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School of Community Health Sciences  
University of Nevada, Las Vegas

## **Dietary Restriction in *Drosophila melanogaster* Increases Flight Duration**

Nelson Nunez

Mark Frye, PhD, University of California, Los Angeles

Mehmet Keles, PhD Candidate, MCIP Program

**Coordinating Center:** Charles R. Drew University of Medicine and Science

### **ABSTRACT**

Caloric restriction extends the lifespan in several model animals, including fruit flies, but less is known about the influence upon endurance and sensory-motor performance. For this experiment, all flies will be raised on standard media. At the point of eclosion, they will be transferred to rich, standard, or restricted media. The endurance of a fruit fly can be tested by monitoring how long it is able to maintain active flight. Flight power is quantified by measuring wing beats per second and total wing stroke amplitude. Sensory-motor performance is measured by the animal's ability to actively fixate on a black bar using closed-loop feedback within an electronic visual flight simulator.

We hypothesize that flies raised on restricted media (0.5% yeast) will have higher mechanical power output, and flight duration than flies raised on standard media (2.5% yeast) or rich media (5.5% yeast).

We tested adult female *Drosophila melanogaster* between 5 days post eclosion. Flies were tethered under cold sedation (~3 °C) to tungsten pins using ultraviolet cured epoxy. Experiments were performed with a computer controlled cylindrical flight area composed of light emitting diodes (LEDs). Subjects were selected for their ability to frontally fixate a vertical black bar for the duration of the experiment.

The average amount of time that the 24 standard flies raised on standard diet containing 2.5% yeast flew for is 109 minutes. The average flight time for the 5 rich media flies raised on 5.5% yeast is 57 minutes.

We have yet to test flies raised on a dietary restriction diet, but since the rich media flies have performed worse in every category, mirroring the results from a similar experiment the previous year, it can be assumed that the dietary restricted flies will outperform its contenders again. Future testing may include how genes involved in cellular metabolism, which are influenced by diet, might coordinate enhanced neural and metabolic function.

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Nunez, Frye, and Keles

**Keywords:** Caloric Restriction, Flight Duration in *Drosophila*, Sensory-motor Performance

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