Electronic Supplementary Material (ESI) for Analyst.

Supporting Information

Fluorescence imaging of intracellular telomerase activity for tumor cell identification by oligonucleotide-functionalized gold nanoparticles

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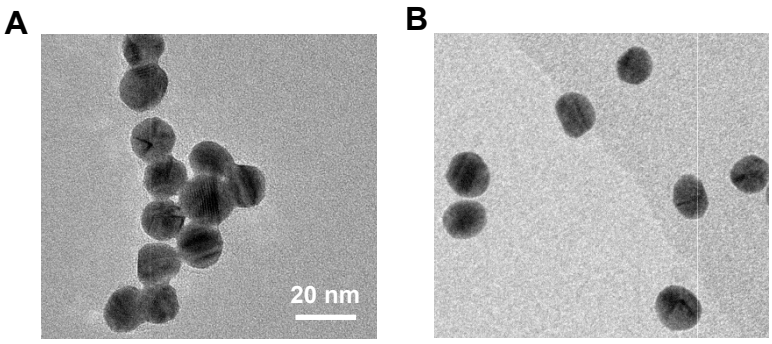

Figure S1. TEM micrograph of gold nanoparticle (A) and oligonucleotide-functionalized gold nanoparticles (B).

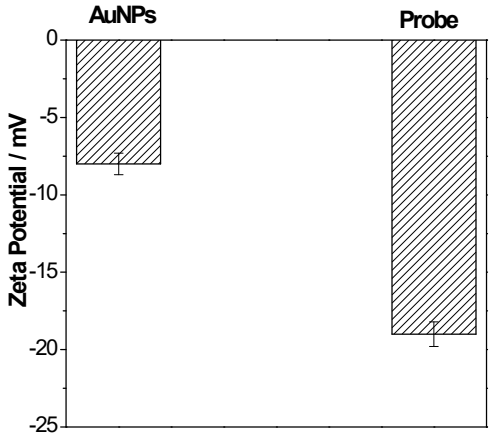

Figure S2. Zeta potential of gold nanoparticle and oligonucleotide-functionalized gold nanoparticles. Error bars represent standard deviation from three independent tests (n = 3).

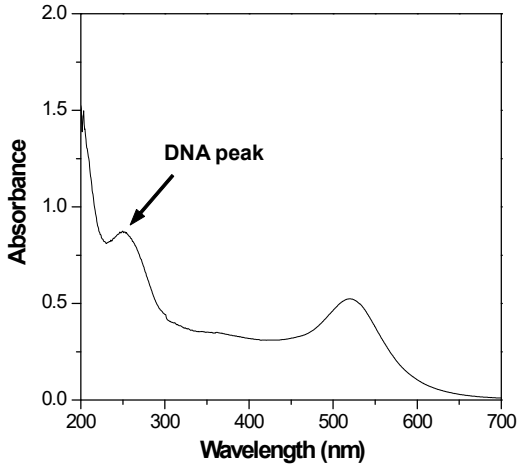

Figure S3. UV-vis absorption spectra of probe.

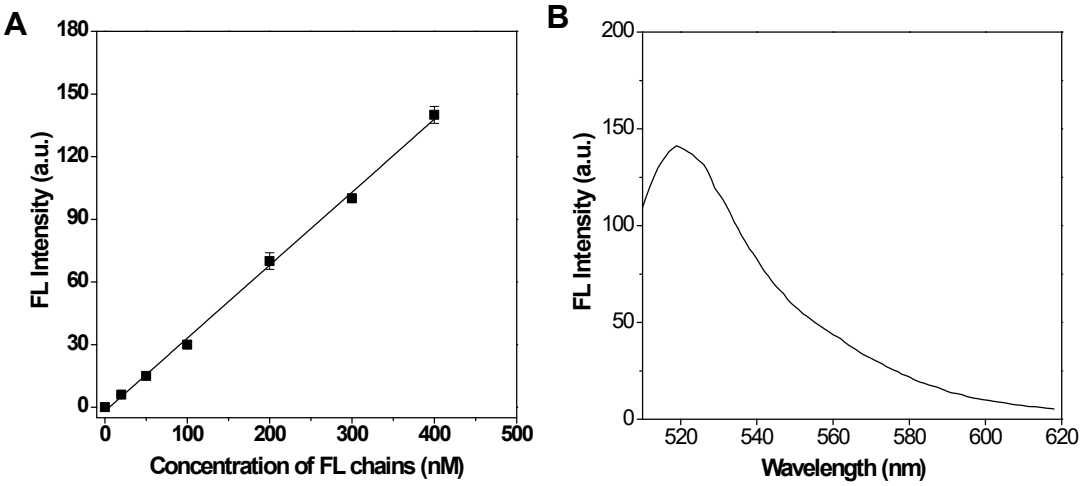

Figure S4. Quantification of number of DNA chains loaded at each AuNPs. (**A**) The liner relationship between fluorescence intensity and FL DNA concentration. (**B**) Fluorescence spectrum of the supernatant containing FL-DNA chains. The average number of DNA chains at each AuNP was calculated by the concentrations of DNA chains and AuNPs. Error bars represent standard deviation from three independent tests (n = 3).

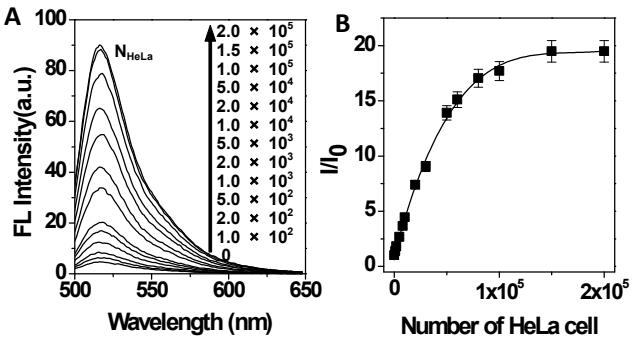

Figure S5. Telomerase activity detection in solution. (A) Fluorescent spectra of probe after incubation with HeLa cell lysates containing different cell numbers (left). (B) Fluorescence enhancement factor plotted against cell numbers. Error bars represent standard deviation from three independent tests (n = 3).

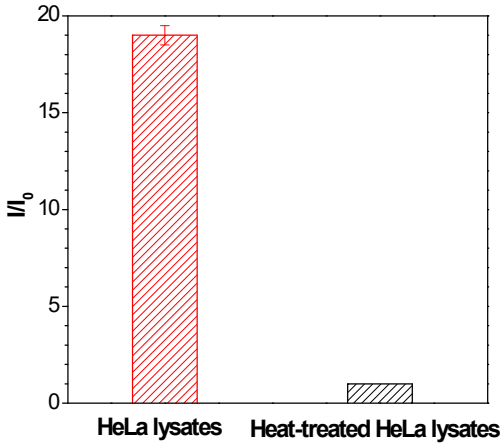

Figure S6. Control experiments for telomerase activity in HeLa cells. In the control experiment, the lysates of HeLa cells were heated at 90 °C for 30 min to inactivate telomerase there. A mixing solution containing 50 µL probe (6 nM), 20 µL 10× TRAP reaction buffer, 4 µL 10 mM dNTPs and 116 µL DEPC water was co-incubated with 10 µL of HeLa lysates or heat-treated HeLa lysates at 37 °C for 2 h. Fluorescent spectra were then measured. Error bars represent standard deviation from three independent tests (n = 3).

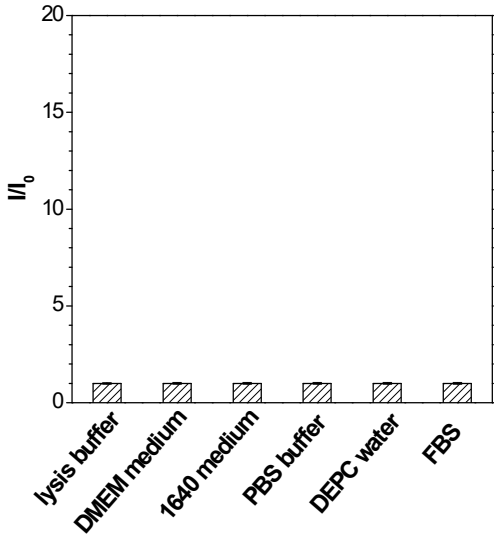

Figure S7. Stability of probe. The probe was co-incubated separately with different media including DEPC water, lysis buffer, DMEM medium, 1640 medium, FBS and blood by co-incubation for 2 h at 37 °C, and fluorescent spectra were recorded. Fluorescent enhancements in various media. Error bars represent standard deviation from three independent tests (n = 3).

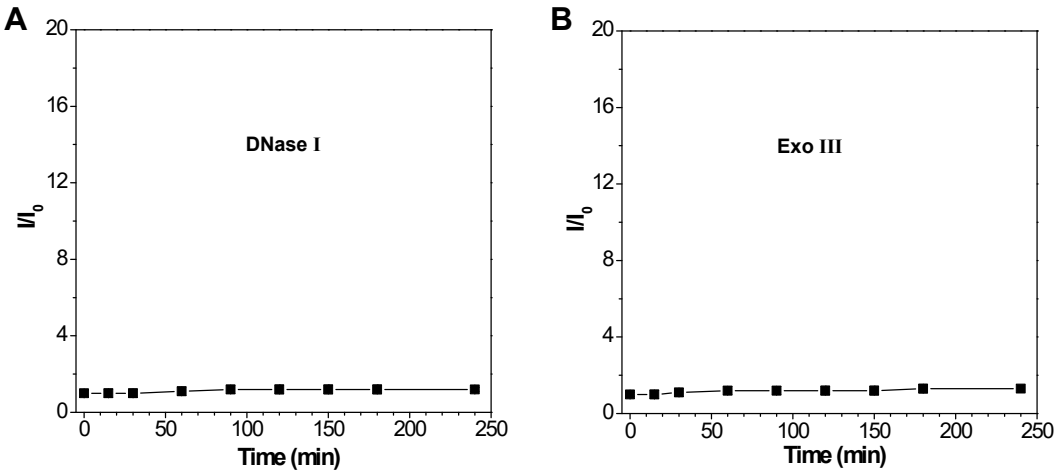

Figure S8. Tolerance of probe with DNA nuclease. Two typical DNA endonuclease DNase I and Exo III were separately co-incubated with probe in PBS buffer at 37 °C for 3 h, and the time-dependent fluorescent spectra were measured. (A) Fluorescent enhancements for DNase I. (**B**) Fluorescent enhancements for Exo III. Error bars represent standard deviation from three independent tests (n = 3). The error is very small and the error bars are invisible in the figure.

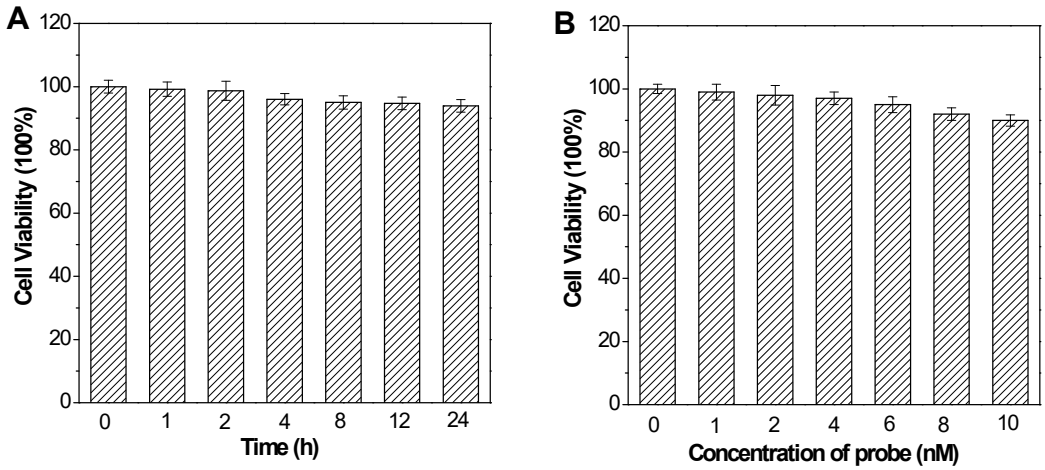

Figure S9. Viability of HeLa cells in the presence of the probe as measured by MTT assay. Error bars represent standard deviation from three independent tests (n = 3).

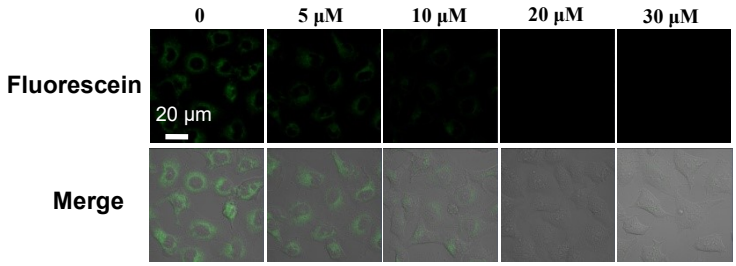

Figure S10 Control experiments by different amounts of telomerase inhibitor 3′-Azido-3′-deoxythymidine (AZT). Here, HeLa cells were first pretreated with 0, 5, 10, 20 or 30 μM AZT for 48 h and then washed with PBS buffer three times, and finally incubated with 50 μL probe (6 nM) for another 2 h. All images were taken with an excitation of 488 nm laser.

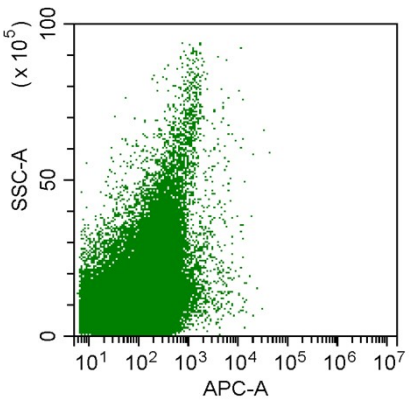

Figure S11. Flow cytometry analysis of peripheral blood. A drop of peripheral blood (50 μL) was treated with red-blood-cell lysing solution to remove red blood cells, and then the blood was analyzed by flow cytometry. The peripheral blood was obtained from a healthy volunteer. The speed of sample injection was 1000 cells/s and cellular fluorescence was excited with the wavelength of 488 nm. About 100,000 cells were detected in a drop of blood after removing red blood cells.