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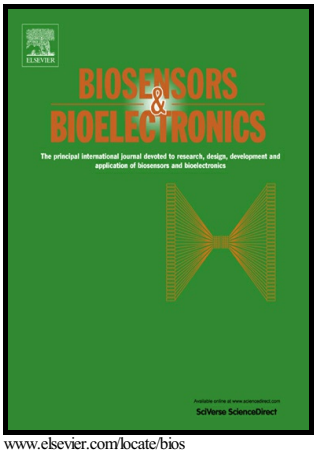

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Highly sensitive electrochemical thrombin aptasensor based on peptide-enhanced electrocatalysis of hemin/G-quadruplex and nanocomposite as nanocarrier

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Abstract:

In this work, we first conjugated a short peptide to thrombin binding aptamer (TBA) and bond hemin to the hybrid, effectively rendering hemin/G4-peptide more active over the original hemin/G4, so that a highly sensitive electrochemical thrombin (TB) aptasensor was developed based on it and PtNTs@rGO nanocomposite. It was the first report on the application of hemin/G4-peptide in electrochemical aptasensor. PtNTs@rGO with large surface area served as excellent nanocarrier for high loading of hemin/G4-peptide hybrids, resulting in the formation of hemin/G4-peptide–PtNTs@rGO bioconjugate as the secondary aptamer and further signal enhancement. The specific affinity of aptamer for target TB made the secondary aptamer go into the sensing interface, and then a noticeable current signal was obtained from hemin without additional redox mediators. Due to the collaborative electrocatalysis of hemin/G4-peptide and PtNTs toward H_2O_2, which was formed in situ during the process of hemin/G4-peptide-catalyzed oxidation of NADH with dissolved O_2, the

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