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JOURNAL ARTICLE

Prenatal exposure to dexamethasone alters Leydig cell steroidogenic capacity in immature and adult rats

K. C. Page, C. M. Sottas and M. P. Hardy
Biology Department, Bucknell University, Lewisburg, Pennsylvania 17837, USA.
kpage@bucknell.edu

This study examines the effects of prenatal exposure to dexamethasone (DEX) on postnatal testosterone production in male rats. Pregnant female rats were treated on gestation days 14-19 with DEX (100 microg/kg body weight per day; n = 9) or vehicle (n = 9). Results show that 35-day-old male offspring from DEX-treated pregnant females (n = 42) had decreased levels of serum testosterone (45.6% lower, P < .05) compared with control offspring (n = 43), although serum luteinizing hormone (LH) levels were not significantly altered. These findings suggest that a direct programming of developing gonadal cells occurs in response to high levels of maternal glucocorticoid. Indeed, testosterone production was significantly reduced in Leydig cells isolated from immature offspring of DEX-treated pregnant females compared with controls (48.3%, P < .001), and LH stimulation of these cells did not compensate for the lowered steroidogenic capacity. The hypothalamic-pituitary-adrenal axis was also affected, because significant reductions in both serum adrenocorticotropic hormone (ACTH; 26.2%, P < .001) and corticosterone (CORT; 32.3%, P < .001) were measured in DEX-exposed immature male offspring. In contrast, adult male offspring from DEX-treated dams had significantly higher levels of serum ACTH (39.2%, P <. 001) and CORT (37.8%, P < .001). These same animals had higher serum testosterone (31.6%, P < or = .05) and a significant reduction in serum LH (30.8%, P < .001). Moreover, Leydig cells isolated from these adult offspring exhibited an increased capacity for testosterone biosynthesis under basal (38.6%, P < .001) and LH-stimulated conditions (33.5%, P < .001). In summary, sustained changes in steroidogenic capacity were observed in male rats exposed to high levels of glucocorticoid during prenatal development. More specifically, DEX exposure in utero perturbed Leydig cell testosterone production in both pubertal and adult rats.

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