A Quantitative Platform for the Clinical Assessment of Biomarker Concentration

**Clinical Need**

15% of diabetic patients will contract foot ulcers \(^1\)

- \(\rightarrow\) 15-27% will require lower limb amputation
- \(\rightarrow\) Associated treatment costs upwards of \$50K

**Proliferation of Diabetes in U.S.**

\[ \text{Per CDC} \]

**Treatment Options:**

- Dressings
- Compression stockings
- Topical Antibacterial Creams
- Hydrogel Treatments

**Solution**

- **Affinity based GNP binding**
- **2\(^o\) anti-CCL19 polyclonal antibodies** have affinity for multiple epitopes, permitting "sandwich" binding
- **1\(^o\) anti-CCL19 monoclonal antibodies** have strong affinity for one specific epitope on biomarker

**Device Housing**

1. Application port for consistent testing
2. Visualization window to measure binding distance
3. Wick port to press against test strip

**Approach**

- Confirm flow time within clinical restraints (<30 min)
- Establish primary biomolecule binding to nitrocellulose (NC)
- Bind visual labeling conjugate to secondary biomolecule
- Create housing for NC strip to meet size requirements
- Establish model correlating distance flowed on NC dependent on analyte conc.

**Results & Impact**

- **HABA - Avadin: Concentration to Distance**
- \(R^2 = 0.8525\)

- **Supported concentration-distance aspect of design**
- Developed significant portions of the intended design
- Project requires more optimization time/material costs