Transcriptomic alterations associated with opioid craving in the nucleus accumbens of male and female Long Evans rats


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Introduction

One of the major contributing factors to the current opioid epidemic in the United States is relapse. Relapse is often precipitated by drug craving when a recovering drug user is re-exposed to previously drug-paired cues. Research shows that drug craving and relapse behaviors appear to differ by biological sex. Identifying the underlying biological mechanisms of drug craving may prevent relapse and improve treatment outcomes for patients suffering from substance use disorder (SUD). Using an incubation of craving and RNA sequencing, our work aims to elucidate molecular mechanisms underlying cue-induced craving after morphine self-administration in both male and female rats. RNA sequencing may provide a foundation for potential novel gene-directed treatments for relapse, possibly in a sex-specific manner. We seek to delineate the molecular signature associated with drug craving and to identify new targets for developing therapeutics for opioid craving and relapse.

Methods

Drug-seeking behavior incubated over 30 days of forced abstinence after morphine self-administration

30 days of abstinence after morphine self-administration elicits sex-specific patterns of gene expression

Conclusions & Future Directions

- Morphine incubation behavior is similar in males and females but gene expression changes diverge based on sex
- Identifying potential master regulators for each biological sex is current priority
- Potential implications for developing pharmacotherapeutics to prevent craving in males and females

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