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Electrochemical aptasensor for glycated albumin in Diabetes mellitus diagnosis and monitoring

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A simple electrochemical aptasensor was developed for the detection of glycated albumin (GHSA) using ssDNA aptamer that selectively binds to GHSA as a recognition element. The biotinylated ssDNA aptamer was immobilized on a streptavidin-modified screen-printed carbon electrode (SPCE). The changes of interfacial features of the electrode surface, which were based on the aptamer-GHSA interaction, were probed in the presence of the reversible redox $\text{Fe}(\text{CN})_6^{3-}$ using square wave voltammetry (SWV) measurements. Our results showed that the minimum detection limit of this sensor was $10 \mu\text{g/ml}$ with a calibration curve to the range of 16 mg/ml . The aptasensor showed high selectivity for GHSA over other molecules that is usually available in the blood. Importantly, our aptasensor was successfully applied to detect GHSA in blood serum samples, which demonstrated the higher levels of GHSA concentrations in diabetes than normal persons. These indicate that our electrochemical aptasensor has a potential for diagnosis and monitoring of diabetes mellitus.

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