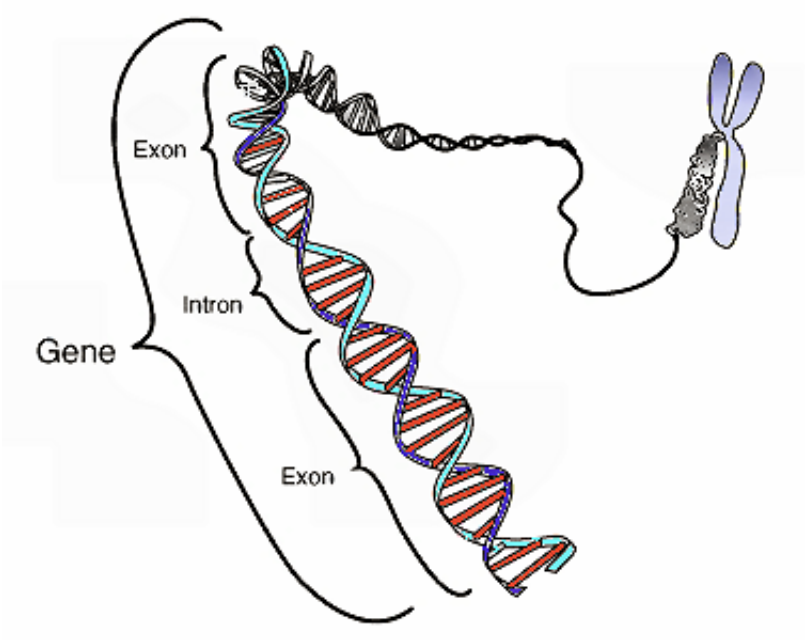
Scientists ID genes connected to wellbeing, depression and neuroticism

April 19 2016



This image shows the coding region in a segment of eukaryotic DNA. Credit: National Human Genome Research Institute

An international group of more than 190 scientists who analyzed the genomes of 298,420 individuals have found genetic variants that may influence our sense of wellbeing, depression and neuroticism.

The study, to be published April 18 by the journal *Nature Genetics*, is one of the largest genomic studies to date on behavioral genetics.

"We have known for a long time that these traits have a genetic component, but until now, we had identified only a few specific genetic variants related to these traits," said Daniel Benjamin, corresponding author and an associate professor of the Center for Economic and Social Research in the USC Dornsife College of Letters, Arts and Sciences.

Benjamin said that the genetic variants do not determine whether someone develops depressive symptoms, neuroticism or have a poor sense of wellbeing.

"Psychological well-being is jointly influenced by genes and environment," he said. "The genetic variants that we found account for a small fraction of these genetic associations."

The scientists found three genetic variants associated with "subjective wellbeing" - how happy or satisfied a person reports feeling about his or her life - based on an analysis of roughly 300,000 people. The researchers also found two genetic variants associated with depressive symptoms, based on an analysis of nearly 180,000 people, and 11 genetic variants associated with neuroticism, based on an analysis of 170,000 people. The depression results were replicated through an analysis of another sample of nearly 370,000 people.

"We found that most of the genetic variants associated with depressive symptoms and/or neuroticism also were linked to subjective well-being, and vice-versa," Benjamin said. "When examined individually, each genetic variant explains very little about these traits. But when taken together, these findings imply that the genetic influences on depression, neuroticism and subjective wellbeing result from the cumulative effects of at least thousands, if not millions, of different variants."

The study also found that subjective wellbeing, neuroticism and depression are predominantly influenced by the same set of genes. The

scientists said this finding indicates that researchers may want to consider studying these traits jointly for future work.

The interdisciplinary team - which included medical researchers and psychologists—also studied whether the genetic variants that they had identified overlap with genetic variants associated with other diseases and disorders, including Alzheimer's disease, anxiety disorders, autism spectrum disorder, bipolar disorder and schizophrenia.

The strongest link was with anxiety disorders. The researchers also found the genetic variants tied to subjective wellbeing, depression and neuroticism moderately overlap with the variants that are associated with schizophrenia and bipolar disorder.

Because the study has found some of the first genetic variants associated with wellbeing, depression and neuroticism, it is too soon to draw conclusions about how the genes affect biological mechanisms, Benjamin said.

The scientists issued several cautions for interpreting the results of their study.

"Genetics is only one factor that influences these psychological traits. The environment is at least as important and it interacts with the genetic effects," Benjamin said.

More information: Genetic variants associated with subjective well-being, depressive symptoms and neuroticism identified through genome-wide analyses, *Nature Genetics*, DOI: 10.1038/ng.3552

Provided by University of Southern California