Supporting Information for

A Highly Robust, Recyclable Displacement Assay for Mercuric Ions in Aqueous Solutions and Living Cells

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Figures:

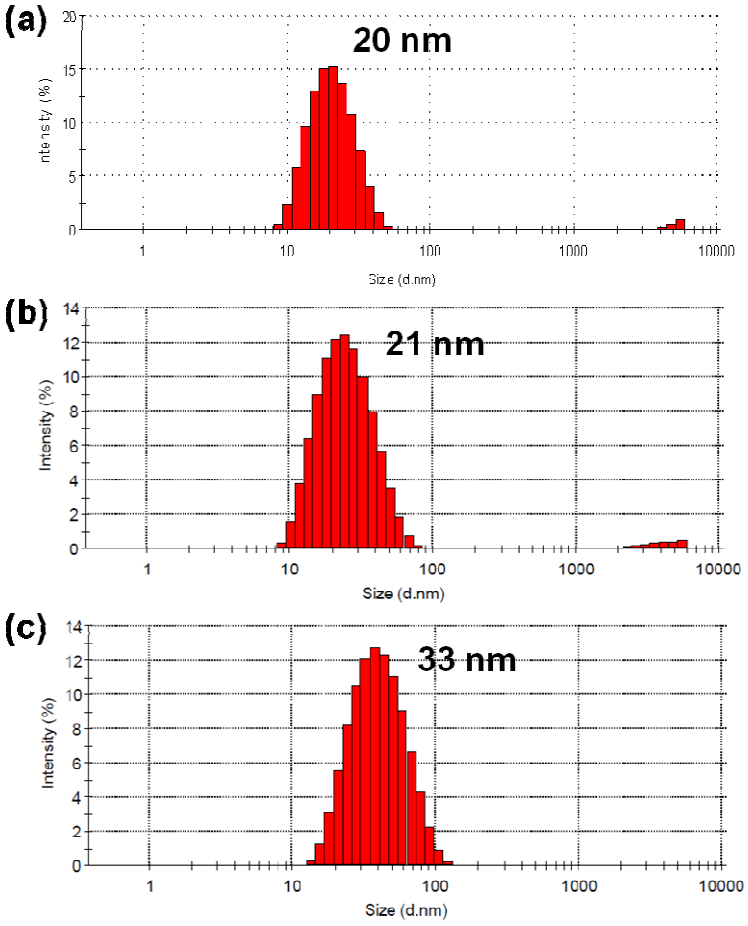

Figure S1 DLS measurements for Citrate-AuNPs, RBITC-AuNPs, and RBITC-PEG-AuNPs.

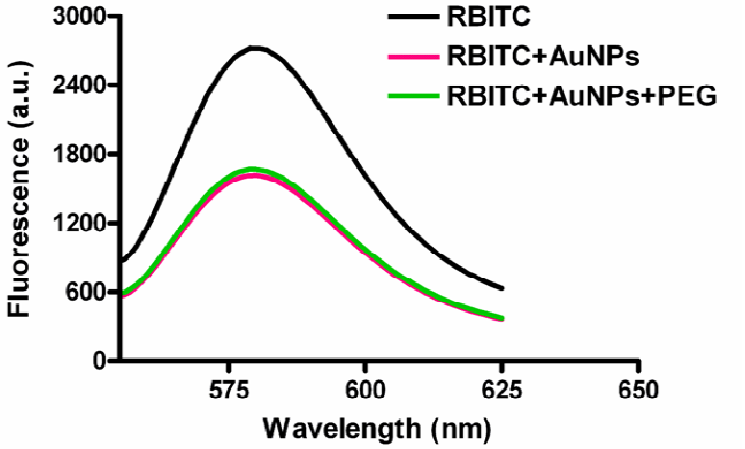

Figure S2 Fluorescence emission spectra of RBITC (10 μM) (black), and those incubated with citrate-AuNPs (red) and subsequently added with 3 μM of thiol-terminated PEG (green).

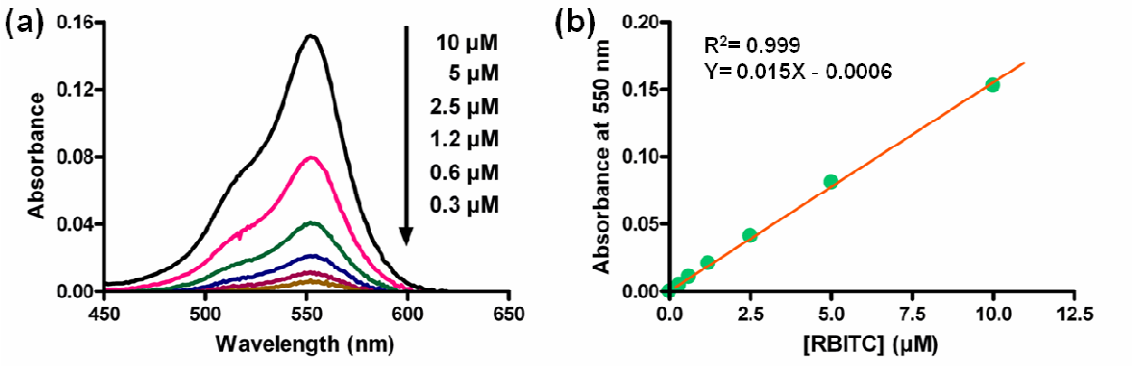

Figure S3 (a) UV-vis spectra of RBITC with varying concentrations from 0.3 to 10 μM and (b) their corresponding plots of absorbance at 555 nm *versus* concentrations of RBITC.

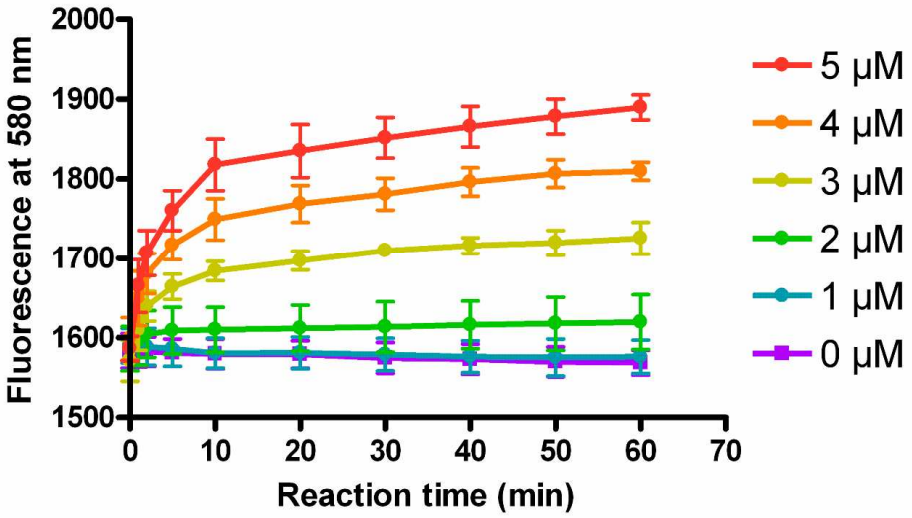

Figure S4 Fluorescence intensity of RBITC solutions (10 μM) incubating with citrate-AuNPs (2.5 nM), and different concentrations of thiol-terminated PEG were finally added.

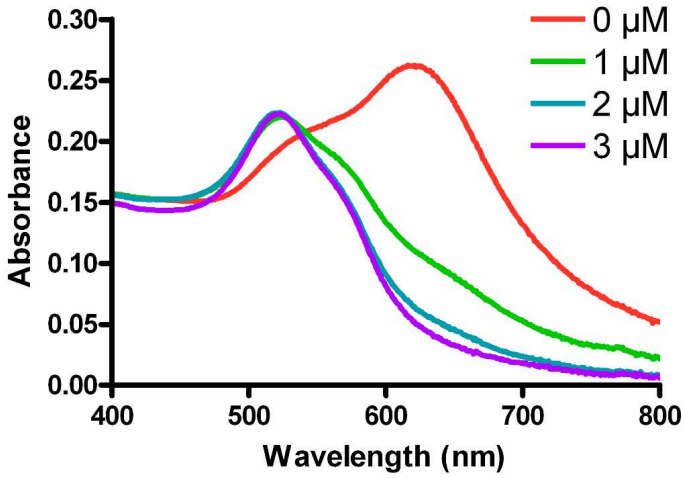

Figure S5. UV-vis spectra of RBITC-PEG-AuNPs functionalized by various concentrations of PEG and then re-dissolved in PBS.

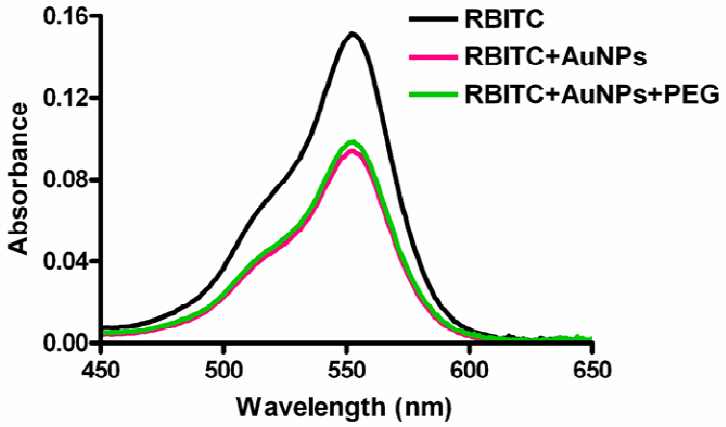

Figure S6 UV-vis spectra of free RBITC (10 μM) (black), and those after incubating with citrate-AuNPs (red) and subsequently adding 3 μM of thiol-terminated PEG (green). The non-conjugated RBITC in each solution was collected by centrifugation (14000 r/min, 15 min) and the supernatants were measured.

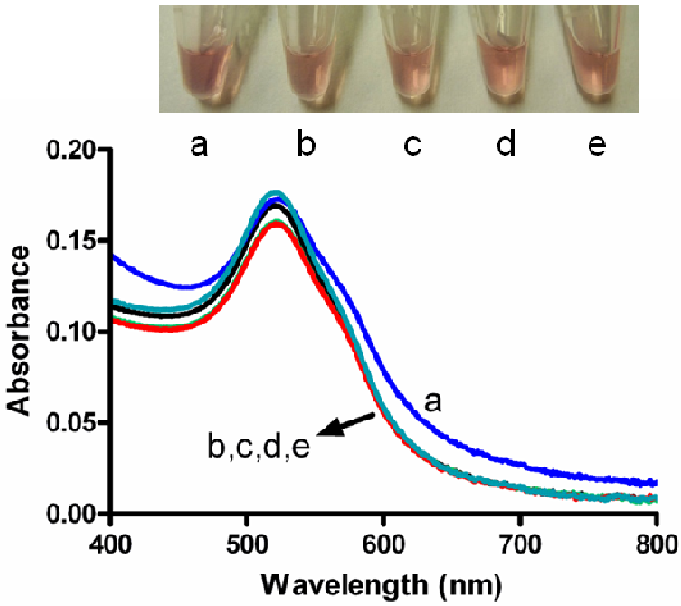

Figure S7 Color and corresponding UV-vis spectra of RBITC-PEG-AuNPs in various complex solutions. a. pure water; b. tap water; c. river water; d. PBS; e. 10-fold concentrated PBS. The RBITC-PEG-AuNPs were well-dispersed in all the solutions.

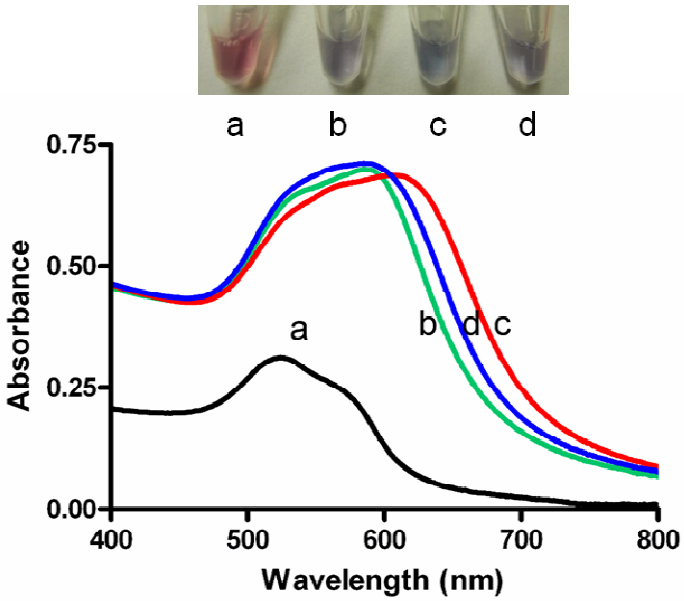

Figure S8 Color and corresponding UV-vis spectra of RBITC-AuNPs in various complex solutions. a. pure water; b. tap water; c. river water; d. PBS. RBITC-AuNPs were well-dispersed only in pure water while aggregated in other solutions.

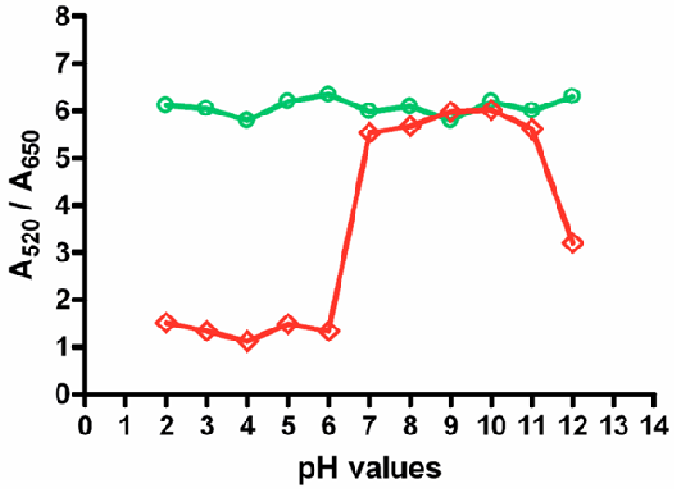

Figure S9 Plots of A_{520}/A_{650} values of RBITC-PEG-AuNPs (green) and RBITC-AuNPs (red) *versus* different pH values. A_{520} represents the absorbance of AuNPs at 520 nm while A_{650} represents those at 650 nm.

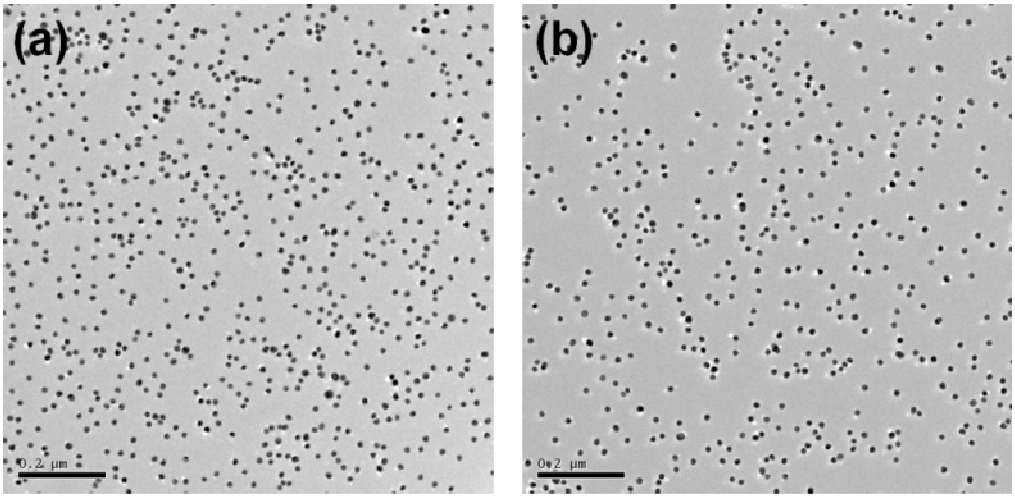

Figure S10. TEM images confirmed the well-dispersed states of RBITC-PEG-AuNPs after addition of Hg^{2+} (a) and that subsequently resupplied with free RBITC (b).

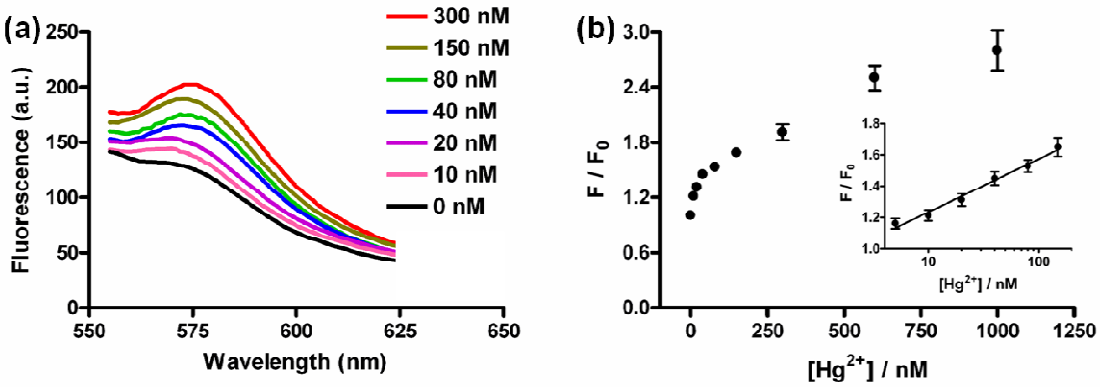

Figure S11 (a) Fluorescence emission spectra of the RBITC-PEG-AuNPs (2.5 nM) in river water spiked with varying Hg^{2+} ions from 0 to 300 nM. (b) Plot of the fluorescence intensity at 580 nm *versus* various concentrations of Hg^{2+} ions in the mixture of river water and RBITC-PEG-AuNPs.

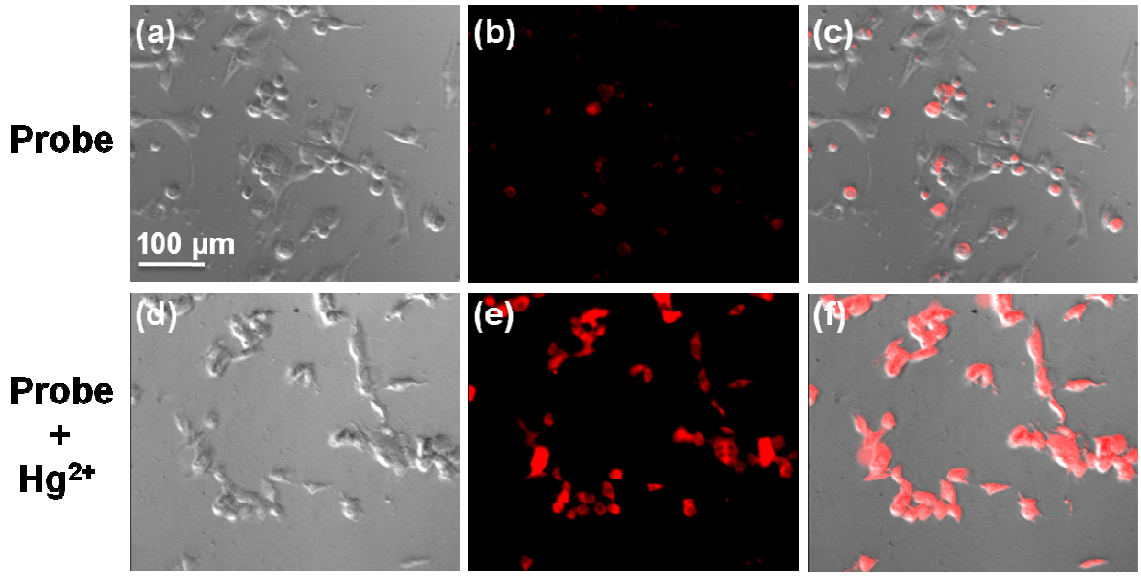

Figure S12 (a) Bright-field transmission image and (b) fluorescence image of MDA-MB-435 cells incubated with RBITC-PEG-AuNPs (20 nM) for 30 min. (c) A merged image of (a) and (b). (d) Bright-field transmission image and (e) fluorescence image of MDA-MB-435 cells pretreated with 10 μM of Hg^{2+}, and then incubated with RBITC-PEG-AuNPs (20 nM) for 30 min. (f) A merged image of (d) and (e).

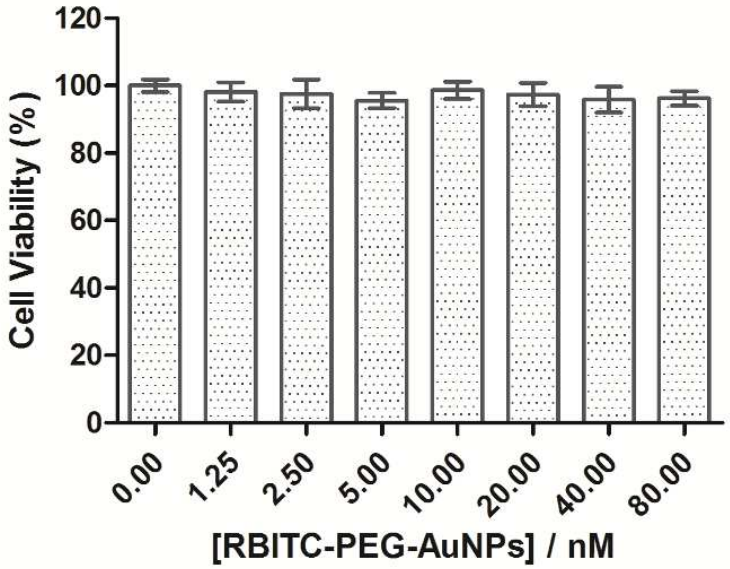

Figure S13 MDA-MB-435 cell viability *versus* different concentrations of RBITC-PEG-AuNPs (untreated cells were set as control and were considered to have 100 % survival). Cell viability was performed by the MTT assay.