Electrochemical Immunoassay Determination of a Cancer Biomarker (CA19-9) by Horseradish Peroxidase

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This work developed an electrochemical immunosensor to quantitatively detect CA19-9 in human serum, a pancreatic cancer biomarker, where the electrode materials were thionine (TH) and graphene sheets (GS), and horseradish peroxidase (HRP) and ferroferric oxide (Fe_3O_4) nanoparticles-loaded mesoporous silica nanoparticles (MSNs) served as labels to amplify signals. The electron transfer and immobilization of primary antibody of CA19-9 (Ab_1) were enhanced by the as a substrate, the GS and TH hybrid (GS/TH). MSNs were used as a carrier for immobilization of secondary antibody of CA19-9 (Ab_2), Fe_3O_4 , and HRP. The sensitivity of the immunosensor could be enhanced by the synergistic effect between HRP and Fe_3O_4 . The proposed technique is potential to be applied to clinical analysis or be used to detect other tumor markers.

Keywords: Pancreatic cancer; Biomarker; Graphene; CA19-9; Horseradish peroxidase

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