

Impact of chronic plus binge alcohol exposure on inflammation in the taste buds in young and aged C57/Bl6 mice

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Introduction

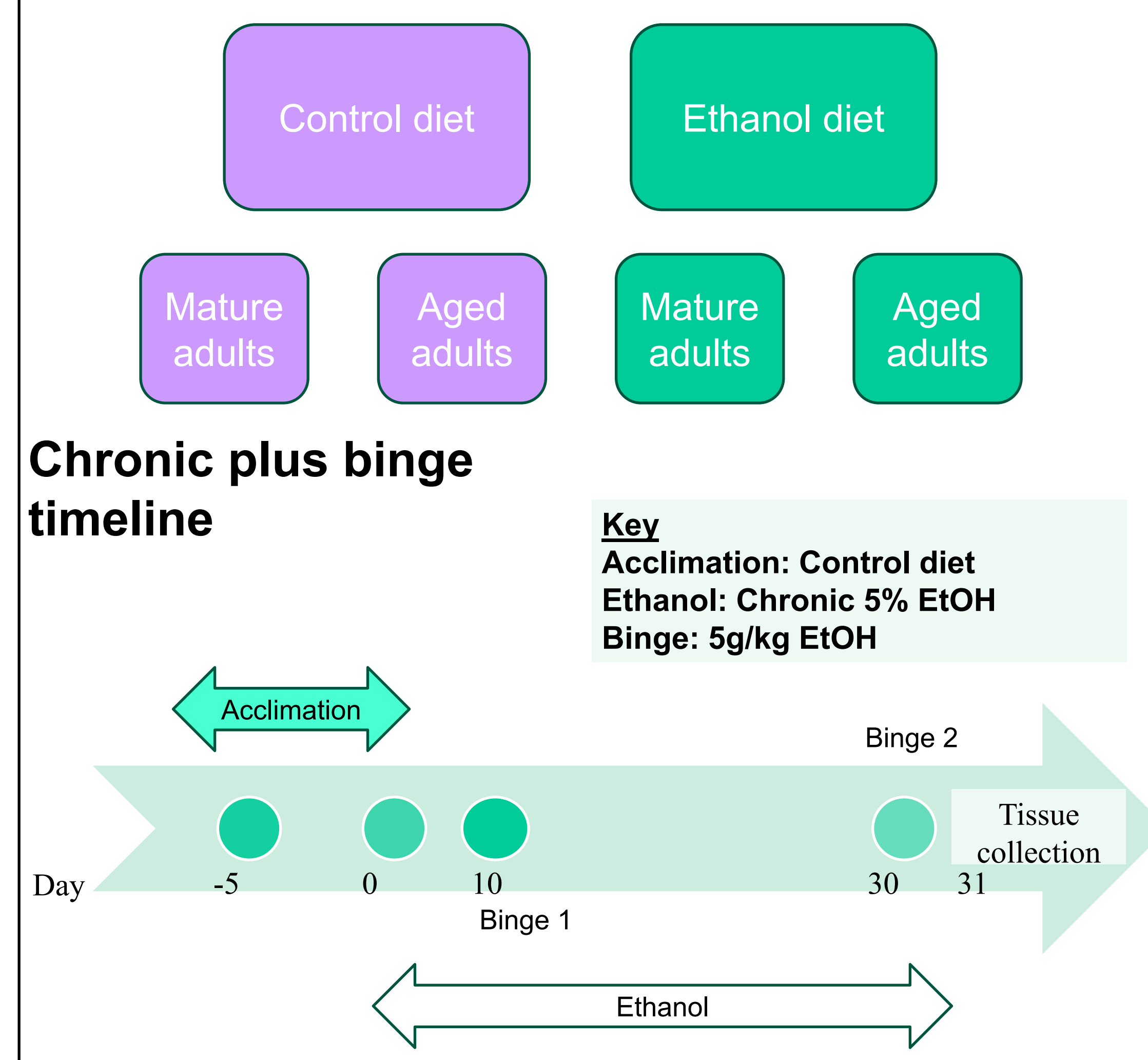
Taste influences food preferences and dietary choices, which in turn can lead to changes in nutritional status and metabolic health. Understanding factors that contribute to taste dysfunction may elucidate mechanisms that lead to metabolic disease (e.g. obesity, diabetes). Previous studies suggest that inflammation of the taste buds may mediate taste dysfunction. Alcohol is a commonly consumed substance that has been shown to promote systemic inflammation. However, the effects of alcohol on taste bud inflammation and proliferation have not been studied.

Goal

This study aimed to investigate the impact of chronic plus binge alcohol exposure on markers of inflammation and proliferation in taste buds. Specifically, we assessed fungiform papillae density and expression of markers of inflammation and proliferation in the circumvallate papillae of young and aged, male and female mice.

Methods

Young (13 weeks old) and Aged (73 weeks old) male and female C57/Bl mice were given *ad libitum* access to either a liquid, Leiber DiCarli diet containing 5% ethanol or were pair-fed the Leiber DiCarli diet without ethanol.



Body Weight

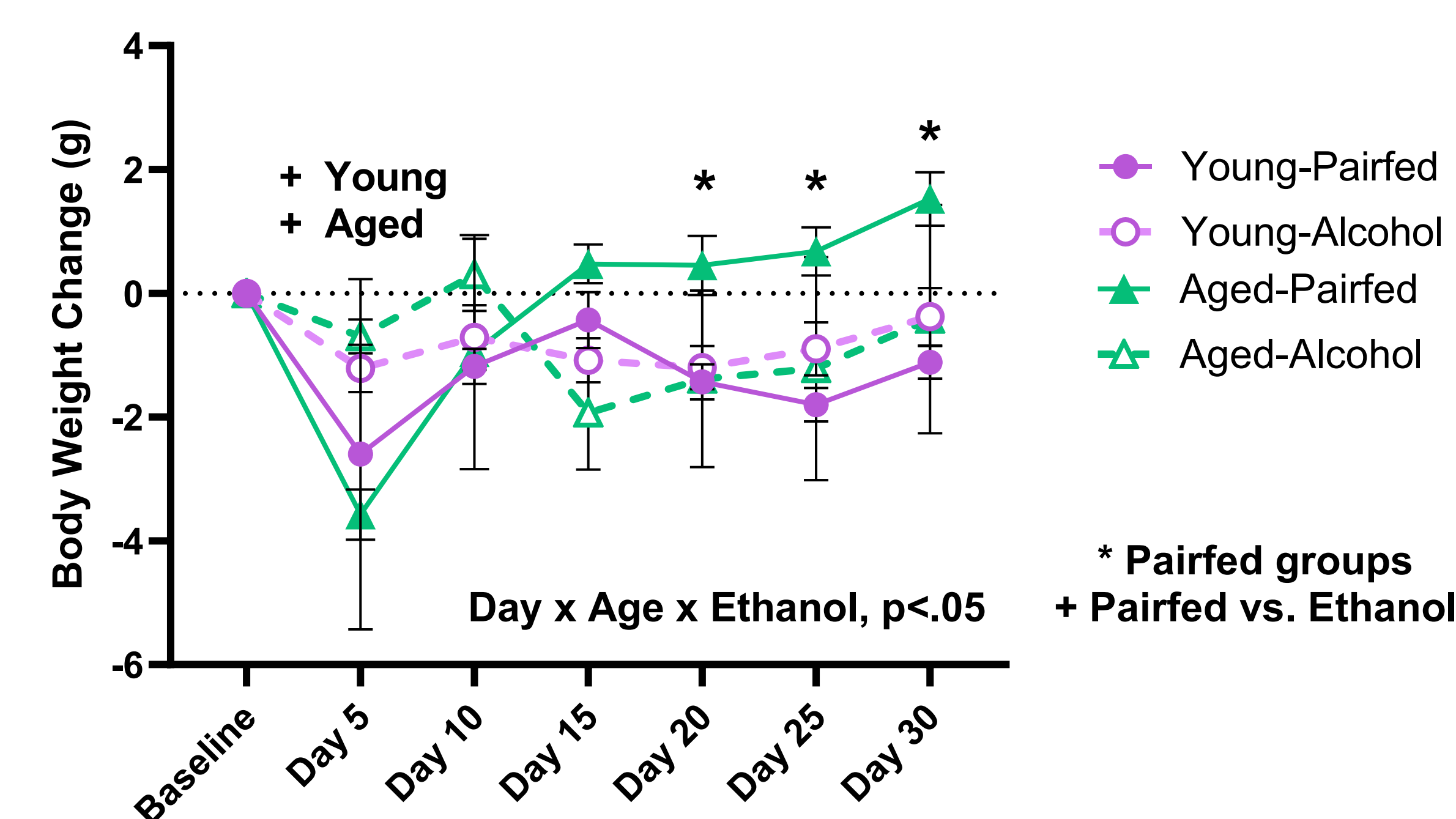


Figure 1. Daily body weight changes in alcohol and pair-fed mice. There was a significant interaction between day, age, and ethanol when a mixed ANOVA was run. At day 5, young-alcohol and aged-alcohol lost less weight than the young-paired and aged-paired. From day 20-30, the aged-paired gained more weight than the young-paired.

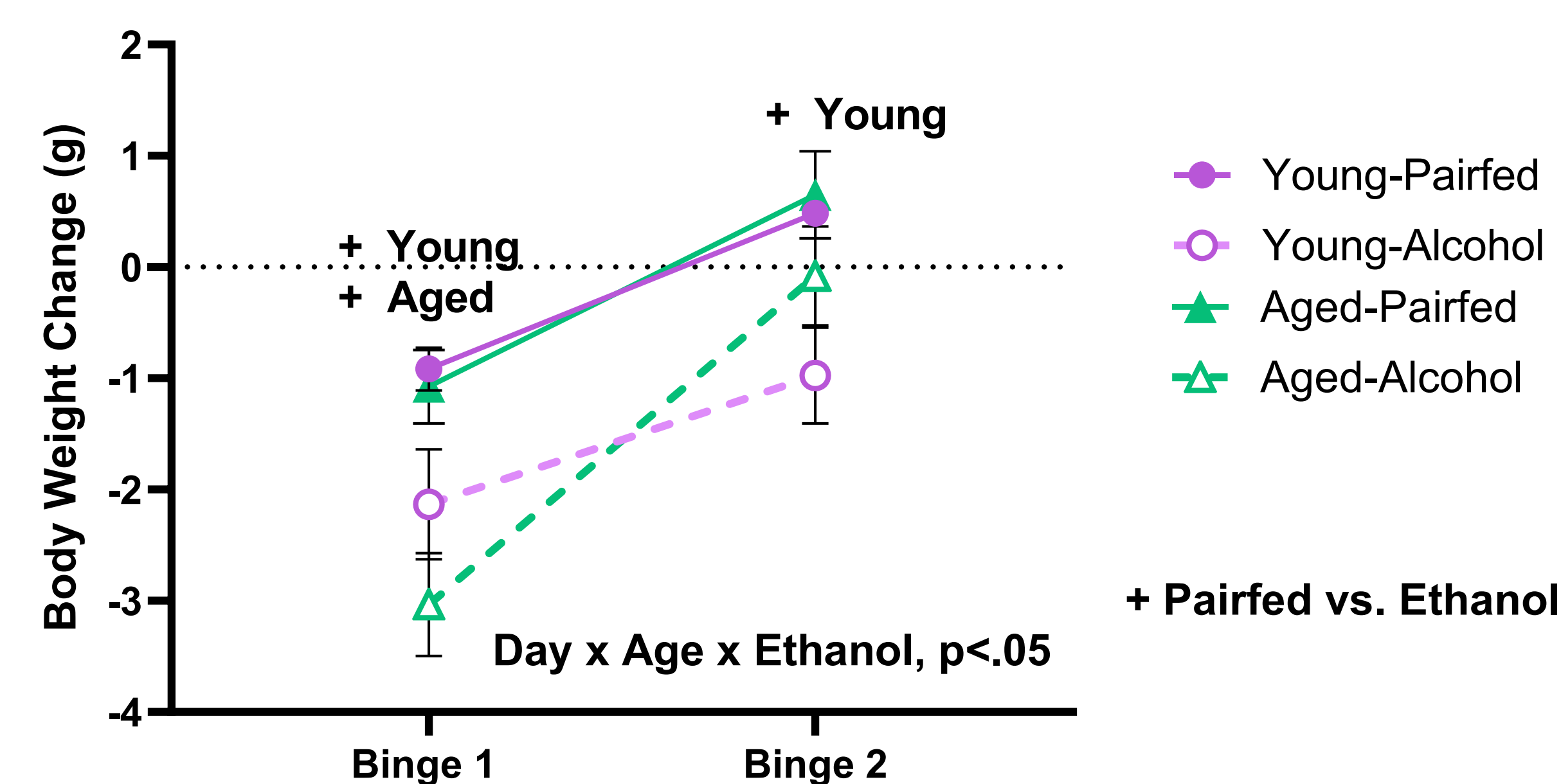


Figure 2. Body weight changes in alcohol and pair-fed mice in the 24 hours after a binge. Pair-fed mice received a control gavage of 9g/kg maltose dextrin. There was significant interactions between day, age, and ethanol. After Binge 1, young-ethanol and aged-ethanol mice lost more weight than their pair-fed counterparts. After binge 2, the young alcohol lost more weight than the young-paired.

Daily Intake

Day: 2-10		Day: 11-20		Day: 21-30	
Group	Average of Intake (mL)	Group	Average of Intake (mL)	Group	Average of Intake (mL)
OA	23.6	OA	26.1	OA	28.1
OP	20.2	OP	23.1	OP	27.0
YA	21.3	YA	24.0	YA	22.7
YP	19.7	YP	24.4	YP	23.0

Table 1. Average daily intake in alcohol and pairfed male mice.

Fungiform Density

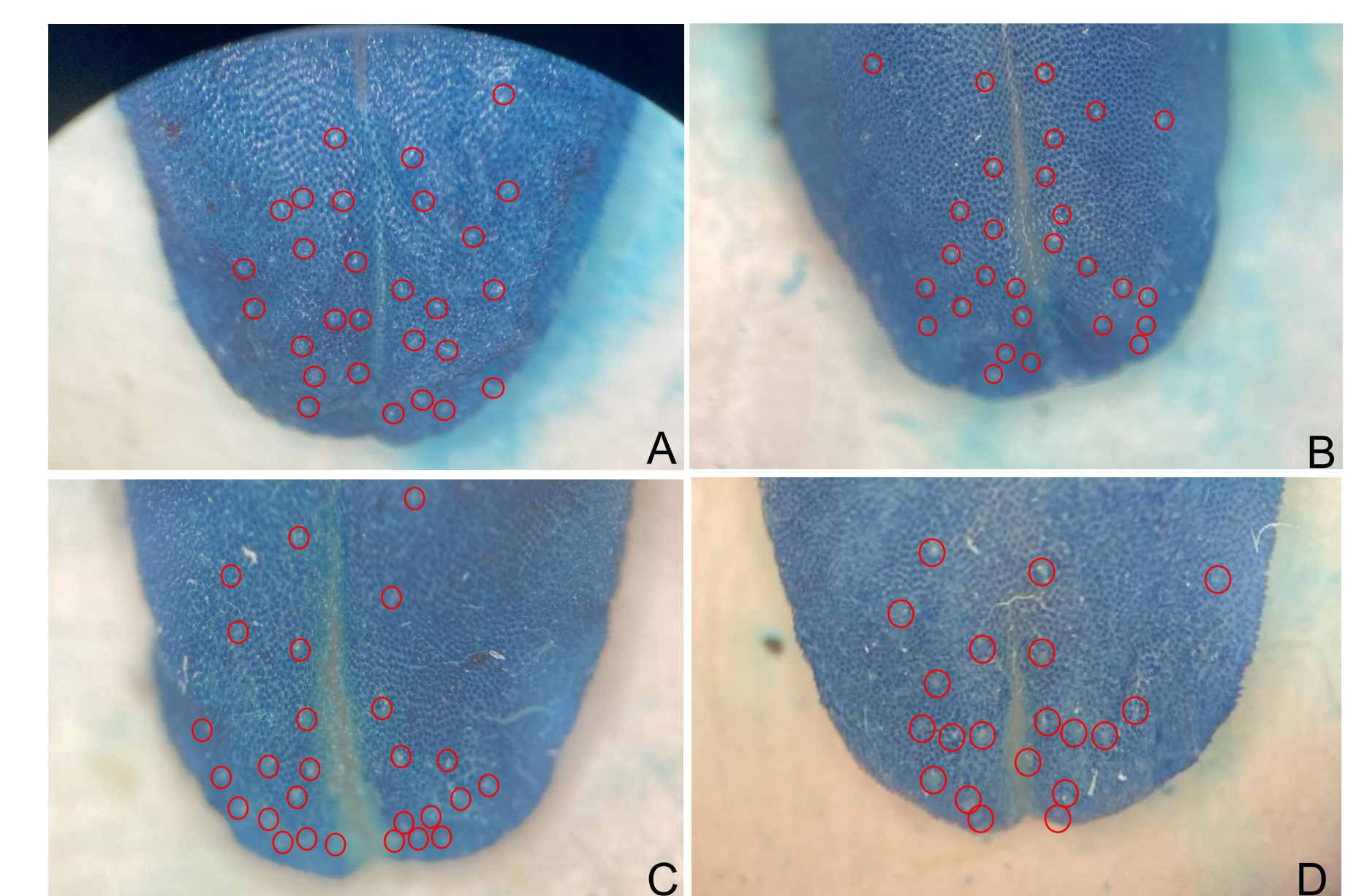


Figure 3. Fungiform papillae density in alcohol and pair-fed male mice. Fungiform papillae were counted following staining with 0.5% methylene blue. A) was a young alcohol fed mouse. B) was an aged alcohol fed mouse. C) was a young-paired mouse. D) was an aged-paired mouse.

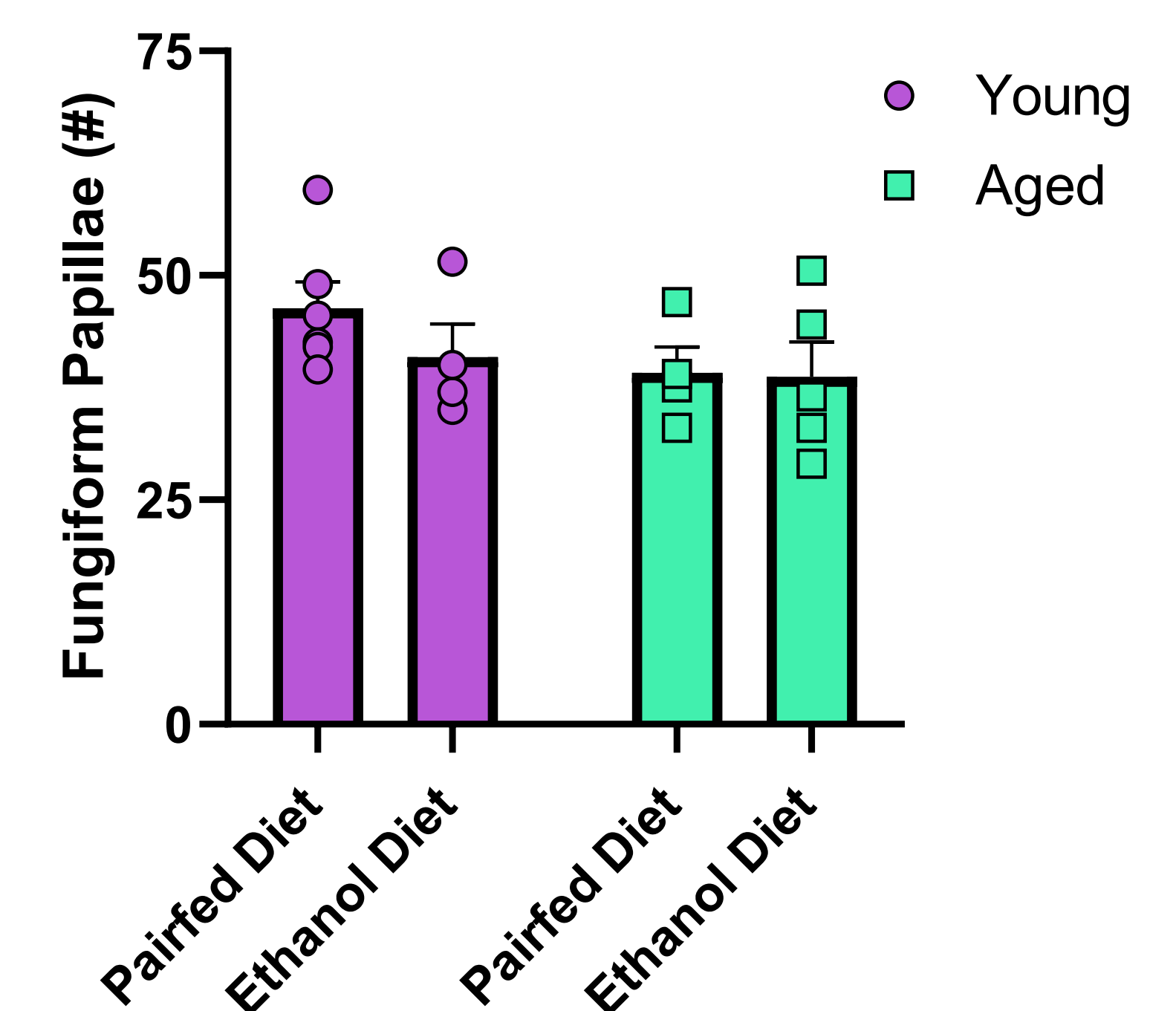


Figure 4. Fungiform papillae density in alcohol and pair-fed male mice were analyzed by a two-way ANOVA. No significant differences were found in fungiform density. (p > 0.05)

Gene Expression Analysis

Expression of CCL2 mRNA, KCNQ1 mRNA, IL10 mRNA and Ki67 mRNA in the circumvallate papillae was not affected by alcohol and did not differ by sex. Next steps will be to complete further Realtime PCR analysis of inflammatory biomarkers in the circumvallate papillae.

Summary

- At day 5, young-alcohol and aged-alcohol lost less weight than the young-paired and aged-paired.
- The day 5 body weights were likely influenced by the mice getting used to the diet.
- From day 20-30, the aged-paired gained more weight than the young-paired.
- After Binge 1, young-ethanol and aged-ethanol mice lost more weight than their pair-fed counterparts. After binge 2, the young alcohol lost more weight than the young-paired, but there was no difference in the aged mice.
- Fungiform density and preliminary gene expression analysis were not significantly affected by alcohol. However, further research needs to be done to explore the relationship between taste and alcohol.

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