Paper-based Microfluidic Immunoassay for Electrochemical Detection of B-type Natriuretic Peptide

Yong Zheng¹, Zhen Huang¹ and Jidong Zhang^{2,*}

¹ Department of Cardiovascular Surgery, Affiliated Hospital of Taishan Medical University, Taian, Shandong, 271000, P.R. China

² Department of Cardiology, Affiliated Hospital of Qingdao University, Qingdao, Shandong, 266003, P.R. China

*E-mail: jidongzhangwuli@sina.com

doi: 10.20964/2018.03.78

Received: 4 October 2017 / *Accepted:* 12 November 2017 / *Published:* 5 June 2018

Heart failure has been acknowledged as a common disorder that leads to great morbidity and mortality. In heart failure and other cardiovascular disorders, effective biomarkers include cardiac natriuretic peptides, among which the most prominent one is B-type natriuretic peptide (BNP). The present study proposed the fabrication of a screen-printed working electrode (SPWE), with which a label-free and highly sensitive paper-based electrochemical immunosensor was successfully prepared. In addition, the SPWE was modified by amino functional graphene (NH₂-G)/thionine (Thi)/gold nanoparticles (AuNPs) nanocomposites, which led to the immobilization of anti-BNP and an enhancement in the determination sensitivity. The linear range and limit of detection (LOD) were determined to be 0.05 to 30 ng/mL and 0.012 ng/mL, with a corresponding correlation coefficient of 0.996.

Keywords: B-type natriuretic peptide; Microfluidic system; Electrochemical detection; Immunoassay; Congestive heart failure

[FULL TEXT](#)

© 2018 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).