Mortality of Fruit Flies, following traumatic brain injury (TBI)

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AGENDA

- Introduction
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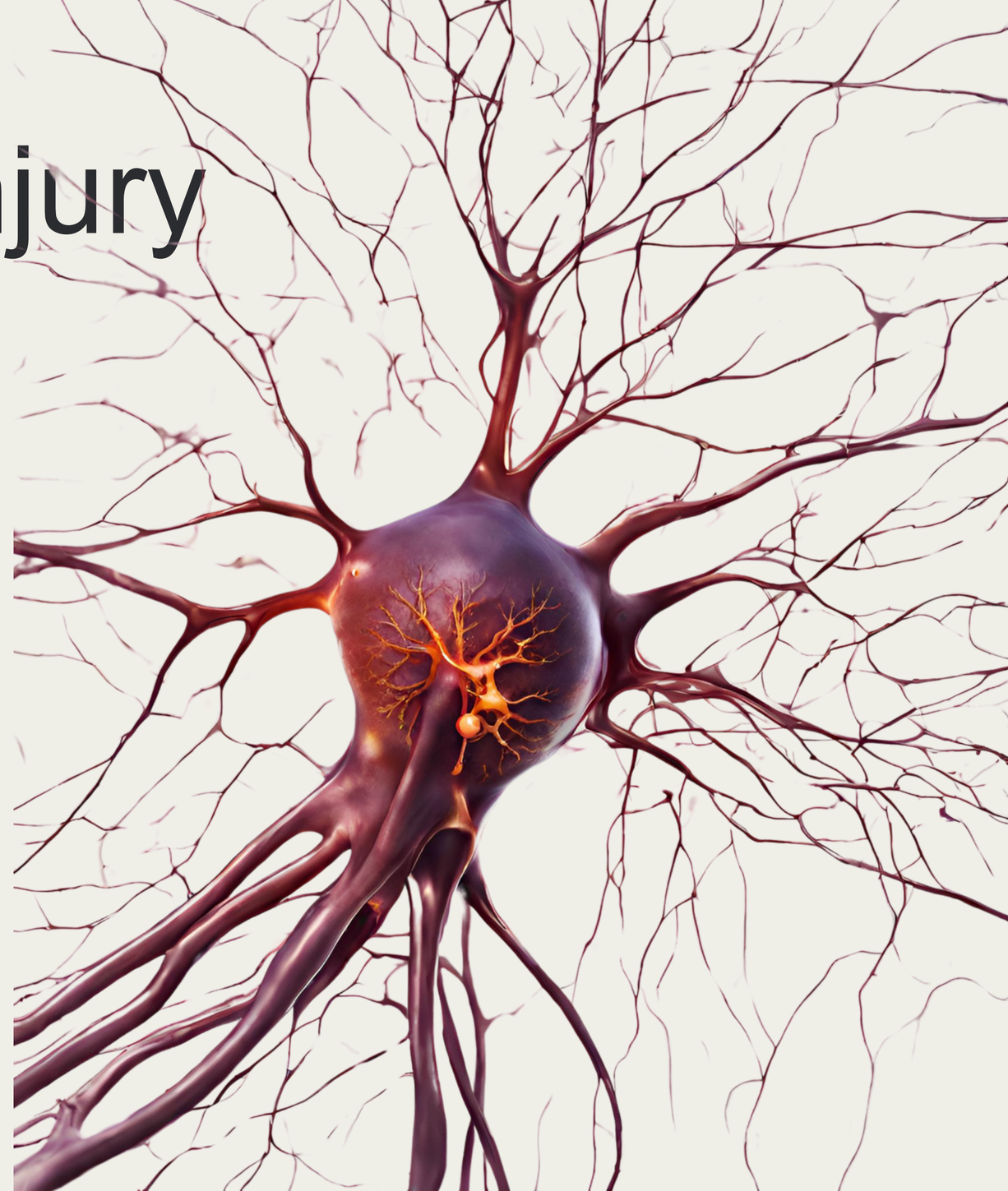
  - Why Fruit Flies?
- Materials and Methods
  - Fly Gene Expression System
  - High Impact Trauma (HIT) Device
- Hypothesis
- Results
- Conclusions

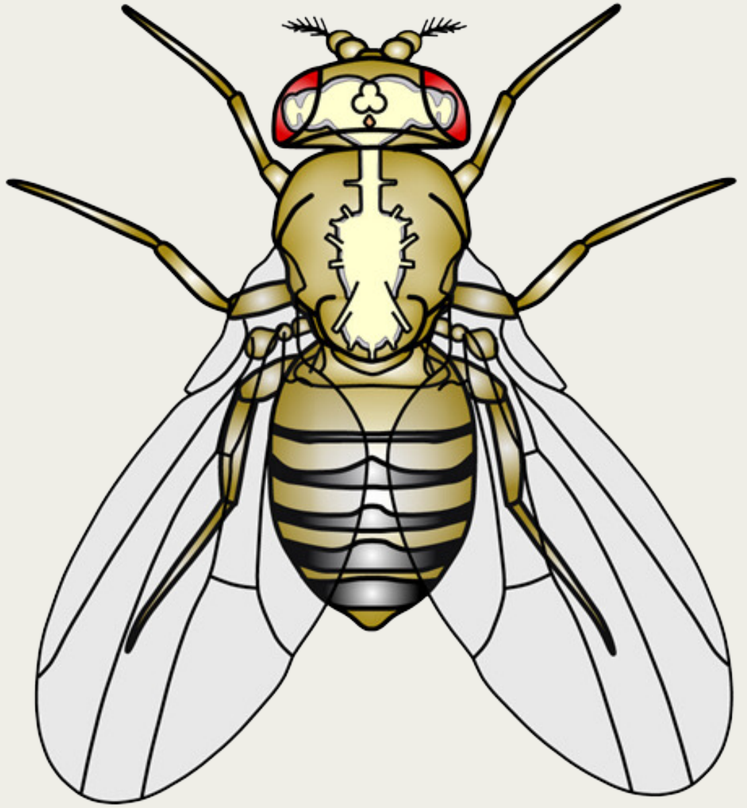
Traumatic Brain Injury

- Traumatic brain injuries (TBI) are the leading cause of neurological deficits and mortality worldwide.
- High variability in TBI symptoms within the human population.
- A TBI can activate many different pathways at the cell level within the brain.
- A TBI consists of two different injury phases: a primary injury and a secondary injury.

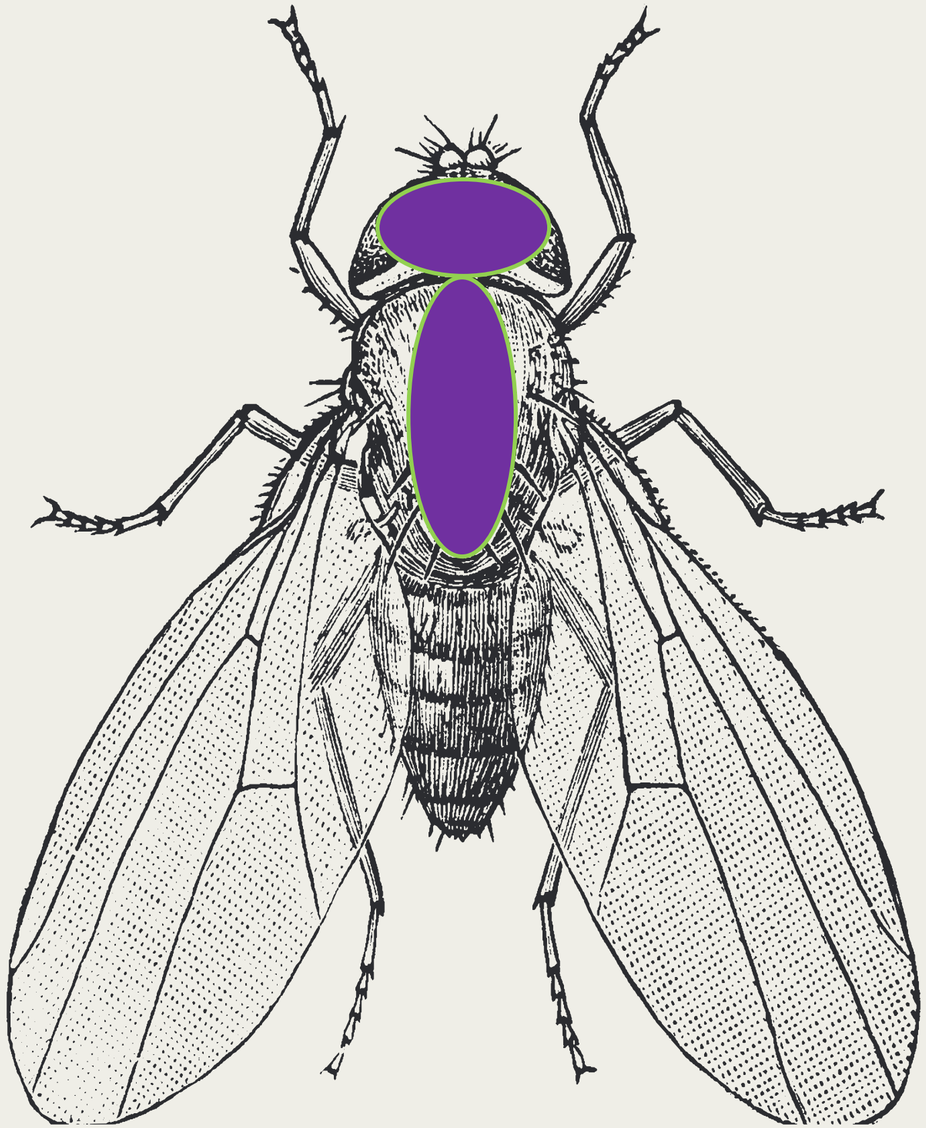


Why Fruit Flies?

- Fruit flies have been used to study neuroscience throughout history.
- Flies have a complex nervous system like humans.
- Flies reproduce and proliferate rapidly and inexpensively.
- Many subjects to be analyzed at once.
- Experimental outcomes can be studied over the entire lifespan of the organism.



Materials & Methods



Fly Gene Expression System

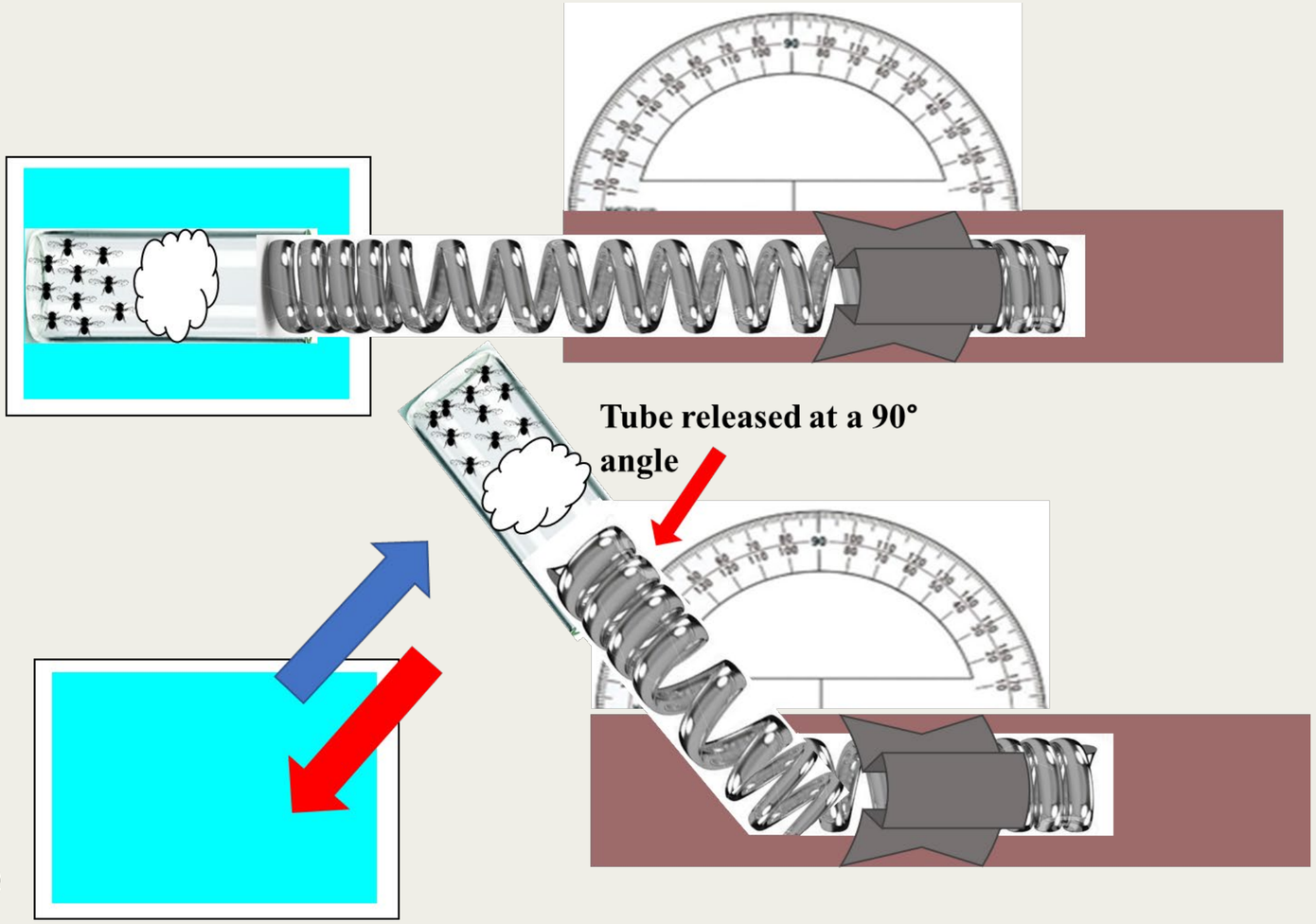
(Brand and Perrimon , 1993)

- APOE is a protein that transports fats in the brain.
- APOE is a **human** genetic risk factor for diseases such as Alzheimer’s and dementia.
- APOE's presence can lead to worse symptoms and longer recovery following TBI.
- Developed a fruit fly population that had the APOE protein in their brain.

Materials & Methods

High Impact Trauma (HIT) Device

(Katzenberger et al. 2013)

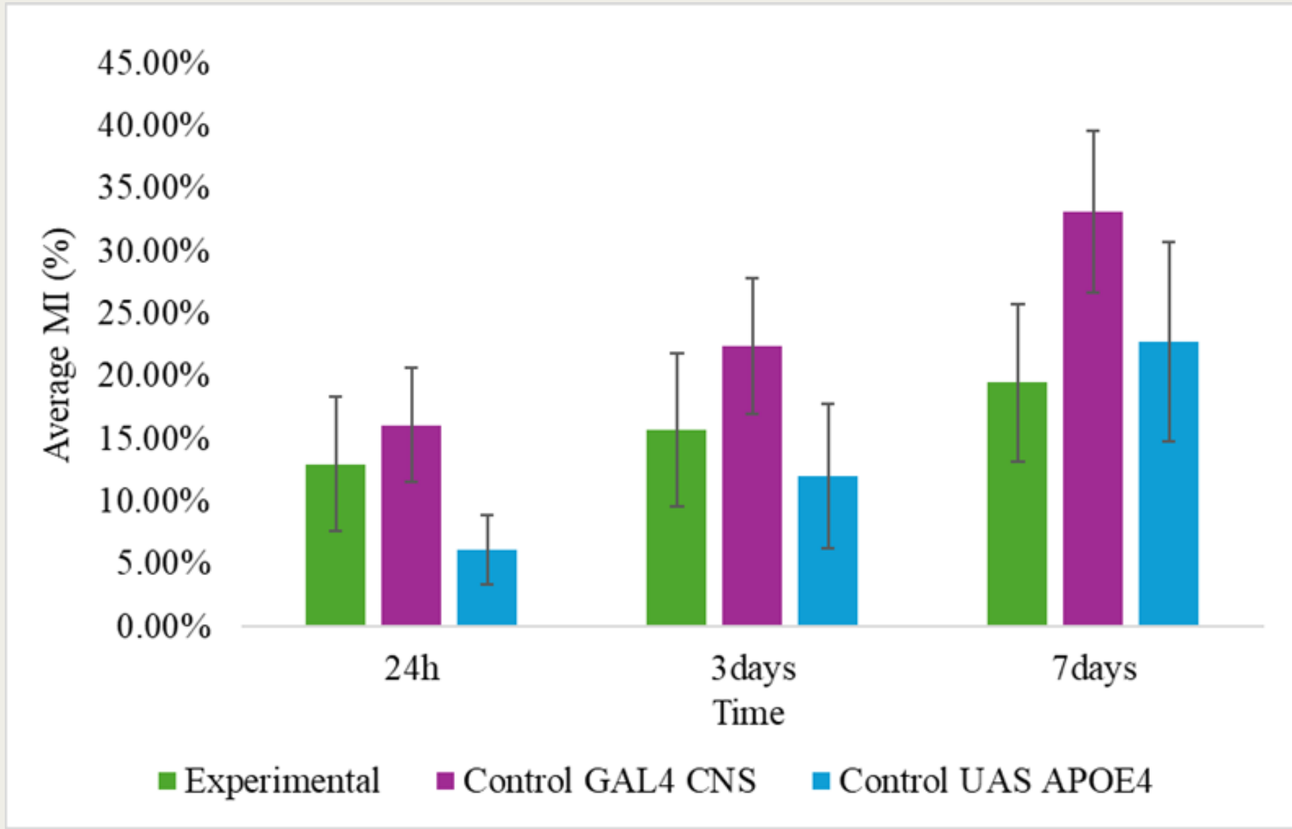


Hypothesis

The presence of APOE will cause mortality to increase post - TBI in all groups.

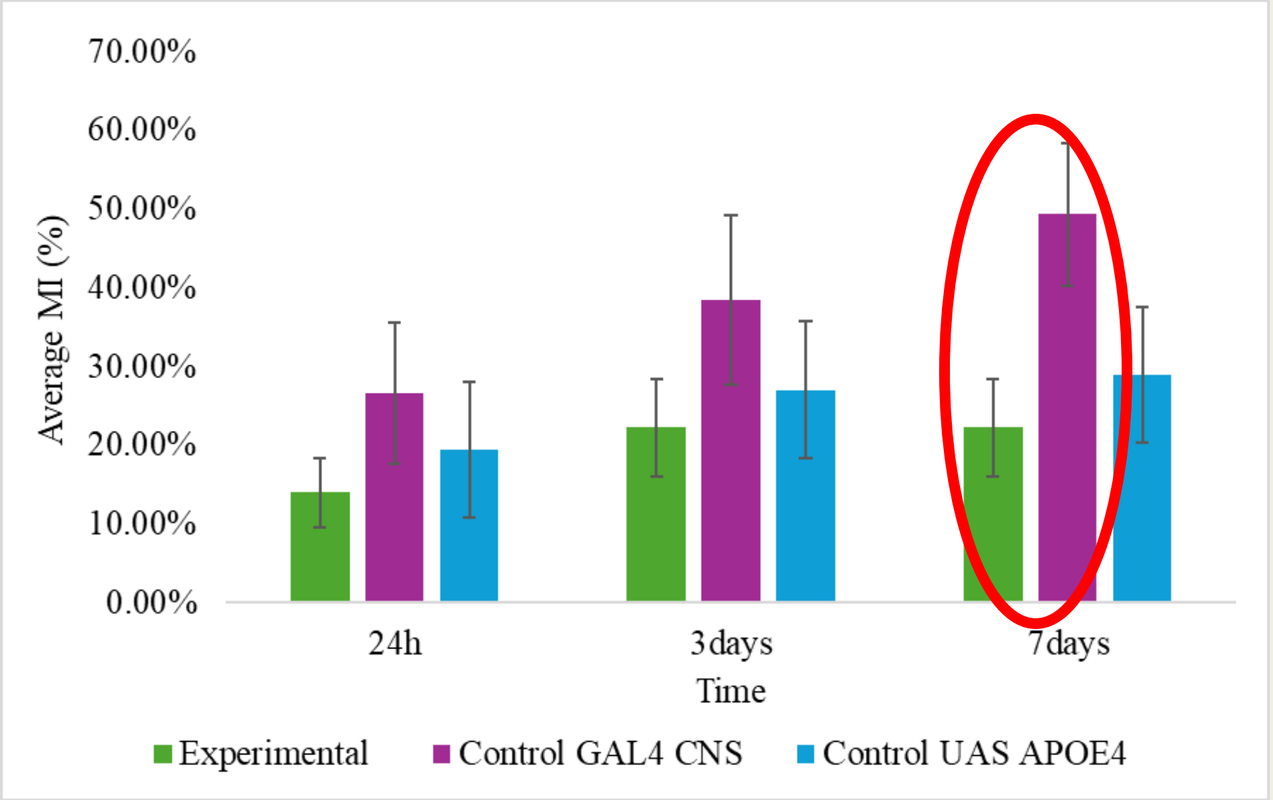
Results: One Hit Group

- The flies with APOE died at a lower rate compared to the two fly lines that did not have APOE.
- APOE's presence did not influence mortality.



Results: Five Hit Group

- The flies with APOE died at a lower rate compared to the two fly lines without APOE.
- The purple control fly line and the green APOE fly line are statistically different from each other at the 7 -day post-TBI timepoint.
- APOE's presence had a minimal effect on mortality.



In Conclusion:

- APOE's presence did not influence mortality following one TBI event.
- APOE's presence had minimal influence on mortality following five TBI events.
- Why?
  - APOE may not be activated unless there is a history of RHI (repetitive head impacts).
  - Fruit flies may not be using APOE.
  - Is APOE neuroprotective?

Thank you!

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