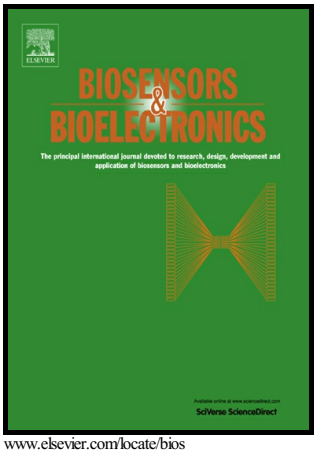

www.elsevier.com/locate/bios

Fully 3D Printed Integrated Reactor Array for Point-of-Care Molecular Diagnostics

Karteek Kadimisetty, Jinzhao Song, Aoife M. Doto, Young Hwang, Jing Peng, Michael G. Mauk, Frederic D. Bushman, Robert Gross, Joseph N. Jarvis, Changchun Liu

PII: S0956-5663(18)30176-3
DOI: https://doi.org/10.1016/j.bios.2018.03.009
Reference: BIOS10335

To appear in: *Biosensors and Bioelectronic*

Received date: 16 December 2017
Revised date: 21 February 2018
Accepted date: 6 March 2018

Cite this article as: Karteek Kadimisetty, Jinzhao Song, Aoife M. Doto, Young Hwang, Jing Peng, Michael G. Mauk, Frederic D. Bushman, Robert Gross, Joseph N. Jarvis and Changchun Liu, Fully 3D Printed Integrated Reactor Array for Point-of-Care Molecular Diagnostics, *Biosensors and Bioelectronic,* https://doi.org/10.1016/j.bios.2018.03.009

Fully 3D Printed Integrated Reactor Array for Point-of-Care Molecular Diagnostics

Karteek Kadimisetty[a], Jinzhao Song[a], Aoife M. Doto[b], Young Hwang[b], Jing Peng[a], Michael G. Mauk[a], Frederic D. Bushman[b], Robert Gross[c,d], Joseph N. Jarvis[e,f,g] and Changchun Liu[a*]

[a] Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, Pennsylvania 19104, USA

[b] Department of Microbiology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania 19104, USA

[c] Center for Clinical Epidemiology and Biostatistics, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania 19104, USA

[d] Department of Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania 19104, USA

[e] Botswana-UPenn Partnership, PO Box AC 157 ACH, Gaborone, Botswana

[f] Division of Infectious Diseases, Perelman School of Medicine, University of Pennsylvania, Philadelphia, 19104, USA

[g] Department of Clinical Research, Faculty of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine

[*]**Corresponding author,** Dr. Changchun Liu, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania 210 Towne Building, 220 South 33rd St., Philadelphia, Pennsylvania 19104-6315, USA. Phone: (215)746-2848. lchangc@seas.upenn.edu

Abstract

Molecular diagnostics that involve nucleic acid amplification tests (NAATs) are crucial for prevention and treatment of infectious diseases. In this study, we developed a simple, inexpensive, disposable, fully 3D printed microfluidic reactor array that is capable of carrying out extraction, concentration and isothermal amplification of nucleic acids in variety of body fluids. The method allows rapid molecular diagnostic tests for infectious diseases at point of