DIGITAL SEPARATION FOR ONE-STEP HIV VIRAL LOAD MONITORING

Tech ID: 23251 / UC Case 2013-143-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,589,270	03/17/2020	2013-143

BRIEF DESCRIPTION

Quantitative molecular diagnostics such as HIV viral load monitoring is essential for follow-up testing of treated AIDS patients. Current FDA approved tests require multiple steps of sample preparation, 3-6 hours of assay time, highly trained technicians, costly equipment and centralized lab testing. Transportation of HIV specimens also risks degradation of the RNA target.

Berkeley researchers have developed a state-of-the-art technology for on-site one-step quantitative molecular diagnostics. As an application example, they demonstrated for the first time that digital separation technology can be used to detect HIV viral load in whole blood. The invention enables on-chip digital amplification analysis. On-chip HIV RNA detection from whole blood and quantitative nucleic acid detection can be performed in a one-step 30 minute process. The system is self-powered and the readout signal can be quantified by a smart phone.

This portable low cost technology (~$10/test, <$100 for smartphone based readout system) is much faster and requires significantly less manual operation than commercially available systems. It is envisioned to replace labor intensive and costly thermal cyclers (~$50/test, $30-70k for real-time thermal cyclers), thus enabling rapid and safe diagnosis for HIV patients and HIV/AIDS surveillance for those who normally do not have proper access to healthcare facilities. This platform technology may also be easily adopted for the detection of other diseases too.

APPLICATIONS

- Portable microfluidic platforms for quantitative nucleic acid amplification in one-step diagnostic assays
- Portable chip can be adoptable to other diseases
- Low cost HIV monitoring in economically challenged countries (e.g., Africa)
- Low cost nucleic acid based quantitative telemedicine applications

ADVANTAGES

- First low-cost, portable and precise point-of-care solution for HIV viral load monitoring; significant improvements to current systems in time, equipment and labor

- Data acquired comparable to data from a thermal cycler

- Chip is able to catch early infection patients without a high viral concentration

- Portable and power-free; ideal for point-of-care or low resource settings

RELATED MATERIALS

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Medical**

» Diagnostics

RELATED CASES

2013-143-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Portable Fluidic Actuation
- Vacuum Battery System For Portable Microfluidic Pumping

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