

Disease diagnosis in just 15 minutes

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Testing for diseases such as cancer and multiple sclerosis could soon be as simple as using a pregnancy testing kit.

A team led by scientists at the University of Leeds has developed a biosensor technology that uses antibodies to detect biomarkers - molecules in the human body which are often a marker for disease – much faster than current testing methods.

The technology could be used in doctors' surgeries for more accurate referral to consultants, and in hospitals for rapid diagnosis. Tests have shown that the biosensors can detect a wide range of analytes (substances being measured), including biomarkers present in prostate and ovarian cancer, stroke, multiple sclerosis, heart disease and fungal infections. The team also believes that the biosensors are versatile enough to test for diseases such as tuberculosis and HIV.

The technology was developed through a European collaboration of researchers and commercial partners in a 2.7 million Euro project called ELISHA. It features new techniques for attaching antibodies to innovative surfaces, and novel electronic measurement methods that need no reagents or labels.

ELISHA was co-ordinated by Dr Paul Millner from the Faculty of Biological Sciences at the University of Leeds, and managed by colleague Dr Tim Gibson. Says Dr Millner: "We believe this to be the next generation diagnostic testing. We can now detect almost any analyte faster, cheaper and more easily than the current accepted testing

methodology."

Currently blood and urine are tested for disease markers using a method called ELISA (Enzyme Linked Immunosorbant Assay). Developed in the 1970s, the process takes an average of two hours to complete, is costly and can only be performed by highly trained staff.

The Leeds team are confident their new technology – which provides results in 15 minutes or less - could be developed into a small device the size of a mobile phone into which different sensor chips could be inserted, depending on the disease being tested for.

"We've designed simple instrumentation to make the biosensors easy to use and understand," says Dr Millner. "They'll work in a format similar to the glucose biosensor testing kits that diabetics currently use."

Professor Séamus Higson, Dean of the Faculty of Medicine and Biosciences, Cranfield Health, and one of the partners within the ELISHA programme, says: "The speed of response this technology offers will be of great benefit to early diagnosis and treatment of many diseases, and will permit testing in de-localised environments such as GP's surgeries."

A spinout company – ELISHA Systems Ltd – has been set up by Dr Gibson, commercial partners Uniscan Instruments Ltd and Technology Translators Ltd to bring the technology to market.

Says Dr Gibson: "The analytes used in our research only scratch the surface of the potential applications. We've also shown that it can be used in environmental applications, for example to test for herbicides or pesticides in water and antibiotics in milk."

Source: University of Leeds

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