
Alterations of immune-related genes in pyramidal neurons of the hippocampus and several brain regions in schizophrenia

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A neuroinflammatory process has been discussed in the literature in schizophrenia. Some immune-related genes have been reported to be increased in serum and post-mortem brain tissue of schizophrenia patients, whereas other studies cannot confirm these results. These controversies may be related to the selection of genes or the material under investigation as well as antipsychotic treatment.

In our genome-wide microarray study (Illumina) we have investigated the left superior temporal cortex and left anterior cingulate cortex in 10 patients with schizophrenia and 10 healthy controls. In a second Laser Capture Microdissection study we dissected pyramidal cells from hippocampus CA4 and performed genome-wide microarrays (Affymetrix).

In the superior temporal cortex and anterior cingulate cortex we found a downregulation of a large group of immune-related genes and could confirm these alterations by quantitative real-time PCR. In the pyramidal neurons of the hippocampus we also found immune-related genes to be downregulated, along with alterations in transcription factors and acetylcholine receptors.

Downregulation of immune-related genes in the brain of schizophrenia patients may occur in several brain regions and may be related to diagnosis or antipsychotic treatment. In contrast to findings in the blood, down-regulated immune-related genes in the brain are related to disturbances in synaptic transmission and plasticity, for example alterations of NMDA receptor mediated plasticity and free radicals.

The question of the cause of these findings, like an immune-deficiency or inflammation processes during neuronal development cannot be answered in post-mortem studies of elderly, chronic schizophrenia patients, which received antipsychotics for decades.