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510. Environmental Manipulation in the Infant Rat: A Model for Child Abuse?

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Neurobehavioral correlates of childhood abuse and neglect (A&N) are now known. A&N involve repetitive-chronic stress. Developmental aspects of the normal neuroendocrine stress response, specifically corticotropin-releasing hormone (CRH) and the regulation of plasma corticosteroids, and their potential perturbations by A&N have not been elucidated. The central nervous system (CNS) components of stress response of infant human and rat pup, specifically CRH, are identical. Creation of an infant rat model of human A&N and investigation of alterations in the stress response are the focus of this study. Sprague-Dawley rats (N = 82) born in our facility were assigned to 3 treatment groups on postnatal day (PND) 2: NH, not handled, but permitted access to

bedding; NHNB, not handled, no access to bedding; H, handled daily (for 15 minutes). Cold-separation challenge was performed on PND 9, as previously described (Yi SJ, Schultz L, Baram TZ, Plasma corticosterone is significantly increased by cold stress in 3-day-old neonatal rats, Soc Neurosci 1992; abst (423.5)). NHNB rats had poor weight gain: On PND 9, mean weight of NHNB rats was 14.82 gm, mean weight of NH rats was 21.17 gm, and mean weight of H rats was 20.08 gm. Basal morning plasma corticosterone (CORT) was significantly higher in NHNB rats (NHNB = 1.63 ± 0.3 $\mu\text{g}/\text{dl}$; H = 1.23 ± 0.1 $\mu\text{g}/\text{dl}$; NH = 1.07 ± 0.15 $\mu\text{g}/\text{dl}$). Cold challenge resulted in plasma CORT elevation at 1.5 hours in all groups. By 4 hours, NHNB plasma CORT continued to rise significantly, while H and NH groups were declining (NHNB = 4.59 $\mu\text{g}/\text{dl}$; H = 2.51 $\mu\text{g}/\text{dl}$; NH = 2.56 $\mu\text{g}/\text{dl}$). Infant rats subjected to environmental manipulation (e.g., bedding deprivation) gained weight poorly and had high basal CORT, compatible with a chronically stressed state. With acute stress challenge (cold), they had an exaggerated stress response, with pronounced elevation of CORT by 4 hours. Chronic stress, specifically prolonged elevation of plasma CORT, is known to result in hippocampal neuronal death. Infants with A&N-induced chronic stress may have long-term, as well as short-term, alterations in CNS function. (Supported by NS28912.)