ABSTRACT

Aptasensors, aptamer-based biosensors, serve as important analytical devices in fields as diverse as medicinal chemistry, environmental chemistry, and chemical defense.[1] A label-free electrochemical aptasensor was developed on gold nanoparticle (GNP)-modified screen-printed carbon electrodes (SPCE) in order to increase both affinity and sensitivity of the aptasensors. Affinity was improved by employing direct electrical detection instead of labeled aptamers, which have reduced bio affinity due to the labels.[2] Sensitivity was improved by employing click chemistry-assisted self-assembly of the aptamers onto the GNPs, which immobilizes the thiolated aptamer.[2,3] Lysozyme was chosen as the target protein, hexaammineruthenium (III) [$Ru(NH_3)_6^{3+}$] was used as the electrochemical indicator, and square wave voltammetry was used to measure the decrease in the amount of surface-bound [$Ru(NH_3)_6^{3+}$] when lysozyme is bound by the aptamer.[3] Specificity of the aptasensor was assayed against bovine serum albumin (BSA), thrombin, and cocaine.[3] The inverse relationship between the peak current of [$Ru(NH_3)_6^{3+}$] and the concentration of lysozyme coupled with the lack of interference from cocaine and slight interference from BSA and thrombin suggests that a new approach was developed for making increasingly sensitive aptasensors.[3]

References

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