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New Daktari Technology Highlighted in *Science Translational Medicine*

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A new sensor technology developed by researchers at the University of Illinois at Urbana-Champaign and collaborators at Daktari Diagnostics can monitor HIV and measure white blood counts using just a drop of blood.

The new results, published in the 4 December 2013 issue of the journal *Science Translational Medicine*, are from a program led by Nicholas Watkins, Umer Hassan, and Professor Rashid Bashir at the University of Illinois, and Dr. Bill Rodriguez at Daktari. The new sensor provides information on how many white blood cells and how many CD4+ T cells (immune cells that get destroyed when a patient is infected with the HIV virus) are in a drop of blood. Clinical diagnoses of AIDS are established when CD4 cells get below 200-350 cells per microliter of whole blood. White blood cell counts are used broadly to monitor patients with infectious diseases, and to monitor drug toxicities.

As described in the article and in an accompanying feature cover story in *Science Translational Medicine*, the device could provide inexpensive, easy-to-use, immediate disease diagnostics, which are especially useful in remote areas of the world and locations with limited resources. Based on Daktari technology, the new device uses a miniaturized chip designed to process fluids and sense cells electronically. It works similarly to a commonly used home monitoring test for blood sugar, where a patient can put a drop of blood on a strip and insert the strip into a handheld reader to get a blood glucose result. In this case, the strip is integrated in a disposable cartridge, where white blood cells or CD4 cells are captured in a microfluidic chamber coated with proteins. The Daktari technology can detect sub-populations of white blood cells, such as CD4+ and CD8+ T cells. The new device can count all white blood cells as well as lymphocytes, monocytes, and granulocytes— known in medicine as a “three-part differential”—just as accurately as more complex, time-consuming approaches using cell counting technologies that require larger volumes of blood and complex instruments.

The system could be used in situations where white blood cell counts, three-part differentials, and CD4 counts are routinely monitored. The team is working to further miniaturize the setup, as well as designing a cartridge for mass production. In addition to Drs. Rodriguez, Watkins (now at Nabsys, Providence, RI), Hassan, and Bashir, co-authors of the study include University of Illinois researchers Gregory Damhorst and HengKan Ni, in addition to Dr. Awais Vaid of the Champaign County Public Health District in Illinois.

Dr. Bill Rodriguez and Professor Rashid Bashir are two of the principals behind Daktari Diagnostics, which was established in 2009 to commercialize portable technologies for global health. The current work adds to the Daktari portfolio, which includes a handheld CD4 cell counter that has completed clinical validation studies in two African countries, and will launch in sub-Saharan Africa in May 2014.

About Daktari

Daktari Diagnostics, Inc. (www.daktaridx.com) is a venture-backed company based in Cambridge, USA. Daktari's corporate mission is to address the world's biggest health problems by building a market-leading business around a fleet of accurate, portable diagnostic products that can be deployed anywhere in the world. The Daktari technology platform combines electrochemical sensing with microfluidics, enabling highly accurate, low-cost diagnostics in a handheld format. The Daktari connectivity platform provides seamless data management for results produced at any health facility.

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