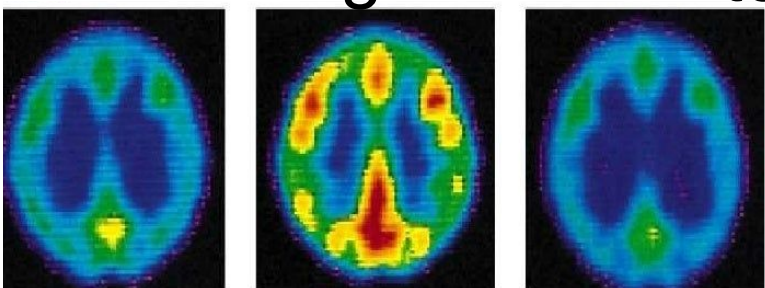


Motivation & Impact

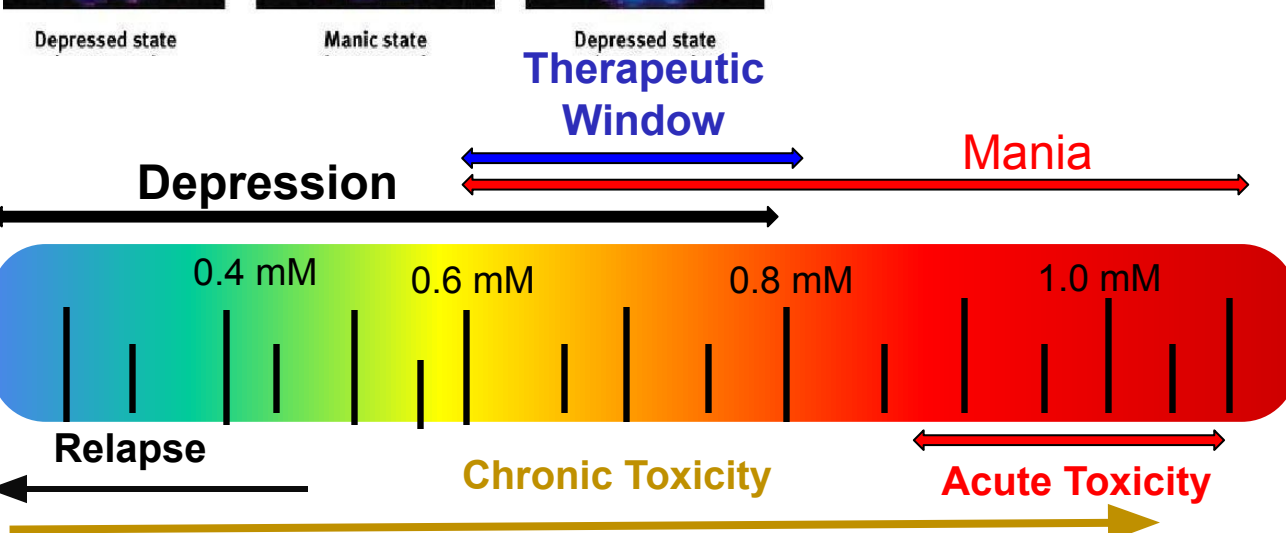
Bipolar disease:³

A brain disorder characterized by mood changes and impaired functioning.



Treatment:

Lithium therapy is commonly used, but requires careful monitoring due to toxicity.



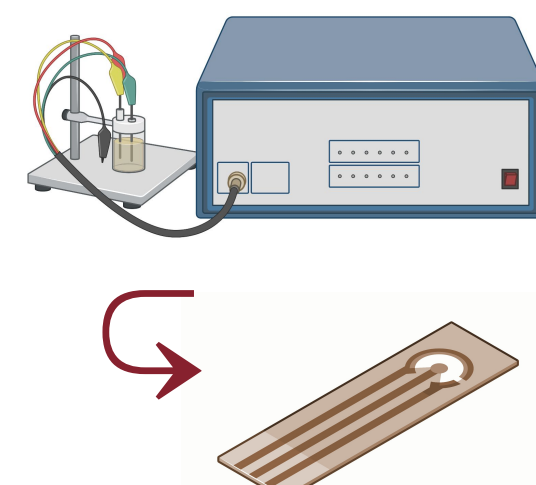
Motivation & Impact

Doctor testing (Blood)

- ✗ Long waiting time
- ✗ Inconvenient doctor visits
- ✗ Uncomfortable
- ✗ Expensive

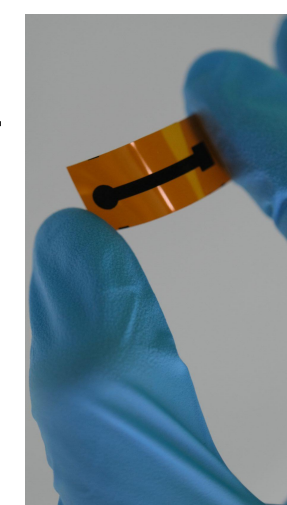
At Home Testing (Saliva)¹

- ✓ Non-invasive
- ✓ Requires less processing
- ✓ Portable
- ✓ Affordable



Li-Selective Membrane

- **Polymer:** PVC
- **Plasticizer:** o-NPOE
- **Ionic Site:** Potassium tetrakis(4-chlorophenyl)borate
- **Ionophore:** Li-Ionophore VI



Conclusion and Future Work

The lithium electrodes were successful as it can detect toxic levels of Lithium. In the future these electrodes will provide patients fast accurate detection of lithium in their systems.



SHINE Impact

SHINE connected me with PhD students, enriching my biomedical education. Despite challenges, it boosted resources and confidence.

Methods & Results

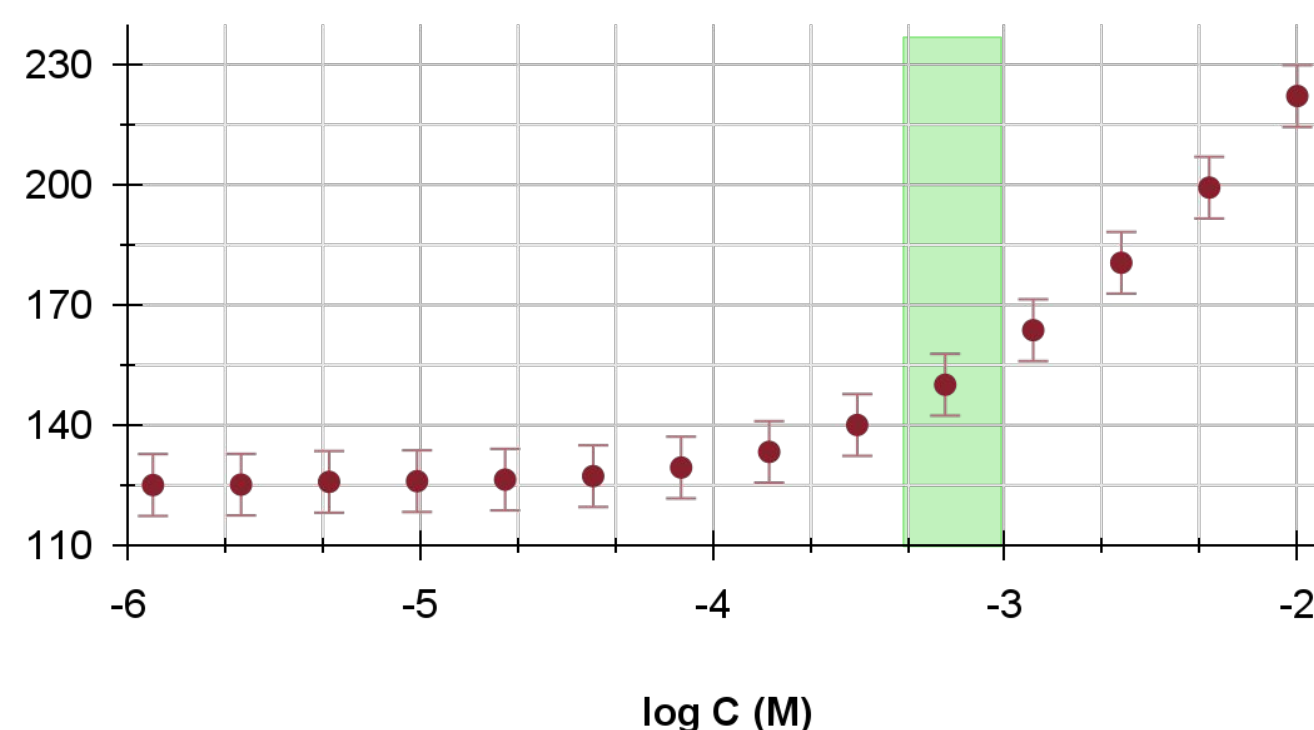
Nernst Equation $E = E_0 + \left(\frac{RT}{nF}\right) \log C$

Electrochemical method used to detect different ions (lithium, in this case). Nernst equation predicts potentials with activities in equilibrium proportion.

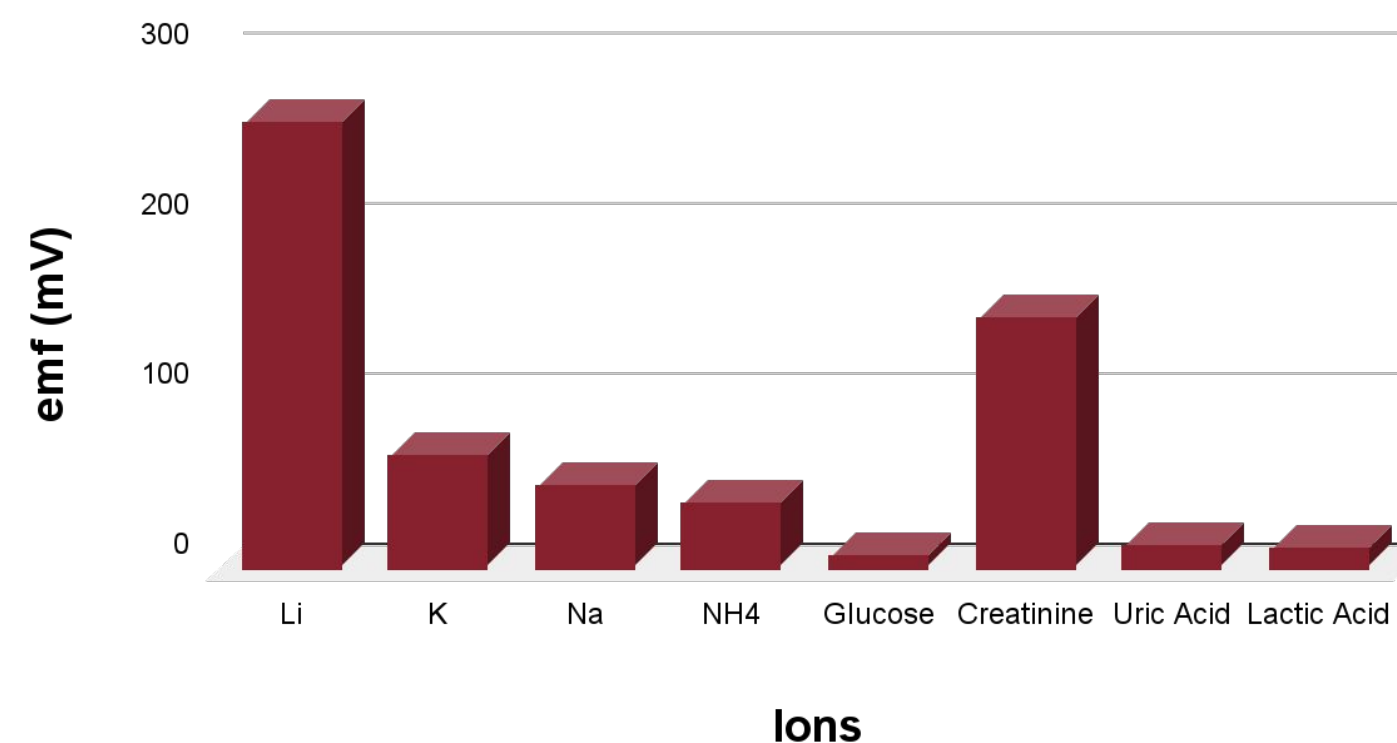
The fabricated sensors were calibrated in artificial saliva to validate sensors performance are selectivity toward lithium.

Limit of Detection:
0.299 mM

Calibration in Saliva



Selectivity Assessment



Acknowledgements

Thank you, Steven Dorfman for the opportunity to be part of SHINE. As well as Dr. Maral Mousavi, and my mentors Victor Ong, Ali Soleimani, and Farbod Amirghasemi.

References

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- Bipolar Disorder Made by Viveka m. <https://www.slideshare.net/vivisvj13/bipolar-disorder-made-by-viveka-m>. Accessed 20 July 2023.(2)
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