



Locomotor activity changes in female adolescent and adult rats during repeated treatment with a cannabinoid or club drug

Jenny L. Wiley^{1,2}, Rhys L. Evans², Darren B. Grainger², Katherine L. Nicholson²

¹RTI International, 3040 Cornwallis Road, Research Triangle Park, North Carolina 27709-2194, USA

²Department of Pharmacology and Toxicology, Virginia Commonwealth University, Richmond, Virginia, USA

Correspondence: Jenny Wiley, e-mail: jwiley@rti.org

Abstract:

Adolescents and young adults of both sexes are the primary consumers of “club” drugs; yet, most of the mechanistic preclinical research in this area has been performed in adult male rodents. The purpose of this study was to evaluate the acute and repeated effects of drugs that are commonly abused by adolescents in female adolescent and adult rats in a rodent model of behavioral sensitization. During two five-day periods separated by a two-day break, rats were injected daily with saline or with one of the following drugs: cocaine (7 or 15 mg/kg), ketamine (3 or 10 mg/kg), 3,4-methylenedioxymethamphetamine (MDMA) (3, 10, or 30 mg/kg), or Δ^9 -tetrahydrocannabinol (THC) (0.03, 0.1, 0.3 or 1 mg/kg) and their locomotor activity was measured. Cocaine increased activity across days in both age groups. Whereas ketamine produced progressive increases in activity with repeated administration in rats of both ages, MDMA increased, and then decreased, activity in the chronic dosing regimen in female adolescents only. Tolerance to the initial stimulatory effects of low doses of THC was observed at both ages. The results with THC are similar to those obtained for male rats tested under identical conditions in a previous study; however, in contrast with the present results in females, male adolescent rats in the previous study failed to develop behavioral sensitization to ketamine. Together, these results suggest that age and sex strongly influence the progressive adaptive changes that occur with repeated administration of some, but not all, of these commonly abused substances.

Key words:

behavioral sensitization, club drugs, cocaine, female rats, locomotor activity, MDMA, THC
