



Dietary Restriction in *Drosophila melanogaster* Increases Flight Duration

## Journal of Health Disparities Research and Practice

Volume 9  
Issue 5 *Special Issue - NIDDK STEP UP*

Article 15

© Center for Health Disparities Research, School of Public Health, University of Nevada, Las Vegas

2016

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

Nelson Nunez

Mark Frye, PhD , *University of California-Los Angeles*

Mehmet Keles, PhD Candidate , *MCIP Program*

Follow this and additional works at: <https://digitalscholarship.unlv.edu/jhdrp>



Part of the [Bilingual, Multilingual, and Multicultural Education Commons](#), [Community College Leadership Commons](#), [Higher Education Commons](#), [Immune System Diseases Commons](#), [Public Health Commons](#), [Translational Medical Research Commons](#), and the [Virus Diseases Commons](#)

#### Recommended Citation

Nunez, Nelson; Frye, PhD, Mark; and Keles, PhD Candidate, Mehmet (2016) "Dietary Restriction in *Drosophila melanogaster* Increases Flight Duration," *Journal of Health Disparities Research and Practice*: Vol. 9: Iss. 5, Article 15.

Available at: <https://digitalscholarship.unlv.edu/jhdrp/vol9/iss5/15>

This Article is protected by copyright and/or related rights. It has been brought to you by Digital Scholarship@UNLV with permission from the rights-holder(s). You are free to use this Article in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself.

This Article has been accepted for inclusion in *Journal of Health Disparities Research and Practice* by an authorized administrator of Digital Scholarship@UNLV. For more information, please contact [digitalscholarship@unlv.edu](mailto:digitalscholarship@unlv.edu).

---

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

### 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.

### Keywords

Caloric Restriction; Flight Duration in *Drosophila*; Sensory-motor Performance



**Journal of Health Disparities Research and Practice**  
**Volume 9, Special Edition 1, Summer 2016, pp. 24-25**  
© 2011 Center for Health Disparities Research  
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.

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

#### **ACKNOWLEDGEMENTS**

The STEP-UP HS program is supported by the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health, Grant Number: 5R25DK078384-09.