

Team to develop nanosensors for HIV diagnosis and monitoring

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The London Centre for Nanotechnology will develop a new device to enable people living with HIV to monitor their own health and the effectiveness of their treatments, thanks to a £2 million EPSRC (Engineering and Physical Sciences Research Council) grant announced today.

The device will give people a way to monitor the virus for themselves, reducing the need to visit a doctor as often. It will act as an early warning system to tell patients to seek medical help if the virus is resisting antiretroviral treatments. It could also be of real benefit to doctors in developing countries who urgently need rapid and affordable ways to diagnose and monitor their patients.

Researchers from the London Centre for Nanotechnology, a joint venture between UCL (University College London) and Imperial College London, and their research partners have been awarded the Nanotechnology for Healthcare grant from the EPSRC's Grand Challenge Competition.

The research will bring biomedical engineers, physicists, chemists, virologists and clinicians together to create the device, which will work in a similar way to how diabetics check their <u>insulin</u> levels - where a hand-held machine analyses a finger prick of blood.

The device will use tiny mechanical <u>sensors</u>, called nano-cantilever arrays, to measure <u>HIV</u> and other protein markers that can indicate a rise



in the level of the virus and the body's response to it.

UCL lead investigator Dr Rachel McKendry, Reader in Biomedical Nanoscience at the LCN, explains: "The nano-cantilever arrays are each coated with substances that stick to the HIV and other proteins, which are markers associated with disease progression. Accommodating these markers causes the highly sensitive sensors to bend like a diving board and this bend indicates the level of virus in the body. We have used nanocantilever arrays to investigate <u>drug resistance</u> in super bugs, and are excited by the opportunity to extend this approach to detecting HIV markers."

The device will display messages on an integral screen, giving patients access to clear, immediate advice. For example, they could be told that their condition remains stable if levels of virus do not change, or they could be told to make an appointment to see their doctor if the virus begins to flare up.

Investigator, Dr. Anna-Maria Goretti, an NHS consultant and coinvestigator based at the Royal Free Hospital, says: "If patients neglect to take their treatments or need prompting to see their GP the device will provide a simple way of letting them know. It will really empower HIV patients to keep a close eye on their health and their treatments."

Robin Weiss, Professor of Viral Oncology at UCL, whose pioneering work in identifying the receptor for HIV has deepened our understanding of HIV/AIDS, adds: "One of the principal advantages of the proposed device is its capacity to monitor viral and immunological markers on a single chip without the need for time consuming analysis that requires specialist laboratories."

Dr Yeong-Ah Soh, lead investigator at Imperial and lecturer in Materials Science, who is responsible for engineering the nano-cantilever arrays,



sayss: "This project combines technology from semiconductor processing with modern biology to produce a unique piece of kit for tracking how HIV develops in individual patients, and helping them to keep a close eye on their own health."

The project will be carried out over the next three years, with the promise of additional funding.

In the UK, there are an estimated 70,000 carriers of HIV. Worldwide, HIV/AIDS has grown to pandemic proportions and today there are 35 million people living with the virus, two-thirds of them in sub-Saharan Africa. This development is expected to bring major improvement to UK patient and will anchor UK at the forefront of HIV research.

Source: University College London (<u>news</u> : <u>web</u>)

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