

# Assessing impact of diet on anxiety-like behaviour and spatial memory in C57BL/6J mice.

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Alzheimer's disease affects over 6 million older Americans, and diet may play an important role in risk. Diets high in unhealthy fats and sugars (typical of the American diet) are linked to worse brain health, while Mediterranean-style diets may help protect memory. However, many animal studies use unrealistic diets. In this study, we test three more realistic diets in mice: a typical American diet, a Mediterranean diet, and standard chow. We expect mice on the American diet to show more anxiety, less activity, and poorer memory, highlighting how everyday diet choices may impact brain health.

- ### Introduction
- Alzheimer's disease (AD) is the leading cause of dementia; with no cure, modifiable factors like diet are key targets for risk reduction.
  - Western-style diets promote cognitive decline and amyloid- $\beta$  accumulation, whereas the Mediterranean diet is associated with neuroprotection.
  - Existing rodent studies rely on exaggerated high-fat diets or simplified models, limiting translational relevance to typical human diets.
  - This study uses C57BL/6J mouse to compare a typical American diet, Mediterranean diet, and chow control to model diet-driven cognitive and behavioral outcomes.

- ### Conclusions
- Early analysis suggests there may be sex-specific patterns in response to diet, with males and females showing different levels of vulnerability to the effects of the TAD, emphasizing the importance of investigating sex differences further.
  - MED-fed mice seem to perform similarly to or better than mice on standard rodent chow, while TAD-fed mice may show more pronounced impairments, indicating a negative shift in outcomes compared to a healthy baseline diet.

- ### Future Directions
- Use RT-PCR to assess brain gene expression changes in neuroinflammatory, and oxidative stress related pathways relevant to Alzheimer's disease.
  - Analyze existing insulin and glucose tolerance data to evaluate diet-induced metabolic dysfunction and its link to cognitive outcomes.
  - Compare male and female cohorts to identify sex-specific effects on neurobehavioral and metabolic measures.

### References

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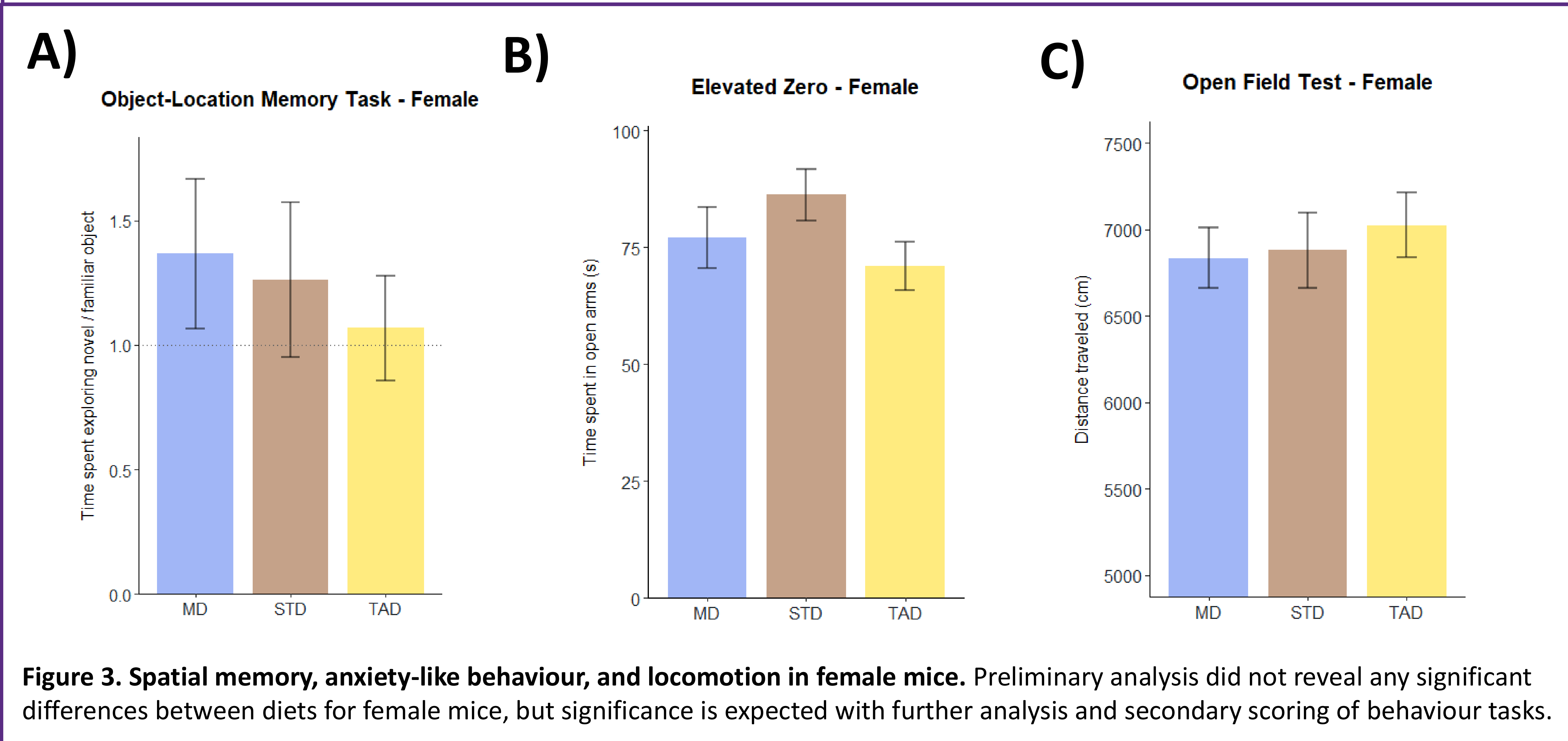
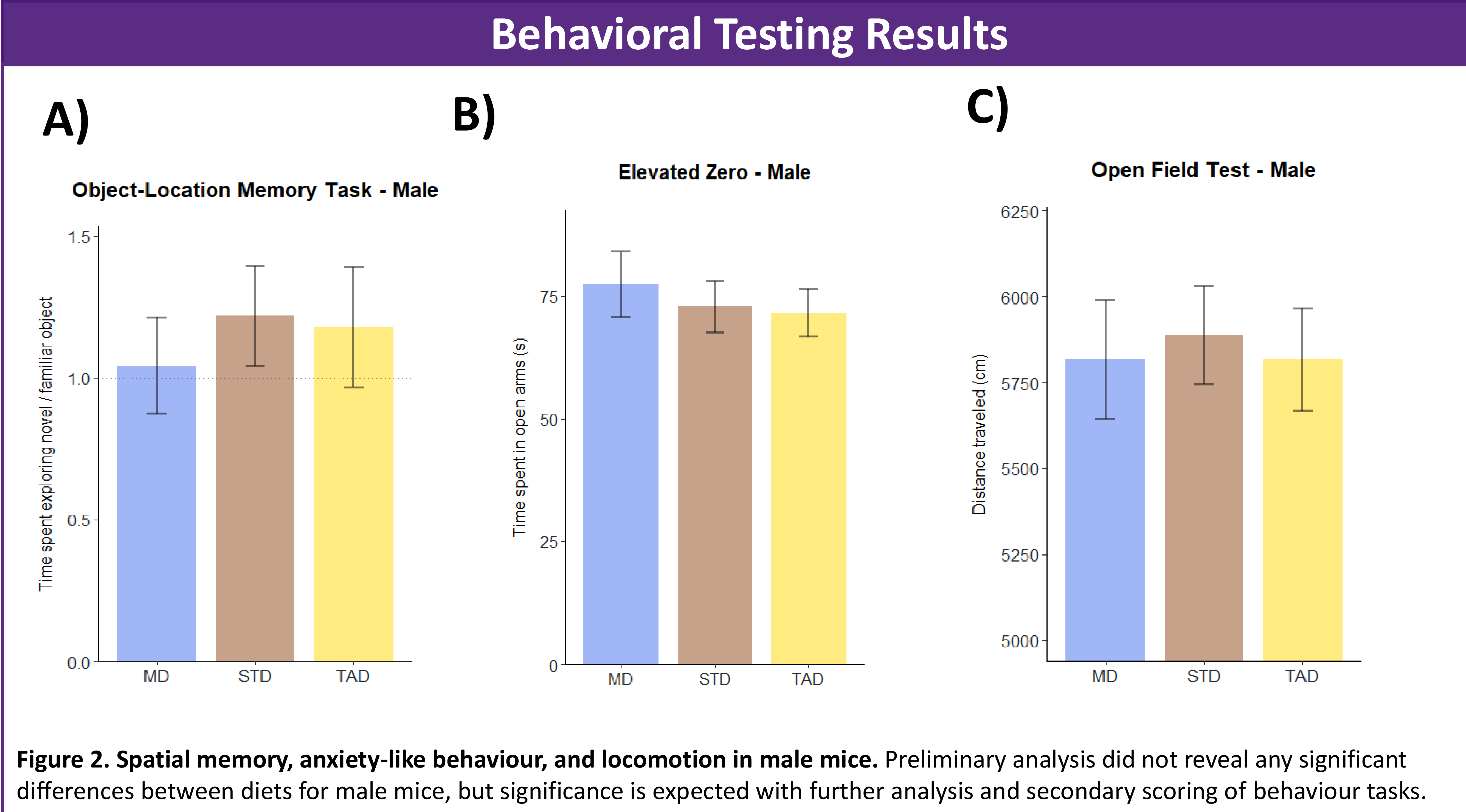
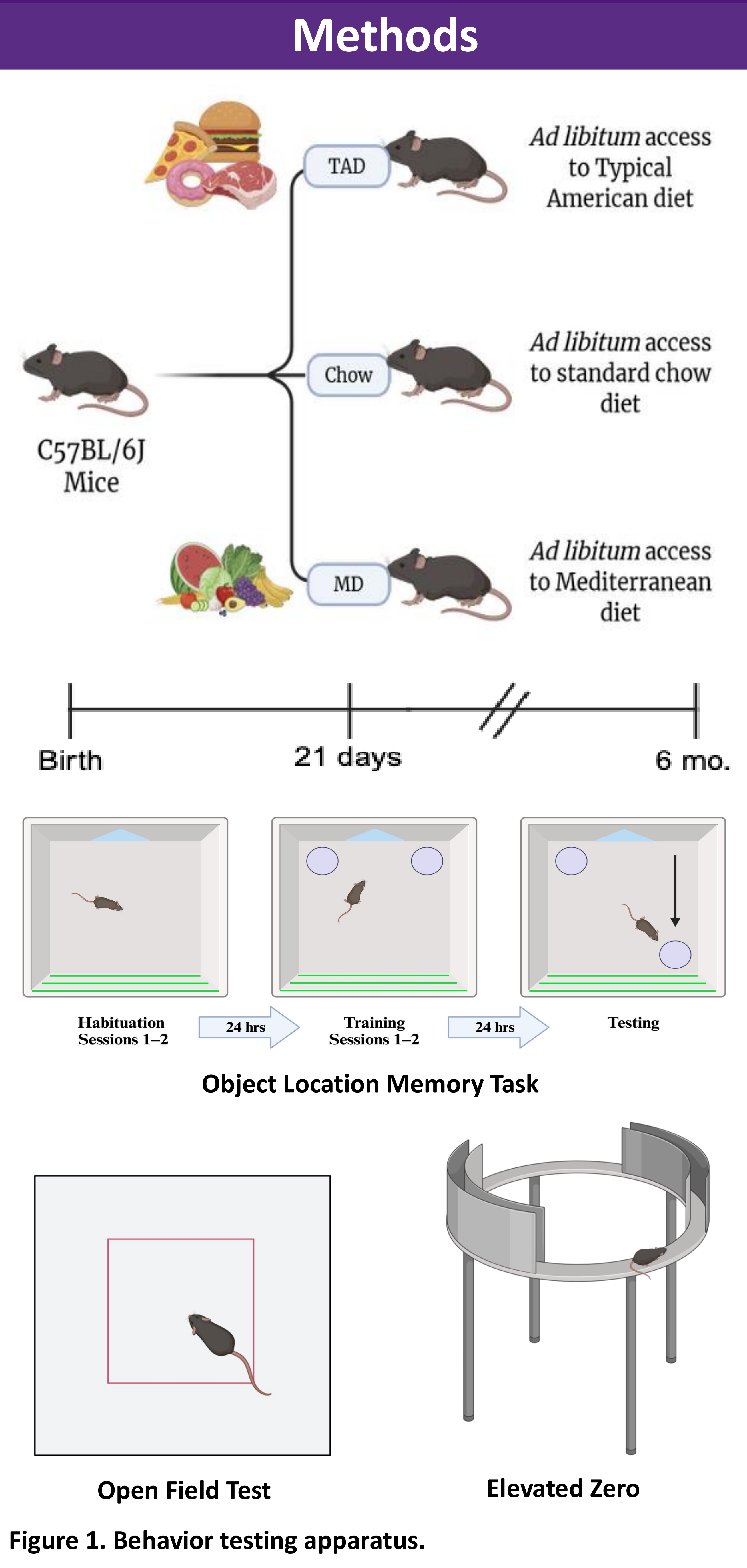


Figure 1. Behavior testing apparatus.

Figure 2. Spatial memory, anxiety-like behaviour, and locomotion in male mice. Preliminary analysis did not reveal any significant differences between diets for male mice, but significance is expected with further analysis and secondary scoring of behaviour tasks.

Figure 3. Spatial memory, anxiety-like behaviour, and locomotion in female mice. Preliminary analysis did not reveal any significant differences between diets for female mice, but significance is expected with further analysis and secondary scoring of behaviour tasks.