

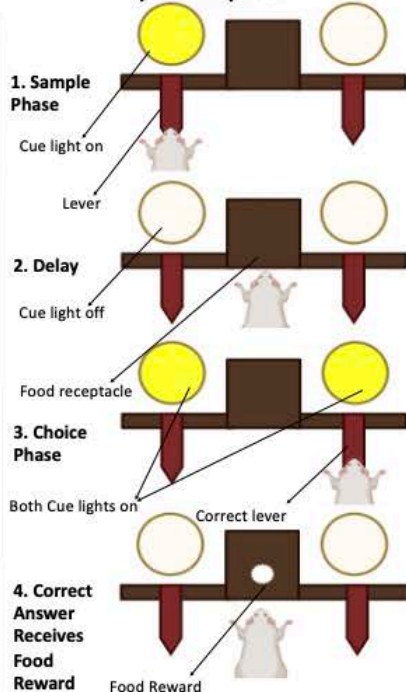
## 1. Introduction

- Alzheimer's Disease (AD) is characterized by significant impairments in memory and underlying neuropathology such as plaques, neurofibrillary tangles, amyloid- $\beta$  peptides etc.
- Evidence suggests that prefrontal cortex (PFC) dysfunction contributes to the impaired memory in AD.
- AD patients show decreased gray matter in the PFC important for working memory.
- The aim of our study is to determine if restoring the prelimbic cortex (PrL) function in an AD rat model will rescue its PrL-Hippocampal function linked to the working memory.
- The goal of our preliminary study was to test if there are any differences in working memory between sexes using Fischer 344 rats.

## 2. Methods

- Working memory can be tested using the Delayed Nonmatch to Position task (DNMTP).
- 2 male and 4 female rats were trained for the DNMTP task.
- 1) **Sample phase:** One of two cue lights turns on and the rat has to press the lever below the cue light
- After the rat presses the lever, the cue light turns off and rat receives a food reward in the food receptacle
- 2) **Delay:** After a delay of 2, 4, 8 or 16 seconds, both the cue lights turn on and the rat must press the opposite (i.e., "nonmatch") lever from during the Sample Phase.
- 3) **Choice Phase:** If rat presses the correct lever during the choice phase, it receives a reward food pellet in the receptacle.
- If the rat presses the incorrect lever, it does not receive the reward.
- Both sexes performed DNMTP task and the % correct choices for each sex were compared across the 4 delays (2,4,8 or 16 seconds).

### Rodent Delay Non-Match to Position (DNMTP) Task



## 3. Results

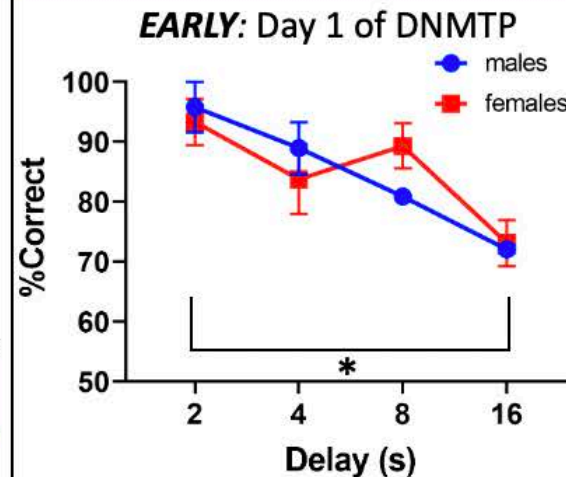


Figure 1: Percent correct choice VS delay time for male and female rats during day 1 of DNMTP. Red squares represent female rats and blue circles represent male rats (n=4 females, n=2 males)

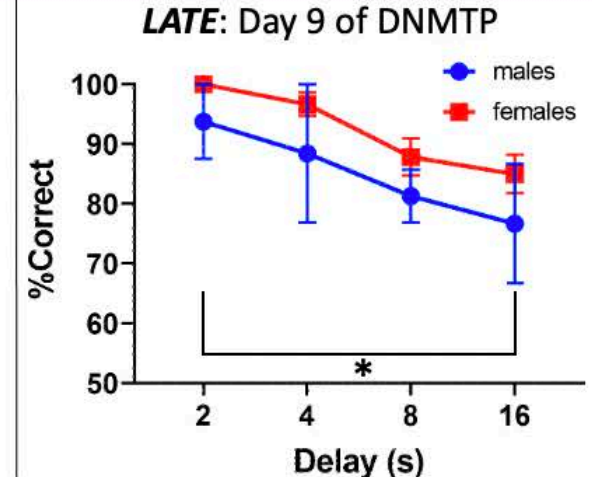


Figure 2: Percent correct choice VS delay time for male and female rats during day 9 of DNMTP. Red squares represent female rats and blue circles represent male rats (n=4 females, n=2 males)

## 4. Conclusion

- Two-way Repeated Measures ANOVA showed no significant difference in percent correct choices (working memory) between males and females during the day 1 or 9 of DNMTP. The sample size is low so we will add more rats to determine if this trend continues.
- Two-way Repeated Measures ANOVA showed that percent correct choices were significantly different between 2 second delay and 16 second delay during day 1 and day 9 of DNMTP task. In other words, with the increase in delay time both male and female rats made fewer correct choices. (i.e., the greater the delay the more difficult it is to retain information acquired during the Sample Phase).

## 5. Future work

- We will increase the sample size.
- We will determine if percent correct choices (Working Memory) of AD model rats are impaired compared to Wild-type litter mate control rats.
- We will modify the PrL function to studying its effect on working memory in AD rats.

## Acknowledgments

This work was supported by NIH funded MARC U STAR program (T34GM127154) and the National Institute on Aging (R00DA042934-3S1). I thank all the members of West Lab.