

# UH System Board of Regents Meeting

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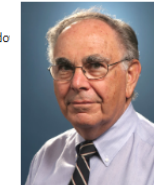
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21 Faculty, ~60 PhD students, ~300 undergraduate students

Neural and Rehabilitation Engineering, Biomedical Imaging, Genomics, Proteomics, and Bionano Engineering and Science, Biosensors

## Continuous biomarker monitor has a very successful market



Dexcom G7

Released since 2012 (13 years ago), glucose monitor remains the ONLY continuous biomarker monitor

## We are NOT short of biomarkers to monitor

### Cardiovascular– heart attack

Troponin, NTproBNP, C-reactive protein

### Metabolism - diabetes

Insulin, Hemoglobin A1C, Cortisol

### Cognitive Function – Alzheimer’s and dementia

Betaamyloid & Tau proteins, Neurofilament Light Chain (NfL), Homocysteine

### Anti-Aging

Testosterone & Estrogen, DHEA, Vitamin D

### Cancer

Circulating Tumor DNA (ctDNA), Prostate Specific Antigen (PSA), CA125

## Then why not other biomarkers? No sensing technology

Glucose monitor rely on **enzyme** as detection molecule

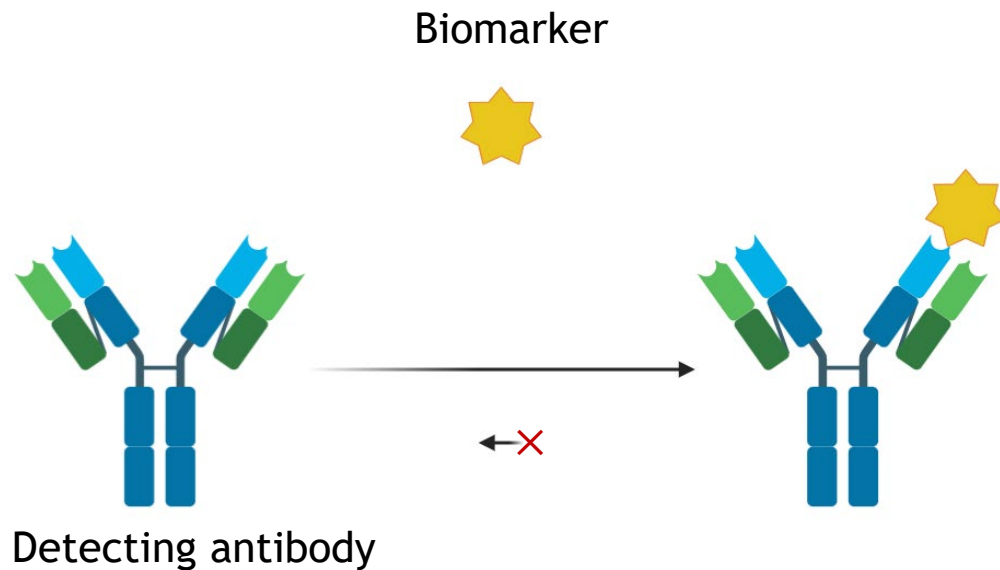


Works for only **0.4%** of biomarkers

**80%** of biomarkers are detected using **antibodies** in clinic



Do **not allow** continuous monitoring



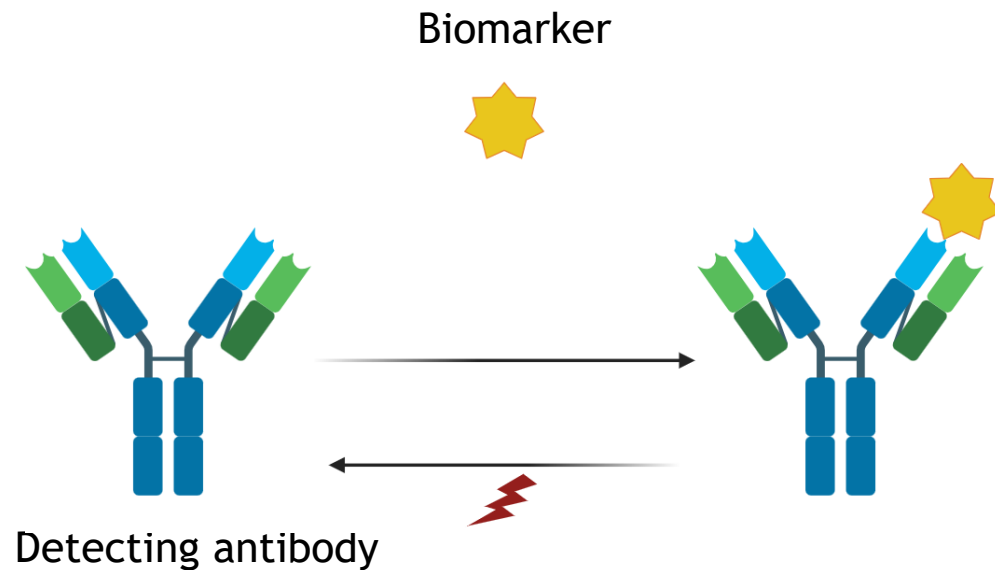
- **“Can we use antibodies for continuous monitoring?”**
- **“No.”**

**Major difference between us and others...**

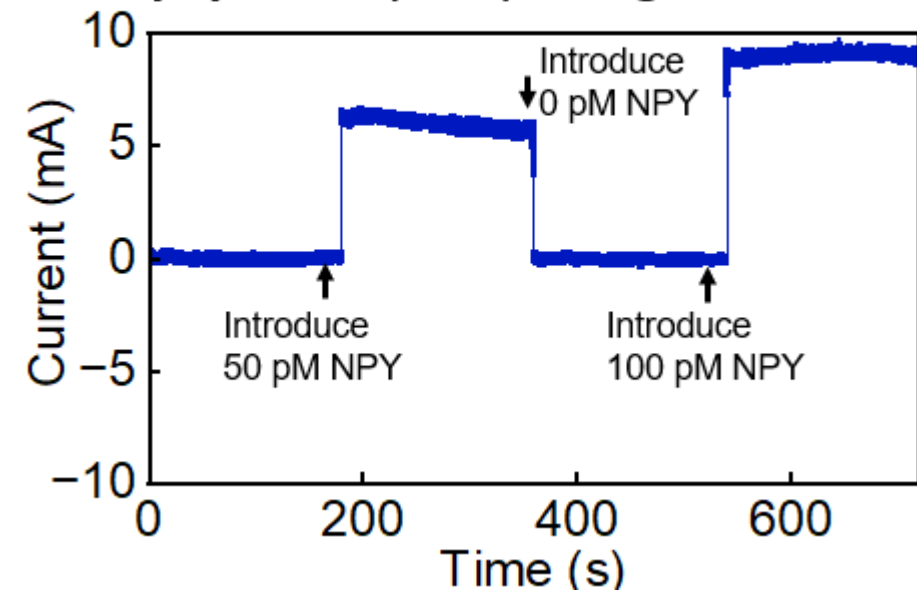
**We Can!**

**use antibodies for continuous monitoring**

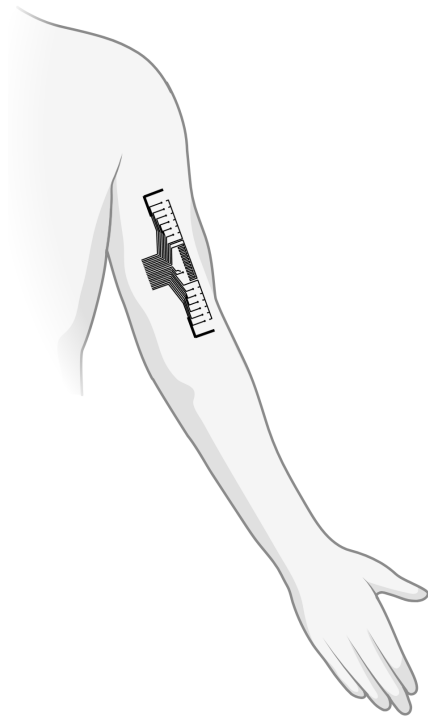
## We have enabled antibody-based continuous monitoring using electric pulses



### Continuous monitoring of neuropeptide Y (NPY) using antibodies



**Future goal is to develop continuous monitoring patch for multiple analytes**

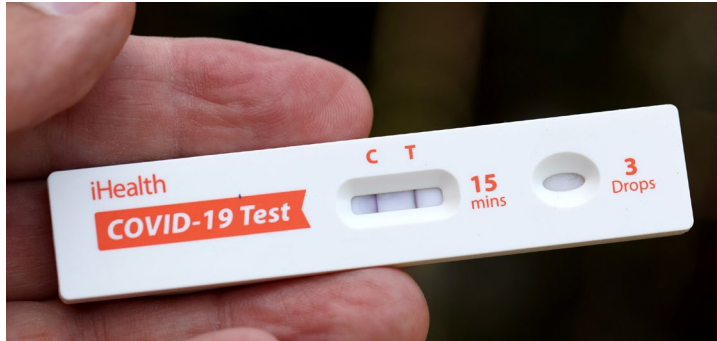


Dr. Chandra Mohan



## Research Thrust 2: Multiplex disease diagnosis

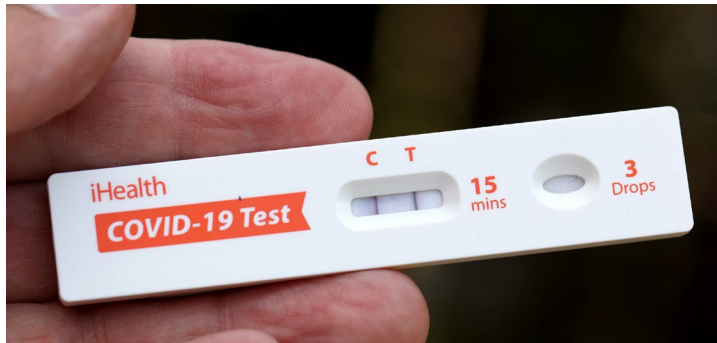
### COVID-19 Test (Test for 1 disease)



Disease 1

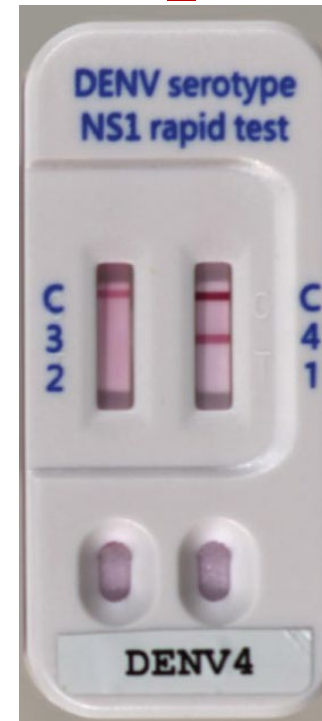
## When we want to test for 3 diseases...

COVID-19 Test (Test for 1 disease)



Disease 1

Test for 2 diseases

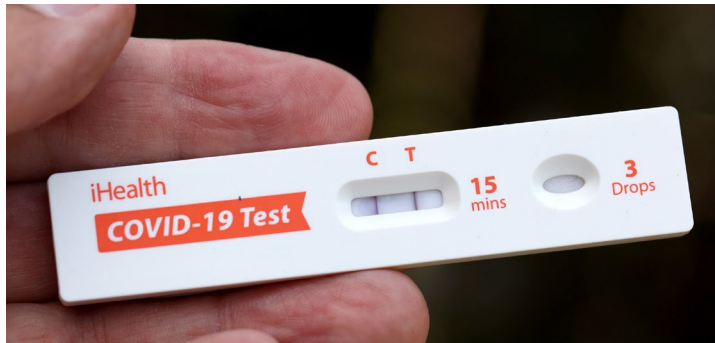


Disease 1

Disease 2

## When we want to test for 3 diseases...

COVID-19 Test (Test for 1 disease)



Disease 1

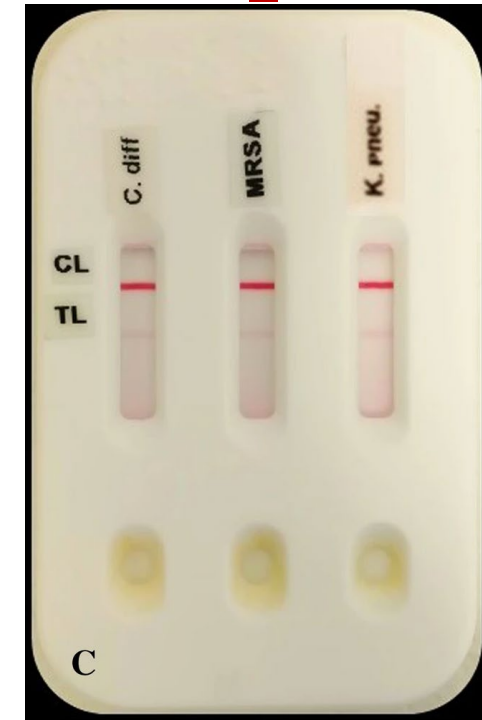
Test for 2 diseases



Disease 1

Disease 2

Test for 3 diseases

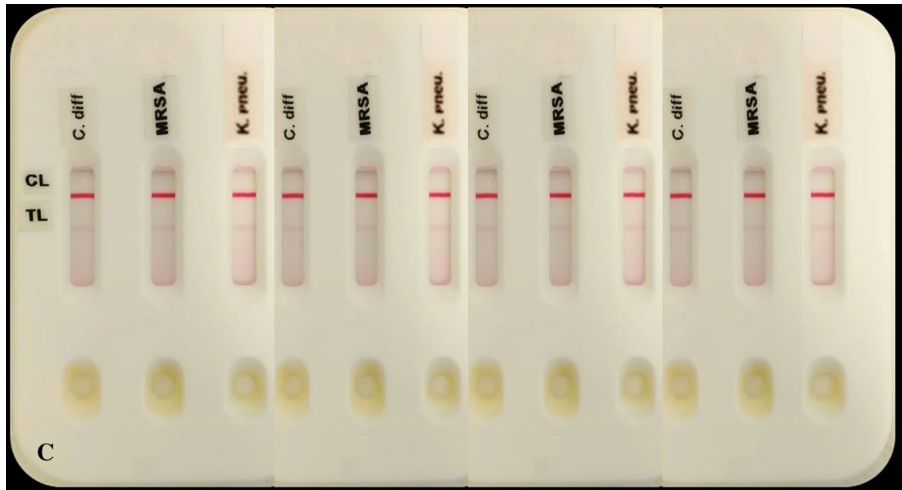
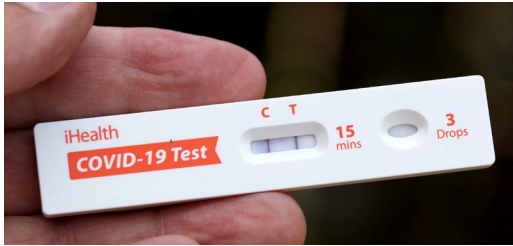


Disease 1

Disease 2

Disease 3

When we want to test for 9 diseases...?



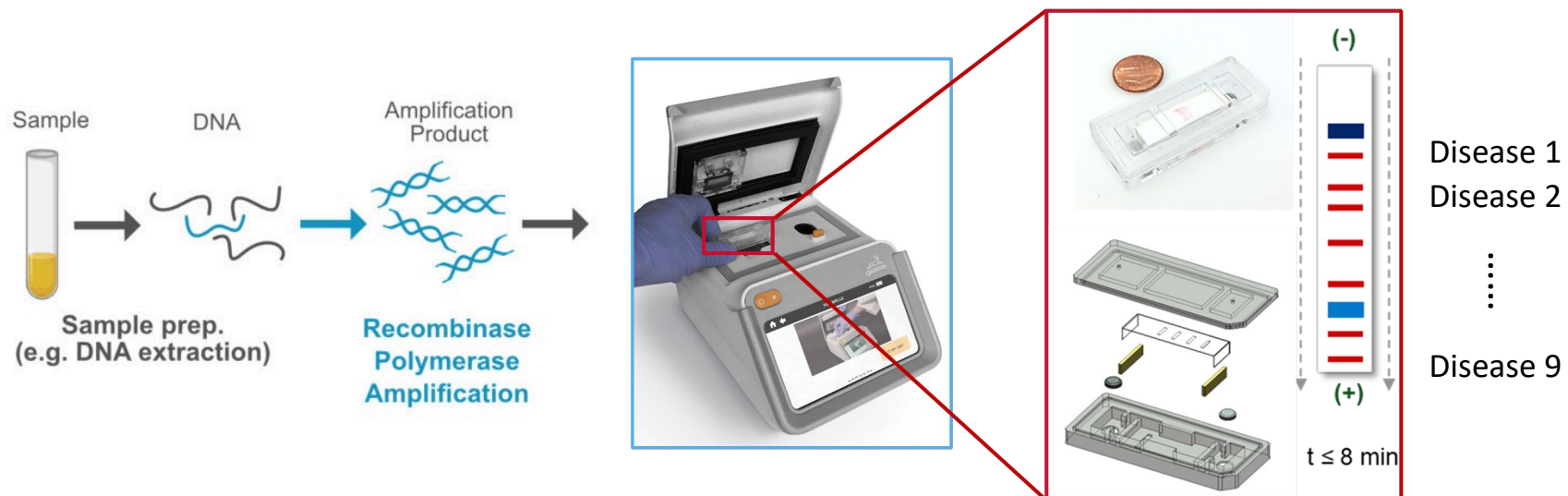
Disease 1 Disease 2

.....

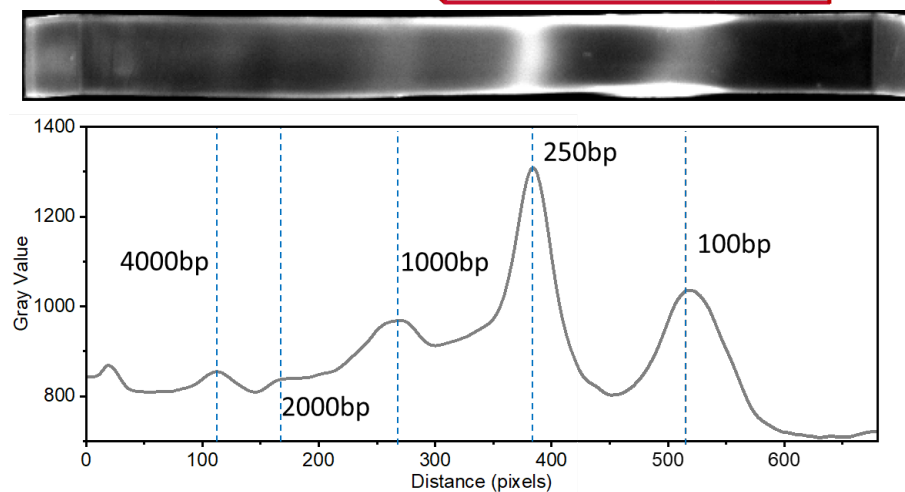
Disease 9



## Our solution: Multiplexed diagnostics on a single strip



Dr. Richard Willson





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