New Clues about Genetic Influence of Stress on Men's Health

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Men with a common genetic variant produce more than twice as much of a hormone known to increase blood pressure and blood sugar when they are angry, according to researchers from Duke University Medical Center.

The findings, presented today at the American Psychosomatic Society's annual scientific meeting, shed more light on the notion that stress can trigger physiological changes that result in the development of cardiovascular disease and type 2 diabetes.

"We know that emotional stress can lead to negative health outcomes but our goal with this study was to obtain a better understanding of the biological mechanisms behind this phenomenon," says Redford Williams, MD, director of Duke's Behavioral Medicine Research Center and study co-author.

Researchers analyzed variants of serotonin receptor genes, which regulate effects of the neurotransmitter serotonin on emotions and physical functions, including levels of the stress hormone cortisol.

"We looked at specific points along a cascade of events," says Stephen Boyle, PhD, study co-author. "Serotonin is processed in the brain and controls the release of cortisol by the adrenal grand. Cortisol is known to stimulate the production of glucose and makes the influence of adrenaline more pronounced."

Researchers measured cortisol in two blood samples taken from 41 men. One sample was collected during a five-minute resting period and the other during five-minutes when they described a recent event in their lives that made them angry.

Men with common variants of one of the serotonin receptor genes (5HTR2C) had increased cortisol production when recalling a situation that made them angry.

One of those variants was associated with an average increase in cortisol that was more than twice as large (70 pg/ml vs. 30 pg/ml) when compared with men possessing the other variant of the same gene.

"Interestingly, one of the genetic variants associated with a prominent affect on cortisol production is also known to alter the amount of receptor protein the gene makes," says Williams. "This tells us that this variant is a strong candidate to be responsible for the findings we observed."

"This work may provide a clearer understanding of the genetic and environmental factors that combine to put some men at greater risk for developing increased belly fat, type 2 diabetes and cardiovascular disease," adds Boyle.

The next phase of research will study large samples of people to determine if men with the genetic variant associated with larger cortisol responses to anger seen in this study are more likely to develop type 2 diabetes or cardiovascular disease.

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Additional members of the research team include Christopher Potocky, MS, Beverly Brummett, PhD, Cynthia Kuhn, PhD, Anastasia Georgiades, PhD, Ilene Siegler, PhD, and Allison Ashley-Koch, PhD.

Provided by Duke University