4-5-2017

The Effects of Adolescent Housing Condition and Voluntary Exercise on Alcohol Intake and Stress Response in Male Long-Evans Rats

Follow this and additional works at: https://ecommons.udayton.edu/stander_posters

Recommended Citation
https://ecommons.udayton.edu/stander_posters/864

This Book is brought to you for free and open access by the Stander Symposium at eCommons. It has been accepted for inclusion in Stander Symposium Posters by an authorized administrator of eCommons. For more information, please contact frice1@udayton.edu, mschlangen1@udayton.edu.
The Effects of Adolescent Housing Condition and Voluntary Exercise on Alcohol Intake and Stress Response in Male Long-Evans Rats

Caroline Lynch
Dr. Tracy Butler

Introduction

• Exposure to chronic stress during adolescence has been shown to lead to behavioral and cognitive deficits in rats (Green et al., 2013).
• A correlation has been found between exposure to chronic stress during adolescence and increased alcohol intake in rats (Besheer et al., 2013).
• Regular voluntary exercise can be a means to relieve stress and reduce anxiety-like behavior in rats (Fulk et al., 2004).
• By giving chronically stressed rats the opportunity for regular voluntary exercise during adolescence, their anxiety-like behavior and alcohol intake may be lessened due to the protective effects of exercise.

Hypothesis: Male Long-Evans rats that undergo a chronic stressor during adolescence and are given access to voluntary exercise will exhibit less anxiety-like behavior and alcohol intake/preference than those rats that undergo a chronic stressor and do not have access to exercise.

Methods

Subjects:
16 Male Long-Evans rats arrived PND 21

Adolescent Chronic Stress Paradigm:
• Socially Isolated (SI) Housing: 1 rat per cage (n=8), a chronic stressor
• Group Housed (GH): 4 rats per cage (n=8)
All rats were GH from PND 21-27
After PND 69 all rats became SI to prepare for subsequent procedures

Voluntary Exercise Protocol:
• PND 28-69
4 SI and 4 GH rats were designated as runners
SI and GH runners were given 30 minutes of exposure to a running wheel (Figure 1a) five days per week for five weeks
Distance (km) was measured using BoGeer YT-813 bicycle odometers (Figure 1b)

Anxiety-Like Behavior Measure: Elevated Plus Maze
• Time spent in open vs. closed arms, arm entries. Measured 5 min. per rat

Swim Stressor Procedure and Corticosterone (CORT) Measurements:
• Blood samples via tail nick were taken at 60 min. pre-stressor and 5 and 30 min. post-stressor
• Each rat swam for 5 min. in a bucket (9.5”x15”) filled with 9” of water at 25°C
• CORT measured using a 96 well plate competitive enzyme immunoassay containing a polyclonal CORT antibody (ImmunoDiagnostics Systems)

At the completion of behavioral testing, all of the cohort participated in Alcohol self-administration:
• 20% EtOH/water given M, W, F for 4 weeks
• 2 bottle choice- controlled for location preference
• Alcohol intake and preference were measured at 30 min. and 24h.

Conclusion

• Voluntary Exercise: GH rats generally ran greater total distances than SI rats, although running behavior dropped off after PND 43.
• Elevated Plus Maze: SI runners spent the most time on the open arms compared to all other groups of rats
• CORT: GH non-runners and SI non-runners had higher baseline plasma CORT than the GH and SI runners
• EtOH: Few significant differences were found between groups for intake or preference
• This data suggests that voluntary exercise may help reduce anxiety-like behavior in SI rats as well as reduce baseline CORT in both SI and GH rats

Future Directions
• This study will be replicated during the summer of 2017

Acknowledgements
I would first and foremost like to thank my mentor, Dr. Tracy Butler, for her support and guidance throughout this honors thesis project. I would also like to thank the University of Dayton Honors Program and the Berry family for their support and for making my experience in the Berry Summer Thesis Institute possible.