

Past child abuse plus variations in gene result in potent PTSD risk for adults

A traumatic event is much more likely to result in posttraumatic stress disorder (PTSD) in adults who experienced trauma in childhood – but certain gene variations raise the risk considerably if the childhood trauma involved physical or sexual abuse, scientists have found. The research was conducted with funding from the National Institute of Mental Health, which is part of the National Institutes of Health, and others.

“Untangling complex interactions between genetic variations and environmental factors can help us learn how to predict more accurately who’s at risk of disorders like PTSD. It can help us learn which prevention and treatment strategies are likely to work best for each person,” said NIMH Director Thomas R. Insel, M.D.

Results of the study were reported on March 18 in a special issue of the *Journal of the American Medical Association* devoted to the influence of genes on health and disease, by Elisabeth Binder, M.D., Ph.D., Kerry J. Ressler, M.D., Ph.D., and colleagues from Emory University and other facilities.

“These results are early and will need to be replicated, but they support the hypothesis that combinations of genes and environmental factors affect the risk for stress-related disorders like PTSD,” Ressler said.

“Understanding how gene-environment interactions affect mental health can help us understand the neurobiology of these illnesses.”

The gene in question is active in the biochemical make-up of the body’s stress-response system. Results of the study suggest that early-life abuse can result in particularly potent changes to this system as it develops – depending partly on whether or not the variations are present in the gene.

Inherited variations in multiple genes, which have yet to be identified, are estimated to account for 30 to 40 percent of the risk of developing PTSD. The gene identified in this study is one likely candidate, although others are almost certain to emerge.

To conduct their study, the researchers surveyed 900 primarily African-American people 18 to 81 years old, from poor, urban neighborhoods. As is common in impoverished environments, many of the people in this study had experienced severe traumatic experiences in childhood and had later experienced other kinds of trauma as adults. The researchers also examined the genetic make-up of 765 of the participants.

They found that having a history of child abuse – which was the case for almost 30 percent of the people in this study – led to more than twice the number of PTSD symptoms in adults who had later undergone other traumas, compared to traumatized adults who weren’t abused in childhood. But the history of child abuse wasn’t enough, by itself, to lead to the increase in symptoms; the increase appeared to depend on whether or not certain variations in the stress-related gene also were present.

Likewise, the gene variations by themselves didn’t appear to affect the risk. The combination of the gene variations and past child abuse were the key ingredients for the doubled PTSD symptoms when a subsequent trauma occurred.

The scientists also detected protective variations in the same gene. People who had these resiliency variations didn’t have a substantial increase in PTSD symptoms after a trauma in adulthood, even if they had been abused in childhood.

The gene is called FKBP5, and the protein it produces helps regulate the amount of binding that takes place between stress hormones and their receptors on cells. Binding between the hormones and the receptors leads to cell functions that help regulate response to stress, a process that may be altered by variations in the gene.

The researchers showed that this process was changed in ways that led to excess stress-hormone reactivity in study participants who had both the risk version of the gene and PTSD symptoms.

“This finding helps us understand the neurobiology of PTSD. It’s equally important to understand how to decrease the high rates of childhood and adult trauma that inner-city populations suffer,” Ressler said.

“PTSD rates in U.S. inner cities are as high as among war veterans.”

Source: National Institute of Mental Health

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