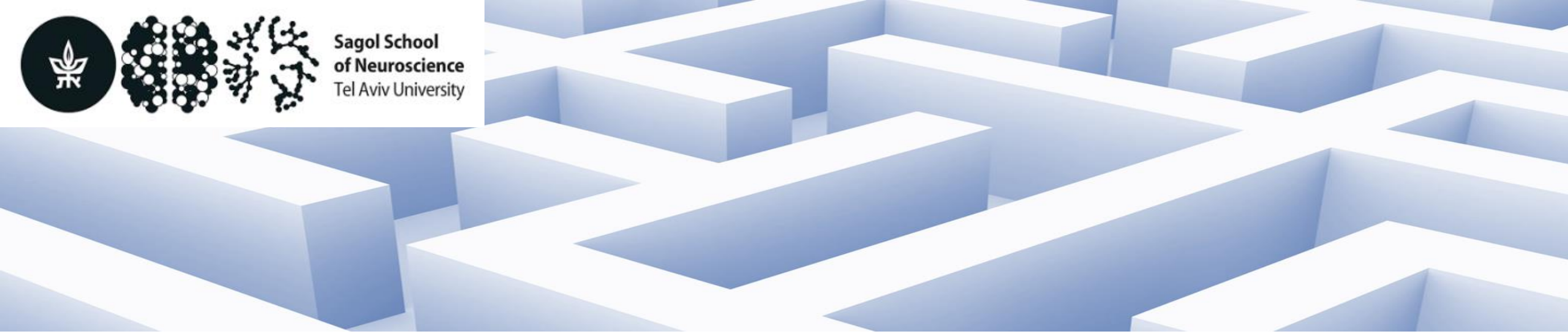


Spatial Learning and Memory Assessment in a Complex Maze Paradigm in a mice model for the genetic risk factor of Alzheimer's disease

Lior Lin

Laboratory of Prof. Pablo Blinder

Department of Neurobiology, Sagol School of Neuroscience
Tel Aviv University

Introduction

Alzheimer's disease (AD) is an age-related neurodegenerative disorder

Memory impairments

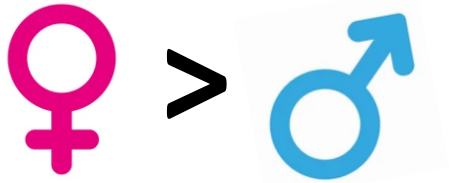
Cognitive deficits

Motor function impairments

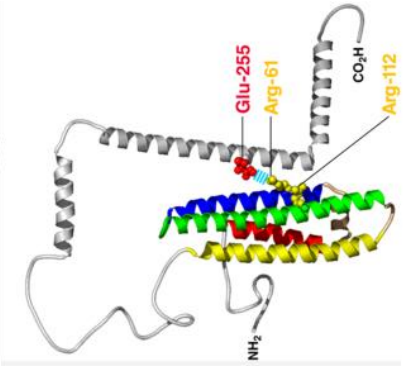
Primary risk factors for sporadic late-onset AD are :

Advanced age

Sex



Apolipoprotein E (APOE) - ε4 Allele

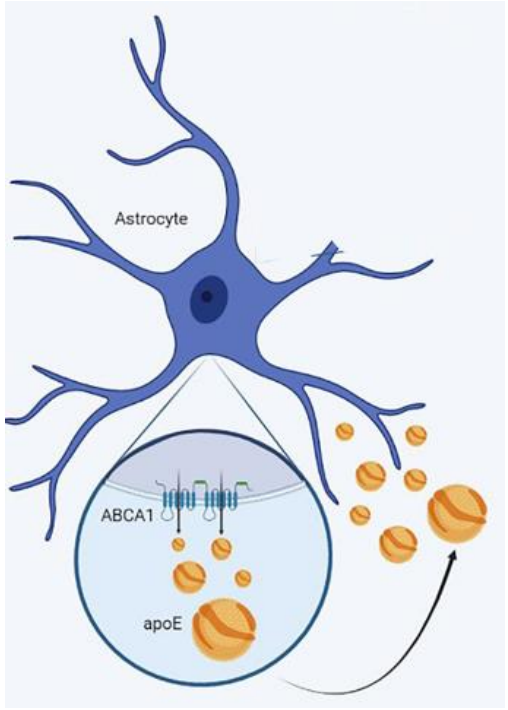


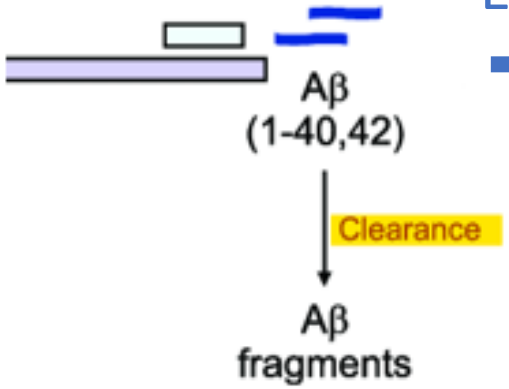
15% - General

40% - AD patients

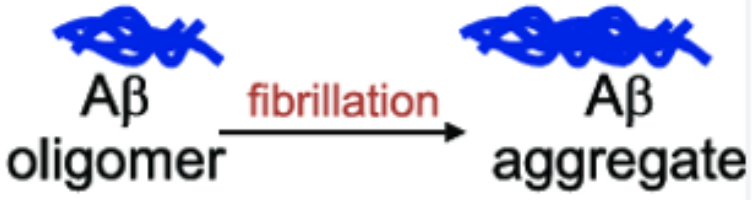
Introduction

Expressed mainly in astrocytes





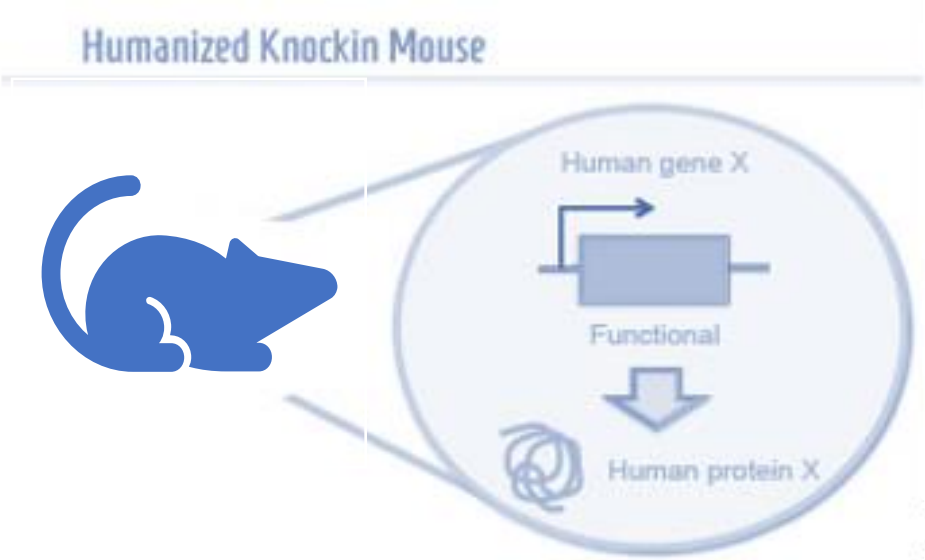
E2 > E3 > E4



Therapeutic target

Mice model

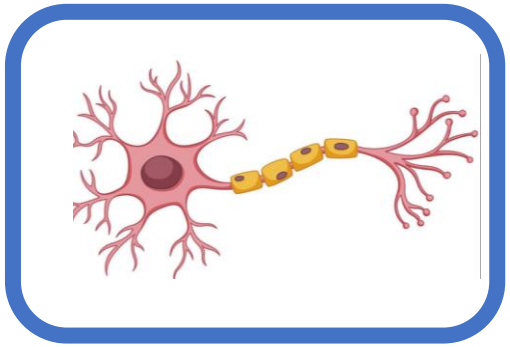
Mice model for the genetic risk factor of Alzheimer's disease :



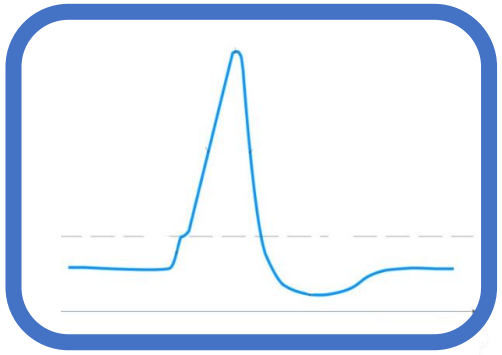
ApoE4 - Experimental group

ApoE3 - Control group

Structural



Functional



Behavioral

Innovative Spatial-Navigation Paradigm

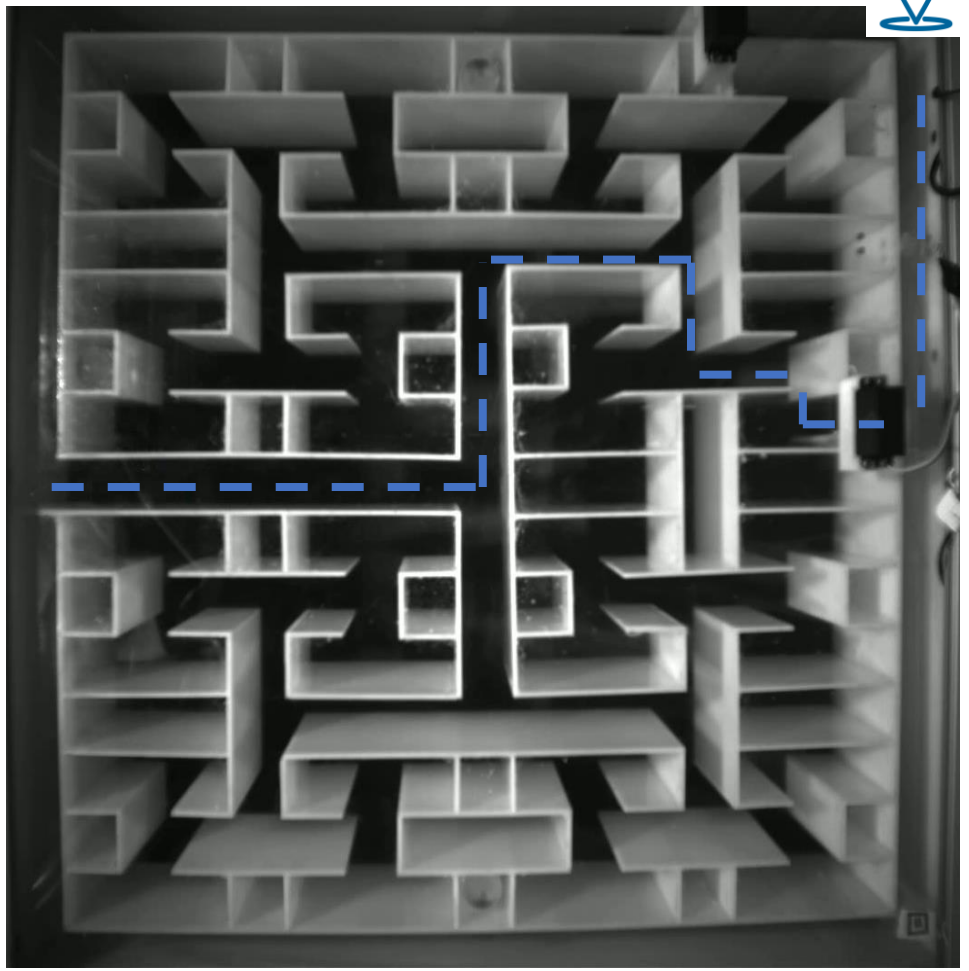
Complex maze :

Automated 6-level binary labyrinth.

Ecologically relevant tasks allows unconstrained behavior during subjective night.

Ideal platform for *in-vivo* live imaging in the future.

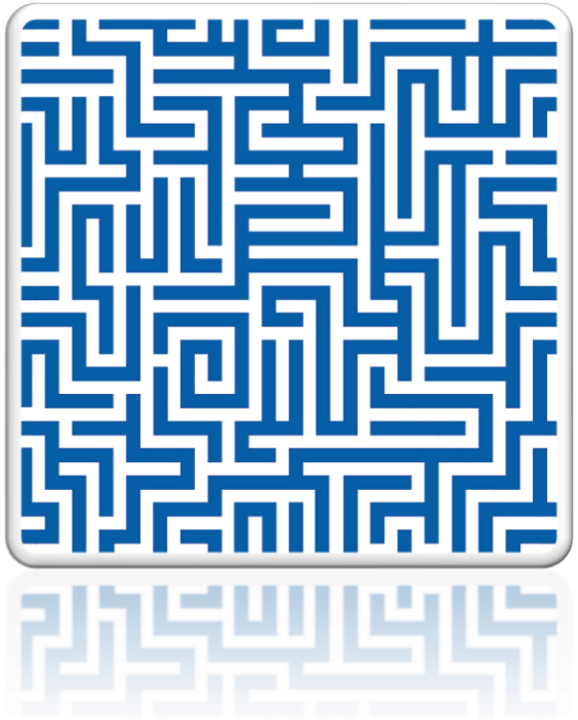
★ *SUPERSTAR apoE3 4m male – 12 second memory session*



Developed by Meister's group, Caltech

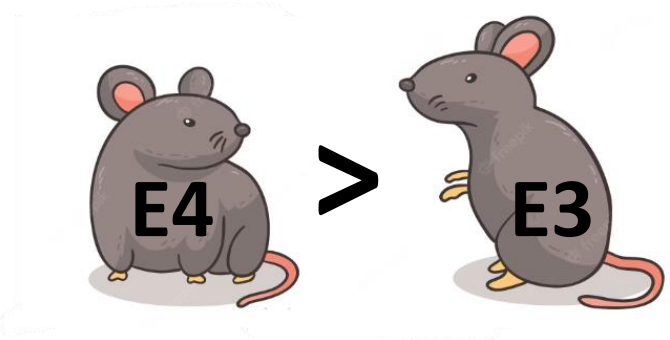
Aim :

To characterize apoE4-mediated learning and memory phenotypes in male and female mice, in the innovative complex maze paradigm.



Hypothesis :

Based on the reviewed literature, we expected :



Longer memory sessions in apoE4

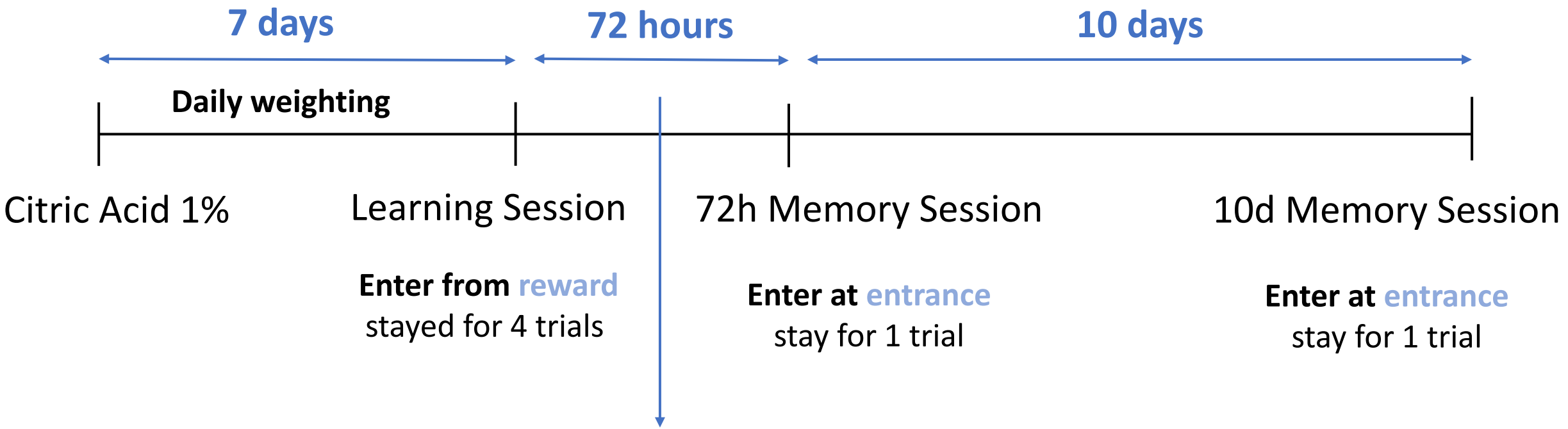
Inside ApoE4 group :

♀ > ♂

Longer memory sessions in females

Methods

Procedure :



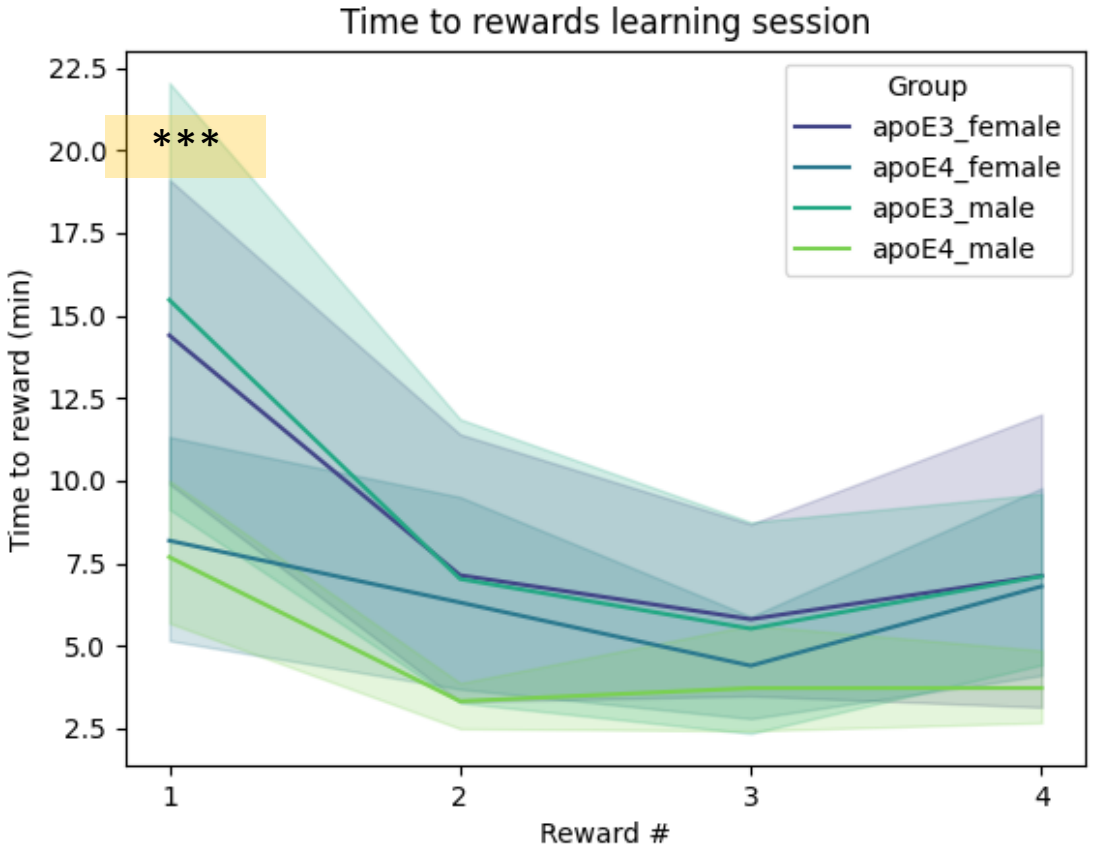
Maze turn control

♂ 18 (apoE3 – 9, apoE4 – 9), 4m old

♀ 12 (apoE3 – 7, apoE4 – 5), 4m old

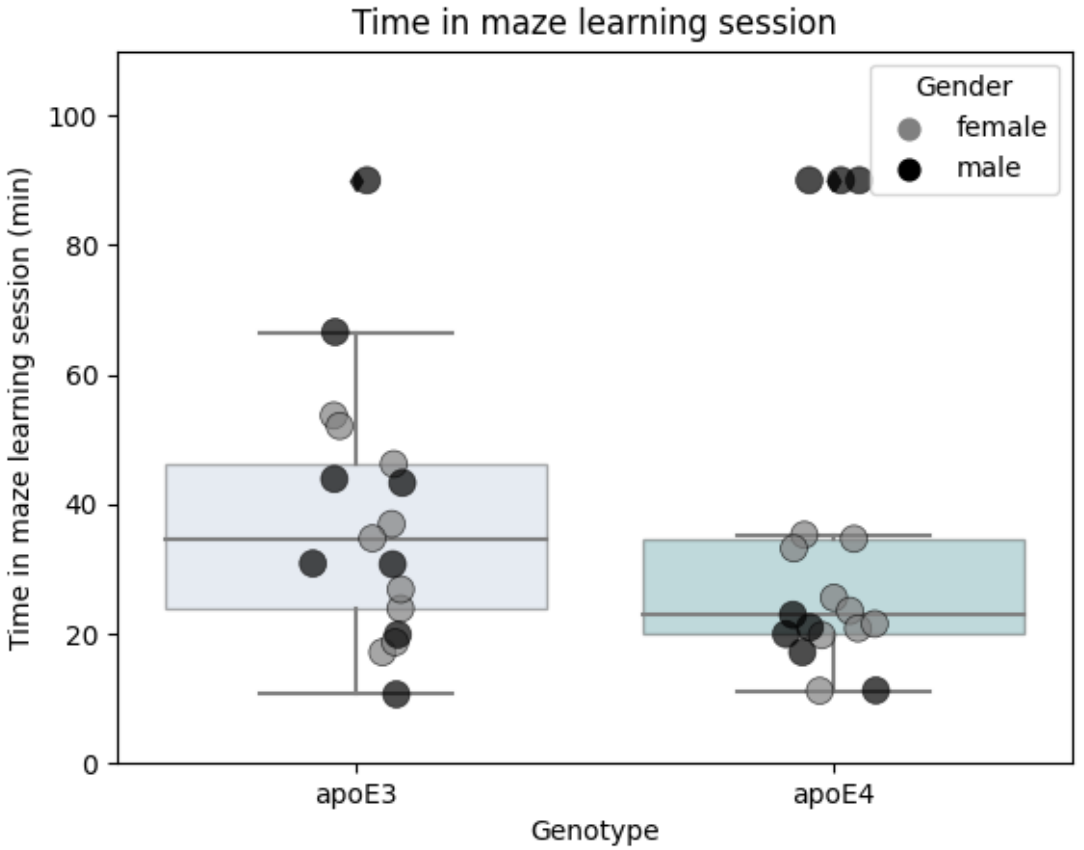
Results

Learning Session :



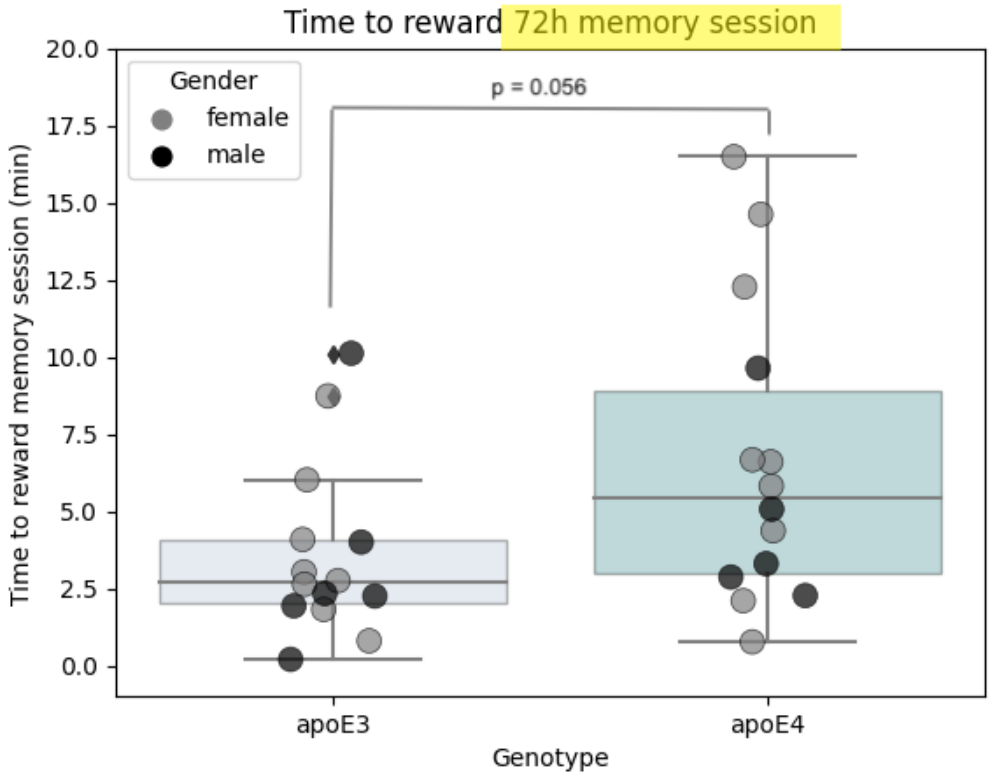
- Shorter time to 1st reward in apoE4.
- Possible explanations – velocity, curiosity.

- No significant difference in total time spent in the maze while learning.

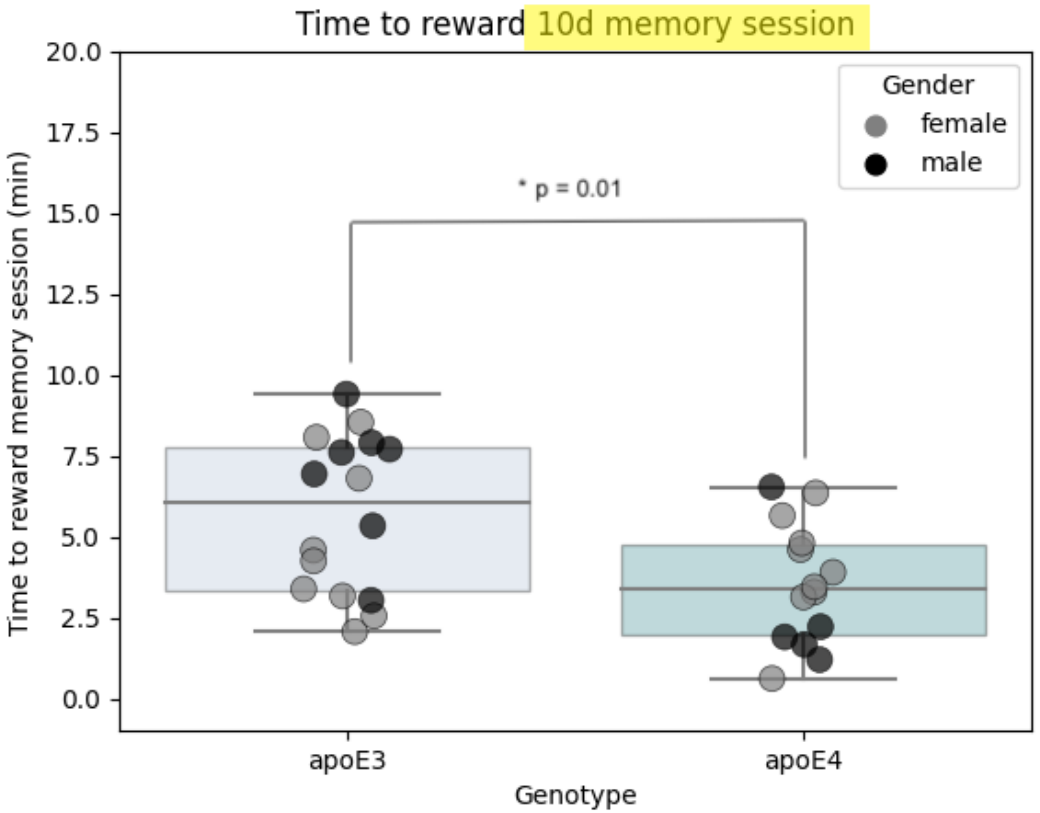


Results

Memory Session :



- Trend for longer time to reward in ApoE4
- Prominent in females (p=0.07)
- Absent in males (p=0. 95)



- Significant shorter time to reward in ApoE4
- Present in females (p=0.06)
- Significant in males (p=0. 004**)

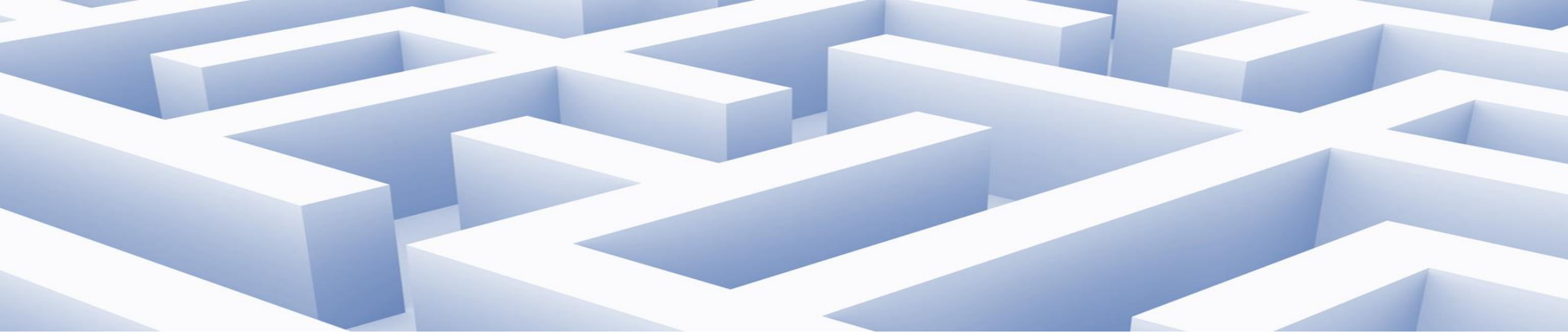
Discussion :

Raw data is presented, consideration of additional parameters is required

- Walking velocity
- Grooming time
- Exploration tendency
- Curiosity index

Findings in the 1st memory session, although not significant, imply effects in a direction that certifies the maze paradigm as relevant.

Findings in the 2nd memory session are opposite from the 1st and from expectations and may result from participation thresholding method.



Thank You for listening !!

Special thanks to Pablo Blinder, Amit Koren-Iton
and to all lab members !