

HEALTH RESEARCH ABSTRACT SUBMISSIONS

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College *	College of Public Health
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Title of Research *	Maternal Antioxidant Blocks the Programming of PTSD Susceptibility in Female Mice
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Introduction & Purpose *

Maternal psychological stress may program post-traumatic stress disorder (PTSD) susceptibility. Placental 11 β -hydroxysteroid dehydrogenase (11 β -HSD) protects the fetus from excessive exposure to maternal glucocorticoids, but it is down-regulated during intrauterine growth restriction (IUGR). Enhanced oxidative stress is linked to IUGR-programmed cardiovascular disease, but its role in programmed behavioral alterations has not been explored. We sought to identify the effects of IUGR and transplacental glucocorticoid exposure on PTSD susceptibility, and further evaluated the protective effects of maternal antioxidant therapy.

Experimental Design *

IUGR was identified when pup weights were less than the 10th percentile on postnatal day 2. A subset of dams received tempol, an antioxidant, in their drinking water one week prior and throughout pregnancy. Another subset of dams received subcutaneous injections of saline or the 11 β -HSD inhibitor carbenoxolone on embryonic days 12-19. Fear conditioning (a model of human PTSD) was performed at 4-6 months.

Results *

Both IUGR females and the female offspring of carbenoxolone-treated dams had significantly increased conditioned fear. Maternal antioxidant completely blocked the programming of this PTSD-like fear. Among mice without IUGR or carbenoxolone exposure, maternal antioxidant decreased the conditioned fear of mice born to either undisturbed or sham-injected dams

Conclusions *

IUGR and exaggerated transplacental glucocorticoid exposure program PTSD susceptibility in female mice. We speculate oxidative stress plays a central role in the programming of adult psychiatric disease. The protective effects of tempol therapy in the offspring of sham-injected dams suggests the benefits of antioxidant therapy may further extend to pregnancies complicated by psychological distress.

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