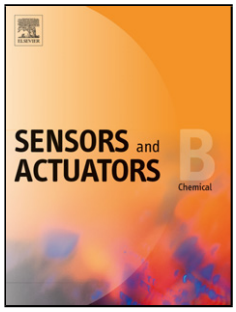

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Sensitive Electrogenerated Chemiluminescence Aptasensor for the Detection of Ramos Cells Incorporating Polyamidoamine Dendrimers and Oligonucleotide

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Abstract

A sensitive electrogenerated chemiluminescence (ECL) apatasensor was developed for the detection of human Burkitt's lymphoma Ramos cells based on the cells-specific oligonucleotide TD05 served as a molecular recognition element and ruthenium(II) complex (Ru1) labeled polyamidoamine dendrimer (Dend) as a signal probe. Dend was used as platform to assemble substantial Ru1 and TD 05 to form Ru1-Dend-SH-$(CH_2)_6$-oligo(ethylene oxide)$_6$-TD05 bioconjugate which was used as the signal probe. Dend was not only used as platform to assemble substantial Ru1 but also used as a coreactant of Ru1 to amplify the ECL signal. The biosensor platform was fabricated by covalently coupling the 52-mer amino-substituted oligonucleotide probes with carboxyl groups on single wall carbon nanotubes-coated glassy carbon electrode. With the sandwich assay, Ramos cells were selectively captured on the surface of the biosensor based on the specific affinity between aptamers and mIgM on the target cells surface, and then, the signal probe was bound with the captured cells. In the presence of tri-n-propylamine, the increased ECL intensity of the biosensor was logarithmically proportion to the concentration of Ramos cells over a range from 1.0×10^2 to 1.0×10^4 cells/mL with a detection limit of 55 cells/mL. It was found that the sensitivity of the biosensor increased 4.3-fold by comparison with that without Dend. And also, the ECL biosensor showed satisfied selectivity against the tested control cancer cells.