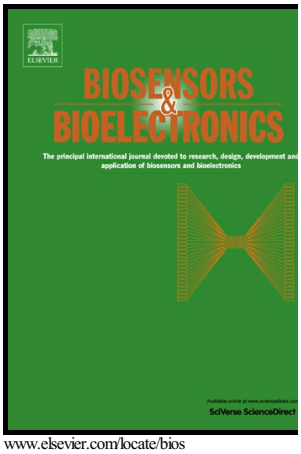

A nanocoaxial-based electrochemical sensor for the detection of cholera toxin

Michelle M. Archibald, Binod Rizal, Timothy Connolly, Michael J. Burns, Michael J. Naughton, Thomas C. Chiles

www.elsevier.com/locate/bios

PII: S0956-5663(15)30233-5
DOI: http://dx.doi.org/10.1016/j.bios.2015.06.069
Reference: BIOS7806

To appear in: *Biosensors and Bioelectronic*

Received date: 9 May 2015
Accepted date: 26 June 2015

Cite this article as: Michelle M. Archibald, Binod Rizal, Timothy Connolly Michael J. Burns, Michael J. Naughton and Thomas C. Chiles, A nanocoaxial based electrochemical sensor for the detection of cholera toxin, *Biosensors an Bioelectronic,* http://dx.doi.org/10.1016/j.bios.2015.06.069

A Nanocoaxial-Based Electrochemical Sensor for the Detection of Cholera Toxin

Michelle M. Archibald,[1] Binod Rizal,[2] Timothy Connolly,[1] Michael J. Burns,[2] Michael J. Naughton,[2] and Thomas C. Chiles[1]*

[1]Department of Biology, [2]Department of Physics

Boston College, Chestnut Hill, MA 02467

*Corresponding author. Tel: +1 617 522 0840 fax: +1 617 552 2011.

Email address: chilest@bc.edu (Thomas Chiles)

ABSTRACT

Sensitive, real-time detection of biomarkers is of critical importance for rapid and accurate diagnosis of disease for point of care (POC) technologies. Current methods do not allow for POC applications due to several limitations, including sophisticated instrumentation, high reagent consumption, limited multiplexing capability, and cost. Here, we report a nanocoaxial-based electrochemical sensor for the detection of bacterial toxins using an electrochemical enzyme-linked immunosorbent assay (ELISA) and differential pulse voltammetry (DPV). The device architecture is composed of vertically-oriented, nanoscale coaxial electrodes in array format (~10^6 coaxes per square millimeter). The coax cores and outer shields serve as integrated