

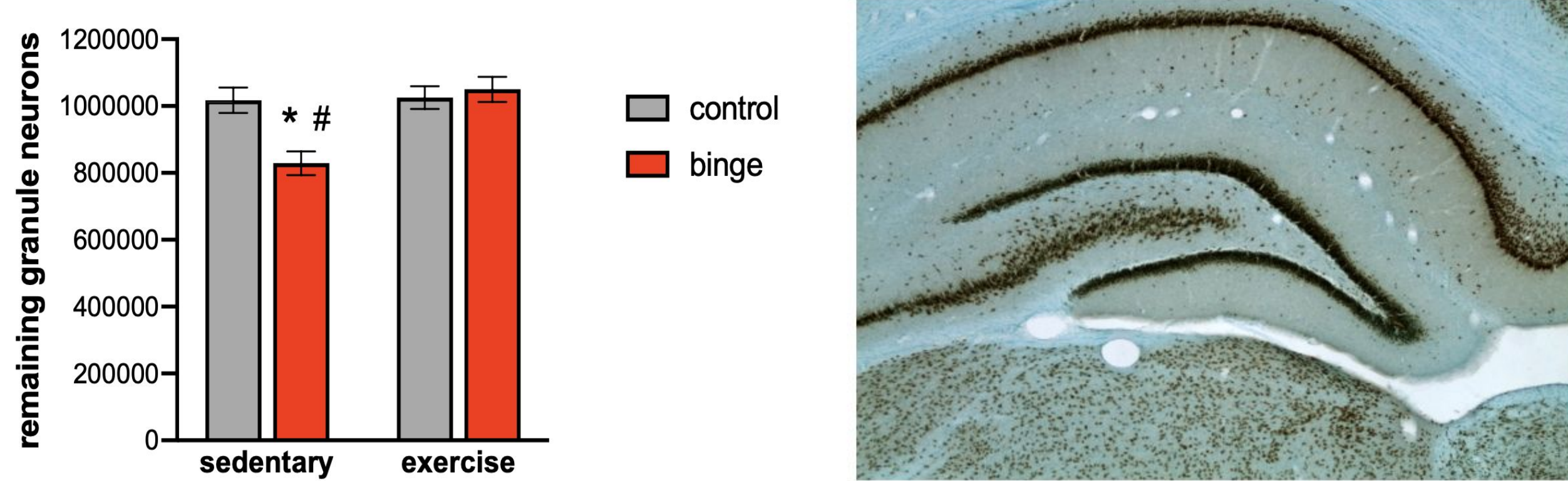
# Neuroprotective Effects of Exercise on Binge Alcohol-Induced Brain Damage

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## Background

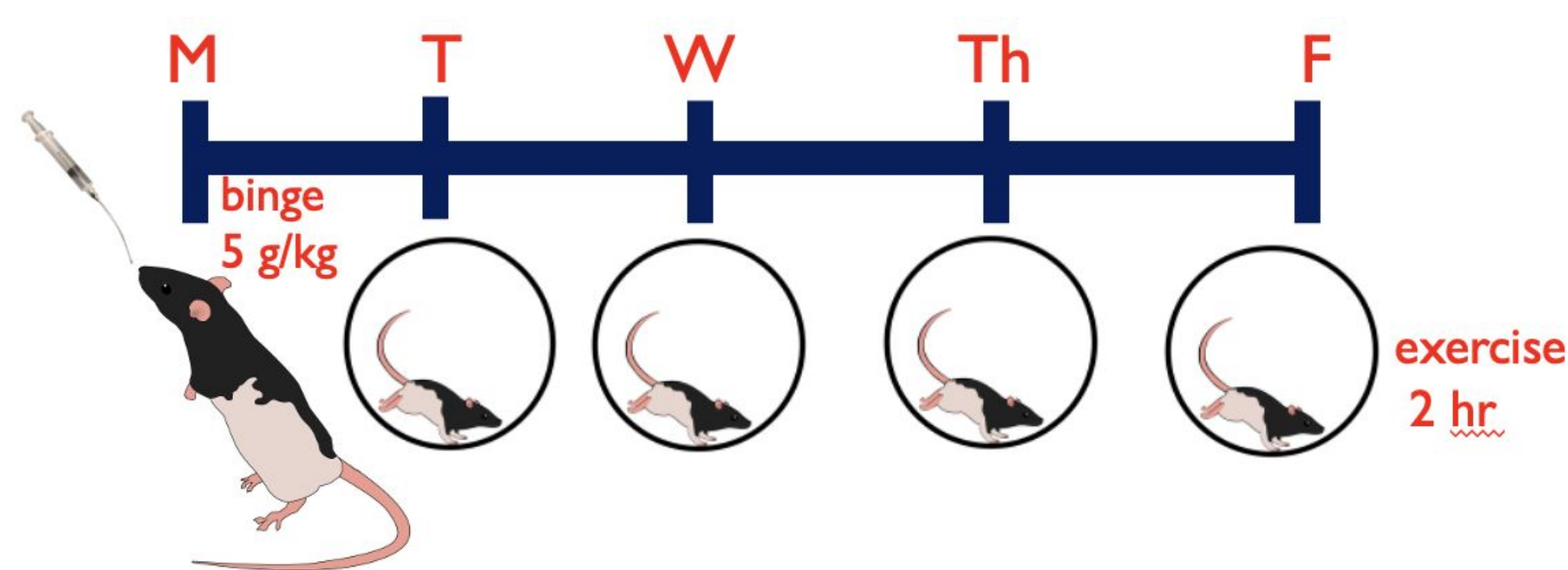
- Binge drinking is the most common pattern of alcohol consumption in the US.
- Binge alcohol exposure results in damage to the brain.
- We have shown that exercise counteracts binge-induced loss of granule neurons in the hippocampal dentate gyrus



- In the present study, we investigated possible mechanisms of exercise neuroprotection including:
  - Decreased alcohol-induced stress hormone (cort) output
  - Increased levels of exerkins (peripherally-derived factors that sustain the brain)
  - Decreased neuroimmune response

## Methods

- 4 groups:
  - Sedentary non binge (control), F = 8, M = 11
  - Sedentary binge, F = 12, M = 8
  - Exercise non binge (control), F = 10, M = 13
  - Exercise binge, F = 13, M = 7

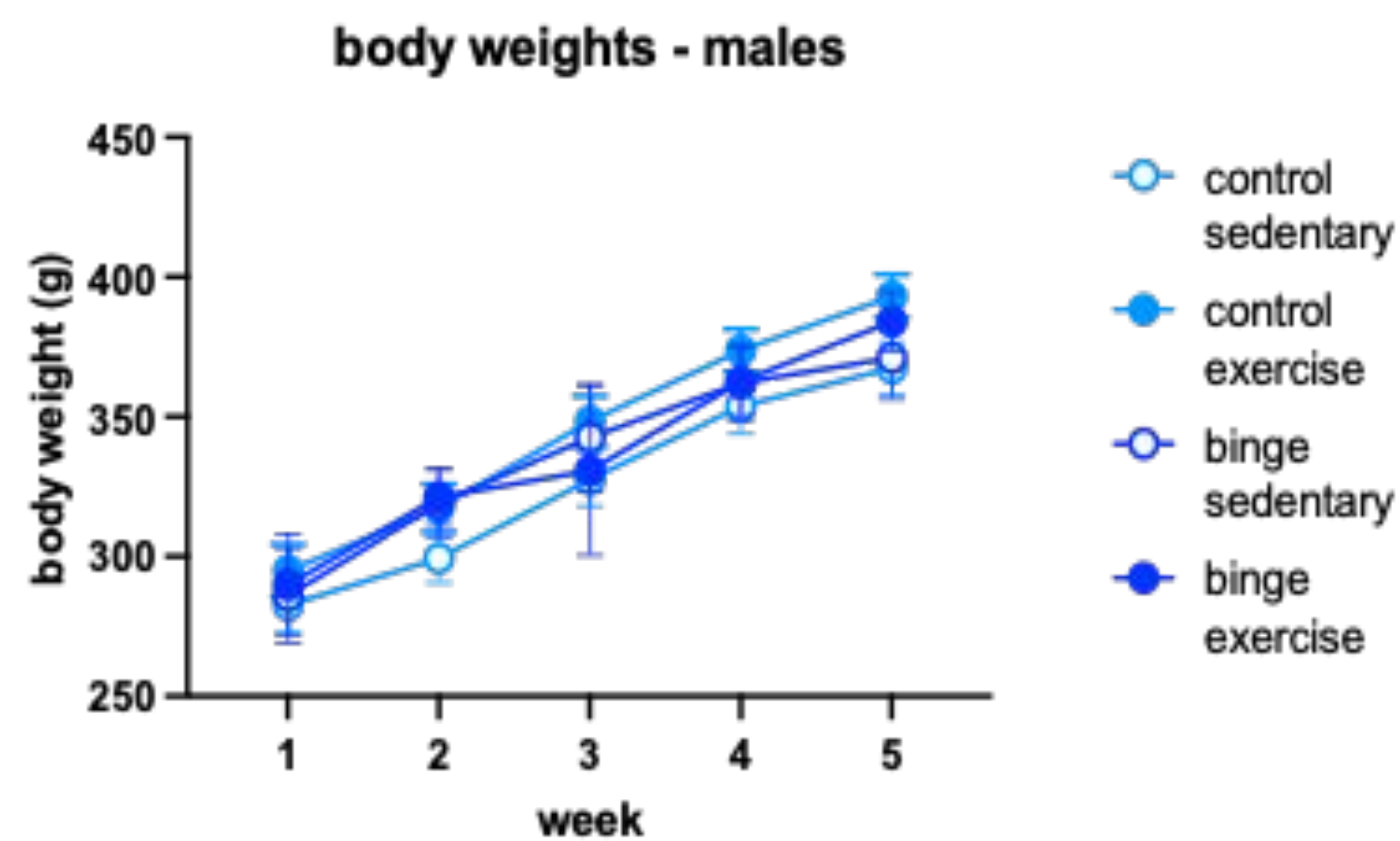


- We looked at blood (serum) to quantify adiponectin levels.
- We looked at brain sections to quantify microglial neuroimmune response.

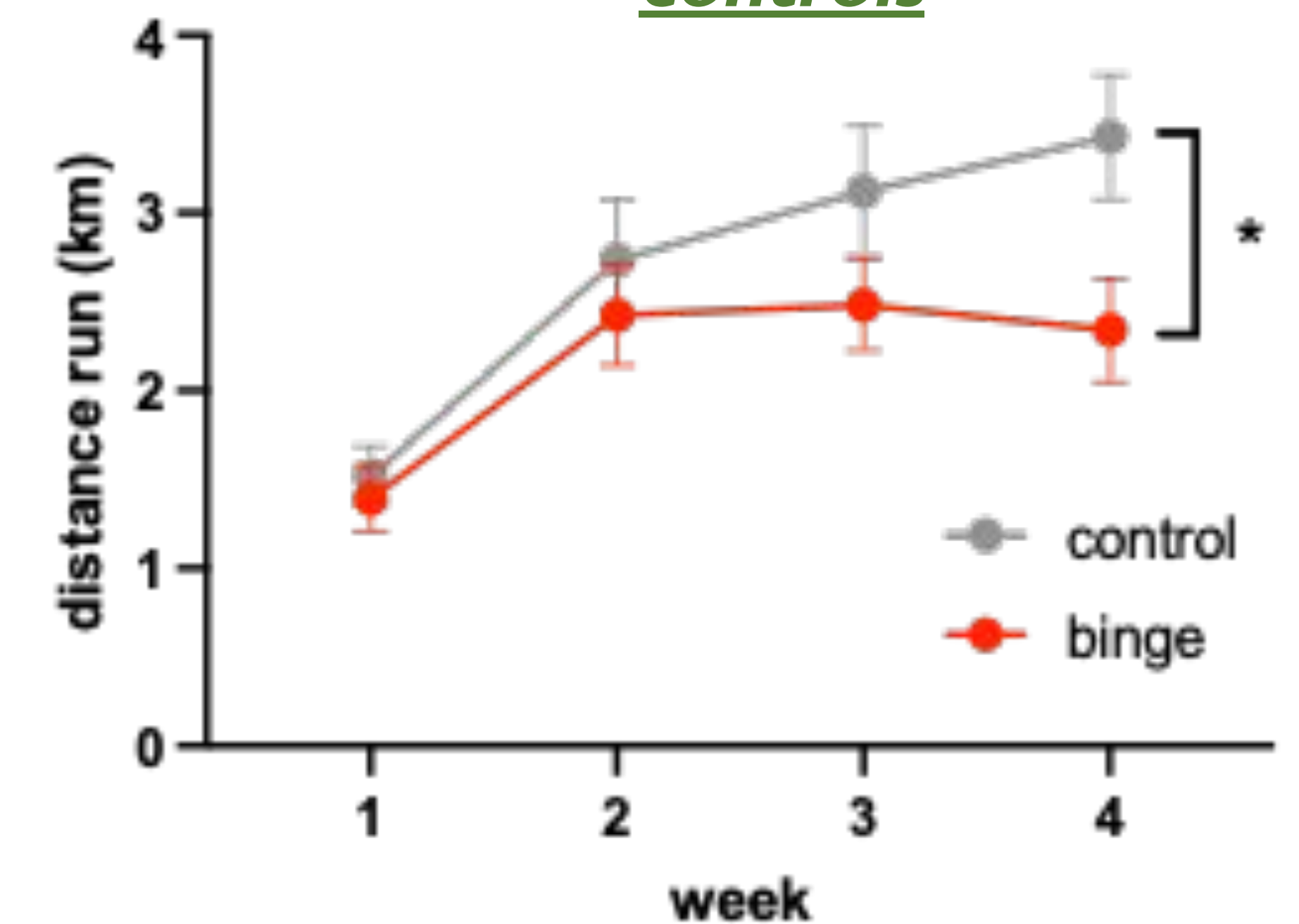


## Results

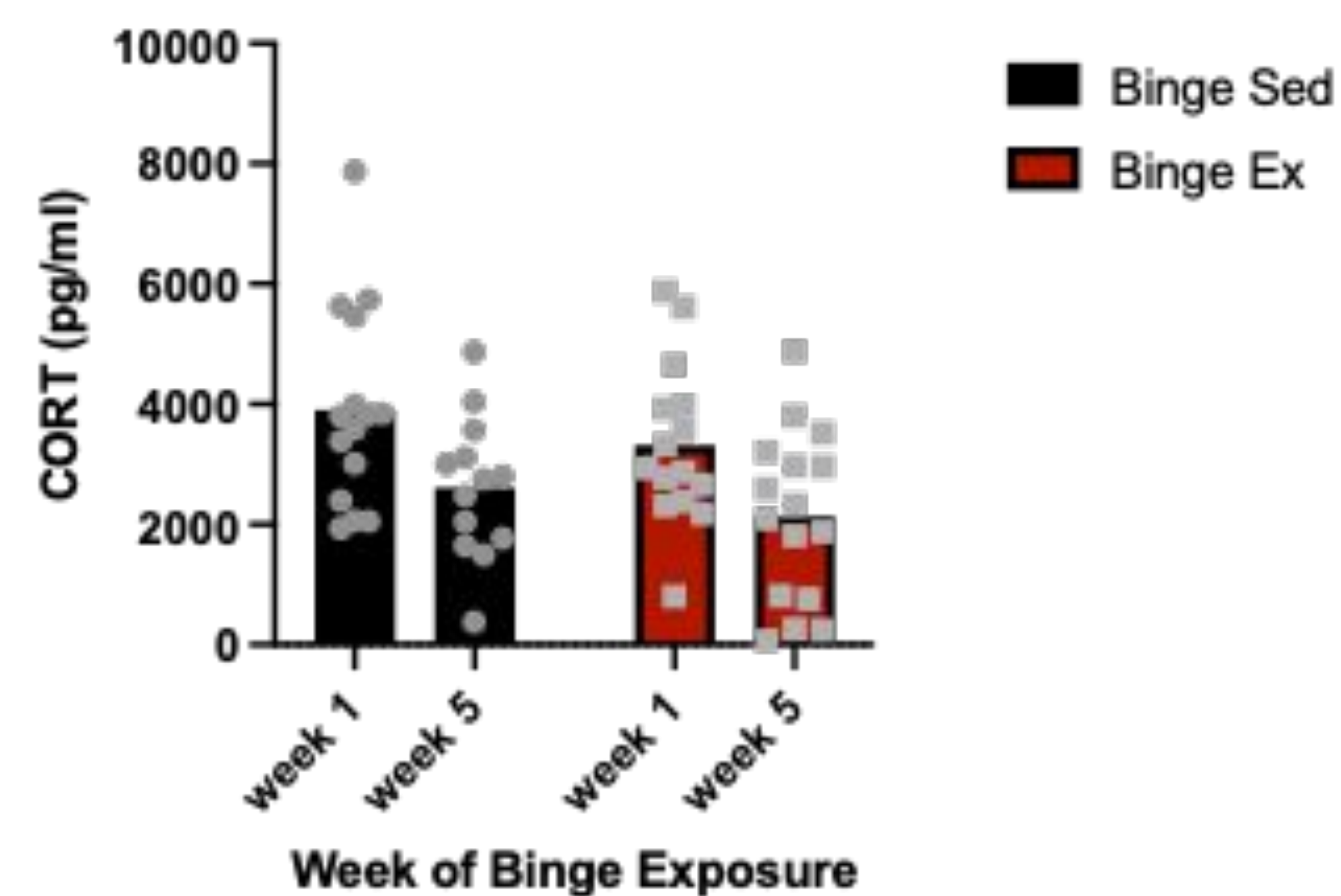
### Exercise increased body weight in males



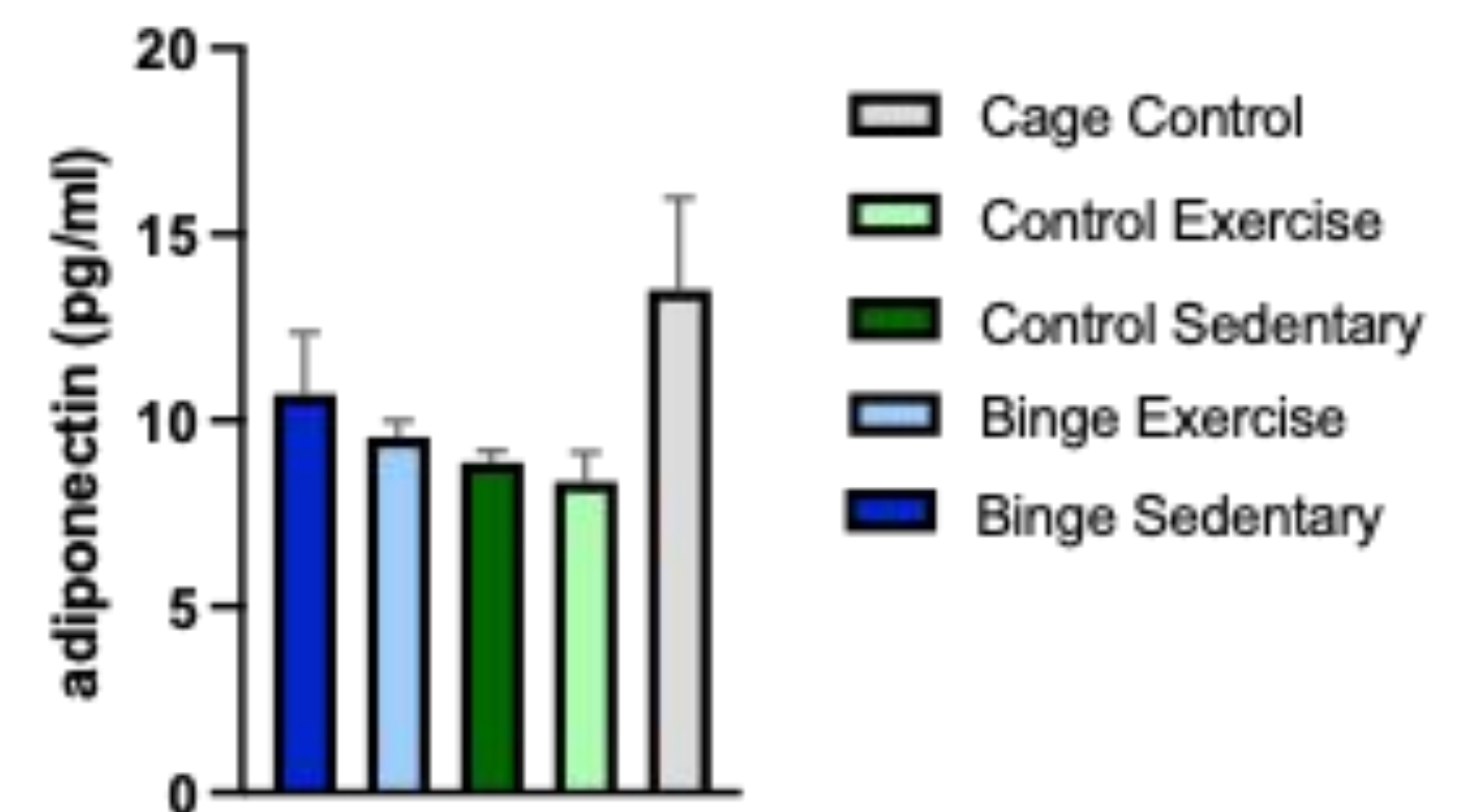
### Binged animals ran less than controls



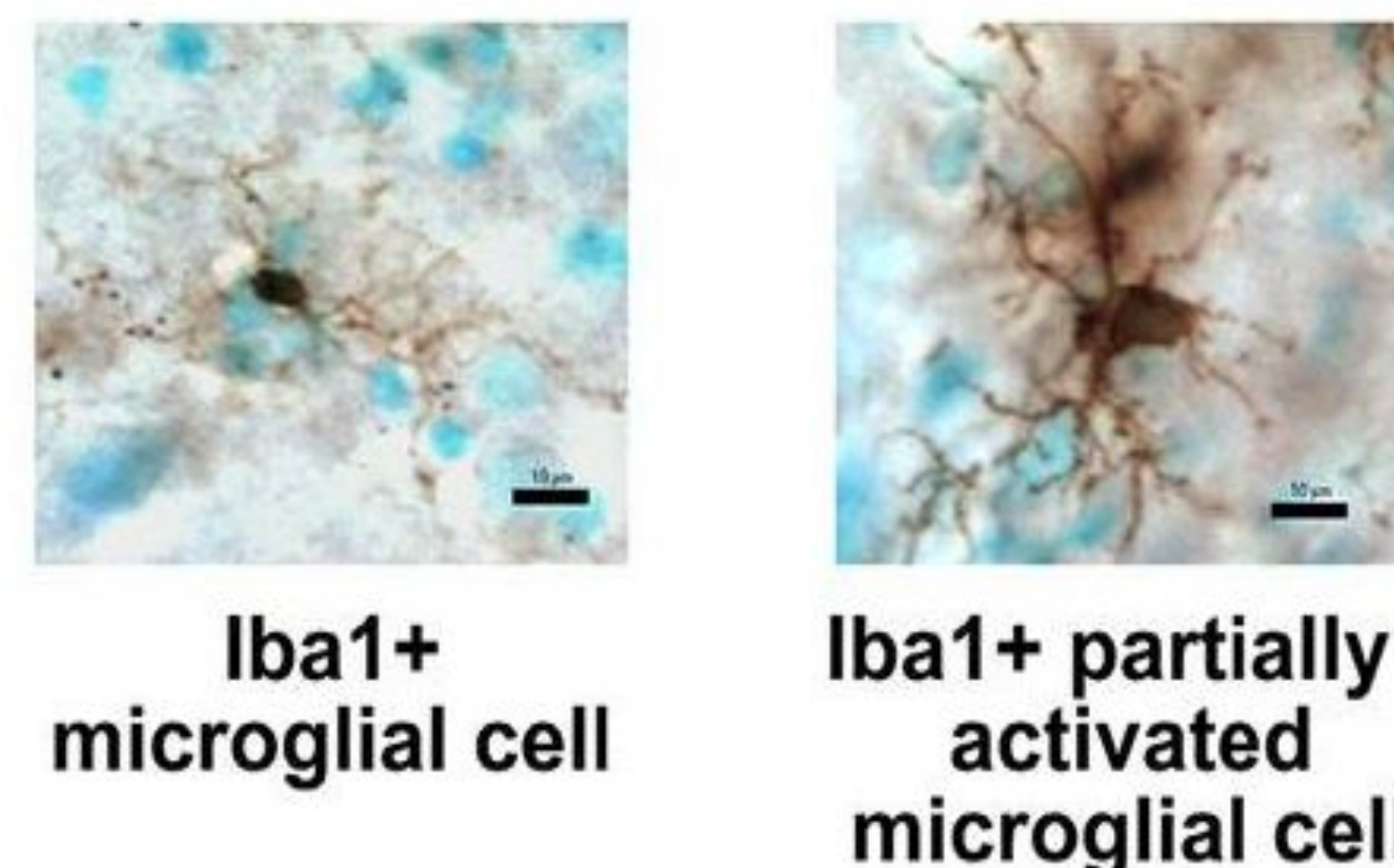
### CORT levels decreased over time, and exercise did not affect this



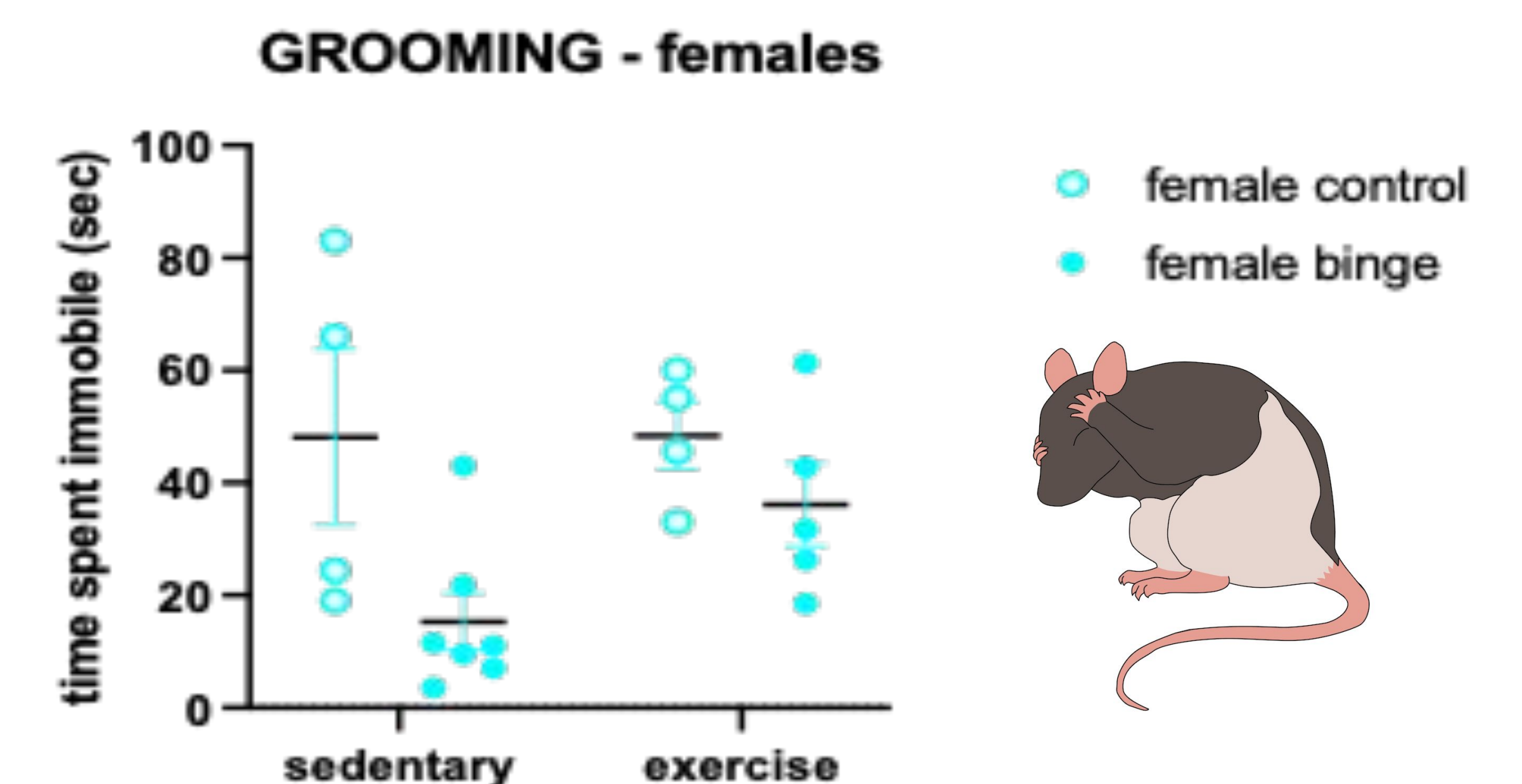
### Adiponectin was not affected by either binge alcohol or exercise



### Exercise decreased partially activated microglia, indicating a decreased neuroimmune response



### Binged rats groomed less than controls suggesting a state of malaise. exercise eliminated this effect.



## Discussion

- In conclusion, exercise buffers the effects of binge alcohol, both neurally and behaviorally. Ongoing studies continue to probe potential mechanisms, including the contribution of additional exerkins and analysis of gene transcription changes induced by binge alcohol and/or exercise.