Investigation of reactive oxidative stress using a uniaxial stretch model to simulate physiological micromotion induced cyclic strain on brain.

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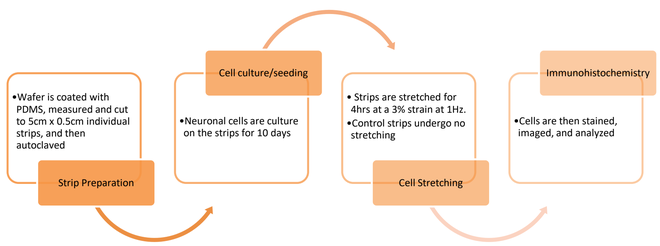
Research Hypothesis

We hypothesize that cyclic mechanical stretching for approximately 4 hours simulating physiological micromotion induced stresses on the brain will induce ROS/RNS in cultured neuronal networks.

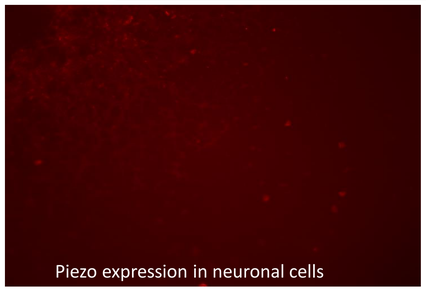
Specific Aims

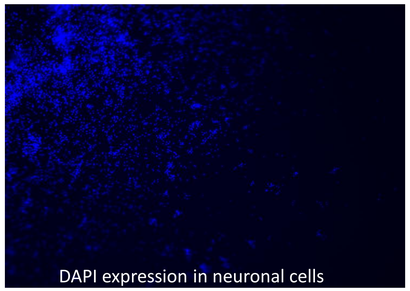
- To assess how long it takes to cause reactive oxidative stress in neuronal cultures (DIV 10-14) by simulated physiological strains (3 Hz) up to 3% strain using a programmable cell stretching device.
- To assess whether soft interfaces mitigate the cell dysfunction biomarkers, in addition to Piezo 1.

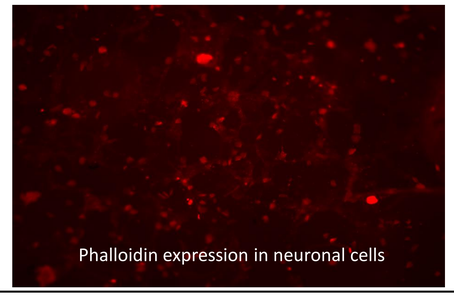
Methodology



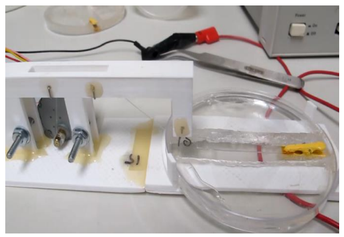
Progress Thus Far

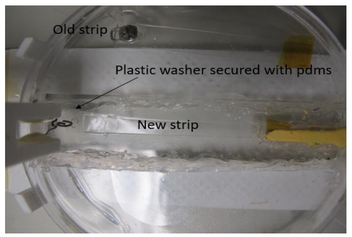

Piezo expression in neuronal cells


DAPI expression in neuronal cells


Phalloidin expression in neuronal cells

Device Set-up





Future Work

- Performing immunohistochemical analysis using a combination of antibodies and fluorescent dyes on 4- hour stretched strips and control strips
- Data analysis

Acknowledgement

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References

Scan for References

MORE
Masters Opportunity for Research in Engineering

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