Exploring the Role of Microglia Cells in Dysregulated Orexin System Function in Rats Exposed to Bisphenol-A During the Peripubertal Period

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Early life exposure to endocrine-disrupting compounds (EDCs), such as bisphenol-A (BPA), have been associated with increased risk of depression and anxiety, particularly in young adult females. BPA is known to cause hormone dysregulation following neonatal exposure, yet there is a lack of research on the impact of BPA exposure during puberty, a developmental period characterized by heightened hormonal reorganization. Our lab has previously shown that female rats exposed to BPA during postnatal days 28-56 exhibit decreased reward motivation, which is accompanied by a reduction in the number and activity of neurons that produce orexin, a hypothalamic neuropeptide involved in motivated behavior. The mechanisms underlying these changes remain unclear. Microglia are the resident immune cells of the brain. They survey their environment in a ramified morphological state before being activated by cellular distress signals. This project aims to investigate whether peripubescent BPA exposure is associated with increased neuroinflammation which may, in turn, affect orexin system functionality. To test this, we processed brain tissue from BPA-exposed (0, 25, 250ug/kg/d) rats for immunohistochemical detection of orexin-containing neurons and microglia. Based on the decrease in motivation and orexin expression indicated by previous studies, we hypothesize that there will be lower numbers of orexin-containing neurons, a higher presence of activated-state microglia, and higher extent of colocalization between these cell populations in BPA-treated rats than untreated controls. This study will contribute to our understanding of how BPA exposure during puberty impacts motivational behavior in adolescents and young adults, predisposing them to motivation-linked disorders. This work is financially supported by the NIH R25ES020721 Grant, a NIDA R00 award (DA045765), a New Jersey Health Foundation award, a NIEHS P50 Pilot Grant Award, and a NIH T32 Training Grant.