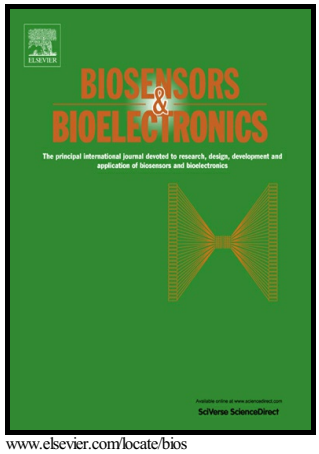

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PII: S0956-5663(16)30510-3
DOI: http://dx.doi.org/10.1016/j.bios.2016.05.080
Reference: BIOS8770

To appear in: *Biosensors and Bioelectronic*

Received date: 5 April 2016
Revised date: 12 May 2016
Accepted date: 23 May 2016

Cite this article as: Daoqing Fan, Qingfeng Zhai, Weijun Zhou, Xiaoqing Zhu Erkang Wang and Shaojun Dong, A label-free colorimetric aptasensor for simple sensitive and selective detection of Pt (II) based on platinum (II)-oligonucleotid coordination induced gold nanoparticles aggregation, *Biosensors an Bioelectronic,* http://dx.doi.org/10.1016/j.bios.2016.05.080

A label-free colorimetric aptasensor for simple, sensitive and selective detection of Pt (II) based on platinum (II)-oligonucleotide coordination induced gold nanoparticles aggregation

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Abstract

Herein, a gold nanoparticles (AuNPs) based label-free colorimetric aptasensor for simple, sensitive and selective detection of Pt (II) was constructed for the first time. Four bases (G-G mismatch) mismatched streptavidin aptamer (MSAA) was used to protect AuNPs from salt-induced aggregation and recognize Pt (II) specifically. Only in the presence of Pt (II), coordination occurs between G-G bases and Pt (II), leading to the activation of streptavidin aptamer. Streptavidin coated magnetic beads (MBs) were used as separation agent to separate Pt (II)-coordinated MSAA. The residual less amount of MSAA could not efficiently protect AuNPs anymore and aggregation of AuNPs will produce a colorimetric product. With the addition of Pt (II), a pale purple-to-blue color variation could be observed by the naked eye. A detection limit of 150 nM and a linear range from 0.6 μM to 12.5 μM for Pt (II) could be achieved without any amplification.

Keywords

Gold nanoparticles; Platinum ion; Colorimetric; Aptamer sensor; Streptavidin.

1. INTRODUCTION

There are various existence forms of bivalent platinum ion in chemical, biochemical and pharmaceutical areas. For instance, potassium tetrachloroplatinate (II) (K_2PtCl_4) is an important platinum source for the synthesis of platinum based nanomaterials. (Huang et al. 2011; Ma et al.