

Effects of brain damage from an autoimmune encephalitis similar to those of 'angel dust'

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A new study in *Biological Psychiatry* reports structural brain damage from an autoimmune encephalitis that impairs behavior in ways that are somewhat similar to the effects of "angel dust."

The body sometimes makes substances that have effects on the brain in ways that resemble the effects of illicit drugs. In their paper, the authors report findings on a syndrome called anti-NMDA receptor encephalitis that arises when the body makes antibodies that target one of the subunits of the N-methyl-D-aspartate (NMDA) subtype of receptor for the chemical messenger, glutamate.

The antibodies appear to mimic effects produced by the drug phencyclidine (PCP), also known as "angel dust", which produces a schizophrenia-like syndrome by blocking the NMDA glutamate receptor. Schizophrenia itself is also associated with NMDA receptor dysfunction.

Senior author of the study, Dr. Carsten Finke, Professor at Charité-Universitätsmedizin Berlin, explains, "Anti-NMDA receptor encephalitis is a recently discovered autoimmune disorder of the brain, which causes a severe neuropsychiatric syndrome with behavioral changes, psychosis, memory loss, and decreased levels of consciousness. Although many patients recover well, the majority suffer from [long-term cognitive impairment](#)."

In this issue of *Biological Psychiatry*, Finke and his colleagues analyzed multimodal magnetic resonance imaging data from 40 patients who were recovering from anti-NMDA receptor encephalitis.

They discovered that the patients had structural damage of the hippocampus and impaired hippocampal microstructural integrity, which strongly correlated with memory performance, disease severity, and disease duration. The hippocampus is a brain structure that plays an important role in memory.

"The results of the study therefore reveal a structural correlate of the persisting memory deficits - the chief complaint affecting daily life of patients after the acute disease stage," said Finke. "Furthermore, these observations are also in line with evidence that dysfunction of hippocampal NMDA [receptors](#) causes severe amnesia."

These findings suggest that the disease, which can be particularly difficult to quickly diagnose, is critical to treat promptly because the behavioral symptoms can be signs that the antibodies are actively damaging the brain.

"The atypical psychosis syndromes arising from the development of anti-NMDA receptor antibodies are extremely important to diagnosis and treat," commented Dr. John Krystal, Editor of *Biological Psychiatry*. "They may be easily misdiagnosed as the psychiatric disorders that they superficially resemble.. Nonetheless, these syndromes highlight the importance of NMDA receptor signaling for the genesis of symptoms associated with psychotic disorders."

More information: Carsten Finke et al. Structural Hippocampal Damage Following Anti-N-Methyl-D-Aspartate Receptor Encephalitis, *Biological Psychiatry* (2016). [DOI: 10.1016/j.biopsych.2015.02.024](https://doi.org/10.1016/j.biopsych.2015.02.024)

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