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Lab-on-a-CD: A Fully Integrated Molecular Diagnostic System

CHICAGO – What if a single piece of hardware no larger than a laptop computer functions not only as an accurate diagnostic device, but also as a self-contained, biomedical lab capable of performing all sample preparation steps needed for disease diagnosis?

This piece of hardware is nothing more than a CD player. A simple CD player can be retooled to perform cell lysis, sample metering, sample clarification, sedimentation, mixing, DNA amplification, and biomarker detection, crucial steps in diagnostic assays. Such an instrument is especially attractive for performing molecular diagnostic assays, which use DNA or RNA for highly sensitive and accurate diagnosis of certain medical conditions. However, due to the precise temperature requirements and the overall complexity of molecular diagnostic assays, implementing them in a fast, low-cost, and highly accurate manner can be challenging.

On a centrifugal microfluidic device, the requirements for pumping are simplified by the use of a single motor for actuation. Assay multiplexing is straightforward, making it an attractive platform to be placed at the point of patient care. While a commercial version of a molecular diagnostic assay on a disc is not yet available, the development of such a sample-to-answer system would enable quality, fast, low-cost, and automated diagnosis of a variety of different diseases.

A review article published in the June 2016 issue of the *Journal of Laboratory Automation (JALA)* not only documents past work toward such a sample-to-answer diagnostic system, but describes the potential such a platform can harness for future research. As more processing and detection techniques are incorporated and automated on a microfluidic disc, the platform can be developed into a mobile laboratory, and can be used by scientists and professionals for research in other fields or remote, resource poor regions.

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JALA is one of two MEDLINE-indexed scientific journals published by SLAS (Society for Laboratory Automation and Screening). Visit JALA Online at <http://jla.sagepub.com/content/21/3> to read "Lab-on-a-CD: A Fully Integrated Molecular Diagnostic System." Listen to a JALA Podcast with lead author Ling X. Kong at http://jla.sagepub.com/site/misc/Index/JALA_Podcasts.xhtml. For more information about SLAS and its journals, visit www.slas.org/publications/scientific-journals.

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SLAS (Society for Laboratory Automation and Screening) is an international community of more than 20,000 individual scientists, engineers, researchers, technologists and others from academic, government and commercial laboratories. The SLAS mission is to be the preeminent global organization providing forums for education and information exchange and to encourage the study of, and improve the practice of life sciences discovery and technology. For more information, visit www.SLAS.org.

*SLAS publishes two internationally recognized, MEDLINE-indexed journals, now in their 21st year of publication. **The Journal of Laboratory Automation (JALA)** and **Journal of Biomolecular Screening (JBS)** uniquely serve life sciences discovery and technology professionals. Together, JALA and JBS address the full spectrum of issues that are mission-critical to this important audience, enabling scientific research teams to gain scientific insights, increase productivity, elevate data quality, reduce lab process cycle times and enable experimentation that otherwise would be impossible.*

*Specifically, **JALA** explores ways in which scientists adapt advancements in technology for scientific exploration and experimentation. In direct relation to this, **JBS** reports how scientists develop and utilize novel technologies and/or approaches to provide and characterize chemical and biological tools to understand and treat human disease.*

***Journal of Biomolecular Screening (JBS):** 2014 Impact Factor 2.423. Editor-in-Chief Robert M. Campbell, Ph.D., Eli Lilly and Company, Indianapolis, IN (USA).*

***Journal of Laboratory Automation (JALA):** 2014 Impact Factor 1.879. Editor-in-Chief Edward Kai-Hua Chow, Ph.D., National University of Singapore (Singapore).*