

September 2023

## Effects of Osmotic Stress on Oxygen Consumption of Drosophila Cells (Kc167)

Ali A. Ahmed  
*University Of Louisville*, ali.ahmed.1@louisville.edu

Rajib Hassan  
*University of Louisville*, rajib.hassan@louisville.edu

Michael A. Menze  
*University of Louisville*, michael.menze@louisville.edu

Follow this and additional works at: <https://ir.library.louisville.edu/tce>



Part of the [Cell Biology Commons](#)

---

### Recommended Citation

Ahmed, Ali A.; Hassan, Rajib; and Menze, Michael A. (2023) "Effects of Osmotic Stress on Oxygen Consumption of Drosophila Cells (Kc167)," *The Cardinal Edge*: Vol. 1: Iss. 4, Article 2.  
Available at: <https://ir.library.louisville.edu/tce/vol1/iss4/2>

This Research Abstract is brought to you for free and open access by ThinkIR: The University of Louisville's Institutional Repository. It has been accepted for inclusion in The Cardinal Edge by an authorized editor of ThinkIR: The University of Louisville's Institutional Repository. For more information, please contact [thinkir@louisville.edu](mailto:thinkir@louisville.edu).

---

## Effects of Osmotic Stress on Oxygen Consumption of *Drosophila* Cells (Kc167)

### Cover Page Footnote

Mentored Undergraduate Research and Creative Activities Grant

# Effects of Osmotic Stress on Oxygen Consumption of *Drosophila* Cells

Ali Ahmed<sup>1</sup>, Rajib Hassan<sup>1</sup>, & Michael A. Menze<sup>1</sup>

<sup>1</sup>The University of Louisville, Louisville, KY, USA

Mentored Undergraduate Research and Creative Activities Grant

## ABSTRACT

This article investigates the effect of osmotic stress on a *Drosophila* cell line called Kc167. The embryonic-derived fly (*Drosophila melanogaster*) cell line, Kc-167, was employed as a model for water-stress sensitivity in Arthropods. Like mammalian cells, cells derived from the fruit fly contain the same basic set of membranous components found in all eukaryotic cells. A series of experiments were conducted to characterize the mitochondrial responses of Kc167 cells to water stress. Precisely, the oxygen flux in a sealed respirometer chamber containing Kc167 cells was measured under hyperosmotic and control conditions. Mitochondrial uncouplers were used in some experiments for intact and chemically permeabilized cells to gain detailed information on mitochondrial integrity in response to increased solute concentration. Mitochondria are the primary ATP producer in the cell and consume oxygen in a process termed oxidative phosphorylation. Therefore, oxygen consumption rates can be used to assess the impact of water-limited states on cellular bioenergetics. Conducted experiments were performed to measure the following:

- The basal oxygen consumption rates of Kc167 cells.
- Consumption under conditions of oxidative stress
- The oxygen consumption of the chemically permeabilized cells
- The max mitochondrial uncoupling that the Kc167 could withstand

**KEYWORDS:** Osmotic Stress, Mitochondria, Oxygen, Consumption, *Drosophila*