



Development of a portable NanoAptamer analyzer for the detection of bisphenol A

Ahjeong Son (1), Hyun Jeong Lim (1), and Beelee Chua (2)

(1) Ewha Womans University, Seoul, Korea, Republic Of (ahjeong.son@gmail.com), (2) Korea University, Seoul, Korea, Republic of (chuabeelee@gmail.com)

We have demonstrated a portable NanoAptamer analyzer capable of detecting bisphenol A (BPA) at environmentally relevant concentrations (< 1 ng/mL or ppb). It is designed for performing reaction and fluorescence measurement on single cuvette sample. NanoAptamer assay was developed and used as a sensing mechanism where signaling DNA and QD655 was tethered to QD565 and magnetic bead via the aptamer. Aptamer affinity with BPA resulted in the release of the signaling DNA and QD655 from the complex and hence corresponding decrease in QD655 fluorescence measurement signal. Baseline characterization was first performed with empty cuvettes, quantum dots and magnetic beads under near-ideal conditions to establish essential functionality of the NanoAptamer analyzer. Duration of incubation time, number of rinse cycles, and necessity of cuvette vibration were also investigated. In order to demonstrate the capability of the NanoAptamer analyzer to detect BPA, samples with BPA concentrations ranging from 0.0005 to 1.0 ng/mL (ppb) were used. The performance of the NanoAptamer analyzer was further examined by using laboratory protocol and commercial spectrofluorometer as reference. Correlation between NanoAptamer analyzer and laboratory protocol as well as commercial spectrofluorometer was evaluated via correlation plots and correlation coefficients.