

Portland State University

PDXScholar

---

Student Research Symposium

Student Research Symposium 2024

---

May 8th, 1:00 PM - 3:00 PM

# The Effect Of Metabolic Modulators On The Rate Of Steady State Water Exchange In *S. Cerevisiae* Grown In Chemostat Bioreactors

Samantha Mumford  
*Portland State University*

Mark Woods  
*Portland State University*

Johnathan Dutra  
*Portland State University*

Follow this and additional works at: <https://pdxscholar.library.pdx.edu/studentsymposium>

 Part of the Chemistry Commons

Let us know how access to this document benefits you.

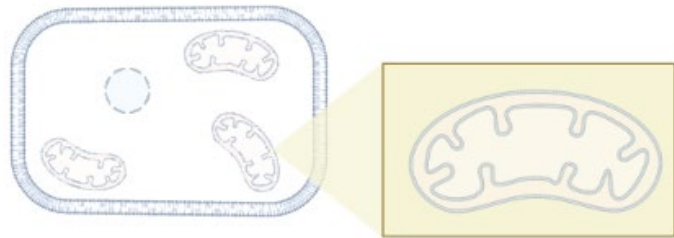
---

Mumford, Samantha; Woods, Mark; and Dutra, Johnathan, "The Effect Of Metabolic Modulators On The Rate Of Steady State Water Exchange In *S. Cerevisiae* Grown In Chemostat Bioreactors" (2024). *Student Research Symposium*. 33.

<https://pdxscholar.library.pdx.edu/studentsymposium/2024/presentations/33>

This Oral Presentation is brought to you for free and open access. It has been accepted for inclusion in Student Research Symposium by an authorized administrator of PDXScholar. Please contact us if we can make this document more accessible: [pdxscholar@pdx.edu](mailto:pdxscholar@pdx.edu).

# Mitochondrial activity may drive steady state water exchange ( $k_{i_o}$ ) at the cell membrane.



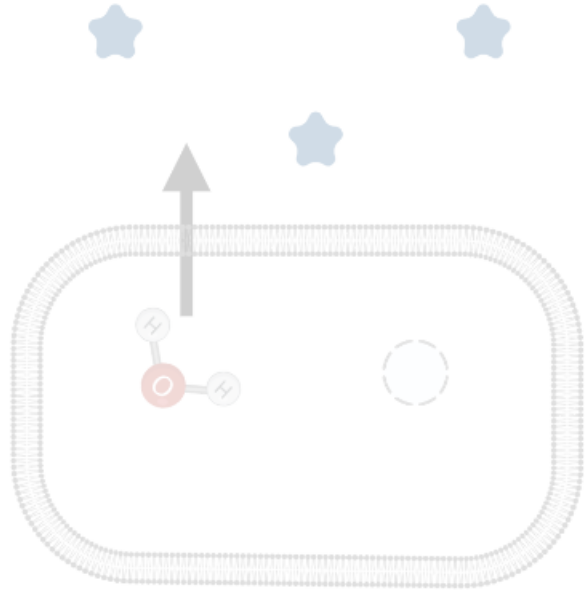
SRS Presentation

Samantha Mumford

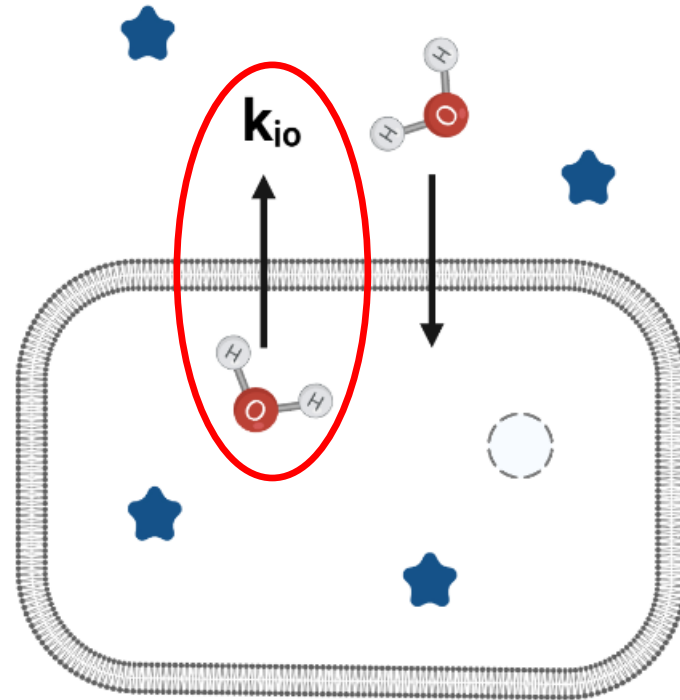
May 8<sup>th</sup>, 2024



# Steady State Water Exchange

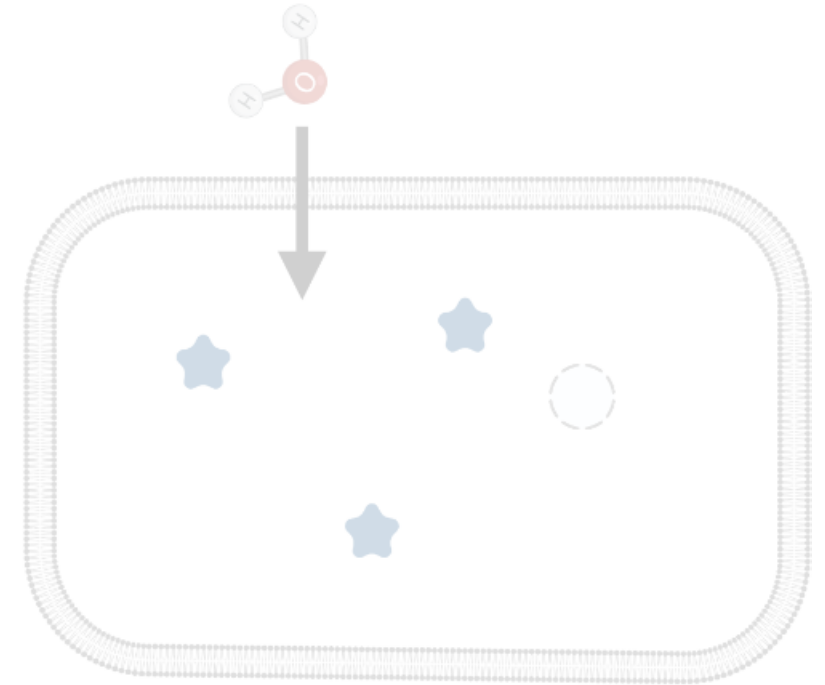


Hyperosmotic environment



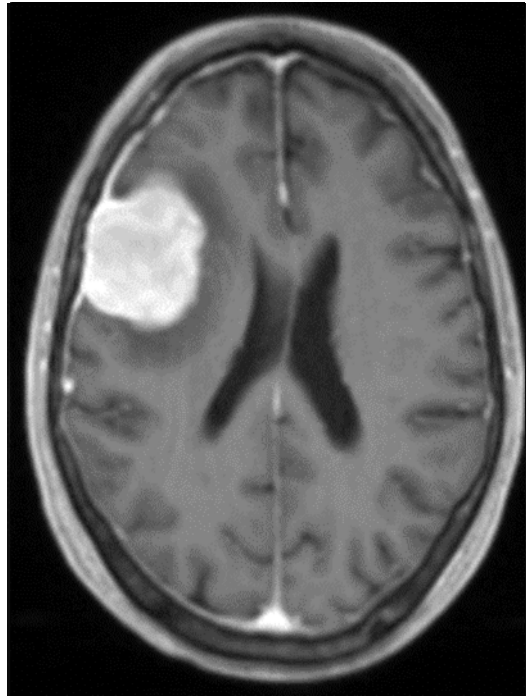
Equilibrium

★ = Salt

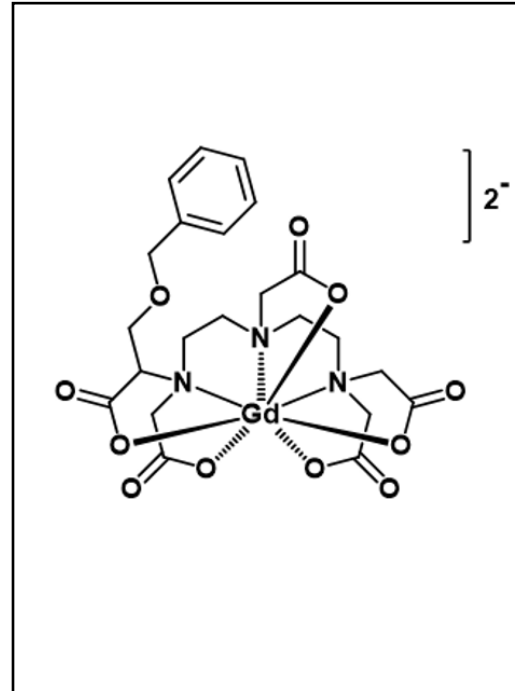


Hypoosmotic environment

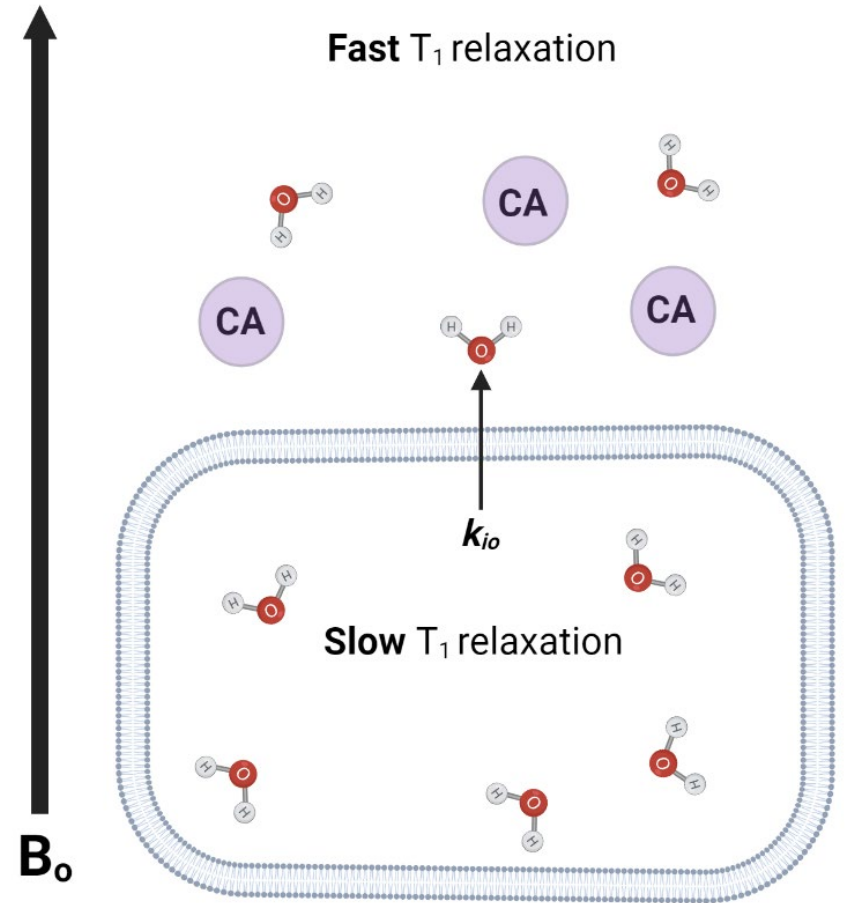
# Contrast Enhanced Magnetic Resonance



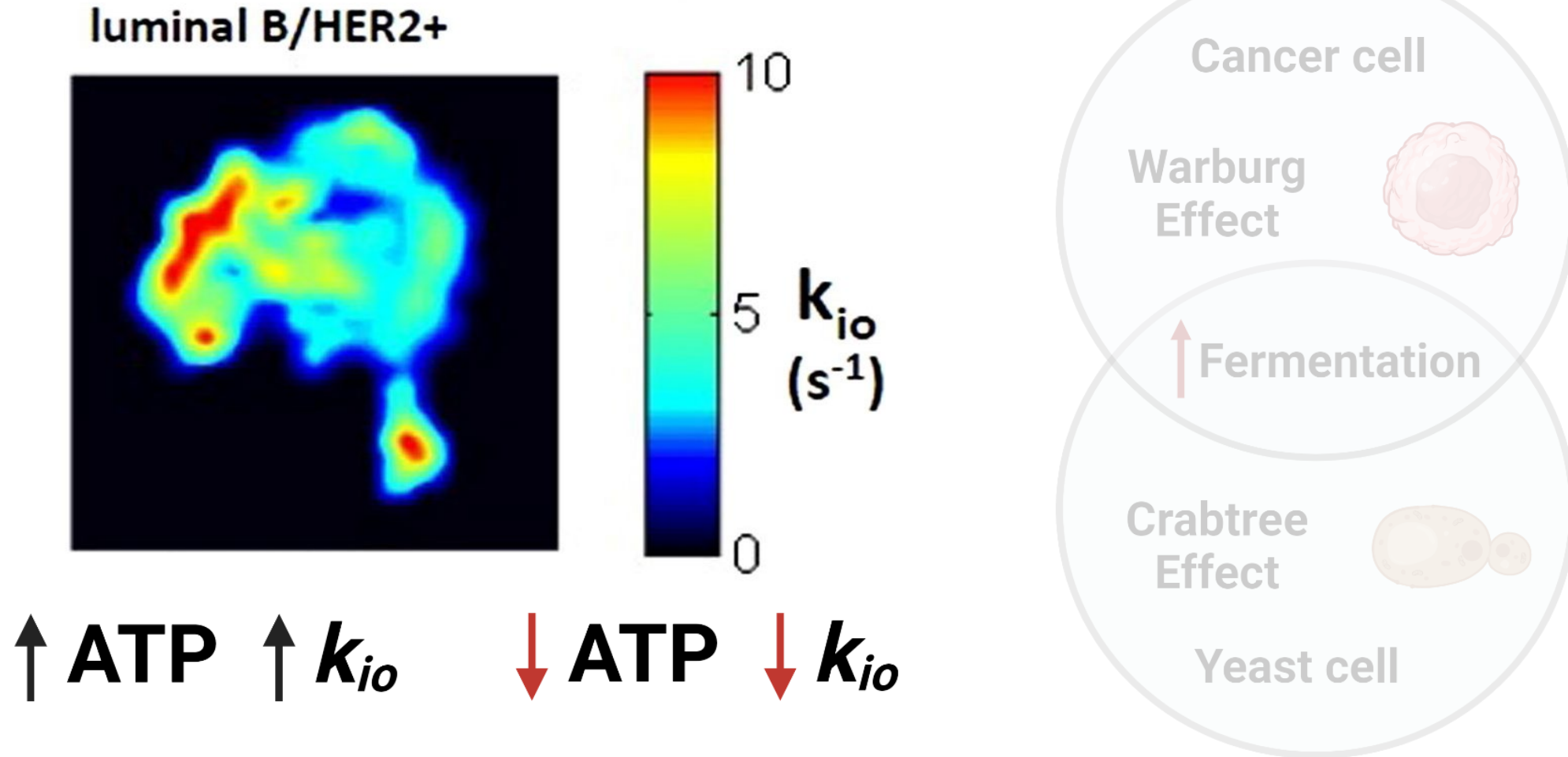
Contrast enhanced  
T1 weighted image



MultiHance CA



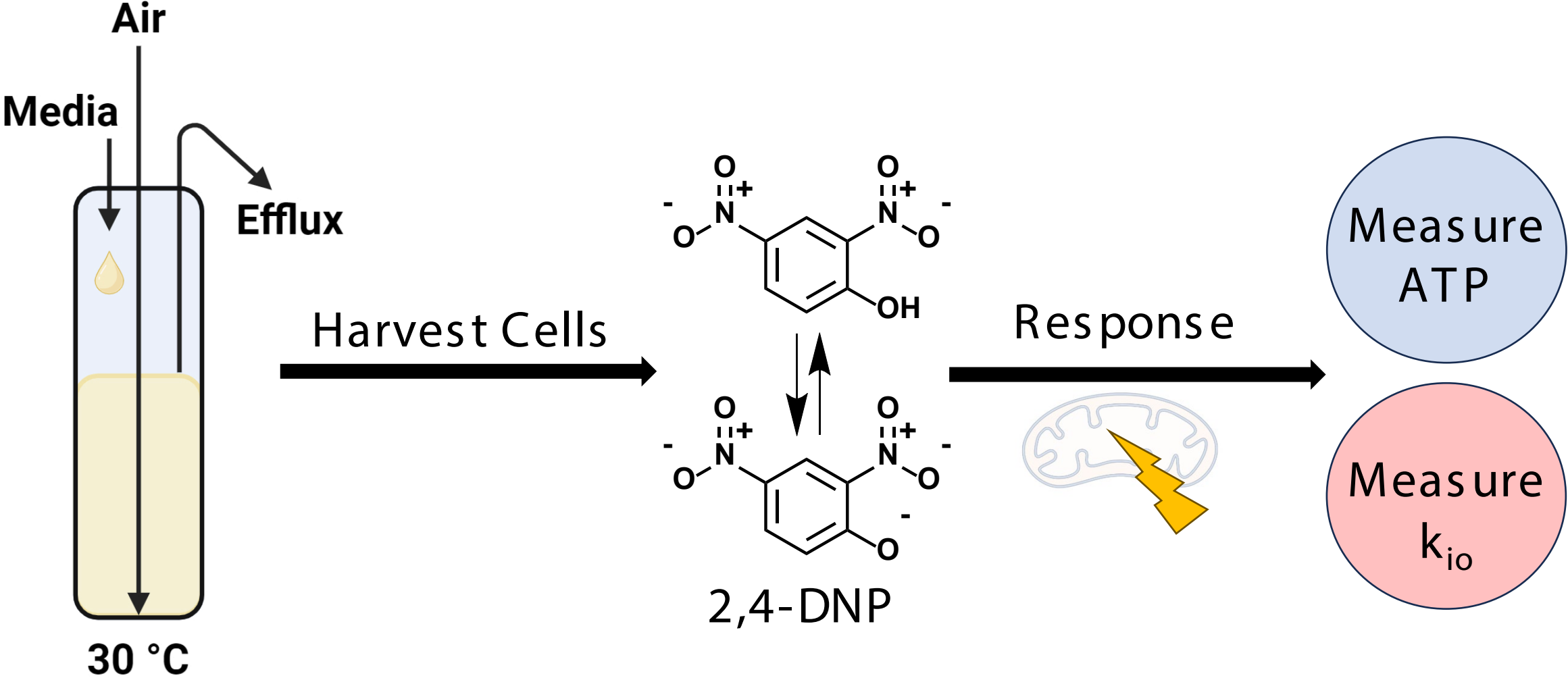
# $k_{io}$ as a Potential Biomarker



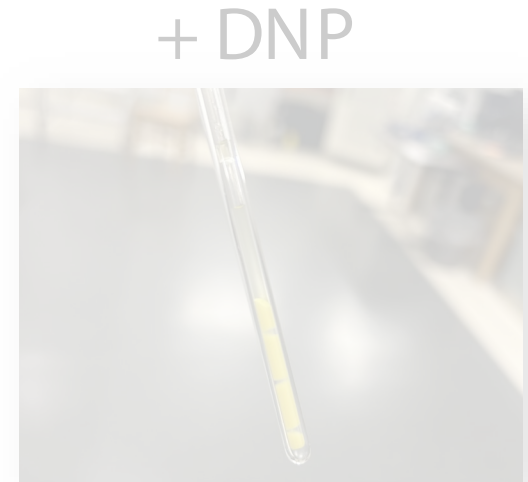
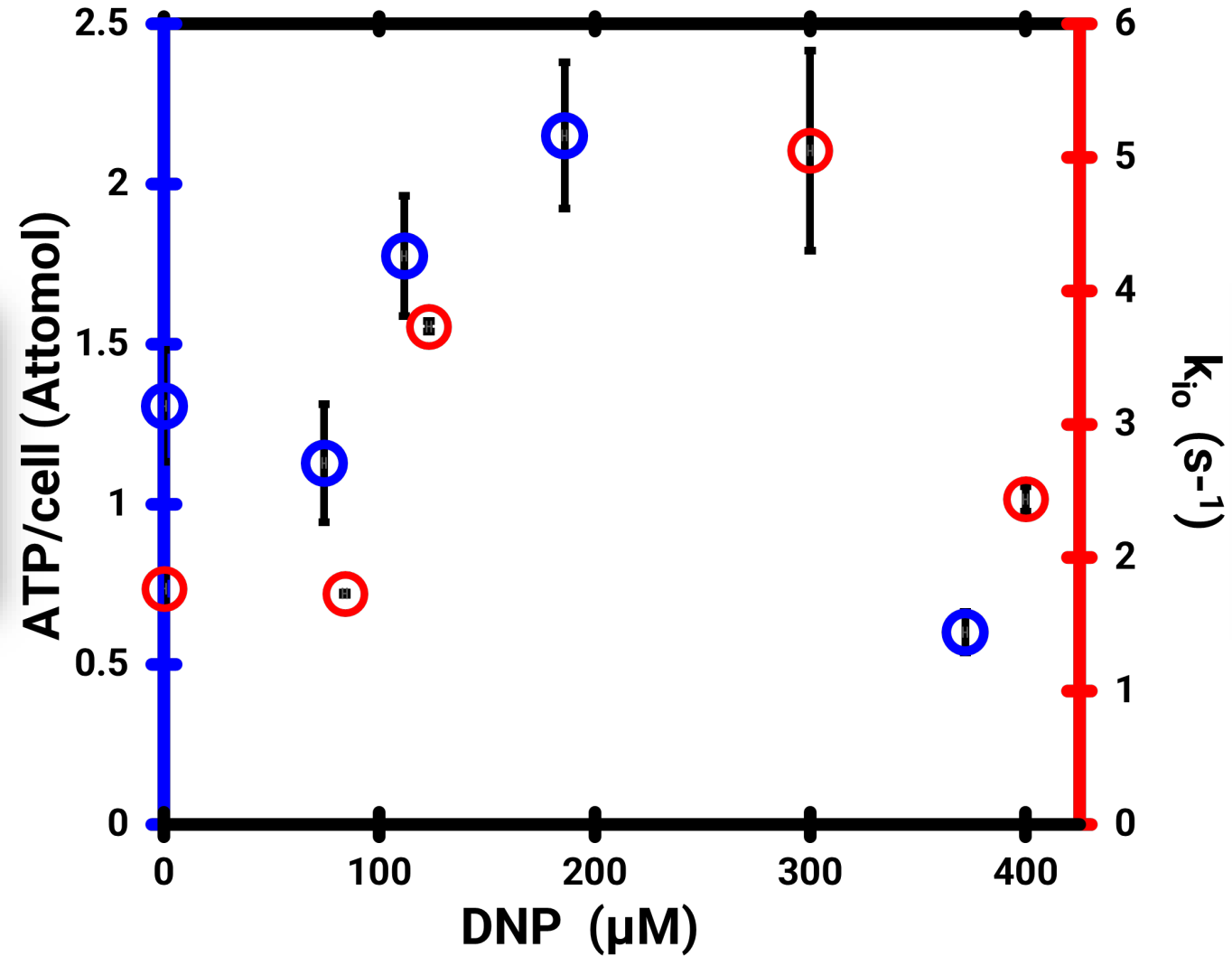
1.) Springer, C. S. Using  $^1H_2O$  MR to Measure and Map Sodium Pump Activity in Vivo. Journal of Magnetic Resonance 2018, 291, 110–126.

2.) Zhang, Y.; Poirier-Quinot, M.; Springer, C. S.; Balschi, J. A. Active Trans-Plasma Membrane Water Cycling in Yeast Is Revealed by NMR. Biophys J 2011, 101 (11), 2833–2842

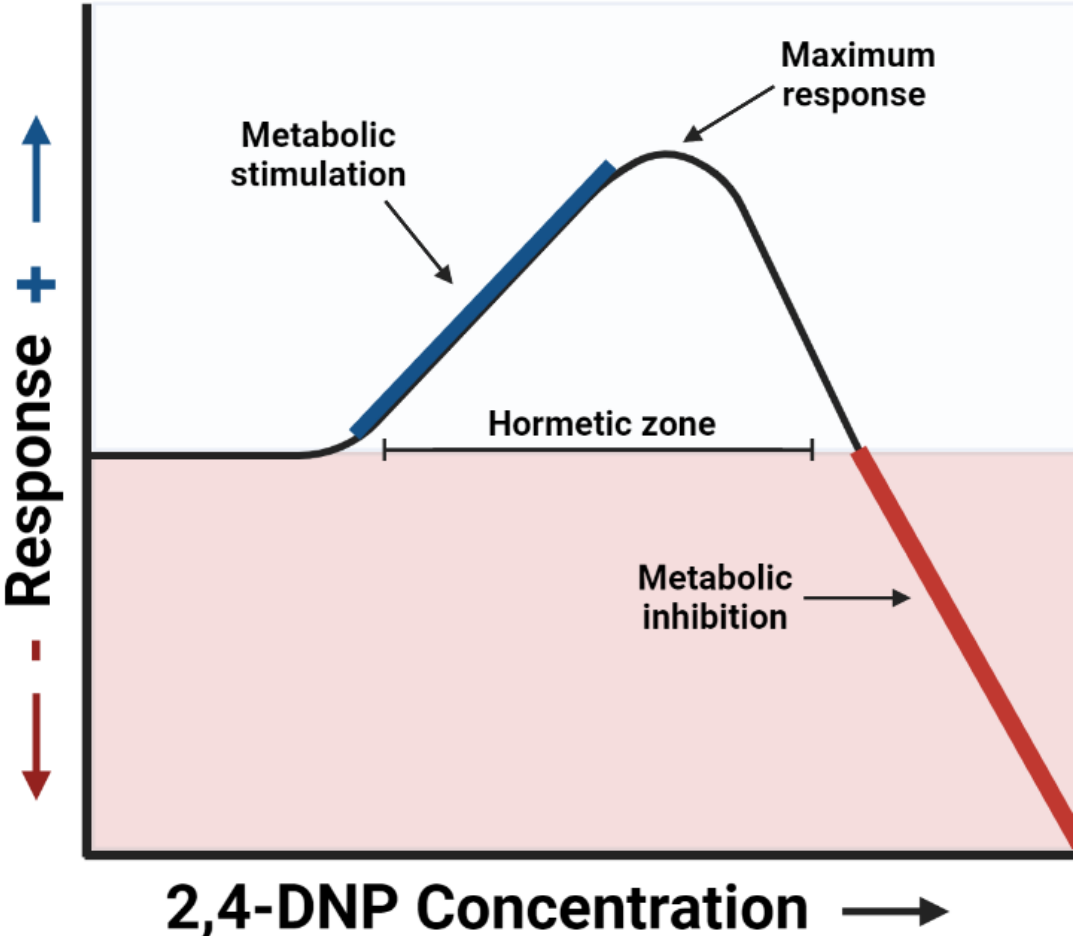
# Methods



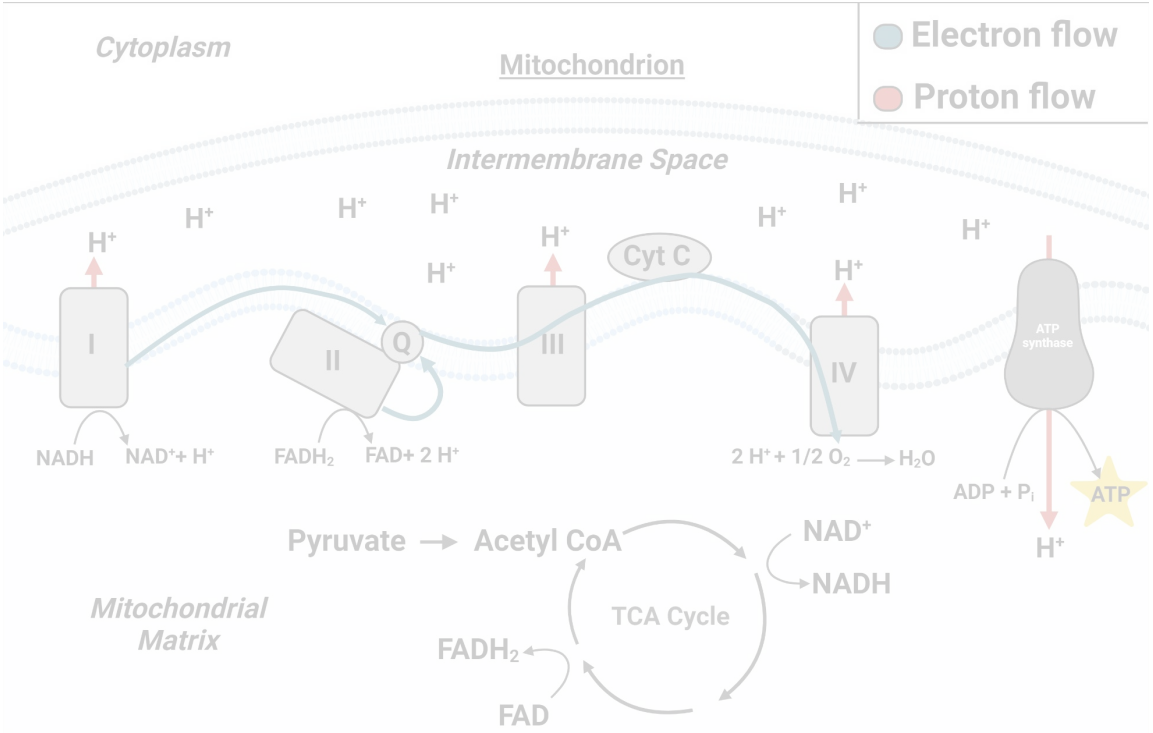
# Results



# Conclusion and Future Direction



## Other mitochondrial inhibitors





# Acknowledgements

## Committee Members:

Dr. Mark Woods (Chair)

Dr. Theresa McCormick

Dr. Anne Thompson

Dr. Robert Strongin

## Support:

El-Mansy Family  
Fellowship (Fall 2023)

## Figures made with:

BioRender.com

## Woods Group:

Charlene Kupara (G)

Abigail Donkor Winder (G)

Esperanza Rodriguez (UG)

Sergio (UG)

Jonathan Dutra (UG)

Lauren Rust, Ph.D.

Joe Armstrong, Ph.D.

Karley Maier, Ph.D.