

Development of albumin glycation detection platforms for diabetes mellitus monitoring

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Abstract

Aptamers are short ssDNA or RNA that specifically bind to target molecule using three-dimensional structure. Their target molecules could be cells, proteins, metal ions, and toxin. Aptamers are more stable and easy to produce compared with the antibody and can be selected from the large aptamer library using the method called "Systematic Evolution of Ligands by Exponential Enrichment" or "SELEX". Our group have selected and modified DNA aptamers specifically bound human serum albumin (HSA) and glycated human serum albumin (GHSA), which is a marker for non-communicable diseases such as diabetes mellitus, kidney dysfunction and Alzheimer. In this study, three sensor platforms, which are electrochemical, nanopore and graphene-based aptasensor have been developed for diabetes mellitus detection. The fluorescent quenching graphene oxide (GO) and Cy5-labeled aptamers could be used for GHSA and HSA detection in both human serum and urine samples (both DM patients and normal group). These indicate that our aptasensor has a potential for diagnosis and monitoring of diabetes mellitus.

Keywords: Aptamer; diabetes mellitus; glycated human serum albumin; aptasensor

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