4-22-2020

Investigating metabolic reprogramming in neurodegenerative disease

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The Impact of FTD on Neuron Energy and Morphology

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Introduction

Frontotemporal dementia (FTD) is a rare neurodegenerative disease that is associated with atrophy of the frontal and temporal lobes of the brain.Like other neurodegenerative diseases, FTD is associated with metabolic reprogramming, meaning the way cells break down and build up molecules is altered. Glucose absorption levels in the brain of FTD patients decreases (Ishii et al., 1997). The goal of our research project is to use *Drosophila* as a model organism to investigate the decrease of glucose absorption in FTD cells. To measure changes in glucose absorption and other metabolic changes, we would use the Seahorse XFe96 metabolic analyzer.

Objective

Specific aims of our research will include: analyzing energy usage and change caused by FTD, observe changes in FTD brain morphology, use data collected to view changes in metabolic pathways at the gene expression level. The data obtained from these experiments can help understand how changes in metabolism can be used as a therapeutic target for FTD.

Methods

Dissection Procedure:

1. Place 1X PBST into the well of a 6 well plate
2. Anesthetize fly on CO_2 pad
3. Decapitate fly
4. Place head into well using tweezers
5. Carefully and quickly remove cuticle to expose the adult brain
6. Repeat to obtain 14 brains total
7. Dissections must be completed within 30 minutes to ensure tissue is still alive

Metabolic Analyzer Procedure:

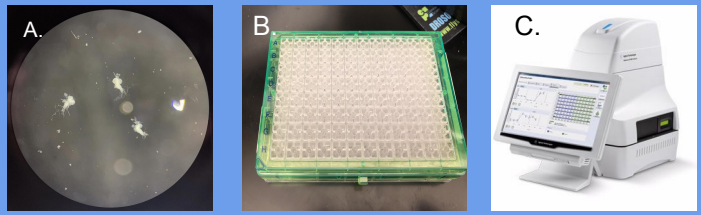
1. Allow metabolic analyzer media to reach room temperature and calibrate cartridge
2. Prepare wells of cartridge
3. Place one brain into each well
4. Place screen into each well containing a brain and place a screen into empty well to create a control
5. Finish well preparation
6. Run metabolic analyzer

Validate Data:

1. Follow normalization protocol
2. Adjust data to reflect normalization

Results

Our lab group has conducted brain dissections and metabolic analysis experiments.. However, due to COVID-19, we are presently unable to conduct any further experiments or analyze the data. We hope to continue this project in the future.



A. Dissected Drosophila brains under a light microscope. B. Cartridge for metabolic experiments. C. Seahorse XFe96 metabolic analyzer.

Acknowledgements

We would like to thank Dr. Tipping for her tireless guidance. We would also like to thank the Center for Engaged Learning at Providence College for the opportunity to complete this project.