A NOVEL BIOSENSOR

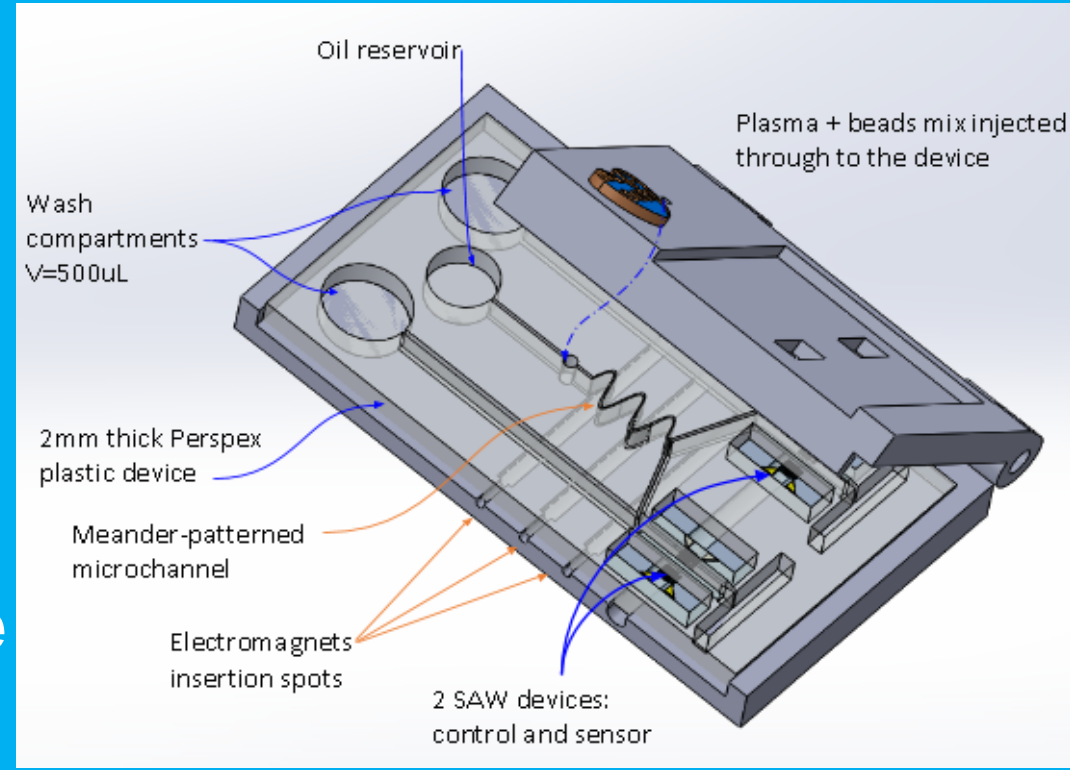## WHAT IS A BIOSENSOR?

A biosensor is an analytical device that measures the amount of a specific molecule in the body, called a biomarker.

Oil reservoir
Plasma + beads mix injected through to the device
Wash compartments V=500uL
2mm thick Perspex plastic device
Meander-patterned microchannel
Electromagnets insertion spots
2 SAW devices: control and sensor

WHAT MAKES IT DIFFERENT?

Currently, testing is being performed by large instruments in centralised laboratories, consuming lots of time. With a biosensor, the same results can be delivered in a few minutes only, reducing greatly the waiting period. It is a portable, low cost device with a friendly interface, which makes it easy to be used by anyone everywhere.

1 YOU FEEL ILL

You've been waking up during the night gasping for breath in recent weeks, your legs are swollen, and you've been feeling exhausted - so you decide to see a doctor…Or maybe you've already been diagnosed with heart failure and you just want to monitor your condition from the comfort of your own home.

2 BLOOD SAMPLE

A droplet of blood is just enough to carry out a test. The blood is then inserted into a cartridge which is placed into the biosensor.

5 SIGNAL OUTPUT

Only waves at or around resonance frequency will make it to the output IDT which will convert the mechanical wave back into an electrical signal. This resonant frequency, and the phase of the wave, will be compared to a reference resonance frequency and phase to determine the amount of NT-proBNP bound.
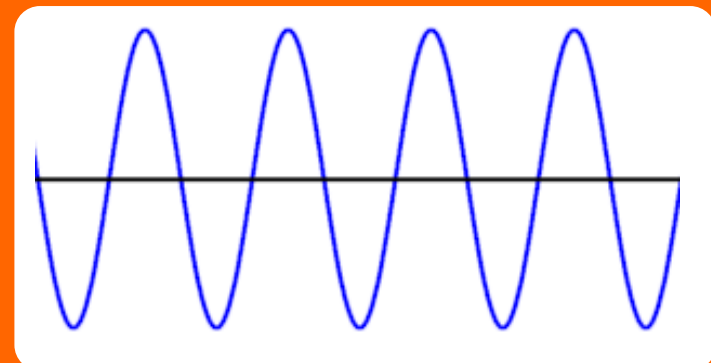
4 DELAY LINE CHANGES

The magnetic nanoparticles capture the NT-proBNP molecules, which are bound to the detection surface. The weight of the magnetic nanoparticles affects the surface properties of the delay line, changing the resonant frequency/phase of the device.

label (magnetic bead)
antibody
target species
antibody
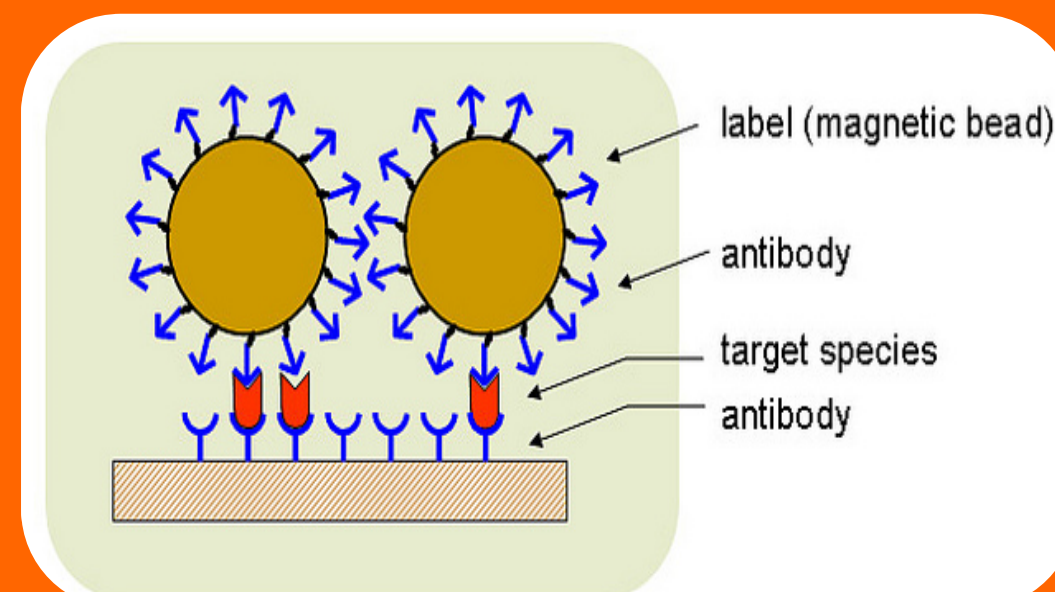
3 SIGNAL INPUT

An input IDT (interdigitated transducer) converts the electrical signal into a mechanical wave through the piezoelectric effect. This wave propagates towards the delay line.

6 SEE THE RESULTS

<300ng/l Unlikely to have heart failure.

>300ng/l Warrants further investigation

???ng/l Individualised targets in chronic management or cardiovascular disease risk stratification
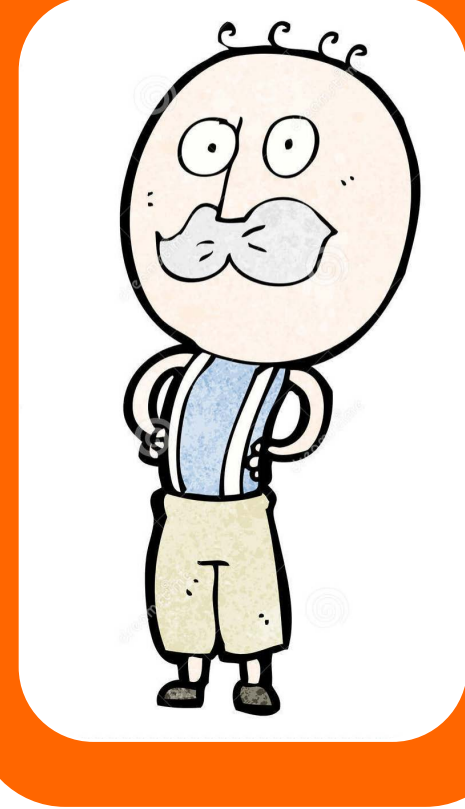
EXAMPLES

- Glucometer
- Automatic insulin pump for diabetes
- Continuous monitoring of glucose level in tears through a contact lens – new development by Google
- Pregnancy test