

05 Examining Parkinson's Disease in Drosophila Model

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Need:

• User and Problem

- Parkinson's Diseases is the second most common neurodegenerative brain disorder.
- Its multifactorial etiology makes it difficult to develop targeted therapies

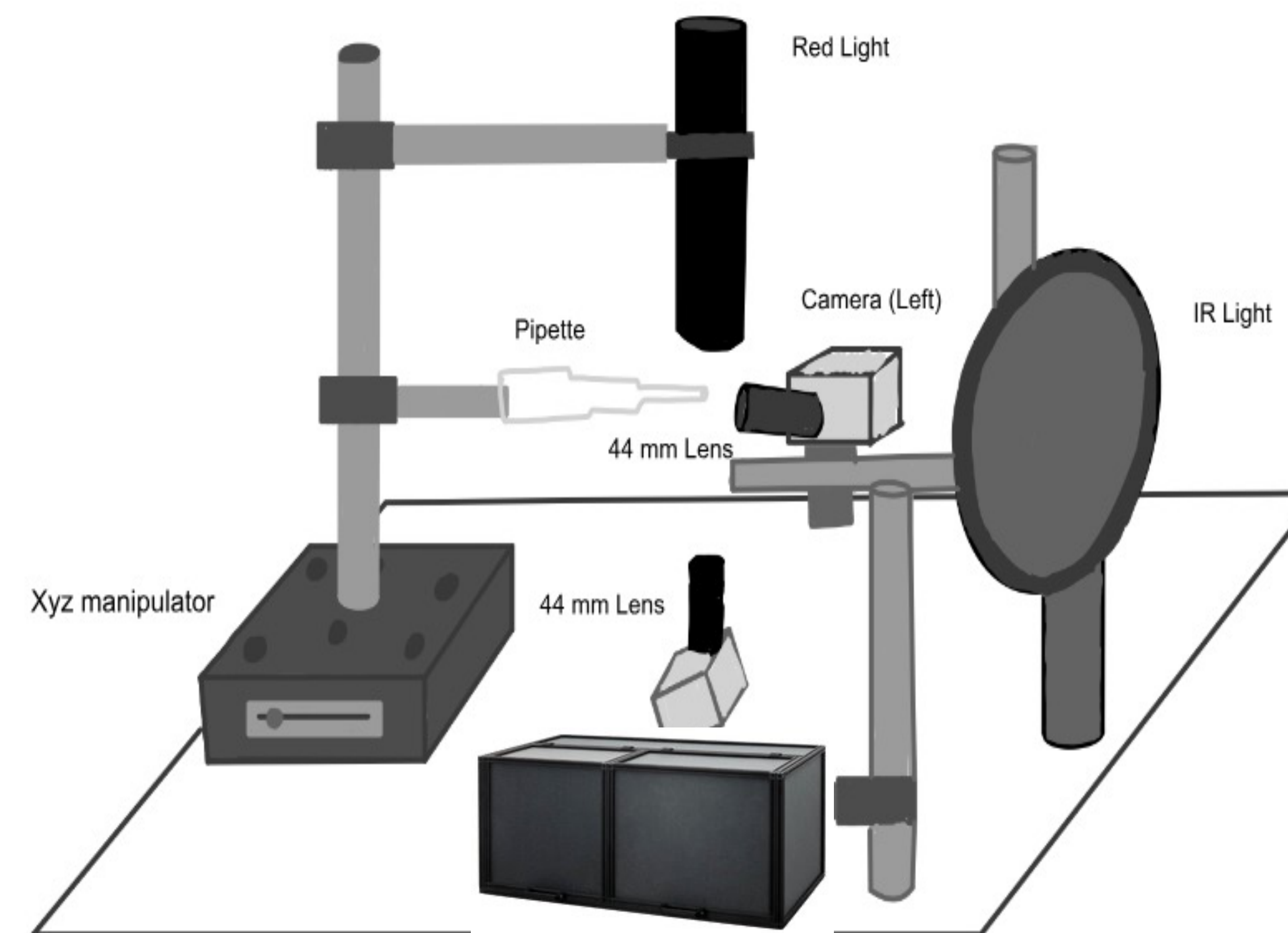
• Limitations in Existing Solutions

- Maintenance, Cost, Ethical considerations, and genetic correlation in animal models

• Objective

- Develop an experimental drosophila model to directly relate and observe changes in physiology to symptoms in Parkinson's Disease through genetic engineering of Drosophila

Assembly / Intended Use



Verification/Validation

• Test (1) - Frame Rate

- Ensure frame rate of 100 to capture the entirety of the PER
- Results (TBD)

• Test (2) - External Lighting

- Ensure PER is stimulated solely by LED stimulus
- Results (TBD)

• Test (3) - Success Rate

- Ensure that the algorithm can successfully track and measure PER
- Results (TBD)

Design Inputs

• Constraints

- Camera
- Gene Expression
- Light Sensitive Proteins

• Requirements

- Frame Rate - 100Hz
- Mitigate External Light PER Tracking - $\geq 80\%$ accuracy

Component Details

1. **Two Cameras** - Basler ace acA800-510 um

2. **Lenses** - InfiniStix 2.0X, 44mm WD, 600-700 nm Optical filters

3. **LED** - Emits red light (590 nm) required to stimulate PER

4. **Night Vision Infrared Illuminator** - source of Illumination without using light on visible spectrum

Conclusion

• Innovations

- Quantifying movement from PER derived from LRRK2 gene mutation

• Impact

- Improved understanding of LRRK2 contribution to PD
- Improved researcher ability to conduct experiments for PD Research

Acknowledgements

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References

- <https://www.ninds.nih.gov/current-research/focus-disorders/parkinsons-disease-research/parkinsons-disease-challenges-progress-and-promise#:~:text=Following%20Alzheimer's%20disease%2C%20Parkinson's%20disease,before%20the%20age%20of%2050.>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2535836/>



Component 1



Component 2



Component 3



Component 4