

## INTRODUCTION

Alcohol use disorder (AUD) is a medical disorder characterized by unsuccessful attempts to reduce or control alcohol consumption in the face of adverse consequences<sup>1</sup>. In the United States, the annual report of AUD surpasses 3 million cases, showcasing its significance as a public health concern<sup>1</sup>.

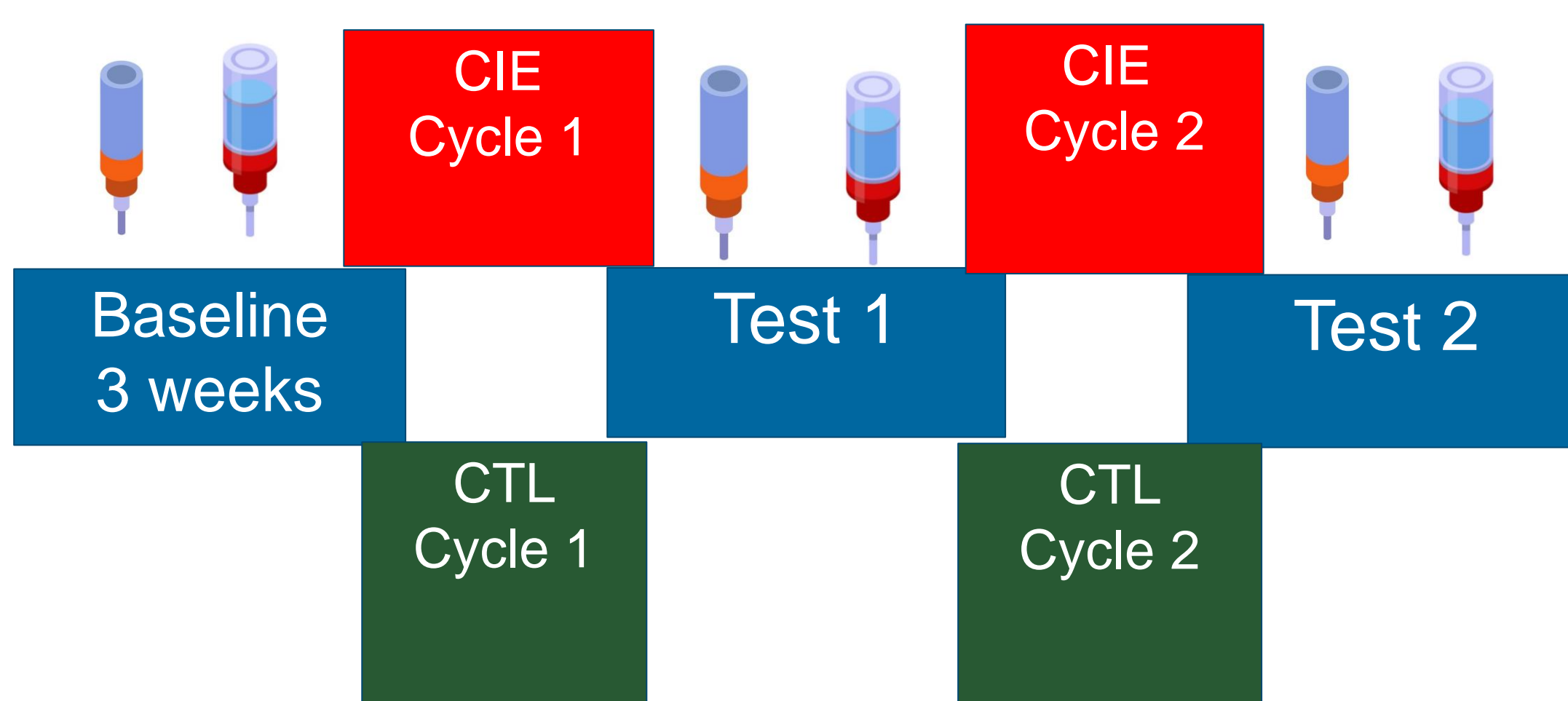
- To learn more about AUD, rodents are commonly used as model organisms to test hypotheses related to understanding the mechanisms of disease/disorders in humans.
- This study aims to investigate the preference and intake between alcohol and sucrose in a model of alcohol dependence induced through chronic intermittent ethanol (CIE) vapor exposure. The CIE vapor exposure will cause an increase in alcohol drinking in mice.

## HYPOTHESIS

The main hypothesis is that the CIE mice will show a stronger preference to alcohol over sucrose compared to the control (CTL) mice.

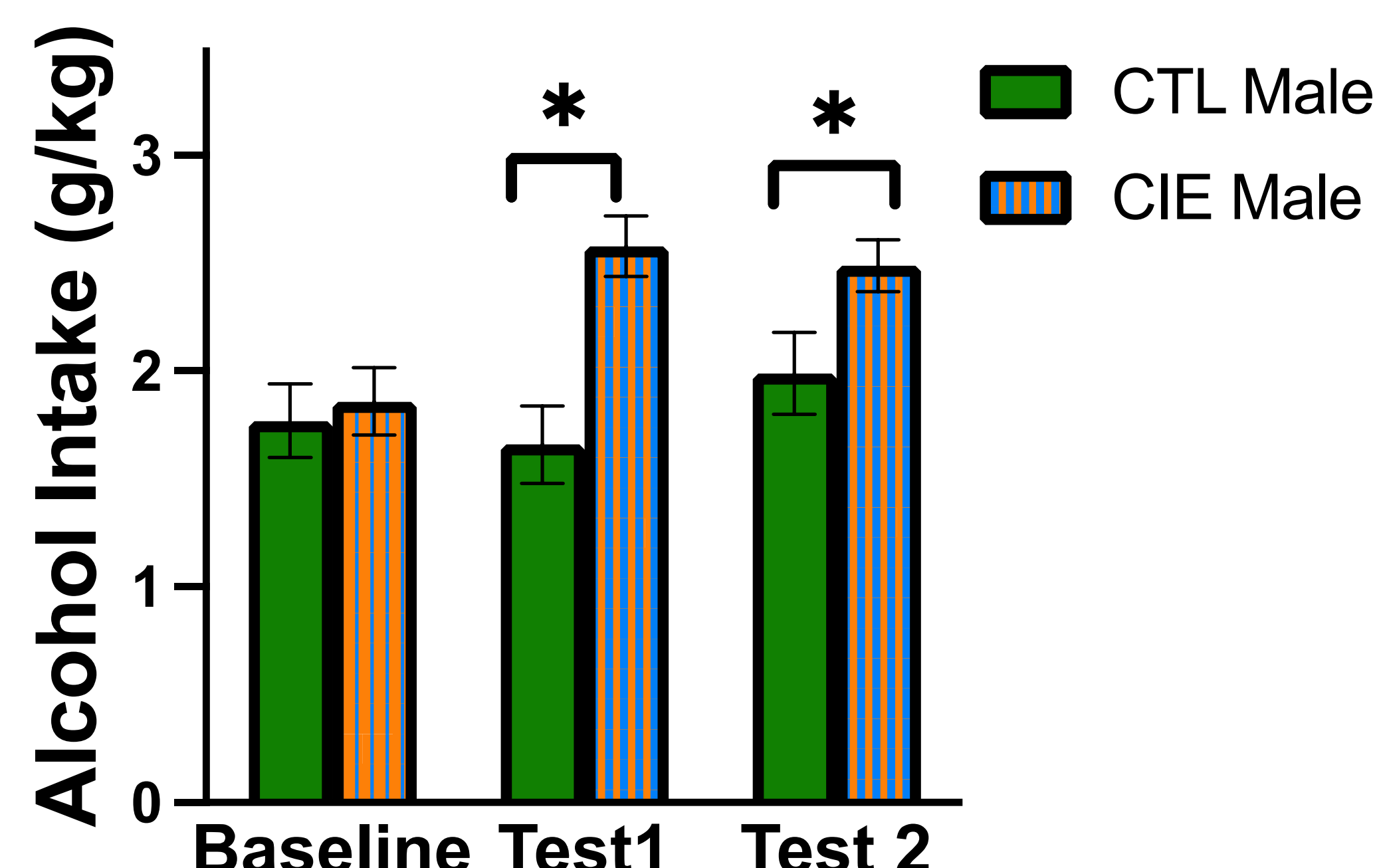
## METHOD

- 48 C57BL/6J mice (24/sex) were used.
- Initially, the mice were given a choice between 15% ethanol and 1% sucrose solutions for two hours daily. Mice were never food or liquid deprived. Baseline preference for alcohol vs. sucrose was evaluated over three weeks.
- Based on these data, the mice were evenly split into CTL and CIE groups.
- CIE mice were exposed to ethanol vapor and CTL mice were exposed to air for a week. This was followed by a week of drinking 15% ethanol and 1% sucrose solutions. This cycle of CIE/CTL exposure followed by a week of drinking was repeated for a second time.



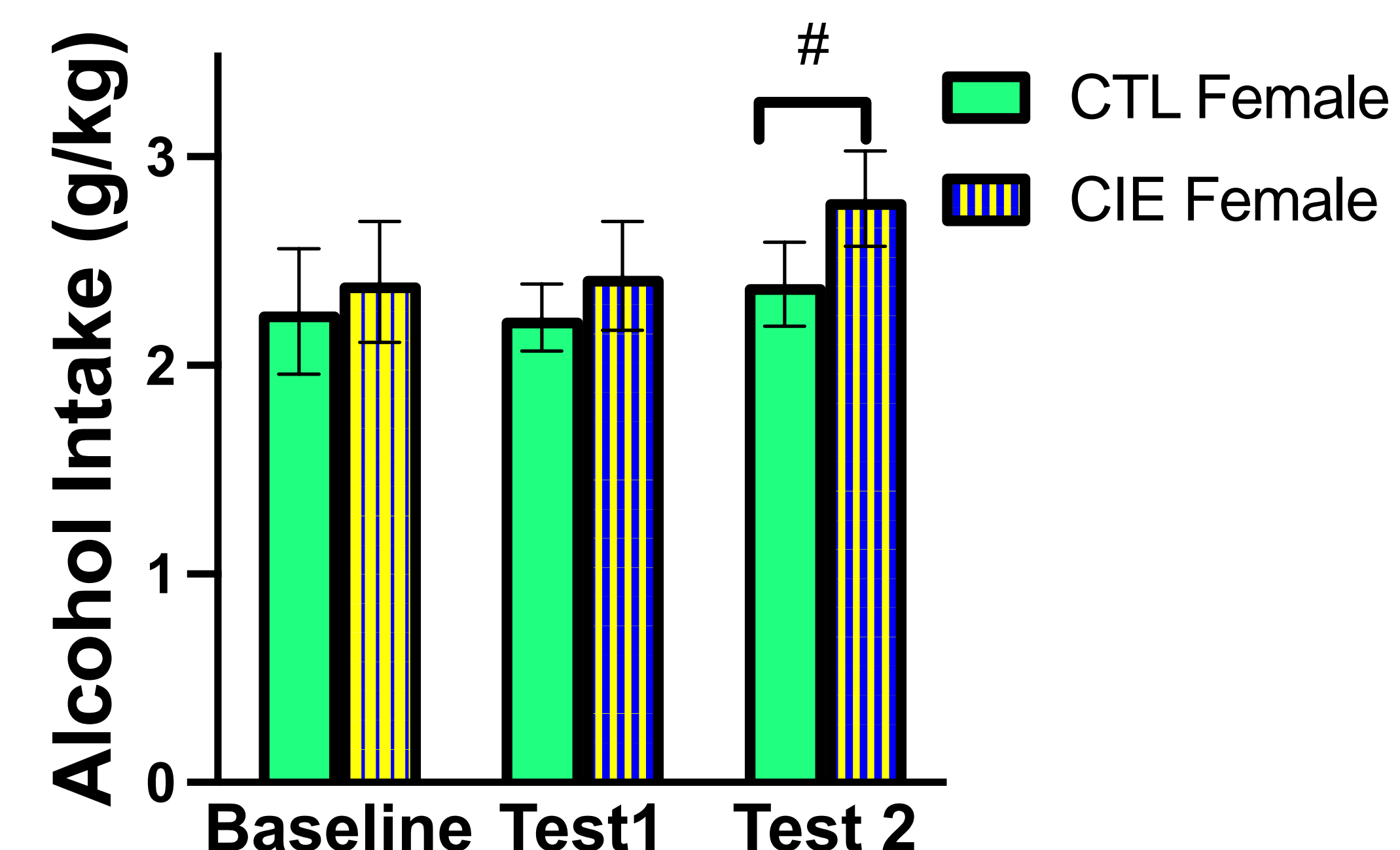
## RESULTS

Figure 1. Alcohol Intake (g/kg) Males



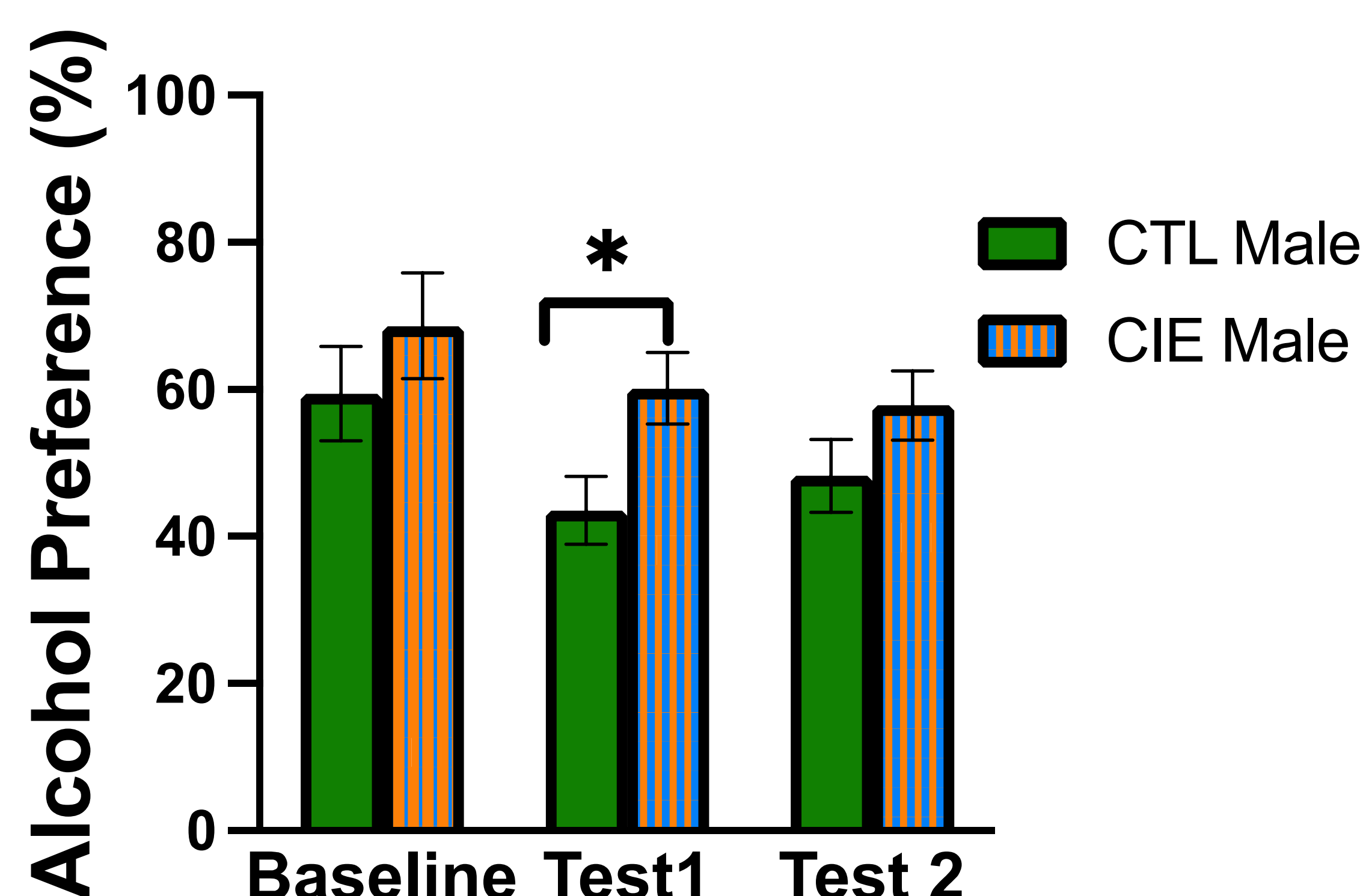
Alcohol intake in g/kg for CIE and CTL male mice from baseline to Test 2. CIE mice had an increase in alcohol intake from baseline to Test 1 and Test 2. CIE mice had a higher level of intake than CTL mice in Test 1 to Test 2 (\* indicates  $p < 0.05$ ).

Figure 2. Alcohol Intake (g/kg) Females



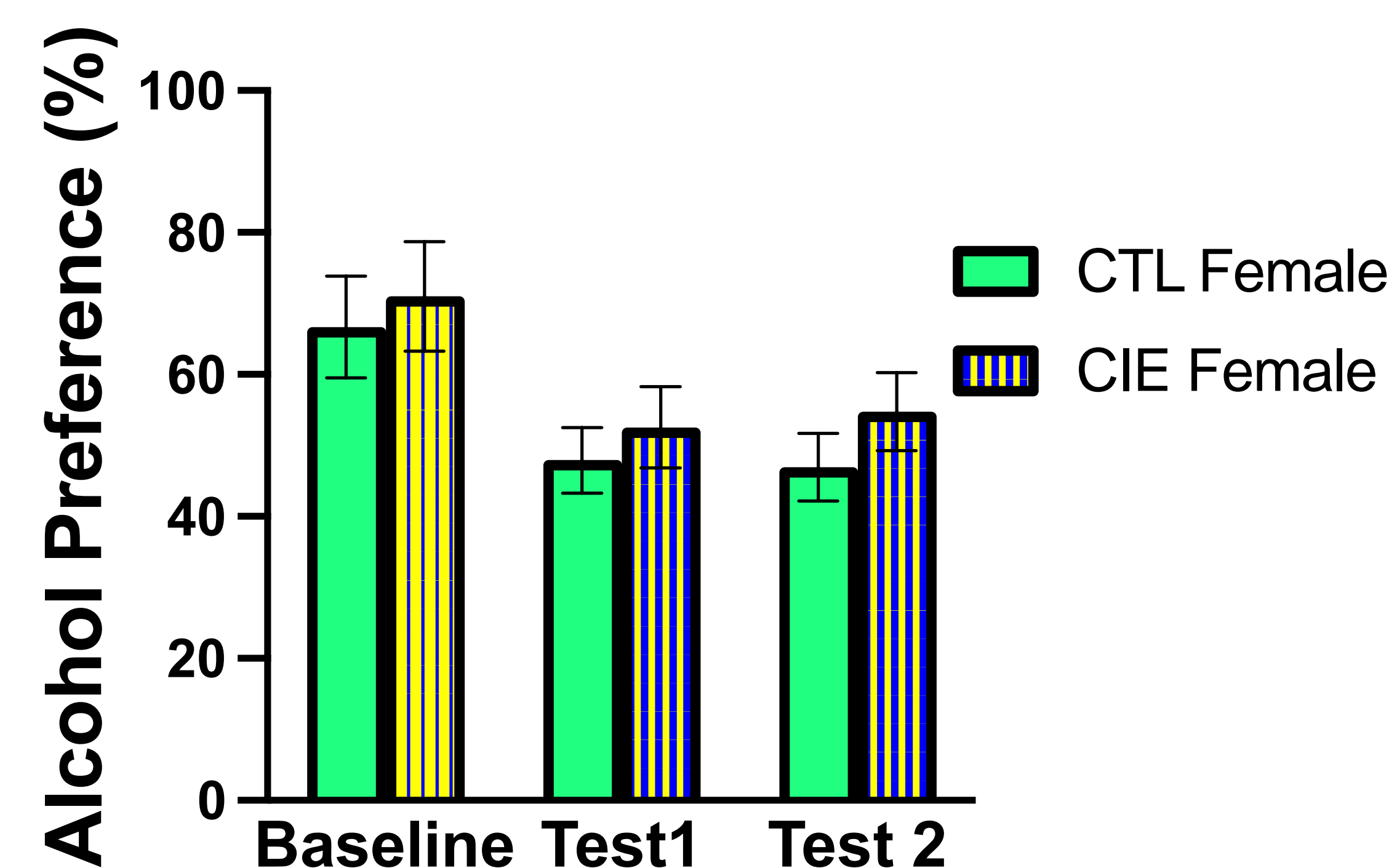
Alcohol intake in g/kg for CIE and CTL female mice from baseline to Test 2. There was no significant difference in intake between the CTL and CIE mice from baseline to Test 1 to Test 2 (# indicates  $p = 0.06$ ).

Figure 3. Alcohol Preference (%) Males



Alcohol preference vs. sucrose in % for CIE and CTL male mice. In baseline, there was a higher preference for both groups than in Test 1 and 2, but it is shown that throughout all cycles, the CIE mice had a higher preference for alcohol than CTL. In Test 1, male CIE mice had a higher preference for alcohol than CTL and that % remained similar for Test 2 (\* indicates  $p < 0.05$ ).

Figure 4. Alcohol Preference (%) Females



Alcohol preference vs. sucrose in % for CIE and CTL female mice. In baseline, there was a higher preference for both groups compared to Test 1 and 2, but it is shown that throughout all cycles, the CIE mice had a higher preference for alcohol than CTL. In Test 1, female CIE mice had a higher preference for alcohol than CTL and that % remained similar for Test 2.

## CONCLUSIONS

- During baseline, female mice had a higher alcohol intake in g/kg than males due to the females being smaller in size.
- After CIE exposure, CIE male mice had a higher alcohol intake (Tests 1 and 2) and preference for alcohol vs. sucrose than the CTL male mice (Test 1).
- For the females, there was no significant difference in alcohol intake between the CTL and CIE mice in Test 1.
- After the second cycle of CIE exposure, CIE female mice did not show a significant difference in alcohol intake compared to the CTL group.
- Preference for alcohol in male and female mice was higher in baseline compared to both Test 1 and 2.
- In Test 1 and Test 2, male CIE mice had a higher preference for alcohol.

## FUTURE DIRECTIONS

This study is ongoing, and we plan to gradually increase the sucrose concentration to further evaluate alcohol intake and preference in CIE and control mice. It is predicted that alcohol dependent mice (CIE group) will continue to prefer alcohol over sucrose despite the increase in concentration. In contrast, control non-dependent mice should prefer sucrose over alcohol.

Insights collected from this study will contribute to a deeper understanding of the correlation between substance preference and addiction, potentially informing future therapeutic strategies for AUD.

## REFERENCES

- National Institute on Alcohol Abuse and Alcoholism. (2020). *Understanding Alcohol Use Disorder*. [www.niaaa.nih.gov](http://www.niaaa.nih.gov); National Institute on Alcohol Abuse and Alcoholism. <https://www.niaaa.nih.gov/publications/brochures-and-fact-sheets/understanding-alcohol-use-disorder>

## ACKNOWLEDGEMENTS

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