New technology ends finger pricking for people with diabetes

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A team at University of Leeds have developed a new technology which uses a small device with low-powered lasers to measure blood glucose levels without penetrating the skin. It could give people a simpler, pain-free alternative to finger pricking. This device could transform the lives of millions of people living with diabetes.

Currently, many people with diabetes need to measure their blood glucose levels by pricking their fingers, squeezing drops of blood onto test strips, and processing the results with portable glucometers. The process can be uncomfortable, messy and often has to be repeated several times every day.

It is also good news for healthcare providers as it could provide a simpler and cheaper alternative to both of the current methods – finger pricking, which uses disposable sample strips, or invasive continuous monitors, which use implanted sensors that need regular replacement.

Professor Jose said: "Unlike the traditional method, this new non-invasive technology can constantly monitor blood glucose levels."

"As well as being a replacement for finger-prick testing, this technology opens up the potential for people with diabetes to receive continuous readings, meaning they are instantly alerted when intervention is needed. This will allow people to self-regulate and minimise emergency hospital

treatment. This wearable device would then be just one step from a product which sends alerts to smart phones or readings directly to doctors, allowing them to profile how a person is managing their diabetes over time."

The technology is licensed to Glucosense Diagnostics, a spin-out company jointly formed and funded by the University of Leeds and NetScientific plc.

Sir Richard Sykes, Chairman of NetScientific, said: "Diabetes is a growing problem, with the need for non-invasive glucose monitoring becoming ever more critical. The ultimate development of two distinct products – a finger-touch and a wearable – could give people with different types of diabetes the option of a device that best suits their lifestyle."

At the heart of the new technology, a piece of nano-engineered silica glass is used with a low-powered laser to measure the concentration of glucose in blood. When the glass is in contact with the users' skin, the extent of fluorescence signal varies in relation to the concentration of glucose in their blood. The device measures the length of time the fluorescence lasts for and uses that to calculate the glucose level in a person's bloodstream without the need for a needle. This process takes less than 30 seconds.

The device has the promise of becoming the first non-invasive way to measure glucose levels, providing a simpler, pain-free and potentially cheaper alternative to the current finger-pricking method. It also has continuous monitoring capabilities making it ideal to be developed as a wearable hypoglycaemia-alert device and replacement for the implantable continuous glucose monitoring device that some people living with Type 1 diabetes require. Professor Jose said: "The glass used in our sensors is hardwearing, acting in a similar way as that used in smartphones. Because of this, our device is more affordable, with lower running costs than the existing self-monitoring systems.

"Currently, we are piloting a bench top version in our clinical investigations but aim to develop two types of devices for the market. One will be a finger-touch device similar to a computer mouse. The other will be a wearable version for continuous monitoring." The initial clinical testing of a prototype device showed a clinically acceptable accuracy rate of 96.5% indicating that the device has the potential to be at least as accurate as current methods. Further device development is underway which will be followed by more clinical studies.

"The award of an important European patent for Glucosense's laser technology is a significant step in preparing the ground for commercial launch within the next three years."