

The effects of maternal separation on adult Methamphetamine self-administration

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The maternal separation (MS) paradigm is an animal model used to investigate long-term effects of early life stress. Animals that undergo daily maternal separation during a critical period of neurological development display altered behavioral and neuroendocrinological responses to psychological stressors as adults. MS also leads to altered drug-induced behaviors and drug-seeking behaviors in adulthood. Previous work has investigated drugs such as cocaine, ethanol, and amphetamine in paradigms such as conditioned place preference, locomotor activity, and intravenous/oral self-administration. However, to our knowledge no studies have examined the effects of MS on methamphetamine self-administration. We examined the effects of MS on adult methamphetamine self-administration, extinction, and cue-induced reinstatement of methamphetamine-seeking behavior. Long-Evans rat pups and dams were separated on postnatal days (PND) 2-14 for either 180 minutes (MS180), 15 minutes (MS15), or were left undisturbed other than for general husbandry (animal facility reared (AFR) condition). Male offspring were allowed to acquire methamphetamine self-administration (0.05 mg/kg/infusion) in 2hr daily sessions starting at PND67 for 15 days, followed by extinction training and cue-induced reinstatement of methamphetamine-seeking behavior. The MS180 group self-administered significantly more methamphetamine and acquired methamphetamine self-administration earlier than the MS15 group but not the AFR group. No significant group differences in extinction or cue-induced reinstatement were observed. These findings suggest that MS may cause lasting effects in the brain that lead to an increased propensity for methamphetamine use. Additional studies are needed to determine if intervention efforts such as environmental enrichment can reverse this stress-induced increase in susceptibility to methamphetamine intake. Supported by DA025606.

Biography

Candace Lewis is a doctoral student at Arizona State University. She works in Dr. Olive's lab investigating the effect of early life stress on drug-seeking behaviors in adulthood. She uses the maternal separation paradigm as an early life stressor and measures adult drug-seeking behavior in intravenous self-administration.

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