

# Biological changes found in pregnant women with chronic stress

12 August 2013

(Medical Xpress)—Researchers at Emory's Nell Hodgson Woodruff School of Nursing have identified underlying biological changes among minority and low-income pregnant women that occur in response to chronic stress. These changes lead to a reduced ability to control the production of pro-inflammatory proteins (called cytokines) from immune cells and cortisol, a major stress hormone.

In a study in *Psychoneuroendocrinology*, the team looked for mechanisms that contribute to the high rates of preterm birth experienced by minority and low-income women. They investigated whether these women showed differences in inflammation and [cortisol levels](#) compared to Caucasian or higher income women.

Inflammation and elevated free cortisol during pregnancy are associated with significant adverse maternal and infant outcomes including preterm birth, hypertension, diabetes, preeclampsia and miscarriage. Long-term effects of [chronic stress](#) during pregnancy are also associated with behavioral and emotional problems for infants throughout toddlerhood.

Led by Elizabeth Corwin, PhD, associate dean for research at the Nell Hodgson Woodruff School of Nursing, the team measured inflammation, self-reported stress, and cortisol levels in 203 pregnant women during their third trimester.

Stress and total cortisol levels were significantly higher in low income and minority women, and the ability to control inflammation was lost.

"With 30,000 more African-American infants born prematurely each year compared to Caucasian infants, it is very clear there is a difference in birth outcomes in the US," explains Corwin. "This [health disparity](#) appears related to the exposure of minority and low-income women to chronic stress, which wears on the health of these women prior to

pregnancy as well as during and after pregnancy."

Inflammatory mediators are important for survival, but when uncontrolled they are proven to be dangerous and damaging to health. A mechanism called the cytokine-cortisol feedback cycle is designed to limit the production of [inflammatory mediators](#). With any stressor, (trauma, infection, anxiety etc.) inflammatory mediators increase to protect the host and also stimulate an increase in production of the stress hormone cortisol. To ensure inflammation does not get out of control, however, cortisol then "feeds back" or provides a signal to stop the further production of inflammatory mediators. In individuals with chronic stress, however, the feedback cycle quits responding to cortisol due to the consistently high levels of the hormone. Ultimately, both inflammation and cortisol become dysregulated.

Women in the study with low stress demonstrated perfect control over inflammation through the [feedback cycle](#), whereas women with high stress – minority women and those of low income - lost the ability to control the inflammatory mediators.

"We believe that the longstanding mystery of why low-income and minority women have poorer birth outcomes, including high rates of premature birth, may be related to this loss of control over inflammation and cortisol production," explains Corwin. "This dysregulation carries the potential for significant health risks for women and their infants. Further research and interventions are essential in this very critical area."

#### More information:

[www.sciencedirect.com/science/S0306453013000711%20](http://www.sciencedirect.com/science/S0306453013000711%20)

Provided by Emory University

APA citation: Biological changes found in pregnant women with chronic stress (2013, August 12)  
retrieved 21 November 2019 from <https://medicalxpress.com/news/2013-08-biological-pregnant-women-chronic-stress.html>

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