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Investigations of binge-like behavior in female, Sprague Dawleys: effects of the catecholamine uptake blocker Lisdexamfetamine and dopamine antagonist Haloperidol

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UCONN

Investigations of binge-like behavior in female, Sprague Dawleys: effects of the catecholamine uptake blocker Lisdexamfetamine and dopamine antagonist Haloperidol

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INTRODUCTION

Binge eating disorder has a lifetime prevalence rate of 1.4%, and typically occurs at a higher rate in women than in men. Individuals who develop eating disorders are at a higher risk of cardiovascular problems, neurological and immune dysfunctions, type two diabetes, and increase in obesity. Lisdexamfetamine (LDX) is a catecholamine uptake blocker and a d-amphetamine prodrug that was approved for the treatment of moderate to severe binge eating disorder. Animal models of binge-like feeding behavior have been developed in the past and involve the induction of binge eating of a highly palatable food. In previous studies, binge-like eating in rats has been induced by random exposure to chocolate and reports show that LDX can reduce chocolate intake in a dose dependent manner during the binging sessions. Previous research has been done in female Wistar rats and has shows a significant increase in rats' intake of chocolate over time with a significant decrease upon LDX administration. The present studies focus on binge-like eating behavior in female, Sprague Dawley rats, induced using Cadbury's milk chocolate, and how lisdexamfetamine (LDX) effects this behavior. This experiment is being conducted to see if there is any strain difference on acquisition of the binge-like behavior and/or effect of LDX.

MATERIALS & METHODS

Subjects

Adult female Sprague Dawley rats (N = 16 Charles River). Standard laboratory chow and water were available ad libitum throughout experiment in their home cages.

Pharmacological Procedure

Administration of Lisdexamfetamine (LDX) during one-hour chocolate exposure sessions. Doses of LDX administered were based on previously completed experiments (Presby et al. 2020). IP injections of 0.1875, 0.375, 0.75, 1.5 mg/kg or vehicle (saline) were given to rats once per week in a randomly varied order 60 min prior to testing. The weight of the chocolate was taken before and after each session to determine the effect of LDX on the consumption.

RESULTS

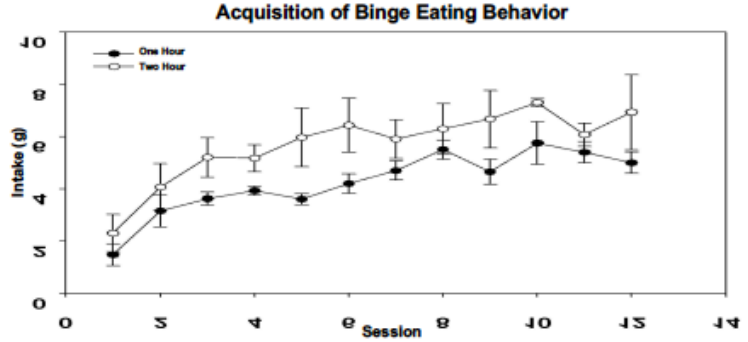

Fig 1. Average chocolate consumption (in grams) of rats per session during chocolate exposure.

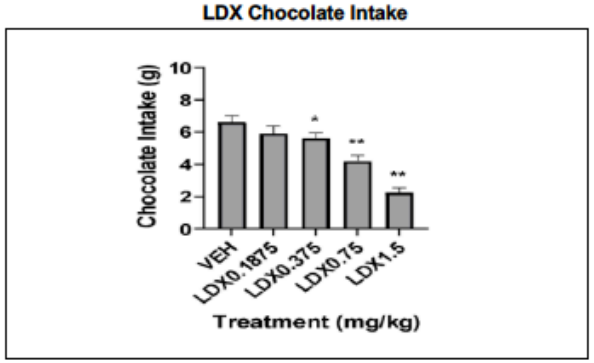

Figure 2. The effects of LDX on chocolate intake in the one-hour session. An overall significant effect of LDX (*p < 0.05 at 0.375, 0.75, and 1.5 mg/kg dose) on chocolate consumption was seen in the female Sprague Dawley rats.

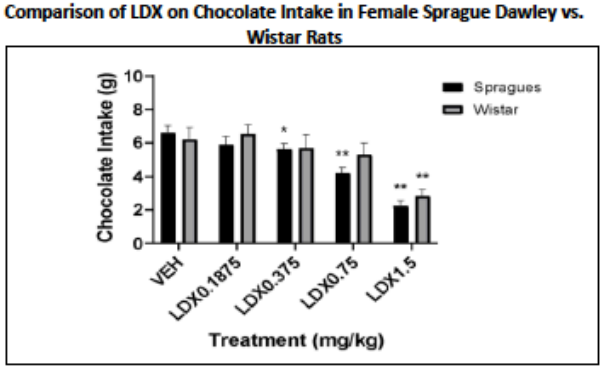

Figure 3. A comparison of the effects of LDX on chocolate intake in the one-hour session of female Sprague Dawley rats vs. female Wistar rats. An overall significant effect of LDX (*p < 0.05 at 0.375, 0.75, and 1.5 mg/kg dose for the female Sprague Dawley and *p > 0.05 at 1.5 mg/kg dose for the female Wistar rats) on chocolate consumption was seen in both strains of rats.

CONCLUSIONS

- Results show binge-like behavior was induced using chocolate in the female Sprague Dawley rats
- LDX significantly reduced the chocolate consumption at the highest doses
- There are no differences that can be seen between the two strains of rats. Future work will aim to reverse the effects of LDX using haloperidol, a dopamine (DA) D2 receptor antagonist. LDX works primarily on DA, by introducing haloperidol to the system it is hypothesized that the reduction in chocolate intake induced by LDX may be reversed.
- When tested in males, a partial reversal was seen after the addition of haloperidol, and can be hypothesized to be seen in females as well

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