

Short Communication

Development of Electrochemical Sensor for Coronary Heart Disease Biomarker MMP-9 Analysis

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This work explored the preparation of a sensitive amperometric immunosensor for MMP-9. The in situ deposition of Au nanoparticles (Au NPs) on the polydopamine functionalized silica nanosphere and subsequent signal antibodies tagging were carried out for the preparation of Au nanoprobe. The fabrication of immunosensor was achieved while the capturing antibodies were covalently immobilized onto the glassy carbon electrode. Cyclic voltammetry (CV) was adopted for studying the modified electrode traits at diverse modification phases. Besides, particular investigation of the behaviors of immunosensor was herein carried out. Apart from the significant sensitivity in detecting MMP-9, the final immunosensor features a favorable correlation in terms of MMP-9 detection with a range (0.1-150.0 ng/mL) and a limit of detection (0.06 ng/mL) estimated at a ratio of 3 (signal-noise). The one-step immunoassay detection of MMP-9 is available with the proposed approach which is potential to be applied in diagnosing coronary artery disease at an early stage.

Keywords: Polydopamine; AuNPs; MMP-9; Silica; Electrochemical sensor; Coronary heart disease

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