Mutations on 3 genes could predispose people to suicidal behaviour

June 15 2010

Mutations on three genes could predispose people to suicidal behavior. Credit: David Corby.

Three genes that have barely been studied to date have now provided fresh knowledge about patients with suicidal backgrounds. This is the result of a study by a team of Spanish researchers at Mount Sinai Hospital and Columbia University in the City of New York (United States), which found that several mutations are involved. This finding could help to develop future genetic tests to identify predisposition to suicide, without ignoring the importance of social and cultural factors.

"There is ever-increasing evidence pointing to the important role played by genes in predisposing people to suicidal behaviour", Mercedes Pérez-Rodríguez, co-author of the study and a researcher at Mount Sinai Hospital in New York (United States), tells SINC. Research carried out

to date shows that around 40% of the variability in suicidal behaviour could have a genetic basis.

The objective of the study published in the *American Journal of Medical Genetics* was to identify a model able to differentiate between people with and without a background of suicide attempts. Instead of focusing on a few traditional candidate genes, the scientists examined a range of 840 functional single nucleotide polymorphisms (SNPs) present in 312 genes expressed in the brain.

"The SNPs were analysed in men with a diagnosed psychiatric illnesses, and the results are promising", says Pérez-Rodríguez, who describes how her team was able to correctly classify 69% of the patients by using an algorithm based on three SNPs from three different genes.

"The predictive features of this algorithm for estimating suicide risk outperform those of all other models developed to date", stresses the researcher. In addition, the new model identifies three different neurobiological systems that could play a role in diathesis (organic predisposition) to suicidal behaviour.

The authors have suggested that the outcomes of this study could be used in future to create simple genetic tests of use in diagnosing and identifying patients prone to attempting suicide.

Genetic research into suicidal behaviour

Aside from the sociological and psychological causes, scientists have also started to use genetics over the past 20 years to analyse the causes of suicidal behaviour, which has continued to increase, above all in industrialised Western countries. The latest data from the WHO show that nearly one million people committed suicide in 2000, and it estimates that by 2020 this figure will have risen to 1.5 million.

Currently there are no reliable clinical tests to identify people who may be more predisposed to suicide. To date, studies have focused on parameters related to serotonin function, such as 5-hydroxyindoleacetic acid (5-HIAA) of the cerebrospinal fluid (CSF) or measurements of the hypothalamic-pituitary-adrenal axis (HPA) such as the dexamethasone suppression test. However, these models are of no clinical use.

Previously, genetic research into suicidal behaviour had hardly looked at the three genes selected in the new study, which has now confirmed they are involved. These three genes code the 5-HT1E serotonin receptor (HTR1E, SNP rs10944288); the pi subunit of the A gamma-aminobutyric acid receptor (GABRP, SNP hCV8953491); and the alpha-2-actinin (ACTN2, SNP rs707216) subunit of the ionotropic glutamate receptor channel.

More information: Enrique Baca-Garcia, et al. "Nucleotide Variation in Central Nervous System Genes Among Male Suicide Attempters". American Journal of Medical Genetics Part B 153B:208, Jan 2010.

Provided by FECYT - Spanish Foundation for Science and Technology