Effects of Wheel Running on Incubation of Cocaine Seeking in Rats
Heather L. Veglahn, Natalie E. Zlebnik, Marilyn E. Carroll
Department of Psychiatry, University of Minnesota

Background
Drug abuse relapse is a major issue in treating addictions. Physical activity decreases cocaine self-administration in lab rats. Access to a wheel has been shown to significantly reduce cocaine-seeking behaviors in female rats, but not in male rats. In humans, exercise has been shown to decrease drug craving and reduce the probability of relapse.

Objective
To assess the effects of chronic wheel running on the incubation of cocaine-seeking behavior in female rats after extended forced abstinence from cocaine self-administration.

Methods
- 10 days self-administration in operant chamber
- Moved to wheel cage and separated into groups
  - 3 Days locked wheel
  - 3 Days unlocked wheel
  - 30 days locked wheel
  - 30 days unlocked wheel
- Returned to Operant Chamber to measure responses

Results

![Figure 1](image1.png)

**Figure 1.** Rats with access to a locked running wheel showed an increase in cocaine seeking behavior after 30 days while rats with access to a running wheel for 30 days showed no incubation of cocaine seeking.

![Figure 2](image2.png)

**Figure 2.** A rat fitted with an infusion apparatus inside the operant chamber

![Figure 3](image3.png)

**Figure 3.** A rat in a cage with an attached running wheel.

![Figure 4](image4.png)

**Figure 4.** The mean number of responses (top) and the mean number of infusions (bottom) of the rats during self-administration in the operant chamber. No group differences were seen during self-administration.

Conclusions
Daily aerobic exercise diminished the incubation of cocaine-seeking after a period of withdrawal. Thus, exercise can be a useful intervention during a period of drug abstinence to reduce relapse-related behaviors.

References

Acknowledgements
Thank you everyone in the Carroll Lab: Vanessa Adamson, Yosef Amrami, Cole Batty, Clare Chamberlain, Arit Harvanko, Sarah Korthauer, Nate Omdalen, Amy Saykao, and Ashley Xiong. Research supported by NIDA grant R01 DA003240 (MEC).