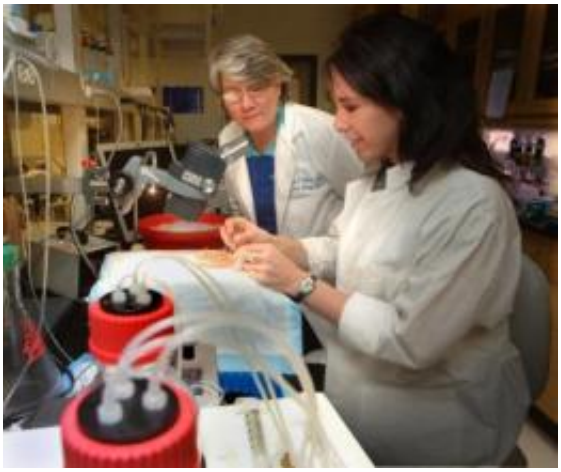
Medical Xpress

Early life stress may predict cardiovascular disease

February 9 2010



Drs. Jennifer Pollock (left) and Analia S. Loria. Credit: Medical College of Georgia

Early life stress could be a risk factor for cardiovascular disease in adulthood, researchers report.

"We think early life stress increases sensitivity to a hormone known to increase your blood pressure and increases your cardiovascular risk in adult life," said Dr. Jennifer Pollock, biochemist in the Vascular Biology Center at the Medical College of Georgia and corresponding author on the study published online in *Hypertension*.

The studies in a proven model of chronic behavioral stress - separating

rat pups from their mother three hours daily for two weeks - showed no long-term impact on key indicators of cardiovascular disease such as increased blood pressure, heart rate or inflammation in blood vessel walls.

But when the rats reached adulthood, an infusion of the hormone angiotensin II resulted in rapid and dramatic increases in all key indicators in animals that experienced early life stress. Stress activates the renin-angiotensin system which produces angiotensin II and is a major regulator of blood vessel growth and inflammation - both heavily implicated in heart disease. "They cannot adapt to stress as well as a normal animal does," Dr. Pollock said. Within a few days, for example, blood pressure was nearly twice as high in the early-stress animals.

The chronic stress model most typically has been used to look at the psychological impact of childhood stress; this was the first time it was used to measure cardiovascular impact, Dr. Pollock said. Findings correlate with studies published in Circulation in 2004 that identified adverse childhood events, such as abuse or parental loss, in the backgrounds of many adults with ischemic heart disease.

"We want to be able to prevent this long-term consequence," said Dr. Analia S. Loria, MCG postdoctoral fellow and the study's first author. Although the adult rats seemed fine until stressed, the scientists noted the inevitability of stress in life.

Next steps include determining the mechanism that translates early life stress into cardiovascular risk; they suspect it results in genetic alterations at a vulnerable time in development. "Hormones can modulate gene expression and, during stress, you have very high levels of stress hormone," Dr. Loria said.

To further test the findings. they are blocking the angiotensin II receptor

in rats to see if that decreases the cardiovascular impact in animals with early life stress. And, to more closely mimic what happens in real life, they are feeding high-fat diets to the rats to see if, like the angiotensin II infusions, it exaggerates cardiovascular disease risk. Receptor blockers are commonly used in cardiovascular patients who have high levels of angiotensin II.

The scientists also will be studying gender differences in response to early life stress since their initial studies were in male rats. Psychological studies indicate that females are less impacted by early life stress and the scientists predict they will find similar results in the cardiovascular response.

Provided by Medical College of Georgia

Citation: Early life stress may predict cardiovascular disease (2010, February 9) retrieved 4 May 2024 from https://medicalxpress.com/news/2010-02-early-life-stress-cardiovascular-disease.html