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Title: Towards developing a model to study alcohol drinking and craving in female mice housed in automated cages

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Highlights

- Animal studies in automated cages and with group housing provide a way to study behavior without human interaction
- Intermittent alcohol drinking in automated cages led to increased number of nose pokes (craving measure) on withdrawal day one and day ten.

Abstract

It is about half a century ago when the so-called “Wise model” to study alcohol drinking behavior in rats was established. The model was based on voluntary intermittent access to increasing concentrations of alcohol. We aimed to establish a model of alcohol craving and used an extinction test on withdrawal days 1 and 10 to study motivation for alcohol. For this purpose, the alcohol drinking training was paired with light cues to establish conditioning. The extinction test was carried out without alcohol but in the presence of light cues and empty bottles. The outcome measures were number of visits, nose pokes, and licks in the conditioned corner where the number of nose pokes represents how much mice “want” alcohol and number of licks shows how much mice “like” alcohol. The number of nose pokes during withdrawal is a measure of craving. Late withdrawal craving was found when intermittent alcohol access was carried out in the automated cages. In this case, we observed a significant increase in the number of nose pokes on both withdrawal days 1 and 10 as compared to water control. The number of nose pokes in the withdrawal days did not correlate with alcohol dose, but number of nose pokes on withdrawal day 1 correlated with the number of nose pokes on the last training day. Although we did not observe incubation of alcohol craving after withdrawal, the craving was increased at the late time point. We conclude that we have established a new tool to study alcohol drinking behavior and craving in female mice.

Key words: alcohol addiction, IntelliCage, intermittent alcohol access, craving, conditional stimuli, social interaction.

1. Introduction

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