"Turn-on" detection of Hg^{2+} ion using a peroxidase-like split G-quadruplex-hemin DNAzyme

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1. CD spectra in the presence of hemin

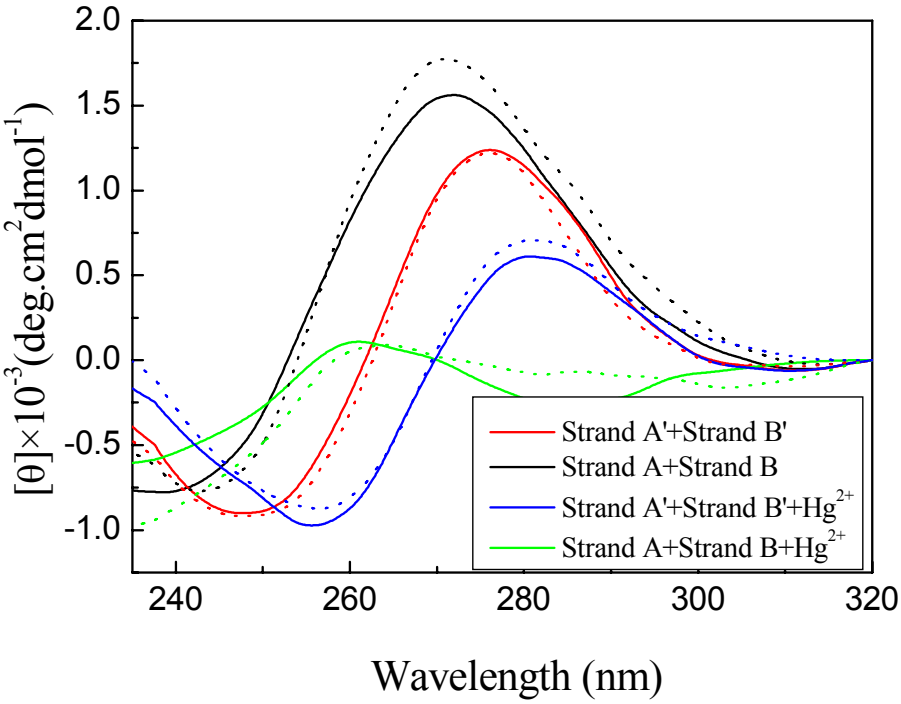

Fig. S1 CD spectra of the strand A′/strand B′ mixture and the strand A/strand B mixture without or with 2.5 μM Hg^{2+} in the absence (solid lines) or presence of 1 μM hemin (dotted lines).

2. Hg^{2+} detection using high concentrations of Strand A and Strand B

Experimental detail: The mixture of strand A (0.5 μM) and strand B (1.0 μM) was prepared in 10 mM Tris-HAc buffer (pH = 7.0) containing 50 mM KAc and 0.004% (v/v) TritonX-100. The mixture was heated to 90 ^{o}C for 5 min to remove aggregates, then cooled slowly to 25 ^{o}C, and incubated at 25 ^{o}C for 30 min. To this solution was added different concentration of Hg^{2+}. The mixture was allowed to incubate at 25 ^{o}C for another 30 min. 1 μM of hemin was added to the mixture. The mixture was held for 1h at 25 ^{o}C. Then, 3.2 mM of ABTS and 0.5 mM of H_2O_2 were added. The absorption spectrum of the reaction product $ABTS^{\cdot+}$ was recorded by a TU-1901 UV-Vis spectrophotometer after the reaction had run for 4 min. The absorbance at 420 nm was used for quantitative analysis.

Results: when 0.5 μM Strand A and 1.0 μM strand B were used, A linear relationship (R^2 = 0.9986) was observed with Hg^{2+} concentrations from 0 to 1000 nM, The limit of detection was 60 nM Hg^{2+} ion, based on a signal to noise ratio of 3.

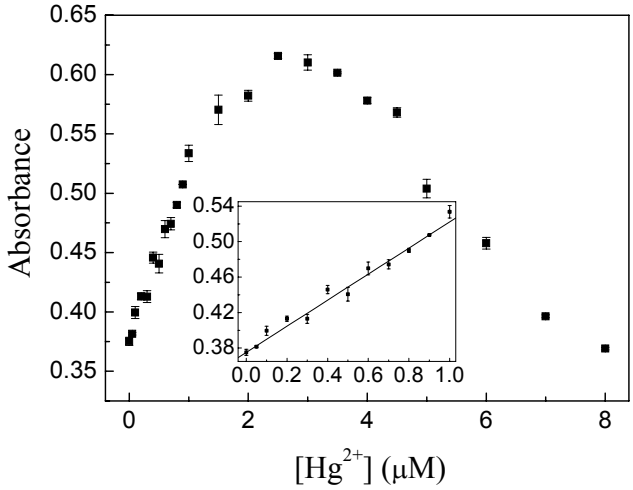

Fig. S2 Hg^{2+} concentration-dependent change in the absorption signal at λ = 420 nm. The insert shows the absorption signal change in the Hg^{2+} concentration range of 0 ~ 1000 nM. The solid line represents linear fit to the data. All experiments were performed in duplicate.