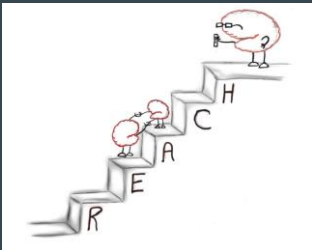


Social Cue Processing in a Rat Model of Autism Spectrum Disorder



Stanley Ligon, Saaqib Chauhdry, Emily Cardenas



A major feature of ASD is altered communication and toy engagement



What is affecting their ability to properly engage socially and emotionally with other humans?

Main Question

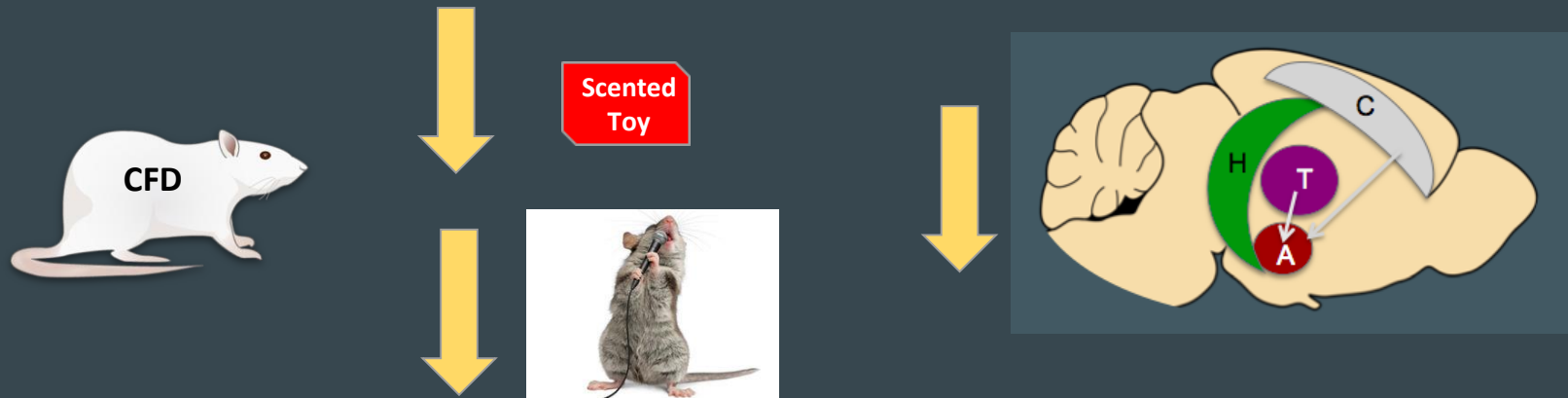
Do CFD rats process social cues differently from neurotypical rats?

Goal of Research

- Characterize the animal model through interactive behavioral tests
 - Rat with toys
 - Rats with other rats
- Investigate the brain mechanisms
 - Explore the neuronal circuit implicated in emotional processing with electrophysiology

Hypothesis

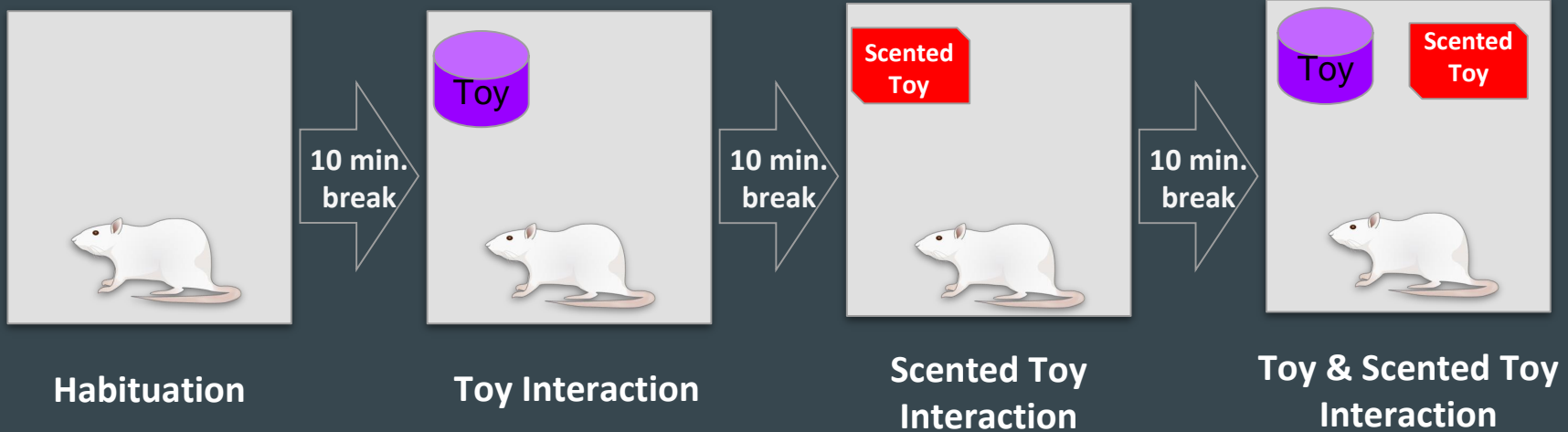
- I. CFD rats will interact fewer times with scented toys and other rats.
- II. They will have decreased vocalization in the presence of any social cues.
- III. There will be a decrease in neural activity in the areas associated with emotional processing.



Ia. Design of Rat-Toy Recognition Task

Males were tested w/ male scented toys (in soiled bedding)

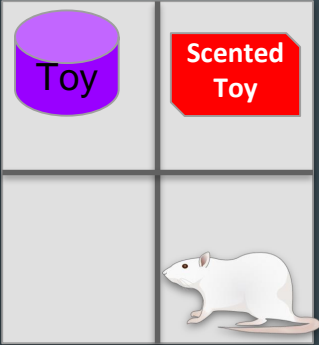
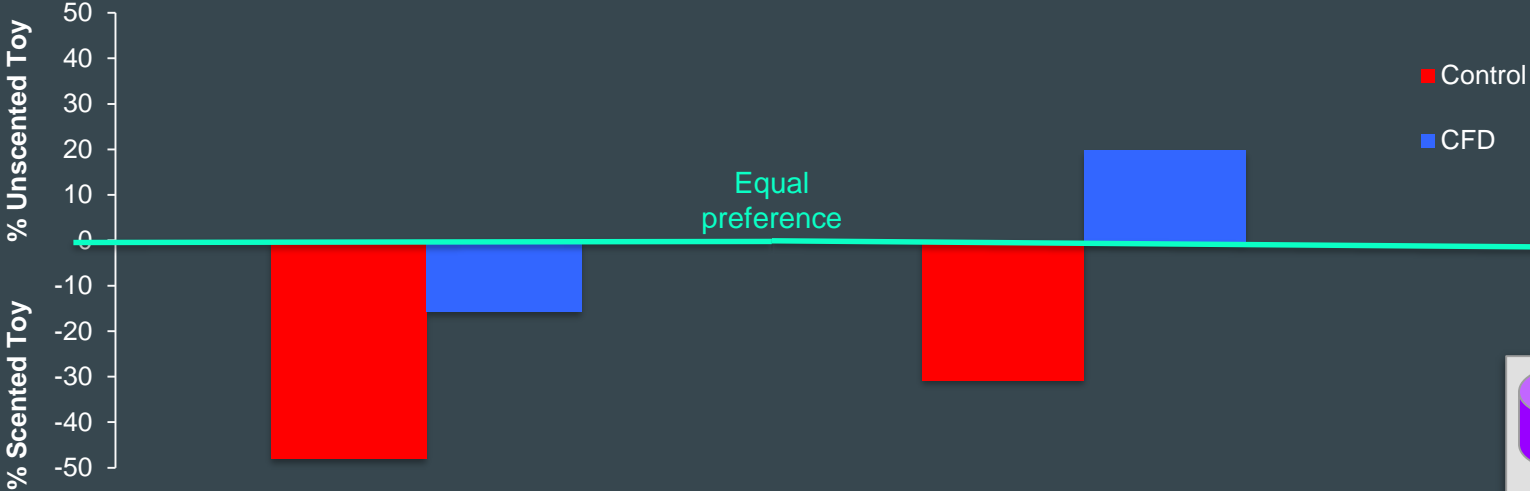
Females were tested w/ Female scented toys (in soiled bedding)



CFD Rats Have Less Preference for Scented Toy

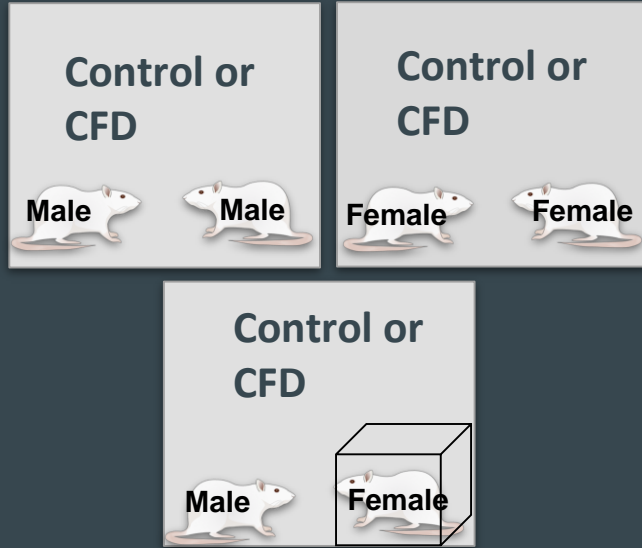
Male Toy Preference

Female Toy Preference

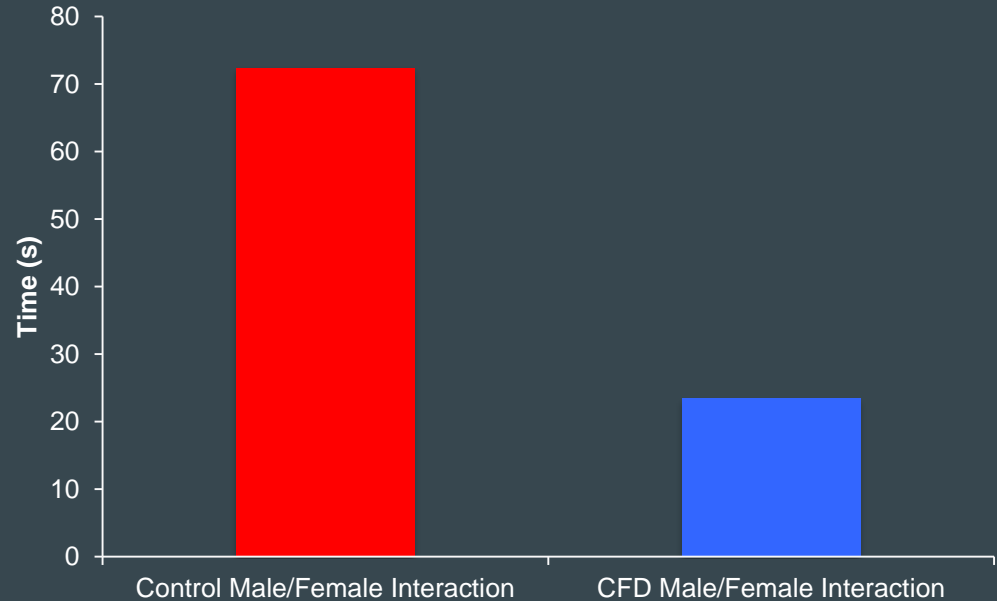


Ib. Rat-Rat Interactions and Pairing Design

- Interactions were always CFD w/ CFD or Control w/ Control
- Same sex: rats interacted without any boundaries in arena
- Opposite sex: Females were kept in a cage to prevent potential for copulation



Average Time Spent Interacting



II. CFD pup model has impaired social communication

- Rodents communicate via olfactory cues and ultrasonic vocalizations
- When CFD pups are isolated from their mothers, they do not respond the same as control pups in isolation



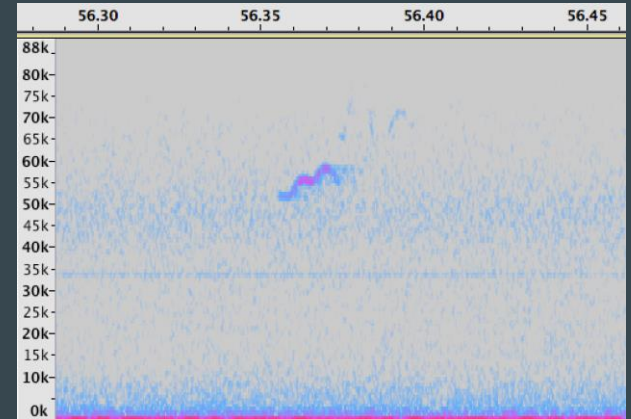
Control Pup (PND4)
Isolated Calls



Exposed Pup (PND4)
Isolated Calls

Vocalization during Control Male and Female Interaction

- Excerpt of Spectrogram from video

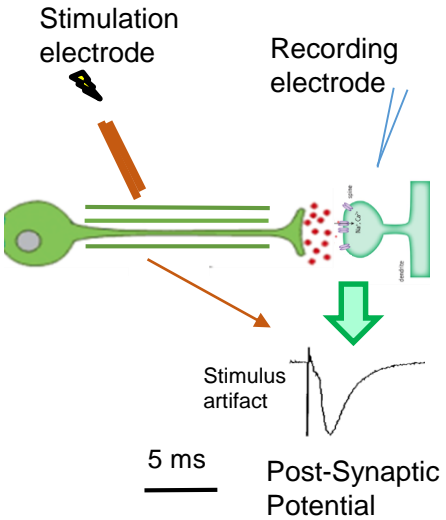


III. Synaptic Response from the Amygdala

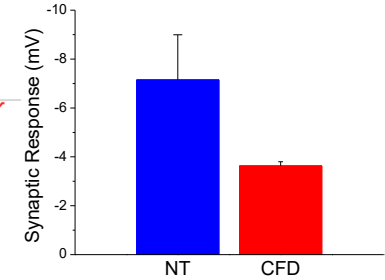
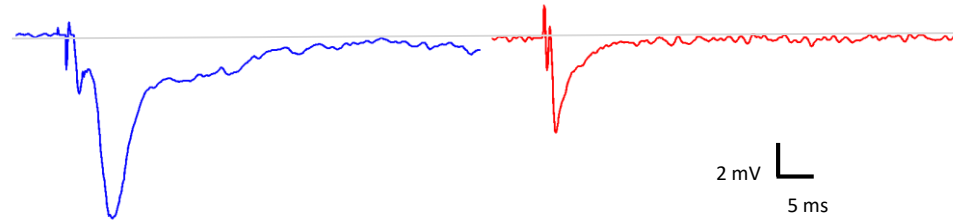


H= Hippocampus; C= Cortex; T=Thalamus; A=Amygdala

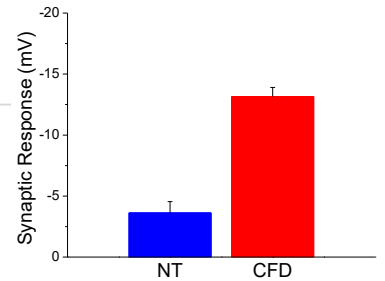
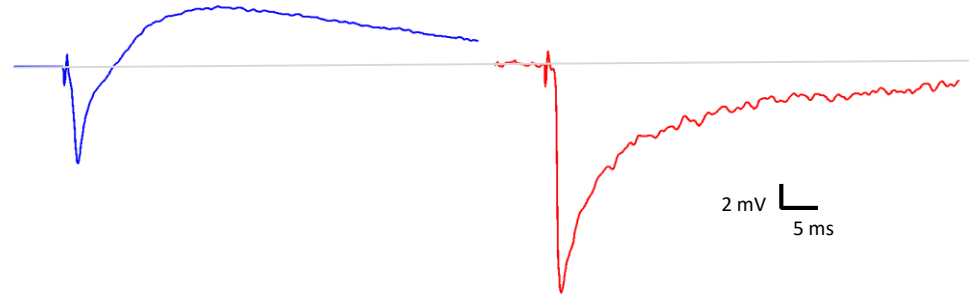
Synaptic responses are modulated differently in different amygdala inputs



Cortex-Amygdala



Thalamus-Amygdala



Conclusions and Interpretations

- CFD rats showed less preference to the scented toy than control rats; with females rats showing lower preference than male rats.
- CFD-paired rats showed less interaction than control-paired rats; with females paired rats showing lower interaction than male rats.
- Vocalizations were only observed in control male to female pairing but not in CFD male to female pairing
- CFD rat showed differential modulation of synaptic communication at amygdala inputs compared to control rat

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