Adolescent Social Isolation Increases Vulnerability to Voluntary Opioid Consumption in Adulthood in Rats

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Social stress during adolescence can cause behavioral changes lasting into adulthood and is a risk-factor for substance use disorder, but the effect varies between individuals. This study characterizes how social isolation in adolescence affects opioid use and anxiety-like behavior in adulthood using the inbred strains WKY and DSS rats. We compare adulthood oxycodone intake in self-administration and behavior in an elevated plus maze (EPM) between rats either group housed (GH) or isolated for 6 weeks during adolescence. We also develop a method (PeerPub) for operant oral intake of two rats in the same chamber to better model human social condition. Our data shows rats isolated during adolescence (n = ~12/group) have higher vulnerability to oxycodone consumption in adulthood (WKY females P=0.006, WKY males P=0.01, DSS females P=0.02, DSS males P=0.05). We also found differences in anxiety-like behavior between experimental phases (baseline, post-drug, and withdrawal). Overall, our data indicates that rats isolated during adolescence have less anxiety-like behavior before oxycodone exposure, a decreased sensitivity to the negative effects of oxycodone, however, they consume more drug. These data demonstrate a need for better understanding in the role social environments play in vulnerability to drug use. We plan to examine underlying molecular mechanisms associated with these phenotypes in future studies.