

KreaSensor

Agten H., Al-Ghezi O., Bollen O., Breukers J., De Rop F., Katsafadou M., Lepoudre J., Lyu N., Piron P., Saesen R., Sels S., Soenen R., Staljanssens E., Taraporewalla J., Dal Dosso F., Decrop D., Pérez Ruiz E., Daems D., Spasic D., Lammertyn J.

Why measure creatinine concentration?

Creatinine concentration in plasma is an indicator for renal health



Early detection of kidney malfunction prevents or delays the need for dialysis or kidney transplantation

*Dialysis costs € 90,000 per year per patient
In the EU 50,000 patients on the kidney waiting lists*



Chronic kidney disease patients can check if their symptoms are caused by decreased renal function

Common symptoms are fatigue, feeling cold, nausea, dizziness and skin rash



Some drugs are only recommended below a certain creatinine level

Thiazide diuretics should not be used when creatinine level is > 2.5 mg/dL

What is our technology about?

SIMPLE device for colorimetric detection

Enzymatic bioassay

*Specific creatinine recognition
Assay for plasma and urine
Optimized for results in < 5 min*



Unique cartridge technology

*Adaptable to integrate other assays
Cost-effective building materials
Self-powered*



Portable colorimetric detector

*Affordable and robust platform
Built in-house*



How do we quantify creatinine?

Sample in, result out



1. Apply sample on cartridge

2. Activate cartridge and slide into measuring device



3. Colorimetric detection

Creatinine + enzymes = pink solution

no creatinine	low concentration creatinine
medium concentration creatinine	high concentration creatinine

4. Read the creatinine concentration on the display

*Time-to-result: < 5 min
Range: 0 - 20 mg/dL
LOD: 0.67 mg/dL*



How do we see the future?

Market



Partners



Portable creatinine sensor



Personalized monitoring tool



Multiple tests



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SensUs - KU Leuven Team



<http://kuleuven.sensus.org>

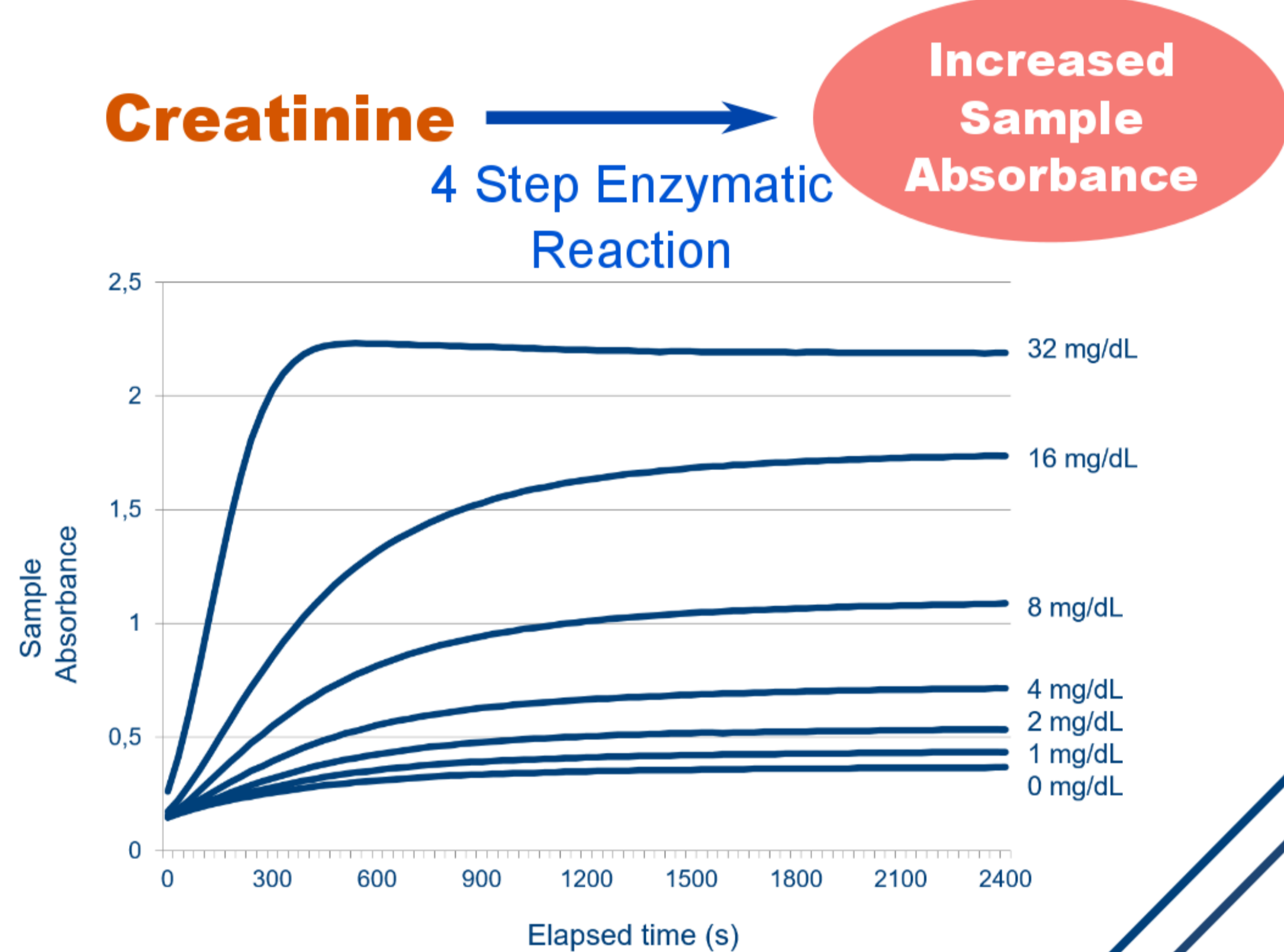
A SIMPLE device for colorimetric detection of physiological creatinine concentrations in plasma

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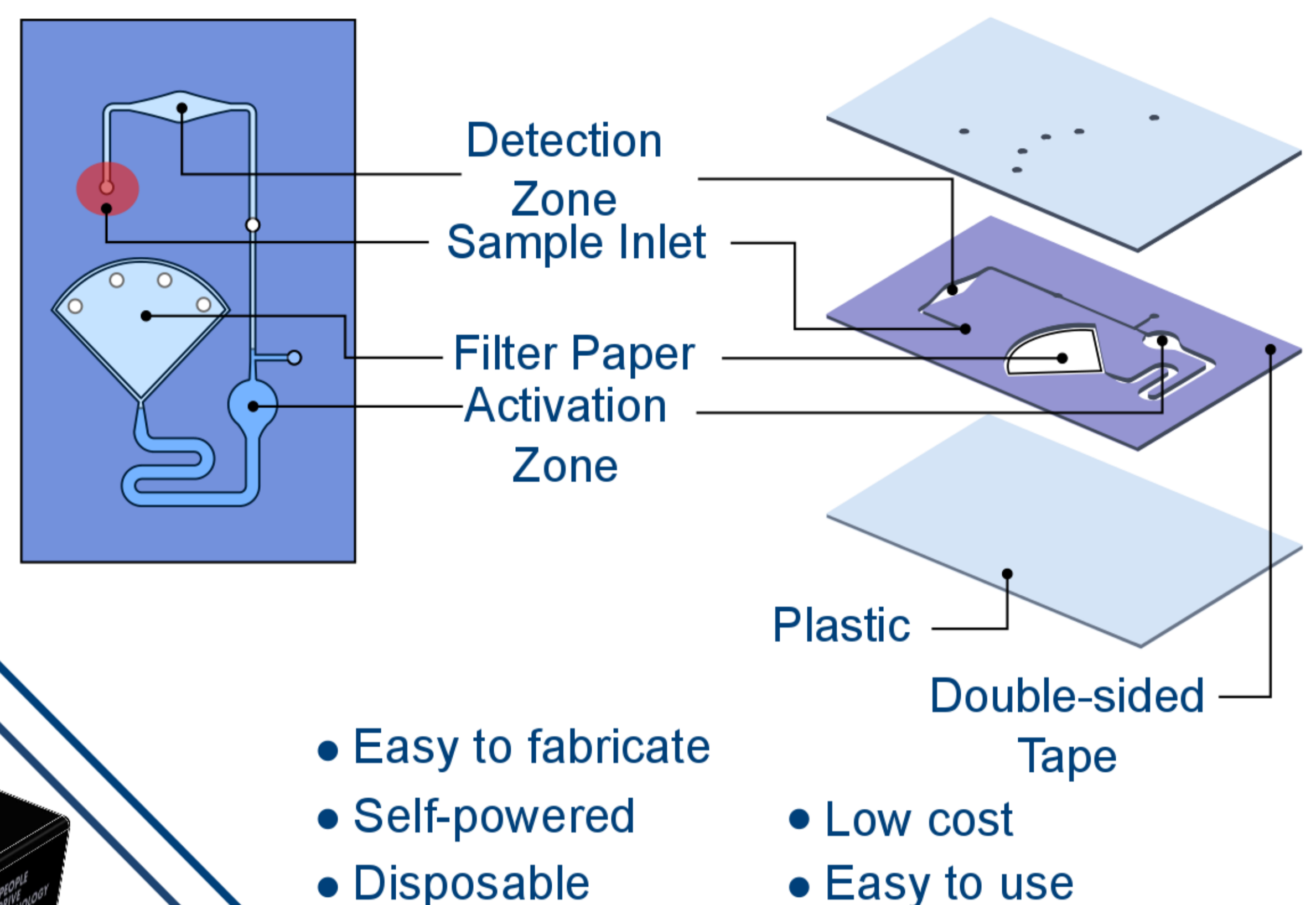
Introduction

- A common method for assessing renal function is measuring creatinine clearance as an estimation of kidneys' glomerular filtration rate
- Current laboratory methods for determining plasma creatinine are very tedious and labour-intensive
- The market lacks a device that is affordable, sensitive, specific, user friendly, robust, equipment free, and deliverable

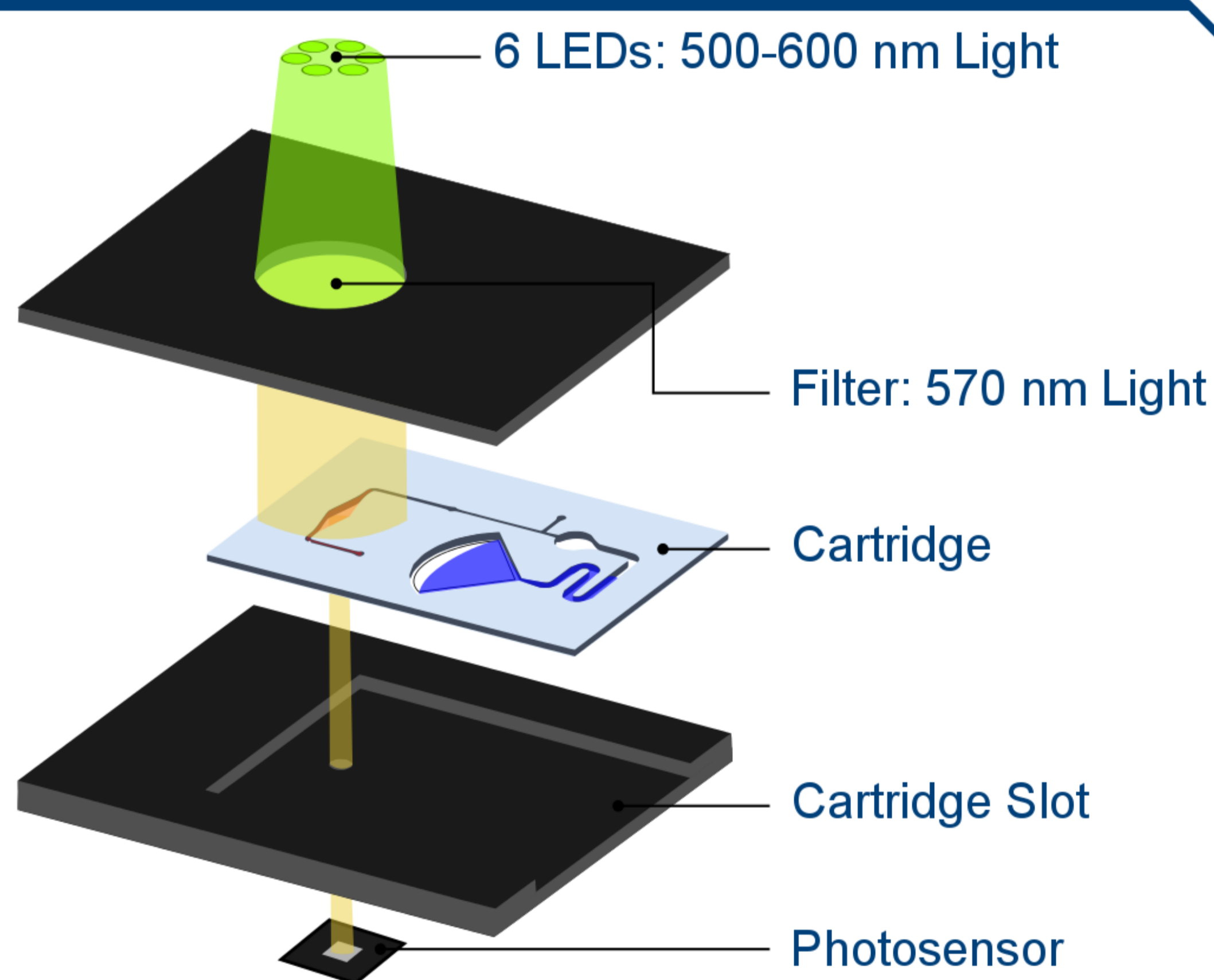
Enzymatic Assay



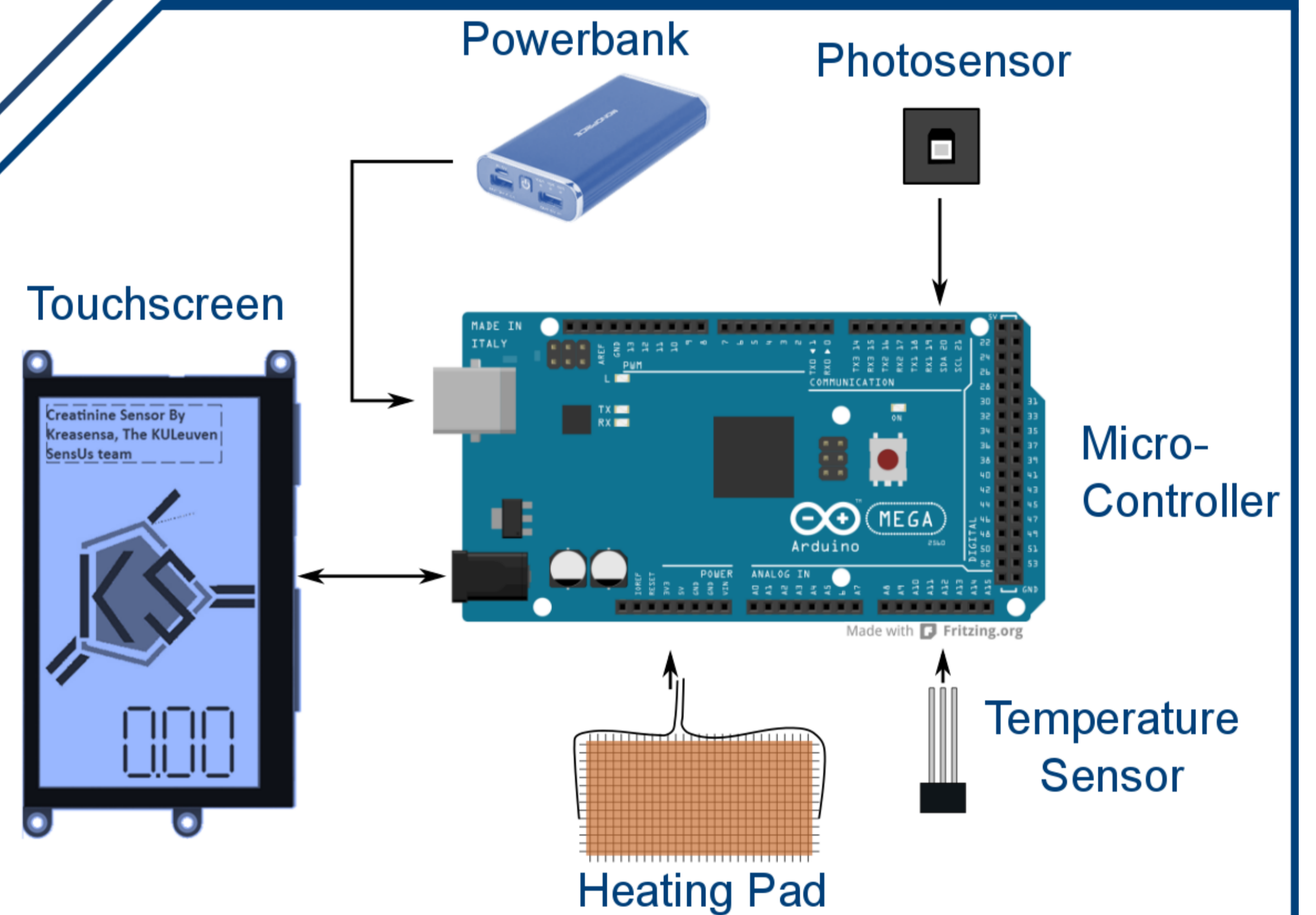
SIMPLE Pump



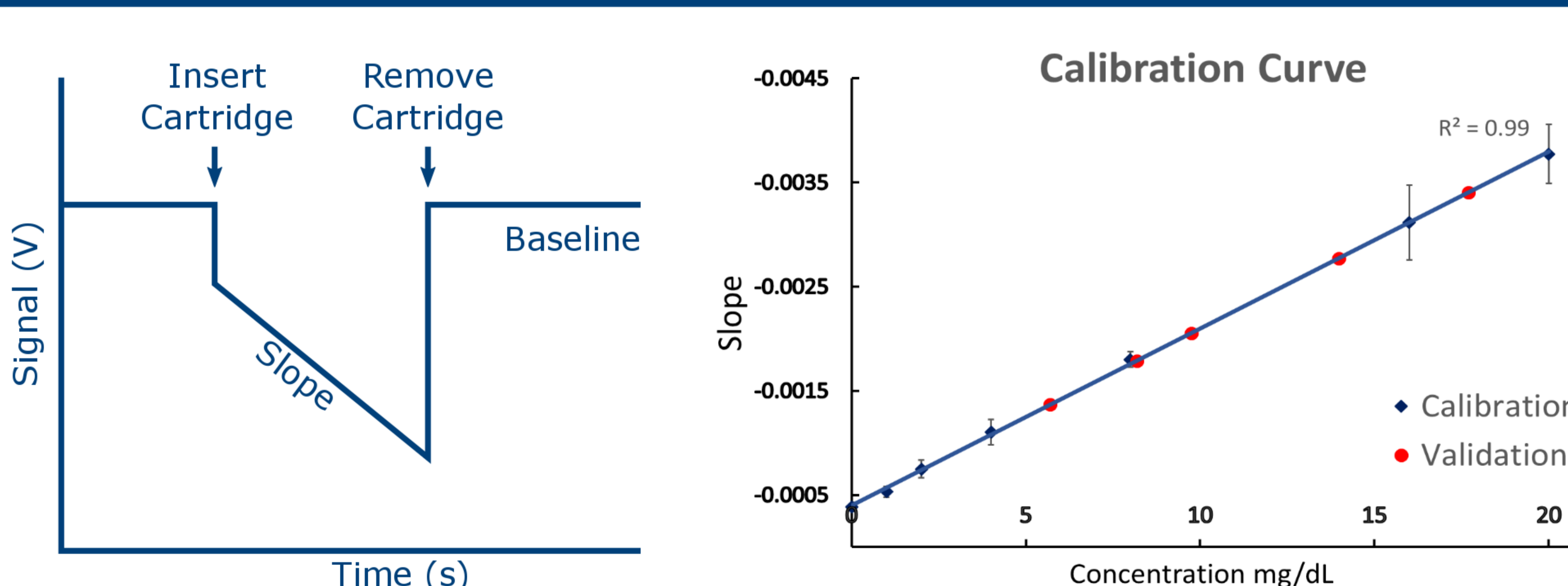
Readout Device



Signal Processing



Calibration and Validation



Conclusion

- Time to result = 150 seconds
- Slope-based calibration curve
- Steeper slope → higher creatinine concentrations
- Custom software calculates the result
- The final result is displayed on the touchscreen
- LOD: 0.67 mg/dL
- Range: 0 – 20 mg/dL