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Drosophila Models of Neurodegenerative Diseases

Ella Clifford '20, Jackson Diltz '22, and Em Teixeira '22

Faculty Mentor: Dr. Marla Tipping, Biology

Introduction:

Many neurodegenerative diseases have no cure and available treatments only delay the inevitable. Further, the progressive neuronal death that characterizes these disorders results in functional impairments, disturbance of everyday life, physical and emotional pain, and financial hardship.

Our research aims to identify structural differences between the brains of fruit flies modeling neurodegenerative disorders and the brains of wild types flies. We hope to contribute to the growing body of knowledge concerning neurodegenerative diseases so that new methods of intervention may be developed and the pathology of these conditions may be better understood.


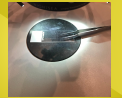
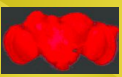
Objective:

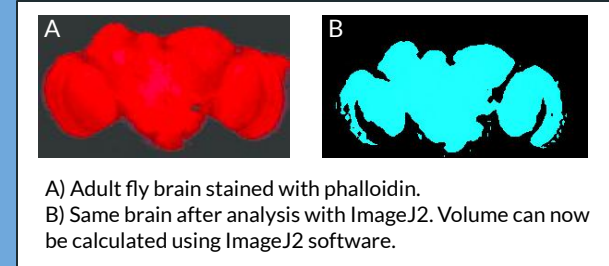
Determine if there are structural differences in the brains of flies that carry mutations for neurodegenerative disorders (such as Frontotemporal Dementia (FTD) and Alzheimer's Disease (AD)) compared to wild type flies.

Methods:

- Conduct adult fly brain dissections
- Stain fly brains with phalloidin, an actin marker
- Image fly brains using confocal microscope
- Analyze brain morphology (cell number, cell size, and brain volume)

3-Day Procedure:

| | | |
|---|--|--|
| 1 |  | <ul style="list-style-type: none">- Dissect brains in 1x PBST- Fix brains in 4% formaldehyde- Wash with 1x PBST- Permeabilize with 0.3% Triton in 1x PBS- Wash with 1x PBS- Incubate in phalloidin solution |
| 2 |  | <ul style="list-style-type: none">- Wash with 1x PBST- Wash with 1x PBS- Mount brains on glass slide |
| 3 |  | <ul style="list-style-type: none">- Image slides on confocal- Analyze confocal images using ImageJ2 |



Results/Conclusion:

Our lab group has conducted adult fly brain dissections and successfully stained brains with the phalloidin marker. However, due to COVID-19, our lab group has not been able to analyze the cell morphology of our samples.

The lab group hopes to analyze the samples as soon as campus reopens and will have data to share at a date in the future.

Acknowledgements:

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