

Trauma-induced changes to genes may lead to PTSD

May 4 2010

A study by researchers at Columbia University's Mailman School of Public Health suggests that traumatic experiences "biologically embed" themselves in select genes, altering their functions and leading to the development of post-traumatic stress disorder (PTSD).

"Our findings suggest a new biological model of PTSD in which alteration of [genes](#), induced by a traumatic event, changes a person's stress response and leads to the disorder," said Sandro Galea, MD, professor and chair of the Department of Epidemiology at the Mailman School of Public Health, and principal investigator.

"Identification of the biologic underpinnings of PTSD will be crucial for developing appropriate psychological and/or pharmacological interventions, particularly in the wake of an increasing number of military veterans returning home following recent wars worldwide."

The findings are published today online in [Proceedings of the National Academy of Sciences](#) (*PNAS*).

Previous studies have found that lifetime experiences may alter the activity of specific genes by changing their methylation patterns. Methylated genes are generally inactive, while unmethylated genes are generally active.

The new study is the first large scale investigation to search for trauma-induced changes in the genes of people with PTSD. [DNA](#) samples were

obtained from participants in the Detroit Neighborhood Health Study (DNHS), a longitudinal epidemiologic study investigating PTSD and other mental disorders in the city of Detroit. The researchers analyzed the methylation patterns of over 14,000 genes from blood samples taken from 100 Detroit residents, 23 of whom suffer from PTSD.

The analysis found that participants with PTSD had six to seven times more unmethylated genes than unaffected participants, and most of the unmethylated genes were involved in the immune system.

The observed methylation changes in the immune system genes were reflected in the PTSD participants' immune systems: levels of antibodies to a herpes virus were high in PTSD patients, indicative of a compromised immune system.

While people who experience severe trauma will exhibit a normal stress response, in PTSD, the [stress response](#) system becomes deregulated and chronically overactive causing compromised immune functioning. PTSD has long been linked to increased risk of numerous physical health problems - including diabetes and cardiovascular disease. This paper suggests why PTSD is so strongly associated with physical health problems - trauma exposure causes epigenetic changes in immune system genes and thus, compromised immune functioning putting individuals at risk for a host of disorders.

"Our findings show that PTSD may be associated with epigenetic changes in immune-system genes. If this is the case, these clusters could provide clues to our understanding of how a traumatic event changes gene expression, thus altering immune function and resulting in other possible physiologic alterations," says Dr. Galea.

Provided by Columbia University

Citation: Trauma-induced changes to genes may lead to PTSD (2010, May 4) retrieved 24 April 2024 from <https://medicalxpress.com/news/2010-05-trauma-induced-genes-ptsd.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.