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## Long-Term Memory Formation Altered In Schizophrenic And Bipolar Patients, Linked To Specific Protein

By Anoop Singh | Jun 17, 2013 02:43 PM EDT

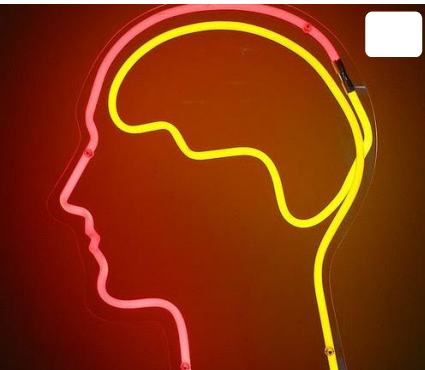
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0 About 26 percent of Americans suffer from a mental disorder, many of them from more than one at a time.

1 Most mental disorders are based on imbalances in the brain. Researchers have just found a particular protein that alters long-term memory and is connected to the development of both bipolar disorder and schizophrenia.

Share **Bipolar disorder**, or manic-depressive illness, affects 5.7 million Americans every year. It is characterized by mood instabilities that interfere with everyday life, and people often have a genetic predisposition toward it. Bipolar disorder symptoms are often attributed to abnormal brain structure and function. In those dealing with condition, the part of their brain that stores memory is much smaller than usual, making the formation of memory, management of emotion, and learning difficult for those with bipolar disorder.



(Brain | Dierk Schaefer/Flickr) A specific protein abnormality has been identified in the brains of those with psychiatric disorders.

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Abnormalities in a bipolar person's brain are similar to those in a schizophrenic's brain. Schizophrenia is another brain-altering psychiatric disorder, characterized by a hereditary predisposition, as well as an alteration in brain structure and therefore function. The centers of schizophrenics' brains are fluid-filled and larger than normal, triggering symptoms like hallucinations, movement disorders, and racing thoughts.

A new study finds that a particular protein, Rap1, which participates in the formation of long-term memories, is lacking in the brains of those with mental health issues. However, researchers have found that in the absence of this protein, neurotransmitters are blocked from release. The brain needs neurotransmitters to help its electrical signals to travel from the brain to elsewhere — a critical function.

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As a result, without these neurotransmitters, the brain functions abnormally. The lack of Rap1 protein could be due to a disordered brain's altered structure, as well as the lack of signaling to other proteins that its absence creates. If the protein is not made at all, as the researchers have assumed for disordered brains, then it cannot hop to function.

Without this single and critical protein, long-term memories are not made. This is because the protein works at the level of cells to stimulate certain channels to let ions in. If the ions are not let in, the cell's contents do not allow for memory retention. The researchers propose that this static state of cells causes them to become disorders and allows for the development of psychiatric disorders like bipolar disorder and schizophrenia.

With this established, the researchers will soon begin studies of Rap1's pathway in cells and how exactly it is different in disordered brains versus normal brains. Alexei Morozov, Ph.D., from the National Institutes of Health and principal investigator of this study, has said, "Our next step is to determine whether this new signaling pathway is altered in cases of mental disease. If so, it could help us gain a better understanding of the molecular underpinnings of channel-related psychiatric disorders, such as bipolar disorder and schizophrenia. Such knowledge would go a long way toward developing new therapeutic methods."

Source: Subramanian J, Dye L, Morozov A. Rap1 Signaling Prevents L-Type Calcium Channel-Dependent Neurotransmitter Release. *The Journal of Neuroscience*. 2013.

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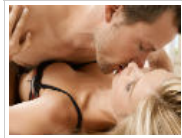
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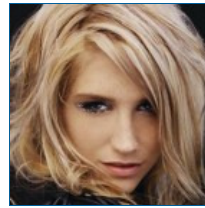
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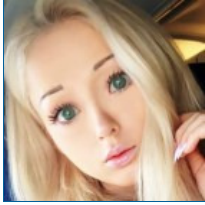
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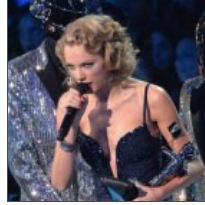
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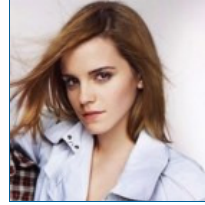
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