

Sapient*Sensors*

Customised Medical Diagnostics

Proposition

Creation of a low cost, single use diagnostic sensor for use in a hand held monitor providing Point of Care customised screening for Tuberculosis without requirement for pathology laboratory support

USP

- Sapiient Sensor's diagnostic
 - Detects a "signature" of multiple biomarkers
 - increases precision for a specific strain
 - allows detection of various TB strains simultaneously
 - allows detection of active and latent TB
 - Does not require recourse to pathology and can be applied in the field by part-trained operators
 - Forms a platform capable of extension to other diseases eg Bovine TB

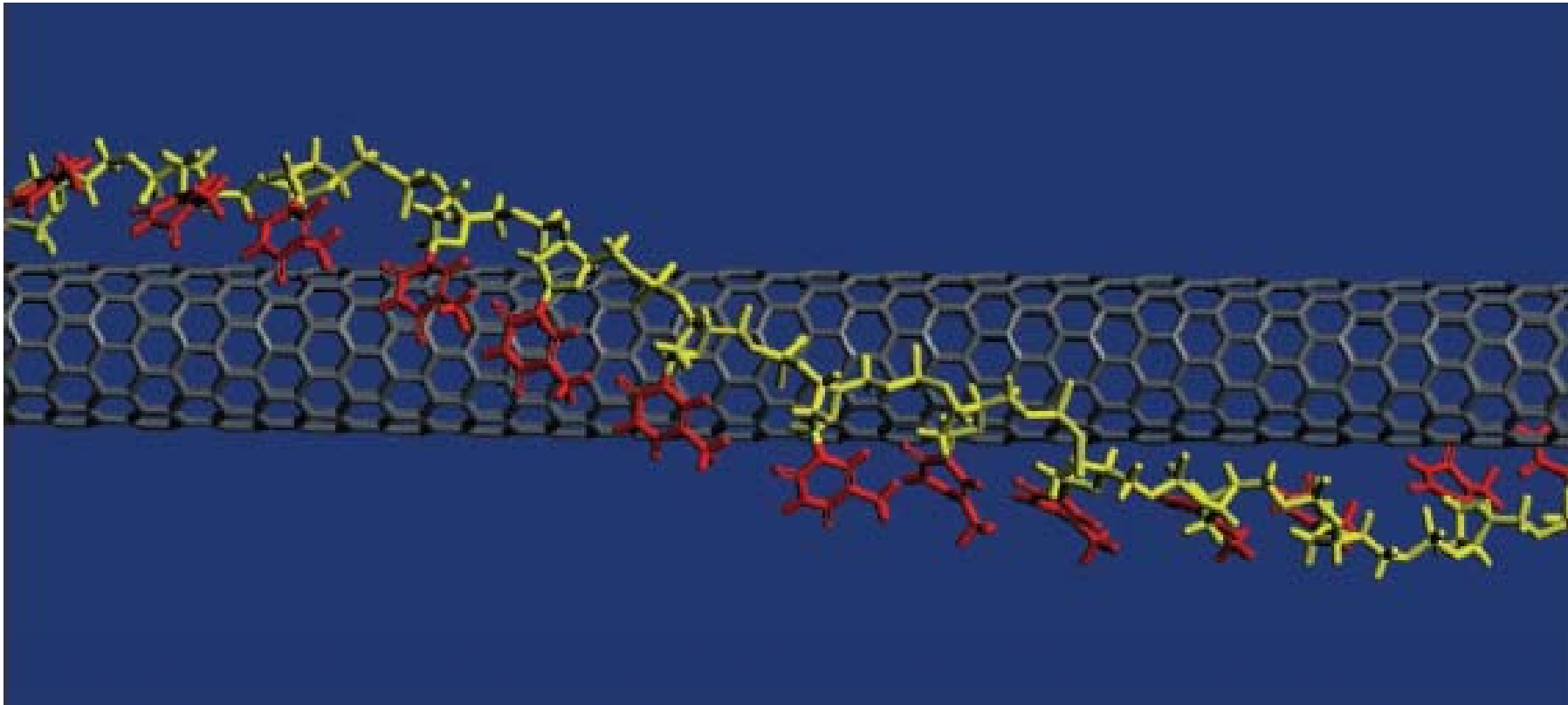
Market

- Current established competitor tests
 - Smear microscopy
 - 88M tests pa
 - average cost £1-10 per test
 - Chest X-ray
 - 50M tests pa
 - average cost £2-10 per test
 - Culture
 - 17M tests pa
 - average cost £8-20 per test

Sapient Sensors' Technology

- Conducting CNT backbone laid down via inkjet printing on a plastic substrate supporting a nanoscale grid
- Synthetic “antibodies” (aptamers) attached to the cnt backbone
- Aptamers customised for specific biomarkers of the disease to be detected
- Measure conductivity change on “binding” event relative to a reference
- Base technology applicable to all diseases
- Device driven by mobile phone
- Epidemiological data automatically reported back to HQ

Sapient Sensors' Technology

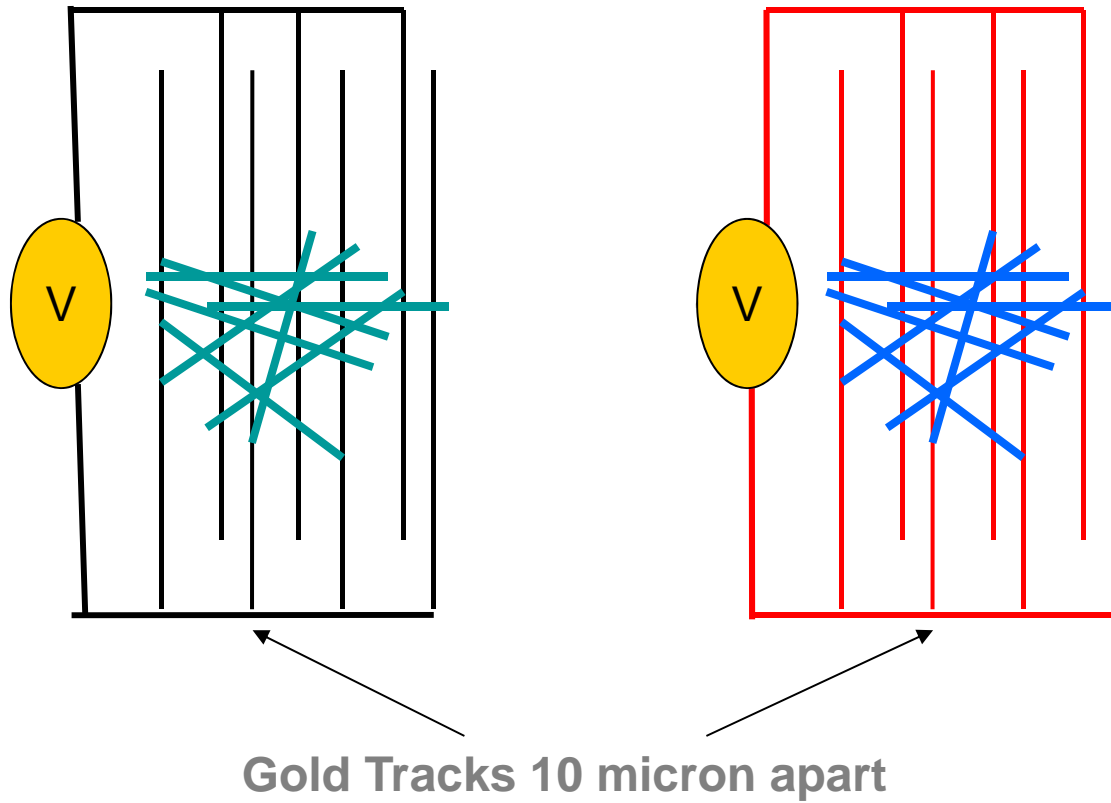


Aptamer Strand Wrapped Around a Carbon Nano Tube

Sapient Sensors' Technology

Measurement via Templated
Biomarker-Receptive
Aptamer (A)

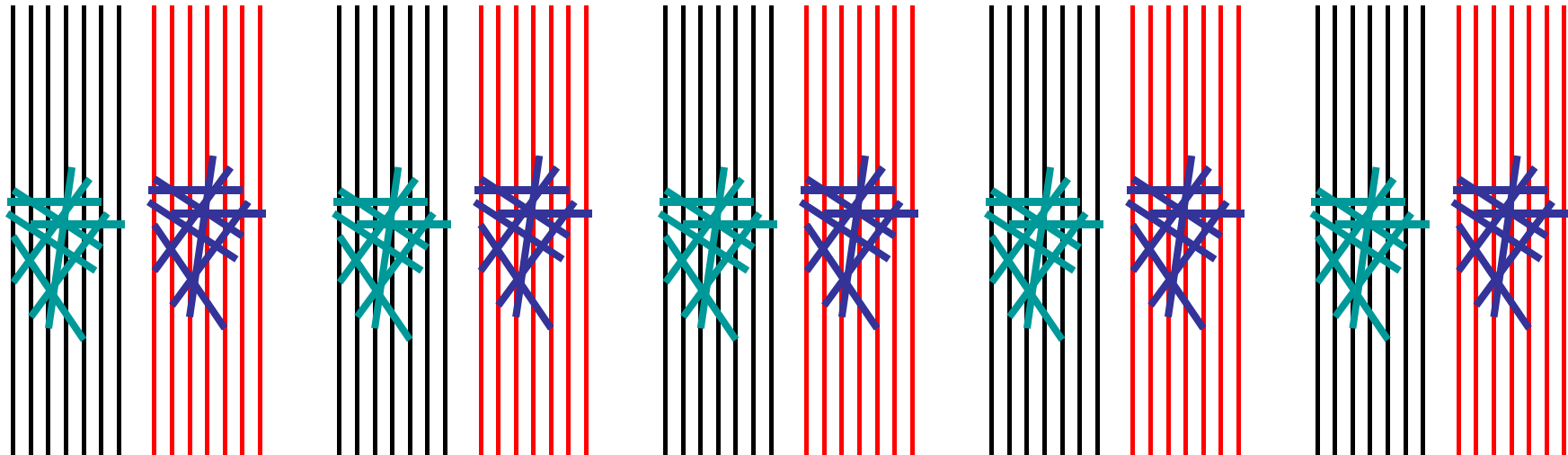
Reference via Templated
Biomarker-Capped
Aptamer A*)



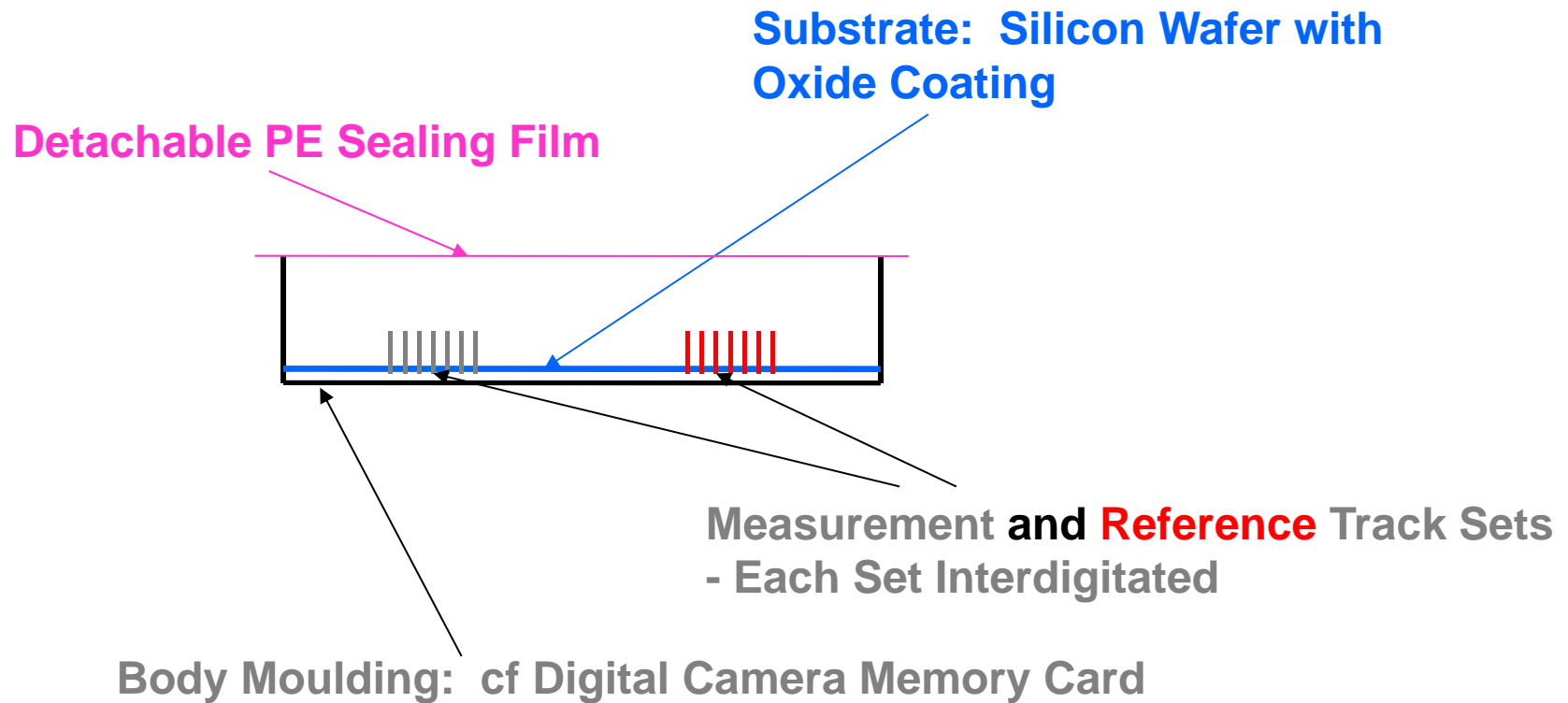
Sapient Sensors' Technology

Measurements via upto Five
Different Biomarker-Receptive
Aptamers (A)

Reference via upto Five
Different Biomarker-Capped
Aptamers (A*)



Sapient Sensors' Technology



State of Development

- Sapiient Sensors has exemplified its base patent on silicon using biomarkers correlated with a wide spectrum of diseases
 - Lysozyme
 - Atherosclerosis
 - Atheroma
 - Stress
 - Thrombin
 - Cardiovascular Disease (via anticoagulation activity)
- Technology is at TRL4

Patent Summary

- GB Patent Patent Application 1105481.4 published October 2012 – examination April 2013
- PCT Patent WO 2012/131403 published October 2012
- A device for identifying the presence of a specific target molecule or biomarker by the detection of a change in an electrical property, the device including a measurement sensor comprising:
 - a conducting or semiconducting sensor structure capable of conjugating with the biomarker, thus giving rise to the said change in electrical property, and
 - an electrode system for conducting a signal from the device;in which the device includes a further such sensor, of substantially identical form but having its sensor structure already conjugated with the biomarker, so as to act as an internal reference.

Technology Strategy Board Programme

- Rapid Diagnosis for Human and Bovine Tuberculosis begins 01/11/13
- Developing bTB device with the following partners:
 - **CompanDX** develops bioinformatics algorithms to identify biomarkers)
 - **CPI Innovation Services Limited** runs the UK Centre of Excellence for Printable Electronics. The Centre was established to facilitate new product prototyping, scale-up and the development of pilot-scale production lines
 - **Health Protection Agency** (HPA Porton) provides specialist and reference microbiology services for high containment pathogens, translational research programmes and the manufacture of biopharmaceutical products
 - **Agri-Food & Biosciences Institute** (AFBI) is a leading provider of scientific research and services to government, non-governmental and commercial organisations)
 - **Nottingham Trent University** (Division of Biosciences) provides analytical characterisation

THANK YOU

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