

Neuronal Ensembles that Drive Reward-Seeking Behavior in Mice Models of Heroin Use

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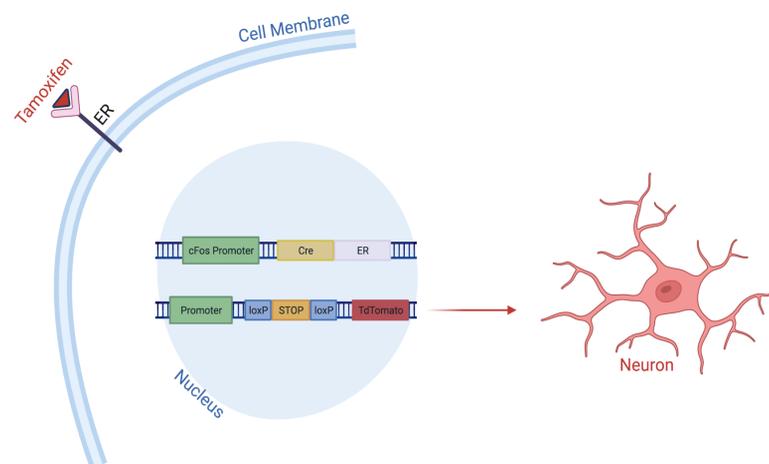
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BACKGROUND

- Heroin is a highly addictive drug with strong rewarding effects that leads to high abuse potential. Hospitalizations and fatal intoxications from opioid use have steadily increased and there is currently no definitive treatment for heroin addiction.
- This project is unique in that we hypothesize that we will be able to identify the small number of neurons within the Nucleus Accumbens (NAcore) coactivated during heroin seeking.
- This can lead to further understanding of the neurocircuitry related to opioid relapse and improvements in treatment options.

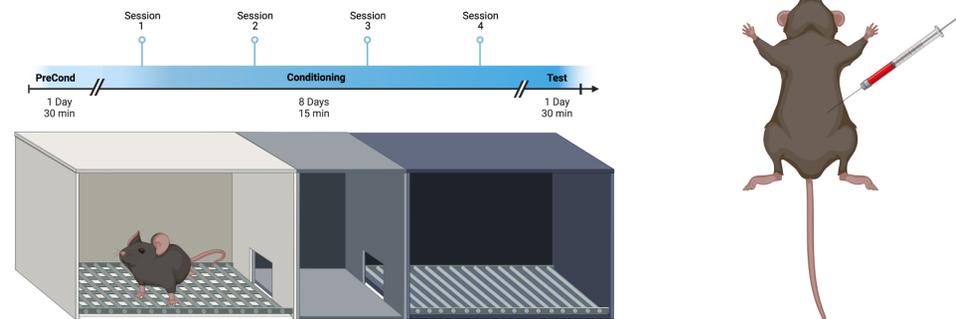
ANIMALS

- cFos^{CreER}xAi14 mice
- 8 female, 6 male (n=14)
- Ages 7-10 weeks



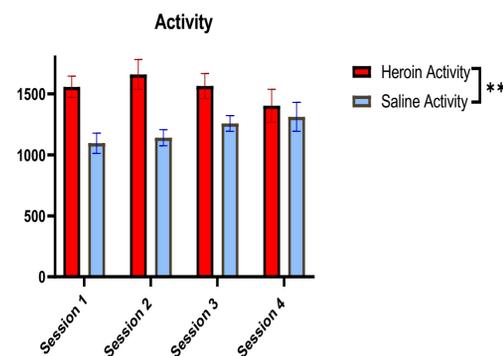
METHODS

- Conditioned Place Preference (CPP) to elicit drug-seeking behavior.

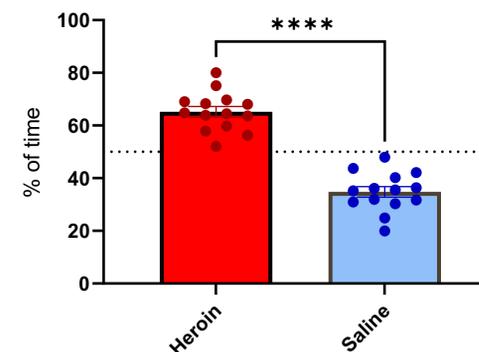


- Animals sacrificed 3 days post-Tamoxifen injection to allow sufficient TdTomato (Tom+) expression.
- Brain tissue collected and prepared into 50µm thick coronal slices.
- Immunohistochemistry (IHC) against Tom+ and the neuronal marker (NeuN+) performed.

RESULTS



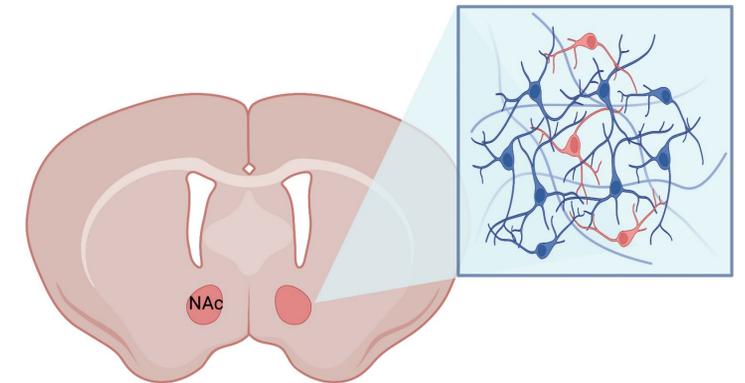
- P value 0.0051**
- Mice had significantly increased activity during conditioning with heroin



- P value <0.0001****
- Mice spent significantly more time in heroin-paired environment

CONCLUSIONS

- The experiment was successful in producing drug seeking behavior.
- A confocal microscope will be used to acquire images of the NAcore.
- Imaris Cell Imaging Software will be employed to quantify Tom+ and NeuN+ expressing neurons.



- The next project will replicate the experiment using a contingent self-administration model.
- Future experiments can look at the genetic modifications within Tom+ heroin-seeking neurons allowing for more targeted treatment options.

ACKNOWLEDGEMENTS

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