Large study finds genetic 'overlap' between schizophrenia, bipolar disorder

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Knowledge about the biological origin of diseases like schizophrenia, bipolar disorder and other psychiatric conditions is critical to improving diagnosis and treatment.

In an effort to push the field forward, three UCLA researchers, along with scientists from more than 20 countries, have been taking part in one of the largest collaborative efforts in psychiatry - a genome-wide study involving more than 50,000 study participants aimed at identifying which genetic variants make people susceptible to psychiatric disease.

This collaborative, the Psychiatric Genome-Wide Association Study Consortium (PGC), now reports in the current online edition of the journal *Nature Genetics* that it has discovered that common genetic variants contribute to a person's risk of schizophrenia and bipolar disorder.

The PGC's studies provide new molecular evidence that 11 regions on the genome are strongly associated with these diseases, including six regions not previously observed. The researchers also found that several of these DNA variations contribute to both diseases.

The findings, the researchers say, represent a significant advance in understanding the causes of these chronic, severe and debilitating disorders.

The UCLA researchers who contributed to the schizophrenia study are Roel A. Ophoff, a professor of psychiatry and human genetics and one of the founding principal investigators of the schizophrenia portion of the study; Dr. Nelson Freimer, a professor of psychiatry and director of the Center for Neurobehavioral Genetics at the Semel Institute for Neuroscience and Human Behavior at UCLA; and Rita Cantor, a professor of psychiatry and human genetics.

Schizophrenia and bipolar disorder are common and often devastating brain disorders. Some of the most prominent symptoms of schizophrenia are persistent delusions, hallucinations and cognitive problems. Bipolar disorder is characterized by severe, episodic mood swings. Both affect about 1 percent of the world's population and usually strike in late adolescence or early adulthood.

Despite the availability of treatments, these illnesses are usually chronic, and patients' response to treatment is often incomplete, leading to prolonged disability and personal suffering. Family history, which reflects genetic inheritance, is a strong risk factor for both schizophrenia and bipolar disorder, and it has generally been assumed that dozens of genes, along with environmental factors, contribute to disease risk.

In the schizophrenia study, a total of seven locations on the genome were implicated in the disease, five of which had not been identified before. When similar data from the bipolar disorder study, which ran concurrently, were combined with results from the schizophrenia study, three gene locations were identified that proved to be involved in both disorders, suggesting a "genetic overlap" between schizophrenia and bipolar disorder.

"Genetic factors play an important role in the susceptibility to develop schizophrenia," Ophoff said, "but identifying these genetic factors has been very difficult. We know that schizophrenia is not caused by a single gene that explains everything but an interplay of many genetic and non-genetic factors."

At the same time, he said, the disease itself is not uniform but manifests itself in different ways; currently, there is no objective biological marker or "sign" that can be used for diagnosis.

"This so-called heterogeneity at the genetic and clinical level is the biggest challenge for genetic studies of neuropsychiatric disorders," Ophoff said.

"One way to deal with these difficulties is to increase the size of the study so there is sufficient 'power' to detect genetic effects, even amidst this clinical and genetic diversity."

The fact that even this large study resulted in a limited number of schizophrenia and bipolar genes demonstrates once again, he said, the complex nature of the disease.

Provided by University of California - Los Angeles