Trans-generational effects of prenatal stress on the neuroendocrine stress axis in rats

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immune response, general homeostasis, is a primary neuroendocrine marker for stress and hypothalamic-pituitary-adrenal axis function.

The purpose of this study was to examine diurnal patterns of cortisol in preterm and full term infants at young adulthood.

This prospective, longitudinal study of 215 preterm infants (healthy, medical, neurological, small for gestational age) and a full-term cohort were recruited at birth and followed to age 23. Five diurnal salivary samples were collected in timed intervals during a typical day. Enzyme immunoassay analyses were conducted in duplicate. Analysis of Variance and hierarchical linear regression analyses were used.

At 23 years, those born full-term displayed a normal diurnal cortisol pattern. In contrast, those born preterm with acute neonatal illness had the most distinct diurnal patterns. Birth weight affected the cortisol awakening response contingent upon preterm group status. Socioeconomic status further predicted diurnal cortisol patterns.

Dysregulation of this stress biomarker may be an early indicator of adult stress-related disease. The DOHaD framework offers a life-span perspective on prematurity and adult outcomes, with potential for early identification of those at risk for later stress-related disease.

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PO24
Trans-generational effects of prenatal stress on the neuroendocrine stress axis in rats
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Exposure to social stress during pregnancy results in hyperactive hypothalamic-pituitary-adrenal (HPA) axis responses to stress in the adult offspring. Here the aim was to test whether the effects of prenatal stress (PNS; exposure to repeated social stress for 5 days during late pregnancy) on HPA axis function are transmitted to the second filial generation (F2) via the maternal line. F1 control and F1 PNS female rats were mated with control males and housed under non-stress conditions throughout pregnancy. HPA axis responses to restraint and systemic interleukin-1β (IL-1β) were assessed in the adult F2 offspring.

ACTH and corticosterone responses to acute stress were significantly greater/prolonged in the F2 PNS females, compared with F2 control females. This was associated with greater corticotropin releasing hormone (Crh) mRNA expression in the paraventricular nucleus. Moreover, glucocorticoid (Gr) and mineralocorticoid receptor (Mr) mRNA expression in the hippocampus was significantly reduced in the F2 PNS females, compared with controls. In the F2 males, HPA axis responses to IL-1β were different between control and PNS rats, however ACTH and corticosterone secretion following restraint stress was markedly attenuated in the F2 PNS group, and hippocampal Gr and Mr mRNA expression was greater compared with controls. In conclusion, PNS affects HPA axis function in the F2 offspring in a sex-dependent manner. In F2 PNS females, greater HPA axis responses were associated with potentially impaired glucocorticoid negative feedback control; whereas in F2 PNS males enhanced glucocorticoid negative feedback control may explain attenuated HPA axis responses to stress.

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PO25
Relationship between prenatal cortisol exposure and behavioral development in macaque monkeys
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Prenatal or early postnatal stress-induced increases in glucocorticoids exert adverse effects on offspring development. Much less