Schizophrenia's genetic architecture revealed (w/ Video)

July 23 2014, by Darius Koreis

Professor Bryan Mowry from UQ's Queensland Brain Institute.

Queensland scientists are closer to effective treatments for schizophrenia after uncovering dozens of sites across the human genome that are strongly associated with a genetic predisposition to schizophrenia.

The study, published in internationally prestigious *Nature* magazine, involved University of Queensland's Professor Bryan Mowry, who said it was the world's largest molecular genetic study into a psychiatric disorder.

Professor Mowry, from UQ's Queensland Brain Institute and the Queensland Centre for Mental Health Research, said the study found 108 sites, 83 of which were previously unidentified, that formed the genetic underpinnings of schizophrenia.

"This provides the potential for understanding the causes of the illness and for discovering new treatments," he said.

He said these locations were not randomly distributed across the genome but converged upon genes that were expressed in certain tissues, particularly the brain and in tissues with important immune functions.

"These are very exciting findings that will no doubt bring hope to the quarter of a million Australians who have schizophrenia and to their families and carers," Professor Mowry said.

"This study constitutes a rapid advance in our understanding of the genetic architecture of schizophrenia, opening the door to expanding our understanding of its underlying biology."

Schizophrenia is a highly-inheritable, debilitating psychiatric disorder that affects about one in every 100 people worldwide, and is characterised by hallucinations, disturbed beliefs and a breakdown of thought processes.

It is ranked ninth in the global burden of illness and is estimated to cost Australian society $5 billion a year.

Professor Mowry said that despite the huge cost to individuals and to society, it was only in the past five years that substantial progress had been made.

"Many of these findings implicate genes that are involved in transmitting

signals from one neuron to another, opening up potential therapeutic avenues," he said.

"Interestingly, by far the strongest genetic finding links schizophrenia to a region previously identified in autoimmune diseases, implying the possibility of an autoimmune pathology in the disease, and is one that warrants further investigation."

Using DNA samples from 36,989 schizophrenia patients, researchers used a genome-wide association study to find genetic variations between the patients and 113,075 control samples.

"A huge international effort was made to increase sample size, because, although previous studies had indicated a small number of genetic signals, sample sizes weren't large enough to confirm definite genetic associations," Professor Mowry said.

"By screening the DNA of people with schizophrenia and those without it at millions of DNA markers across the human genome, we were able to determine which markers were statistically significantly associated with this disorder.

"The next steps will involve determining the functional basis of these genetic signals and how they interact together to cause illness, and then develop new therapeutic interventions."

UQ partnered with more than 200 organisations in the Schizophrenia Working Group of the Psychiatric Genomics Consortium, including researchers from QBI, QCMHR and the Royal Brisbane and Women's Hospital Department of Psychiatry.

The paper is titled Biological Insights From 108 Schizophrenia-Associated Genetic Loci.

More information: "Biological insights from 108 schizophrenia-associated genetic loci." Schizophrenia Working Group of the Psychiatric Genomics Consortium. *Nature* (2014) DOI: 10.1038/nature13595. Received 06 March 2014 Accepted 18 June 2014 Published online 22 July 2014

Provided by University of Queensland