COLLEGE OF SCIENCE
THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

Research and Creative Experience for Undergraduates Program (RCEU)
Summer 2020

Kidney Tissue Preparation for 1H-NMR Analysis and Colorimetric Activity Assay of Mitochondria

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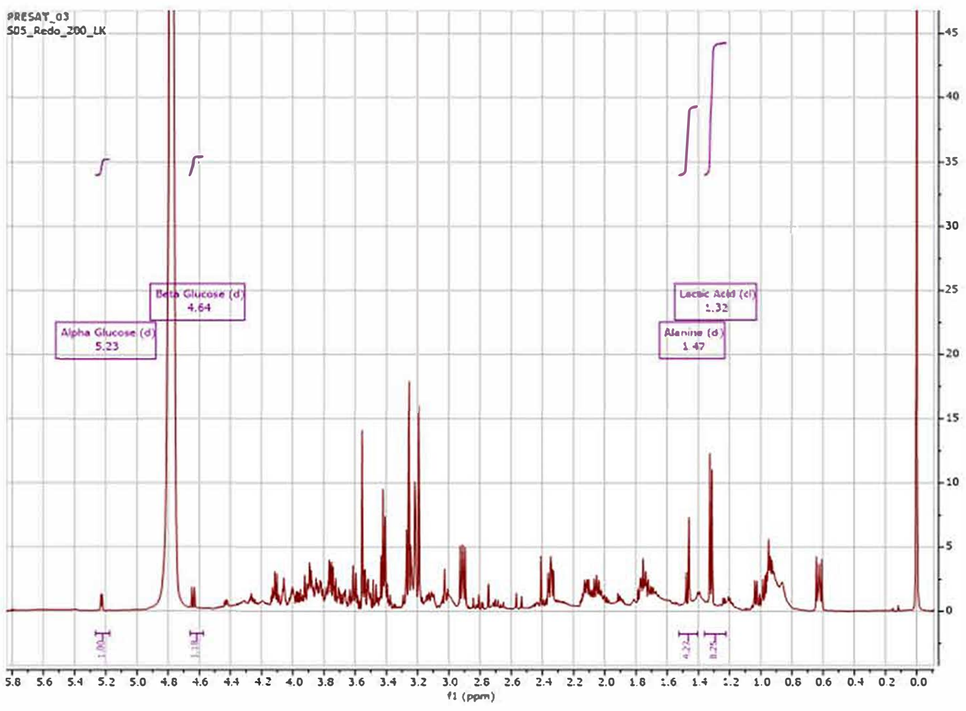
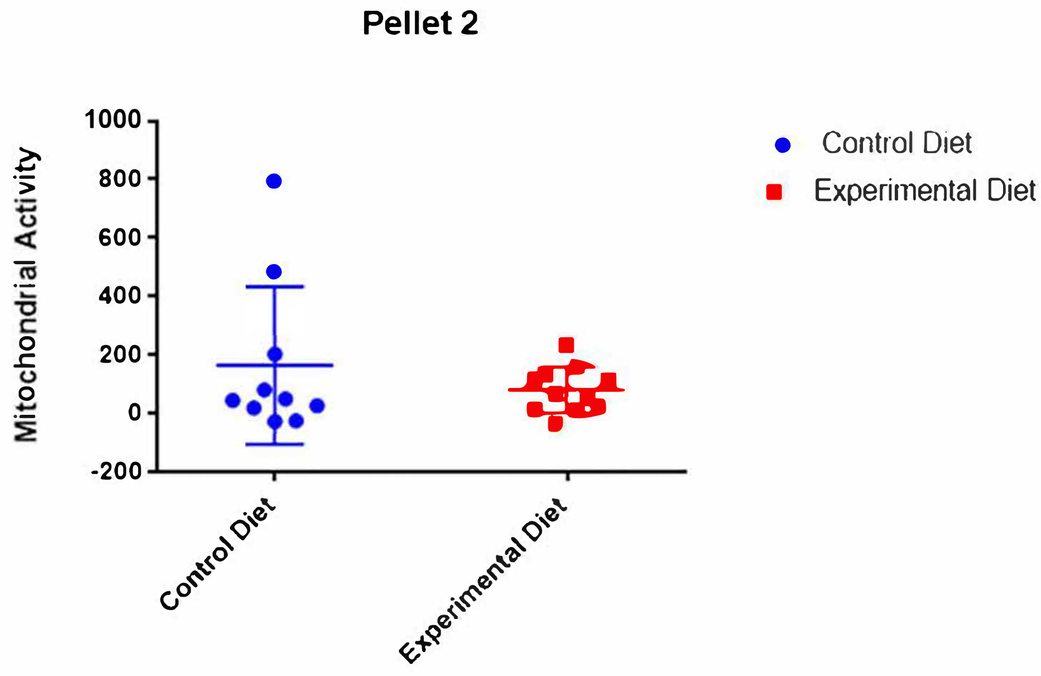
Purpose

The purpose of this study was to assess the activity of mitochondria and identify and quantify the metabolites present in the kidneys of LEW.1WR1 rats. This is important information because it helps us understand the way that diabetes can affect the mitochondrial function and whether the moderate sucrose diet could change the amount of metabolites found in the kidneys.

Introduction

Metabolomics is the analysis of metabolites in a biological specimen. In targeted metabolomics, the goal is quantifying a small number of expected metabolites. Nuclear magnetic resonance (NMR) spectroscopy is useful for metabolomics research because it can study different metabolite classes. NMR spectroscopy is unique because it is non-destructive and easily quantifiable.





Results

There were no significant differences in the metabolite quantities found in the kidneys from rats with the moderate sucrose diet and the rats on the control diet. However, there was a difference in the mitochondrial activity between the moderate sucrose diet and control diet. The difference was not statistically significant, but it did provide insight on how the sucrose diet affects the mitochondria.

Conclusions

In conclusion, the mitochondrial pellet activity in the experimental diet was lower than in the control diet. This could be because the higher sucrose uptake leads to a lowered glucose uptake, which produces less ATP and can't effectively power the mitochondria. This is important information to help us understand how diabetes affects the body at a cellular level and whether our diets can help control that.

References

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Acknowledgements

David Cook, Director of Undergraduate Research, and RCEU Staff, UAH Office of the Provost, UAH Office of the Vice President for Research and Economic Development, and the Alabama Space Grant Consortium for funding.
Dr. Sharifa Love-Rutledge for providing samples.