

The Effects of Lead Exposure During Early Development on Fentanyl Addictive Behavior in Mice

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Abstract

With underlying neurological effects of lead (Pb) on learning and neuron firing, which is seen in consequential developments of learning disabilities, could the comorbidity of ADHD and SUDs be determined, in part, by Pb exposure? This study investigates a potential causal relationship between developmental Pb exposure and fentanyl addictive behavior with male and female mice in a Drinking in the Dark (DID) paradigm. Developmental Pb exposure and fentanyl use disorder (FUD) are both critical issues in public health, with ties to disadvantaged Social Determinants of Health and Adverse Childhood Experiences. With similar underlying neurological and demographical characteristics between Pb exposure and FUD, I hypothesize that Pb exposure puts one more at risk of FUD. I predict that this experiment will show that exposure to Pb leads to higher preference for fentanyl over water, even with aversive quinine additives, compared to mice in regular housing conditions.

This study addresses public health concerns with experimental behavioral neuroscience to display a causal relationship between Pb and FUD. In this study, I will be able to pursue my deep interdisciplinary interests surrounding health equity. If results from this experiment support the concept that environmental conditions from society constructs are a cause of FUD, then I would argue that the War on Drugs should not be a war against people who use drugs, but a war against those harmful, systemic environmental conditions in order to provide effective and sustainable health change.