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Study finds brain chemical elevations in young people experiencing first episode of psychosis

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The findings appear in a new paper in *Biological Psychiatry*

A new study of young people experiencing a first episode of psychosis reports elevations in the brain chemicals glutamate and glycine. Published in *Biological Psychiatry*, the study led by Dr. Dost öngür of Harvard Medical School provides the first-ever measurement of glycine levels in patients with psychotic disorders.

Abnormal brain activity in psychotic disorders, such as schizophrenia and bipolar disorder, is thought to stem in part from impaired function of the NMDA receptor. Glutamate and glycine activate the receptor, which is an important mediator of brain signaling for processes such as learning and memory. According to Dr. öngür, the findings may serve as a marker in the development of future treatments aimed at restoring function of NMDA receptors.

Reliable detection of glycine in the human brain has previously been very challenging-if not impossible-with conventional techniques, as an overlapping signal interferes with its detection. But first author Dr. Sang-Young Kim and colleagues applied a new method of the brain imaging technique called MR spectroscopy to suppress the interfering signal and reveal the hidden glycine signal.

Glycine levels were higher in 46 patients with first-episode psychosis, compared with 50 healthy participants. "Our findings suggest that glycine abnormalities may play a role in the earliest phases of psychotic disorders," said Dr. öngür. The researchers also measured increased glutamate levels in patients, which lines up with strong support for elevated glutamate reported in other studies of first-episode psychosis. The elevations in glutamate and glycine indicate that NMDA receptors receive abnormal stimulation in psychotic disorders.

The increased glycine level was the opposite of what the authors expected to find - researchers have actually tried raising glycine levels in patients to compensate for the underperforming NMDA receptors. The new findings revealing higher levels early on in the disease might help to explain why glycine supplementation hasn't worked as well as researchers hoped.

"This study supports the notion of different developmental phases in the biology of schizophrenia. These phases might require somewhat different treatments," said Dr. John Krystal, Editor of Biological Psychiatry.

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