# Differential effects of central oxytocin on social versus cued fear

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## Introduction

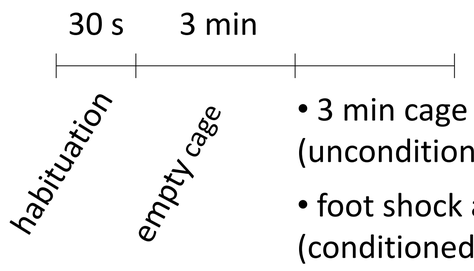
- Oxytocin (OXT) is a pro-social neuropeptide with anxiolytic properties, which might be a potential therapeutic agent for social anxiety disorder and post-traumatic stress disorder

## Aim of the study

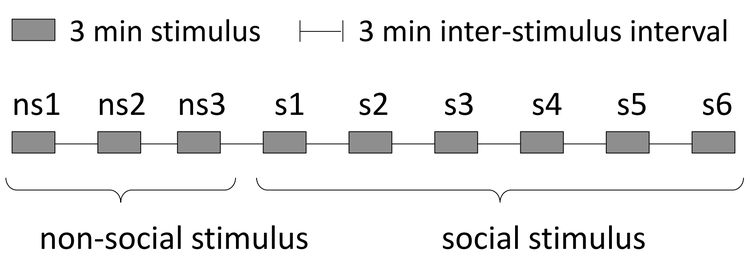
- To determine whether central (icv) OXT facilitates social and cued fear extinction via the OXT receptor (OXTR)

## Methods

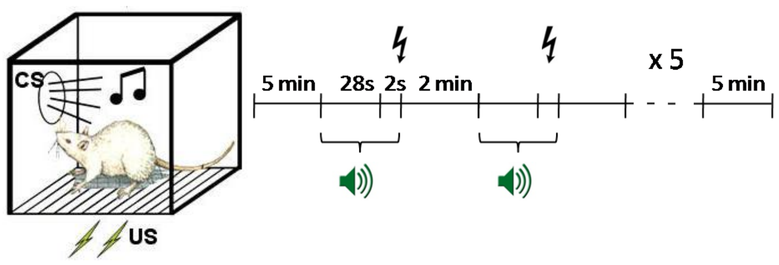
- **Social fear** induced by *social fear conditioning* (Toth et al., 2012)



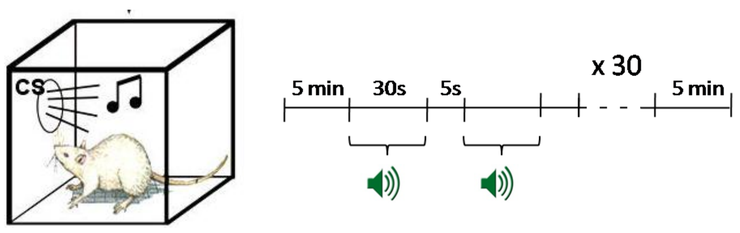

- Assessment of social investigation as indicator of social fear and fear extinction 24h later in the home cage




- **Cued fear** induced by *cued fear conditioning* (Toth et al., in revision)




- Assessment of freezing as indicator of cued fear and fear extinction 24h later in a different context

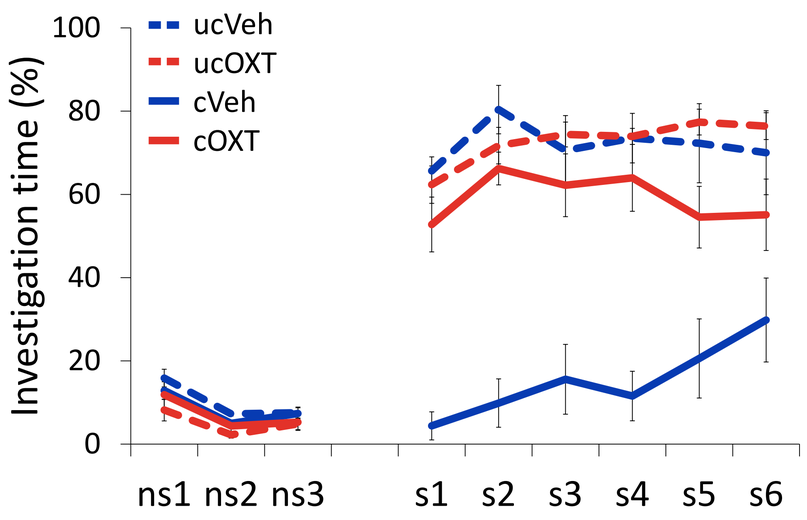



**Treatment:**

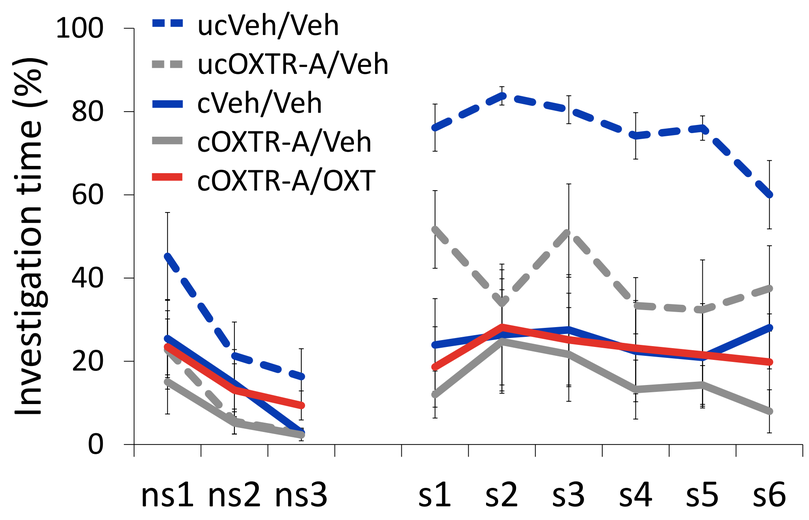
- Veh/OXT infused icv 10 min prior to test
- Veh/OXTR antagonist (OXTR-A) infused icv 40 min prior to test

## Results

### OXT reverses social fear (left) through the OXTR (right)

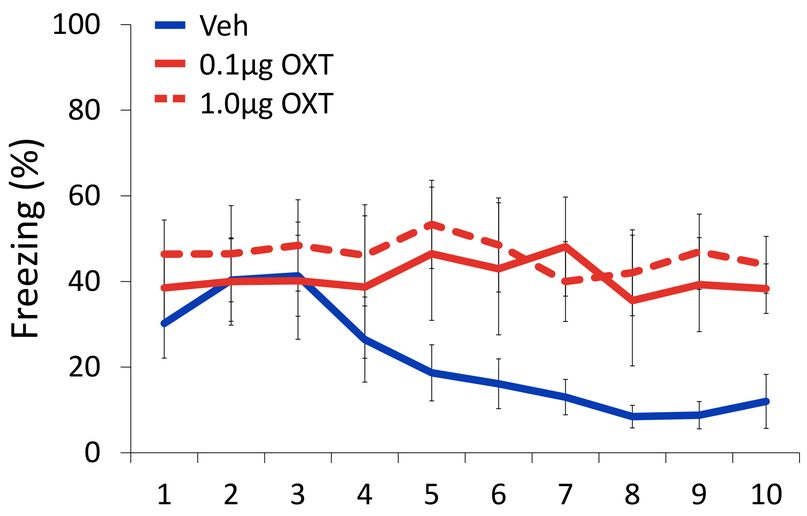



Acute icv OXT increased social investigation in conditioned mice (c), without further increasing social investigation in unconditioned mice (uc)

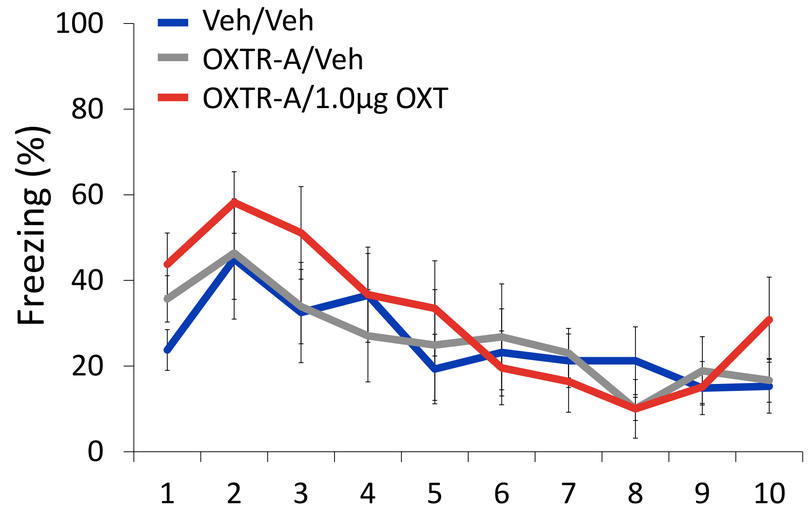



OXTR-A abolished the increase in social investigation caused by OXT in conditioned mice (c) and decreased social investigation in unconditioned mice (uc)

### OXT impairs cued fear extinction (left) through the OXTR (right) in rats

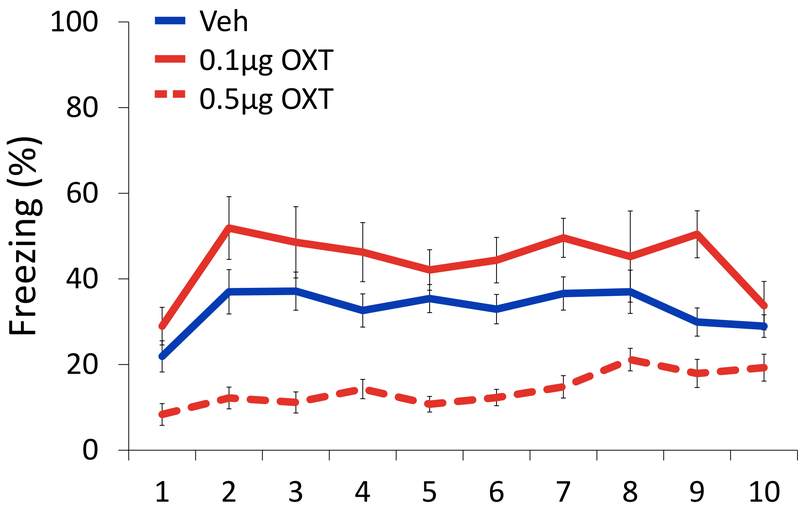



Acute icv OXT impaired extinction at two different doses, without increasing fear expression



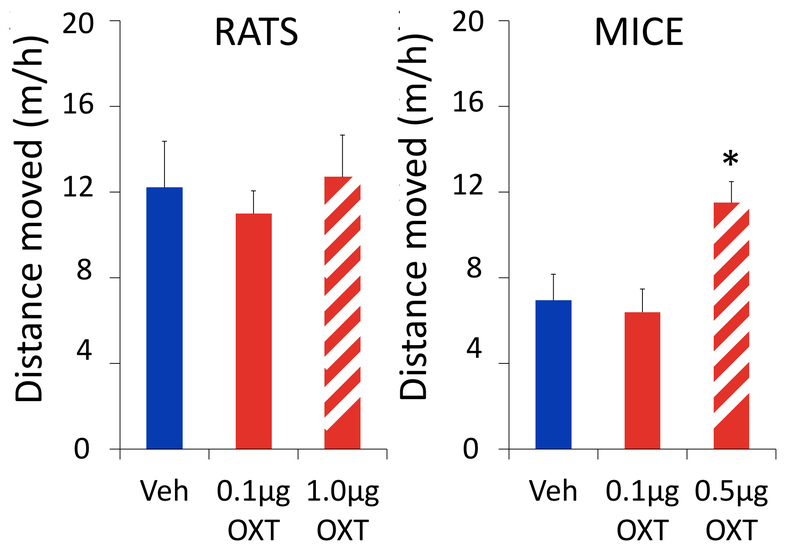

OXTR-A abolished the cued fear extinction impairment caused by OXT, but did not facilitate fear extinction by itself

### Low dose of OXT impairs cued fear extinction in mice




Low dose of acute icv OXT impaired, while a high dose facilitated extinction

### Home cage locomotion




Acute icv OXT did not alter locomotion in rats, while the high dose increased locomotion in mice

## Summary

- OXT completely reversed social fear
- OXT impaired cued fear extinction both in rats and mice
- A high dose of OXT decreased freezing in mice due to an increase in locomotor activity
- Both the facilitatory effect on social fear extinction and the impairing effect on cued fear extinction were mediated via effects through OXTR
- **OXT represents a therapeutically promising approach in patients with deficits in social functioning, such as social anxiety disorder and autism spectrum disorders. However, in patients where the fear does not involve a social component, such as post-traumatic stress disorder, OXT may delay fear extinction**

### References:

Toth, I., Neumann, I.D., Slattery, D.A. (2012) Social fear conditioning: a novel and specific animal model to study social anxiety disorder. *Neuropsychopharmacology* doi: 10.1038/npp.2011.329

Toth, I., Neumann, I.D. Slattery, D.A. (in revision) Central administration of oxytocin receptor ligands affects cued fear extinction in rats and mice in a time-point dependent manner. *Psychopharmacology*

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