



Sex Differences in the Sex Differences in the Effects of Environmental Enrichment After an Early Life Stressor

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Alfredo Gutierrez

Annelyn Torres-Reverón, PhD , *Ponce Health Sciences University*

Raura Doreste-Méndez , *Ponce Research Institute*

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Abstract

Studies have shown that environmental enrichment can compensate for the effects of an early life stressor such as maternal separation. Behavioral responses and immunohistochemical markers in rats are affected by environmental enrichment after maternal separation. In this study we seek to investigate whether sex influences the behavioral responses of environmental enrichment after maternal separation.

Prior scientific evidence suggests that there are behavioral sex differences in: 1) neural processes underlying successful or failed fear extinction (Gruene et al, 2014); (2) prenatal stress exposure and response to behavioral anxiety tests (Said et al, 2015); and (3) glutamate receptor expression in response to prenatal chronic mild stress (Wang et al, 2015). Therefore, we hypothesize that there will be behavioral differences in depression and anxiety-like behaviors according to sex after environmental enrichment following an early life stressor.

Male and female rat pups were separated from their dam 3 hours daily from postnatal day 1-21 inclusive. From postnatal day 22-77, rats were placed in an enriched environment or standard housing. To measure depression-like behaviors, we used the forced swim test. To measure anxiety behaviors, we used the open field test. Following this, rats were sacrificed and brains removed for further immunohistochemical studies.

Preliminary results show that female rats are having higher anxiety responses than males. On the contrary, males show higher depression-like behaviors. Environmental enrichment seems to be improving behavior in males but having little effects in females.

Keywords

Early Life Stressor; Environmental Enrichment



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School of Community Health Sciences
University of Nevada, Las Vegas

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Alfredo Gutierrez

Annelyn Torres-Reverón, PhD, Ponce Health Sciences University

Raura Doreste-Méndez, Ponce Research Institute

Coordinating Center: Charles R. Drew University of Medicine and Science

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