

## ssDNA aptamer-based SPR biosensor for early diagnosis of type 2 diabetes by RBP4 detection

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Retinol-binding protein 4 (RBP4) is one of the adipokines which contributes to insulin resistance under the condition of obesity and type 2 diabetes. The level of RBP4 increases in insulin resistance state. We have developed an aptamer-based SPR biosensor for sensing RBP4 in serum. An ssDNA aptamer with high affinity and specificity to bind RBP4 was selected from a random pool of  $3 \times 10^{16}$  molecules by SELEX method. The RBP4 aptamer obtained for the first time was immobilized on a gold chip and used for a label free detection of RBP4 by Surface Plasmon Resonance (SPR). The dissociation constant of the aptamer was calculated to be  $0.2 \pm 0.03 \mu\text{M}$  by SPR response units, and the minimum detectable concentration of this aptamer-based SPR biosensing system was 75 nM. Analysis of RBP4 in artificial serum using SPR was compared with ELISA and western-blot analysis. Our results indicated that the RBP4-specific aptamer-based SPR biosensor gave better dose-dependent responses and was more sensitive than ELISA assays. As such, this RBP4 aptamer-based SPR biosensor can be used to monitor the RBP4 levels within the serum as an indicator of type 2 diabetes.