

OXYGEN CONSUMPTION DIFFERENCES IN INTERMITTENT-FASTED ANIMALS

by

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Abstract

Intermittent fasting (IF) is a promising strategy to protect against cognitive impairment, such as in the case of Alzheimer's Disease (AD). Our recent studies have found that young male rats introduced to 10 weeks of alternate-day fasting had significantly reduced body weights, compared to the ad-libitum (AL) control group. However, no significant differences were observed in female body weights even though both males and females had reduced food intake. This sexual dimorphism might be due to changes in resting whole-body metabolism. The study aimed to explore whether IF impacts overall oxygen consumption and carbon dioxide production and whether these effects vary between sexes. Methods- Forty 10-week-old female and male Fisher-344 rats were randomly assigned to either a four-week IF group or AL group. Two weeks into the intervention resting oxygen consumption was measured by placing the animal in an air-tight chamber with O₂ and CO₂ analyzers in order to calculate oxygen consumption, carbon dioxide production, and respiratory exchange ratio (RER). Results- After two weeks of IF, females had reduced O₂ consumption and CO₂ production compared to the AL group (30.6 vs. 41.4 mL/min/kg, $p < .01$ and 25.1 vs. 36.1 mL/min/kg, $p < .001$, respectively), however, no significant changes were seen in the males. Conclusion- The results have confirmed that IF elicits significant sexual dimorphism in both O₂ consumption and CO₂ production where females exhibited declines in both while males did not change. This shift to a slower metabolism is likely the cause for maintained body mass during IF.