

## Author's Accepted Manuscript

MAGNETIC MULTIWALLED CARBON NANOTUBES AS NANOCARRIER TAGS FOR SENSITIVE DETERMINATION OF FETUIN IN SALIVA

Esther Sánchez-Tirado, Araceli González-Cortés, Paloma Yáñez-Sedeño, José M. Pingarrón



PII: S0956-5663(18)30324-5  
DOI: <https://doi.org/10.1016/j.bios.2018.04.056>  
Reference: BIOS10452

To appear in: *Biosensors and Bioelectronic*

Received date: 25 February 2018  
Revised date: 26 April 2018  
Accepted date: 26 April 2018

Cite this article as: Esther Sánchez-Tirado, Araceli González-Cortés, Paloma Yáñez-Sedeño and José M. Pingarrón, MAGNETIC MULTIWALLED CARBON NANOTUBES AS NANOCARRIER TAGS FOR SENSITIVE DETERMINATION OF FETUIN IN SALIVA, *Biosensors and Bioelectronic*, <https://doi.org/10.1016/j.bios.2018.04.056>

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.

**MAGNETIC MULTIWALLED CARBON NANOTUBES AS NANOCARRIER TAGS FOR SENSITIVE DETERMINATION OF FETUIN IN SALIVA**

Esther Sánchez-Tirado, Araceli González-Cortés, Paloma Yáñez-Sedeño\*, José M.

Pingarrón

Department of Analytical Chemistry, Faculty of Chemistry, University Complutense of Madrid, 28040-Madrid. Spain

\*Corresponding author: E-mail yseo@quim.ucm.es

**ABSTRACT**

This paper reports the development and performance of an electrochemical immunosensor using magnetic multiwalled carbon nanotubes (*m*-MWCNTs) as nanocarrier tags for the determination of human fetuin A (HFA), a relevant biomarker of obesity, insulin resistance, and type-2 diabetes as well as for pancreatic and liver cancers and inflammatory processes. Screen-printed carbon electrodes were grafted with *p*-aminobenzoic acid and streptavidin was covalently immobilized on the electrode surface. A biotinylated capture antibody was immobilized through streptavidin-biotin interaction and a sandwich assay configuration was implemented using *m*-MWCNTs conjugated with HRP and anti-HFA antibodies as the detection label. The determination of HFA was accomplished by measuring the current produced by the electrochemical reduction of benzoquinone at  $-200$  mV upon addition of  $H_2O_2$  as HRP substrate. The prepared *m*-MWCNTs were characterized by SEM, TEM, XRD and EDS. All the steps involved in the immunosensor preparation were monitored by electrochemical impedance spectroscopy and cyclic voltammetry. A linear calibration plot for HFA was found between 20 and 2000 pg/mL with a LOD value of 16 pg/mL. This performance is notably better than that reported for an ELISA kit and a chronoimpedimetric immunosensor. The favorable contribution of *m*-MWCNTs in comparison with MWCNTs without incorporated magnetic particles to this excellent analytical performance is also highlighted. The immunosensor selectivity against other proteins and potentially interfering compounds was excellent. In addition, the usefulness of the immunosensor was demonstrated by the analysis of HFA in saliva with minimal sample treatment.

Download English Version:

<https://daneshyari.com/en/article/7229211>

Download Persian Version:

<https://daneshyari.com/article/7229211>

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