

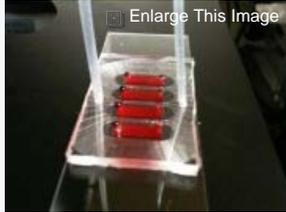
By Jesse Emspak | July 21, 2010 12:27 PM EDT

UC Team Simplifies HIV Testing

"Lab on a chip" offers cheaper, easier method

Article

HIV testing may have just gotten a lot simpler and less expensive, using a "lab on a chip" and imaging technology.



Gulnaz Stybayeva / UC Davis

UC Davis biomedical engineer Professor Alexander Revzin has developed a "lab on a chip" device for HIV testing. Revzin's microfluidic device uses antibodies to "capture" white blood cells called T cells that are affected by HIV.

Alexander Revzin, a biomedical engineer at the University of California, Davis, developed a simple strip that has an array of antibody molecules printed on it. The molecules bind to white blood cells as well as certain proteins. By counting the different types of cells, one can tell whether a person has HIV, and whether they are at risk for full-blown AIDS.

Counting the cells isn't done manually. Instead, Revzin's collaborator, Aydogan Ozcan, developed a holographic imaging system that can count many cells all at once. This speeds up the process and means many tests can be completed quickly.

Revzin says his device would not be too difficult to mass-produce. It is also cheaper than current methods and can be used in the field without a

lot of expensive equipment. He has filed for a provisional patent, he says, but he has no commercial backing.

Currently, HIV testing is done with a process called flow cytometry. It involves counting the number of cells that have receptors for CD4, a protein involved in immune function that HIV uses to get into a patient's T-cells. The machines necessary to do these tests are usually tens of thousands of dollars, Revzin said.

Revzin's method uses a polymer film which has an array of spots, some of which are covered with antibodies that link with two types of T-cells, called CD4 and CD8. Other parts of the array link with cytokines, which are proteins secreted by immune system cells. When blood flows over the array, the T-cells stick to the spots.

The dots change color depending on the cytokine production of the T-cells. By looking at the numbers of CD4 and CD8 cells, checking the ratio between them and measuring the cytokine production, one can tell if a patient has HIV in only a few seconds.

Revzin noted that usually, HIV tests measure the number of cells with CD4, and any number below about 350 is an indicator of HIV. But there is more than one parameter that one can use and by printing out different chemicals on the chip, health professionals can get more information at one time. "What's novel here is we don't just look at one parameter," he said.

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