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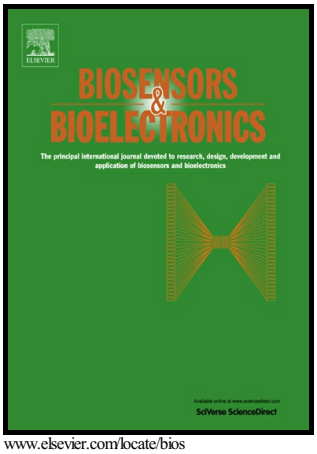

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ABSTRACT

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*-aminobezoic 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.