells towards more normal levels. In their article in *FASEB Journal*, the researchers at CMM note that at present there is no 'biomarker' for schizophrenia that is suitable for clinical sampling. An interesting area of application for the new knowledge may therefore be to develop a simple test of this kind to diagnose schizophrenia, and to monitor how patients respond to the treatment they receive.

"The fact that DNA methylation in an ordinary blood sample can be used as a marker of the severity of schizophrenia opens up completely new opportunities. But follow-up studies are needed to clarify, for example, whether choice of treatment can be linked to this type of test," says Professor Martin Schalling, one of the researchers behind the study.

More information: "Epigenetic aberrations in leukocytes of patients with schizophrenia: association of global DNA methylation with antipsychotic drug treatment and disease onset ", Philippe A. Melas, Maria Rogdaki, Urban Ösby, Martin Schalling, Catharina Lavebratt & Tomas J. Ekström, *FASEB Journal*, published ahead of print 16 March 2012, [doi:10.1096/fj.11-202069](https://doi.org/10.1096/fj.11-202069)

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