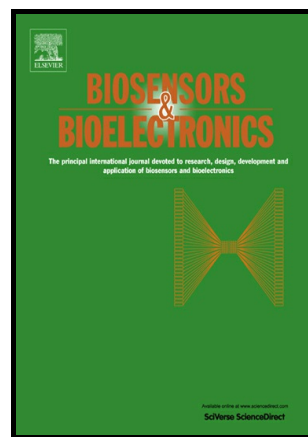


Integrated Amplified Aptasensor with in-situ
Precise Preparation of Copper Nanoclusters for
Ultrasensitive Electrochemical Detection of
microRNA 21

Yijia Wang, Xinying Zhang, Lang Zhao, Ting Bao,
Wei Wen, Xiuhua Zhang, Shengfu Wang



PII: S0956-5663(17)30457-8
DOI: <http://dx.doi.org/10.1016/j.bios.2017.07.009>
Reference: BIOS9842

To appear in: *Biosensors and Bioelectronics*

Received date: 22 March 2017
Revised date: 21 June 2017
Accepted date: 4 July 2017

Cite this article as: Yijia Wang, Xinying Zhang, Lang Zhao, Ting Bao, Wei Wen, Xiuhua Zhang and Shengfu Wang, Integrated Amplified Aptasensor with in-situ Precise Preparation of Copper Nanoclusters for Ultrasensitive Electrochemical Detection of microRNA 21, *Biosensors and Bioelectronics* <http://dx.doi.org/10.1016/j.bios.2017.07.009>

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

Integrated Amplified Aptasensor with in-situ Precise Preparation of Copper Nanoclusters for Ultrasensitive Electrochemical Detection of microRNA 21

Yijia Wang, Xinying Zhang, Lang Zhao, Ting Bao, Wei Wen, Xiuhua Zhang, Shengfu Wang*

Hubei Collaborative Innovation Center for Advanced Organic Chemical Materials, Ministry of Education Key Laboratory for the Synthesis and Application of Organic Functional Molecules & College of Chemistry and Chemical Engineering, Hubei University, Wuhan 430062, PR China

*Corresponding author:

Shengfu Wang: Fax: +86-27-88663043; E-mail: wangsf@hubu.edu.cn

Abstract:

MicroRNA 21 (MIR21) has garnered much attention in recent years as an important disease biomarker. The detection of it in human system shows great significance for the healthy evaluation and major diseases early detection. Herein, a novel approach tactfully manipulates the in-situ precise preparation of copper nanoclusters on overlapping Y-shaped ds-DNA for MIR21 analysis were developed in the proposed integrated aptasensor. In the presence of target MIR21, overlapping Y-shaped ds-DNA was constructed on electrode. Copper nanoclusters were in-situ prepared on this effective template for target detection. Taking advantage of (EXO T7) triggered targets recycling, hybridization chain reaction (HCR) and copper nanoclusters triple amplification strategy, linear detection of MIR21 was achieved from 10 pM to 0.1 fM with a detection limit down to 10 aM ($S/N > 3$). This approach provides a good model for integrating both synthesis and detection into one electrochemistry component. It showed promising potential for applications in aptamer related target detection in human serum analysis.

Keywords: MIR21, exonuclease T7 (EXO T7), hybridization chain reaction, overlapping

Download English Version:

<https://daneshyari.com/en/article/5030940>

Download Persian Version:

<https://daneshyari.com/article/5030940>

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