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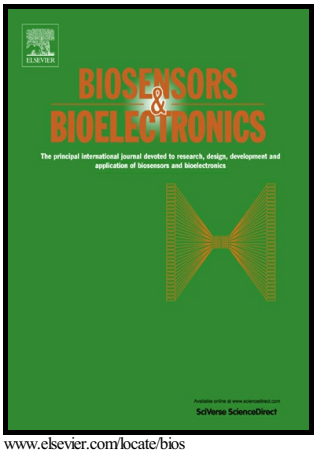

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Novel Electrochemical Biosensor based on Cationic Peptide Modified Hemin/G-quadruples Enhanced Peroxidase-like Activity

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Abstract:

This work designed an artificial substrate peptide to synthesize peptide-hemin/G-quadruplex (peptide-DNAzyme) conjugates. In addition to enhancing catalytic activity of hemin/G-quadruplex, the peptide could also be induced and cleaved by prostate specific antigen (PSA). It was the first report on peptide-DNAzyme conjugates in application of the peptide biosensor. The polyethyleneimine-reduced graphene oxide@hollow platinum nanotubes (PEI-rGO@PtNTs) nanocomposites were cast on the glassy carbon electrode in order to form the interface of biocompatibility and huge surface area for bioprobes immobilization. In absence of PSA, the peptide-DNAzyme conjugates retained intact on the surface of the electrode to produce a strong response signal. But in presence of PSA, the peptide-DNAzyme conjugates were destroyed to release electron mediators, resulting in dramatical decrease of the electrochemicl signal. Therefore, the method had high sensitivity and super selectivity with the limit of detection calculated as 2.0 fg/mL. Furthermore, the strategy would be promising to apply for other proteases

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