Supporting Information

Experimental details

Sequences of oligomers

Most of GMOs contain Cauliflower mosaic virus (CaMV) 35S promoter. This promoter gene was selected as a DNA target sequence and lectin (an endogenous gene for soybean) were selected as the reference gene in this study. Moreover, DNA-T (ATTGTGCGTCATCCCTTACGTCAGTGGAG) and DNA-R (GAGGATGGATTT AAACCAGTCAGCACCG) were screened from the CaMV 35S promoter and lectin gene respectively with Primer Premier 5 software. Binary probes that including CTCCACTGACGTAATGGGTAGGG (probe-1) and GGGTTGGGCGGATGACGCA CAAT (probe-2) for fluorimetric analysis of DNA-T were prepared. Both probes were designed to have two specific portions as shown in scheme 1. One portion is for hybridizing with DNA-T, and another portion is for hybridizing with two GGG repeats. In the presence of DNA-T, the probes boost up G-quadruplex formation and the fluorescence intensity is then enhanced remarkably.

Instrumentation and Reagents

All DNA sequences were synthesized and purified by Sangon Biotechnology Co. Ltd. (Shanghai, China). They were dissolved in a Tris-HCl buffer (pH 7.6). The DNA stock solutions were in 100 μM and stored at 4 ℃. Hemin was purchased from Aladdin Reagents (Shanghai, China). A hemin stock solution (6.75 mM) was prepared in Dimethylsulfoxide (DMSO) and stored at -20 ℃. 2',7'-dichlorodihydrofluorescein

diacetate (H_2DCFDA) was obtained from Alexis Co. (Switzerland). Hydrogen peroxide (H_2O_2) was purchased from Fuchen Chemical Reagents (Tianjin, China). Hemin, H_2DCFDA and H_2O_2 solutions were freshly prepared with a buffer solution (pH 7.0) containing 50 mM Tris-HCl, 150 mM NH_4Ac and 20 mM KCl respectively.

Cary Eclipse Fluorescence Spectrophotometer was used for the measurements. The instrument parameters were set as follows: λ_{ex}= 504 nm (slit 5 nm), λ_{em}= 510-600 nm (slit 5 nm).

Assembly of sensor and Measurements of Peroxidase Reaction

To prepare the sample solutions, 1.5 μL of each probe (probe 1 and probe 2, at 1.0×10^{-4} mol/L) and different amount of DNA-T were well-mixed. The resulting solution was incubated at room temperature. After 60 min, to the solution 1.65 μL hemin (at 7.21×10^{-5} mol/L) was added and the mixture was incubated for another 60 min at room temperature. Afterward, 50 mM Tris-HCl solution that containing 150 mM NH_4Ac and 20 mmol/L KCl was added to make the final volume be 300 μL. Before taking measurements, H_2DCFDA and H_2O_2 were added to the solution, in which their concentrations were fixed to be 5.0×10^{-5} mol/L and 2.0×10^{-4} mol/L, respectively. The fluorescent signals of the mixture were recorded with fluorescence spectrophotometer after incubation for 10 min at room temperature.

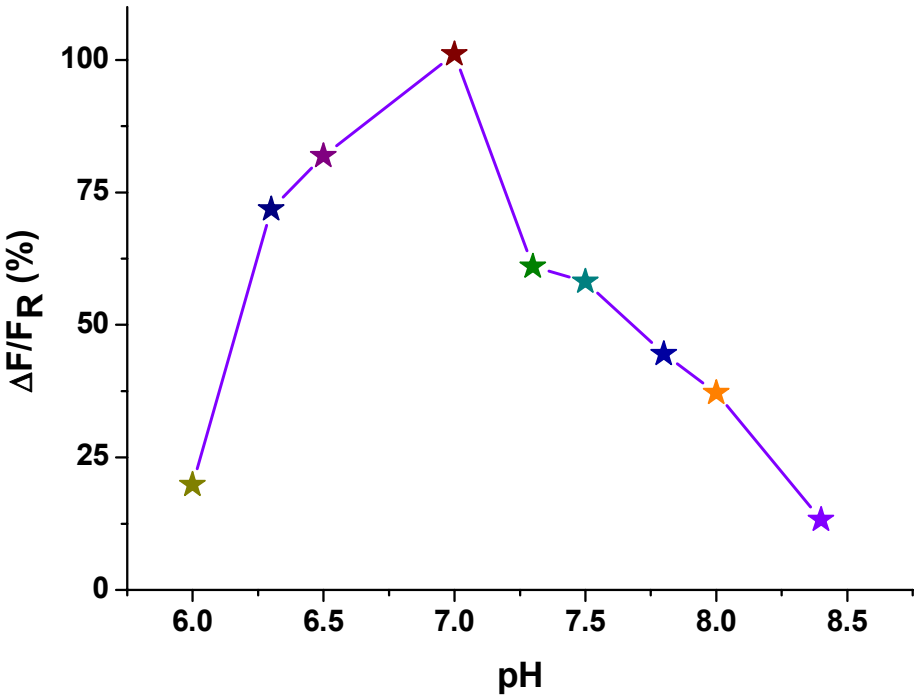

Figure S1 Effect of buffer pH on □F/F_R in 50 mmol/L Tris-HCl containing 150 mmol/L M NH_4Ac with probes 5×10^{-7} mol/L, DNA-T 3.0×10^{-7} mol/L and hemin 5×10^{-7} mol/L, and the pH is 6.0, 6.3, 6.5, 7.0, 7.3, 7.5, 7.8, 8.0, 8.4 respectively.

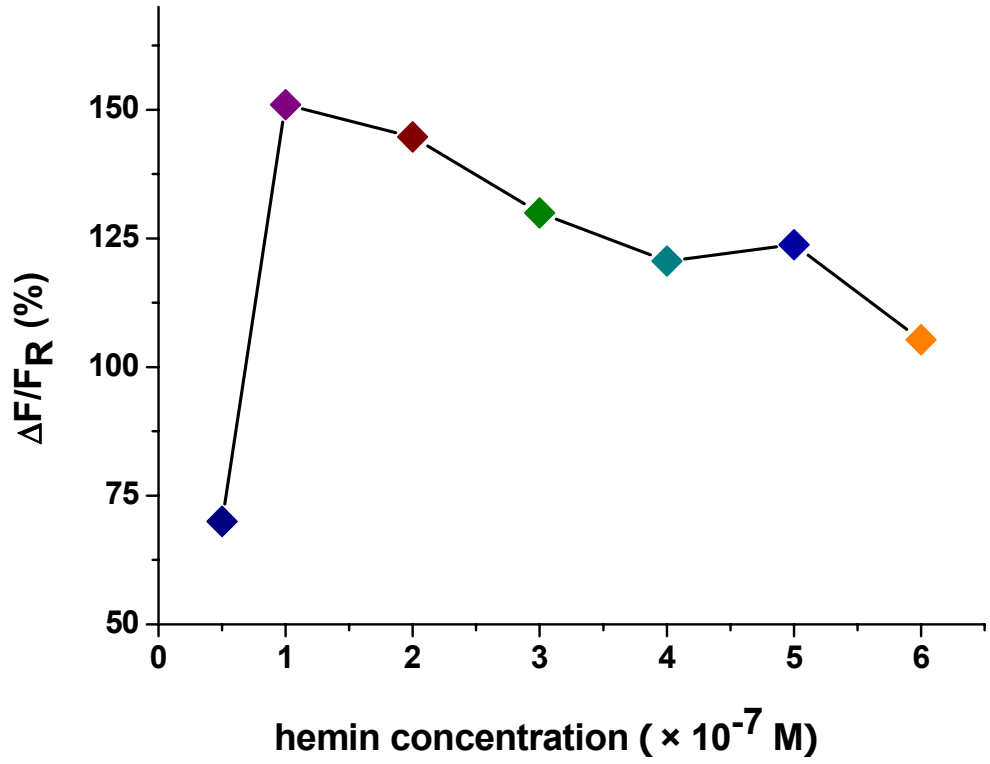

Figure S2 Effect of hemin concentration on □F/F_R in 50 mmol/L Tris-HCl containing 150 mmol/L NH_4Ac and 20 mmol/L KCl (pH 7.0) with probes 5×10^{-7} mol/L and DNA-T 3.0×10^{-7} mol/L.

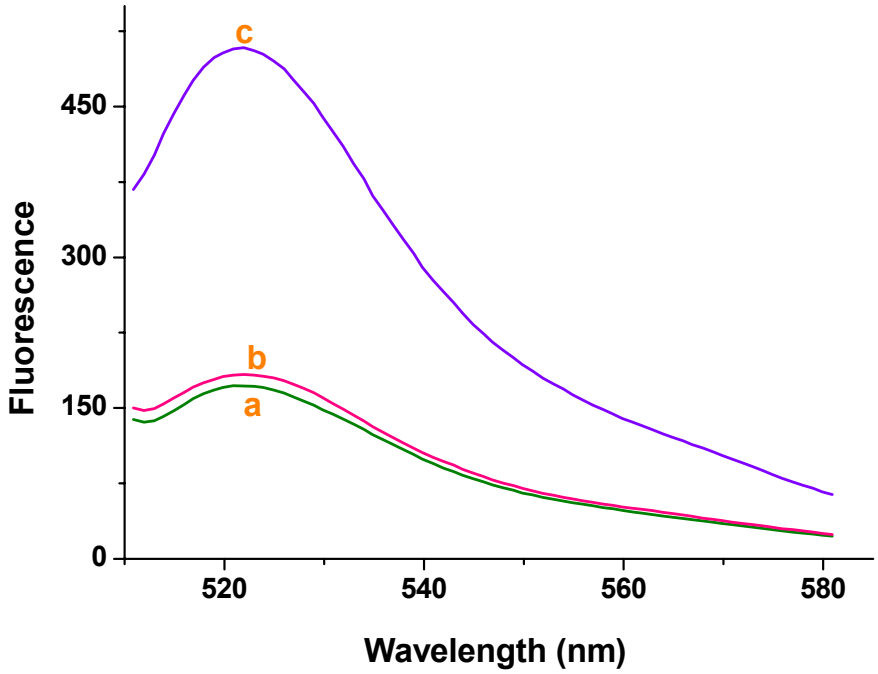

Figure S3 Identification of DNA-T in 50 mmol/L Tris-HCl containing 150 mmol/L NH_4Ac and 20 mmol/L KCl (pH 7.0) with hemin 1.0×10^{-7} mol/L and (a) probe-1 and probe-2 5.0×10^{-7} mol/L (b) probe-1, probe-2 5.0×10^{-7} mol/L and DNA-R 3.0×10^{-7} mol/L (c) probe-1, probe-2 5.0×10^{-7} mol/L and DNA-T 3.0×10^{-7} mol/L. The PMT detector voltage is 600 V.