

Author's Accepted Manuscript

Novel Electrochemical Sensing Platform for
Ultrasensitive Detection of Cardiac Troponin I
Based on Aptamer-MoS₂ Nanoconjugates

Xiujuan Qiao, Kunxia Li, Jinqiong Xu, Ni Cheng,
Qinglin Sheng, Wei Cao, Tianli Yue, Jianbin Zheng



PII: S0956-5663(18)30343-9
DOI: <https://doi.org/10.1016/j.bios.2018.05.003>
Reference: BIOS10461

To appear in: *Biosensors and Bioelectronic*

Received date: 21 February 2018
Revised date: 21 April 2018
Accepted date: 3 May 2018

Cite this article as: Xiujuan Qiao, Kunxia Li, Jinqiong Xu, Ni Cheng, Qinglin Sheng, Wei Cao, Tianli Yue and Jianbin Zheng, Novel Electrochemical Sensing Platform for Ultrasensitive Detection of Cardiac Troponin I Based on Aptamer-MoS₂ Nanoconjugates, *Biosensors and Bioelectronic*, <https://doi.org/10.1016/j.bios.2018.05.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Novel Electrochemical Sensing Platform for Ultrasensitive Detection of Cardiac Troponin I Based on Aptamer-MoS₂ Nanoconjugates

Xiujuan Qiao^b, Kunxia Li^b, Jinqiong Xu^b, Ni Cheng^a, Qinglin Sheng^{*1,a,b}, Wei Cao^a,
Tianli Yue^{*2,a}, Jianbin Zheng^{*3,b}

^aCollege of Food Science and Engineering, Northwest University, Xi'an, Shaanxi 710069, China

^bCollege of Chemistry & Materials Science/Key Laboratory of Synthetic and Natural Functional Molecule
Chemistry of Ministry of Education/Shaanxi Provincial Key Laboratory of Electroanalytical Chemistry, Northwest
University, Xi'an, Shaanxi 710069, China

qlsheng@nwu.edu.cn (QL Sheng)

yuelt305@nwsuaf.edu.cn (TL Yue)

zhengjb@nwu.edu.cn (JB Zheng)

*Corresponding author.

Abstract

Cardiac troponin I (cTnI) is a specific and sensitive biomarker for the early diagnosis of acute myocardial infarction and for the subsequent clinical treatments. In this work, novel electrochemical sensing platform for sensing of cTnI based on aptamer-MoS₂ nanoconjugates was proposed. For comparison, core-shell Au@SiO₂@Au nanoparticles were also used for sensing of cTnI. The sensing schemes and electrochemical responses of the proposed sensors were investigated by electrochemical impedance spectroscopy (EIS) in 5.0 mM K₃[Fe(CN)₆]/K₄[Fe(CN)₆] (1:1) solution containing 0.1 M KCl, respectively. Results showed that the aptamer-Au@SiO₂@Au based aptasensor shows a linear range of 10 pM-10.0 μM with the detection limits of 1.23 pM. For the aptamer-MoS₂ nanosheets based aptasensor, the linear range for cTnI detection was from 10 pM to 1.0 μM with a lower detection limit of 0.95 pM. Meanwhile, both the sensors were successfully applied for detection of cTnI in human blood samples. The two kinds of aptasensors have been successfully used for detecting of cTnI in human blood serums. Moreover, no negligible signal changes could be observed in the presence of non-targets of CK-MB and Myo, suggesting the good potential for clinic diagnosis.

Keywords Electrochemical aptasensor; Nanoconjugates; MoS₂; Au@SiO₂@Au; Cardiac troponin I

Download English Version:

<https://daneshyari.com/en/article/7229223>

Download Persian Version:

<https://daneshyari.com/article/7229223>

[Daneshyari.com](https://daneshyari.com)