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INTRODUCTION & AIM

Tyrosine hydroxylase (TH) neurons are localized in the hypothalamic arcuate nucleus (ARC) and are one of the neuron groups crucial in food intake and energy consumption. It is known that the amount of food consumption increases in mice upon manipulations on these neurons. However, behavioral effects in mice after either chemogenetic or optogenetic stimulation of these neurons have not been investigated. In this study, we examined the possible behavioral alterations that may occur in mice as a result of the chemogenetic activation or inhibition of the TH neurons.

METHODS

Twenty seven (6-8 weeks old) transgenic TH-cre (Jax. Lab. #8601) mice were used.

Ex-vivo (10 mice)

In-vivo (17 mice)

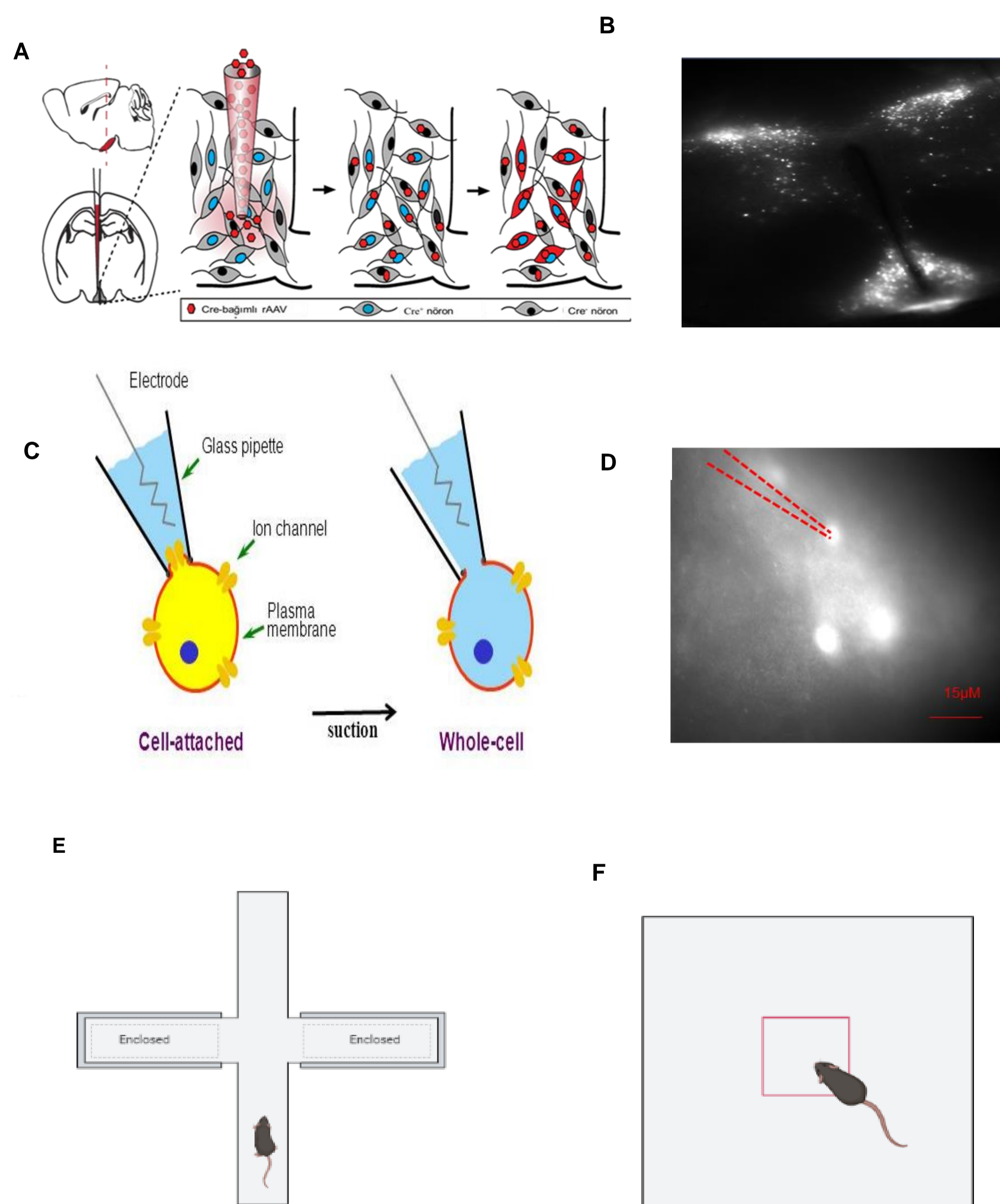


Figure 1. A) Using the Cre technique and injected virus B) Image of GFP injection into the hypothalamus arcuate region C) Patch Clamp technique D) Patch Clamp image of Th-Cre neurons E) Elevated plus maze test F) Open field test

RESULTS

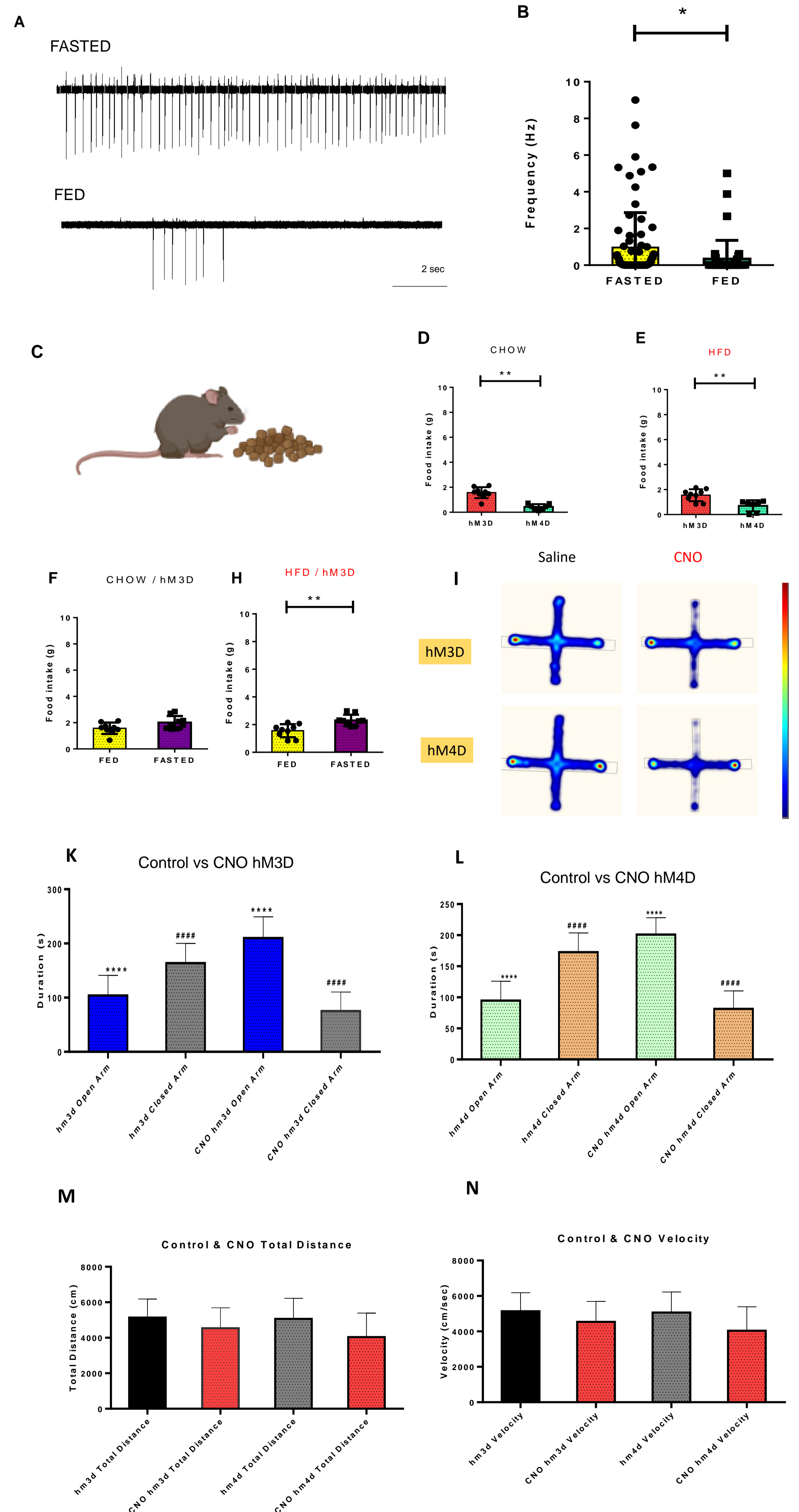


Figure 2. A) Representative image depicting loose seal recording from an ARC neuron; recording pipette highlighted with dashed lines B) Electrophysiology (patch clamp) technique was used to measure electrical activity changes. Student's t test and Mann-Whitney U test were used for statistical analyses n=10 p<0.05. C,D,E,F,H) Food intake. Student T Test were used for statistical analyses n=17. I,K,L,M,N) Elevated plus maze test. Student T Test were used for statistical analyses n=17.

CONCLUSION

This is the first study to report behavioral alterations upon activation/inhibition of arcuate TH neurons. Our findings suggest that manipulations of TH neurons in ARC alter the food intake in transgenic mice, as well as their behavioral patterns.