Rapid Hemorrhagic and Ischemic Stroke Evaluator (RHISE)

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INTRODUCTION:

- Stroke: 5th leading cause of death and leading cause of long-term disability
- Current diagnosis to distinguish between hemorrhagic and ischemic stroke with CT and MRI takes up to 6 hours

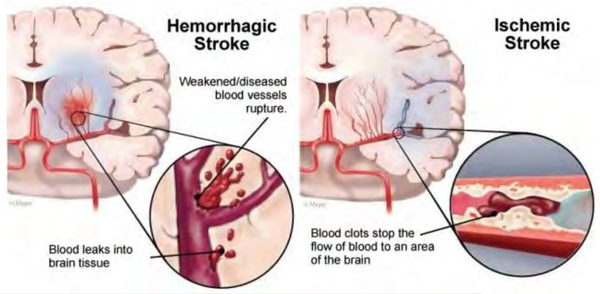


Figure 1: Two types of strokes [1]

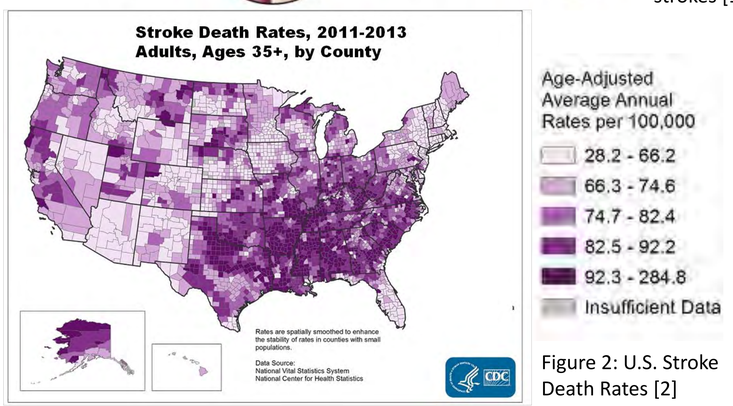


Figure 2: U.S. Stroke Death Rates [2]

PROJECT GOAL

- Design, build, and test first prototype of RHISE to detect distinguishing proteins present in early stages of stroke
- Project completion date: May 10th, 2017

SOLUTION CONCEPT:

- ELISA immunoassay tests for: **GFAP and NMDA NR2A**
- GFAP: hemorrhagic stroke biomarker
- NMDA NR2A: ischemic stroke biomarker

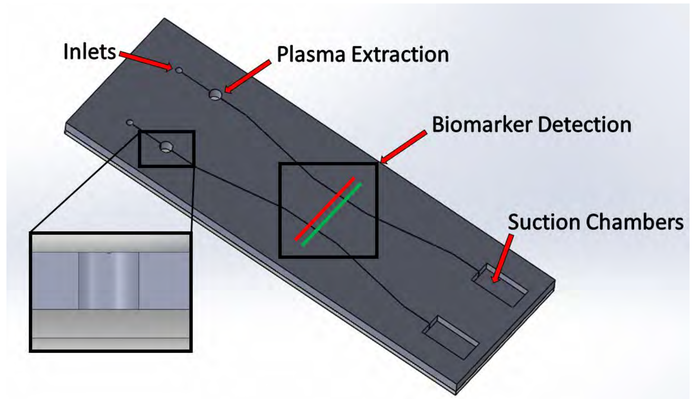


Figure 3: Schematic of Design

CURRENT STATUS:

Design: Four designs of microprinting mask

Fabrication: 1st chip prototypes of RHISE

Testing: GFAP binding to respective antibody

Testing: NMDA NR2A binding to respective antibody

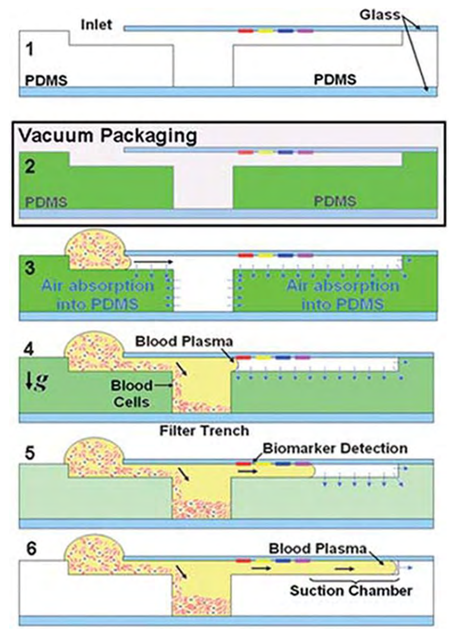
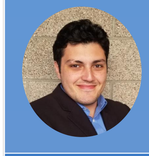


Figure 4: Functionality of RHISE [3]

RHISE Critical Components	Prototype Values
Suction chamber volume	5 µL
Flow rate	< 50 µL / hour
Degassing time	15 minutes
Idling time	2 minutes

SENSENIUM MEDICAL TEAM:



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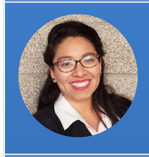

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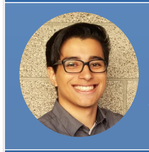

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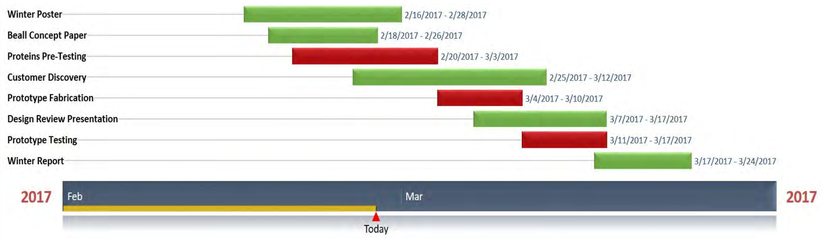
PROJECT TIMELINE



REFERENCES

[1] Property of Heart and Stroke Foundation of Canada
[2] Property of Center for Disease Control and Prevention
[3] Stand-alone self-powered integrated microfluidic blood analysis system (SIMBAS), Dimov K, et al. *The Royal Society of Chemistry,* vol. 11, 845-850, 2011

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