In vitro Selection using DNA Aptamer for HbA_{1c} through SELEX

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Aptamers are single-stranded oligonucleotides (DNA or RNA) that can bind with high affinity and specificity to their targets. These molecules are being presently used with detection and diagnosis purpose. Hemoglobin A_{1c} (HbA_{1c}), which is irreversibly glycosylated on the N-terminal valine of the β-chain, is well known as the main diabetes mellitus marker protein for monitoring long term glycemic control. Generally, HbA_{1c} have been measured by using boronate-affinity chromatography and ion-exchange chromatography. Besides immunoassay, mass spectrometry and electrophoresis have been used clinically. In this study, a single-stranded DNA aptamer was developed to specifically HbA_{1c} through SELEX (systematic evolution of ligands by exponential enrichment). Aptamers obtained after 8 rounds of selection demonstrated the high affinity and specific binding with HbA_{1c} using nanodrop spectrometer and real-time PCR. The further study, SPR (surface plasmon resonance) analysis of the aptamer showed high specificity and affinity. These aptamers open up possibilities to allow simple detection of HbA1c via aptamer-based biosensors.