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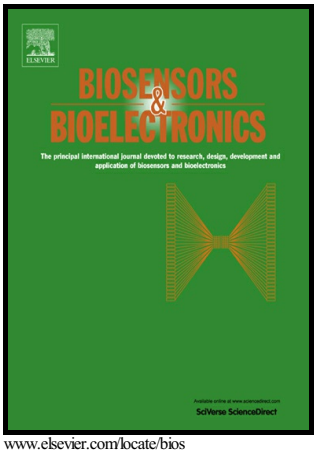

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Nitidine chloride-assisted bio-functionalization of reduced graphene oxide by bovine serum albumin for impedimetric immunosensing

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Abstract: A novel protocol of label-free electrochemical impedance immunosensor based on bovine serum albumin-nitidine chloride-reduced graphene oxide (BSA-NC-rGO) nanocomposite was proposed for quantitative determination of carcino-embryonic antigen (CEA). BSA was anchored to rGO via the aromatic plane of NC by π-stacking interaction to realize bio-functionalization of rGO, and then gold nanoparticles (AuNPs) were electrodeposited onto the surface of BSA-NC-rGO nanocomposite. The morphology, conductivity and interaction of different nanocomposites were characterized by scanning electron microscopy, cyclic voltammetry, electrochemical impedance spectroscopy (EIS) and UV-vis spectrum. CEA monoclonal antibody (anti-CEA) was conjugated to AuNPs via gold-thiol chemistry to construct electrochemical immunosensing platform, and the specific immunoreaction between CEA and anti-CEA was monitored by EIS. Under optimum conditions, CEA could be quantified in a wide range of 0.1−200 ng mL^{-1} (R = 0.9948) with low detection limit of 0.067 ng mL^{-1}. The proposed immunosensor exhibited great potential for detecting blood samples.

Keywords: reduced graphene oxide; nitidine chloride; bovine serum albumin; gold nanoparticles; impedimetric immunosensor

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