

# Oxytocin Signaling in Ventromedial Hypothalamus Regulates Eating Behaviors



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## Abstract

Our main goal of this experiment is to examine oxytocin receptors (OXTR) in the ventromedial hypothalamus (VMH) and how they regulate eating behaviors. This region in the brain is largely responsible for regulating emotion, eating behaviors and sexual behaviors (Florea et al., 2022). OXTR-expressing neurons play a major role in eating behaviors and emotion and have been shown to be expressed in the VMH (Florea et al., 2022). Recently, studies have shown a decrease in food intake with VMH oxytocin infusion, however information about oxytocin signaling in the VMH remains largely unknown (Klockars et al, 2017). In efforts to provide better understanding of neuron function, seven male OXTR-Cre mice were used in this experiment. Initially, the mice underwent operant conditioning tests to see how the OXTR-expressing neurons in the VMH could affect motivation. However, we found that activation of the OXTR-expressing neurons in the VMH had no impact on motivation. Food intake was tested to see if neuron activation would have an effect on eating behaviors in various energy states. When the mice were tested with ad libitum normal chow, and fasted normal chow no effect was observed. Conversely, neuron activation caused a decrease in intake of highly palatable food. Based on our findings, we hypothesize that OXTR neurons in the VMH may regulate the intake of highly palatable food.

## Materials and Methods

- Animals- 7 OXTR CRe Mice
- Chemogenetics
- Progressive ratio schedule reinforcement
- 60% kcal fat rodent chow

## Conclusion

- Neuron Activation via clozapine-N-oxide can lead to a decreased intake of high fat food
- Operant conditioning performed to see how the OXTR-expressing neurons in the VMH could affect motivation

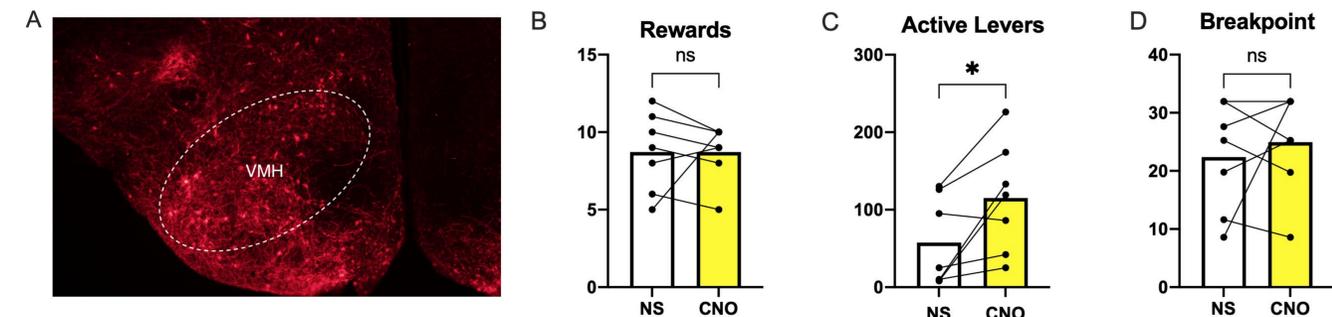
## References

Klockars, O. A., Waas, J. R., Klockars, A., Levine, A. S., & Olszewski, P. K. (2017). Neural basis of ventromedial hypothalamic oxytocin-driven decrease in appetite. *Neuroscience*, 366, 54–61.

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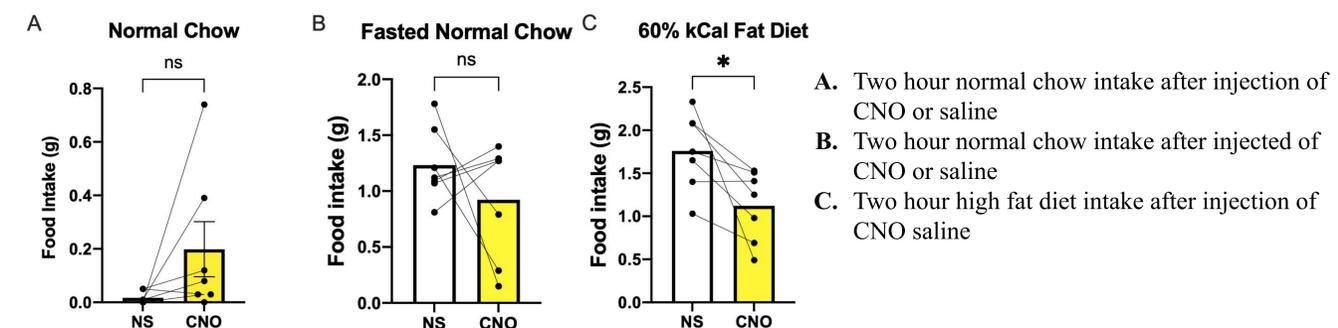
Florea, T., Palimariciuc, M., Cristofor, A. C., Dobrin, I., Chiriță, R., Bîrsan, M., Dobrin, R. P., & Pădurariu, M. (2022). Oxytocin: Narrative Expert Review of Current Perspectives on the Relationship with Other Neurotransmitters and the Impact on the Main Psychiatric Disorders. *Medicina (Kaunas, Lithuania)*, 58(7), 923. <https://doi.org/10.3390/medicina58070923>

## 1. VMH-OXTR Activation has no Effect on Motivated Behaviors



- A. Representative image of virus injection in OXTR-Cre mice  
 B. Number of high fat pellet rewards after injection of CNO or Saline  
 C. Number of active levers after injection of CNO or Saline  
 D. Number of rewards or pellets to reach breakpoint on average after injection of CNO or Saline

## 2. VMH-OXR Activation Reduces Highly Palatable Food Intake Across Two Hours



- A. Two hour normal chow intake after injection of CNO or saline  
 B. Two hour normal chow intake after injected of CNO or saline  
 C. Two hour high fat diet intake after injection of CNO saline

## 3. Potential Downstream Targets

