Supporting Information

Simple and Rapid Functionalization of Gold Nanorods with Oligonucleotides using an mPEG-SH/Tween 20-Assisted Approach

Jiuxing Li, Bingqing Zhu, Zhi Zhu, Yicong Zhang, Xiujie Yao, Song Tu, Rudi Liu, Shasha Jia, Chaoyong James Yang**

The MOE Key Laboratory of Spectrochemical Analysis & Instrumentation, the Key Laboratory of Chemical Biology of Fujian Province, State Key Laboratory of Physical Chemistry of Solid Surfaces, Collaborative Innovation Center of Chemistry for Energy Materials, Department of Chemical Engineering, Department of Chemical Biology, College of Chemistry and Chemical Engineering, Xiamen University, Xiamen 361005, China

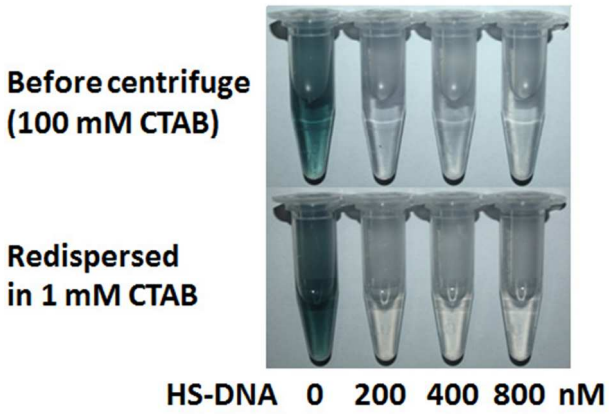

Figure S1. The positively charged AuNRs (15×50 nm) are easily to aggregate in the presence negatively charged DNA (DNA2) no matter how high (100 mM) or how low (1 mM) are the concentration of free CTAB.

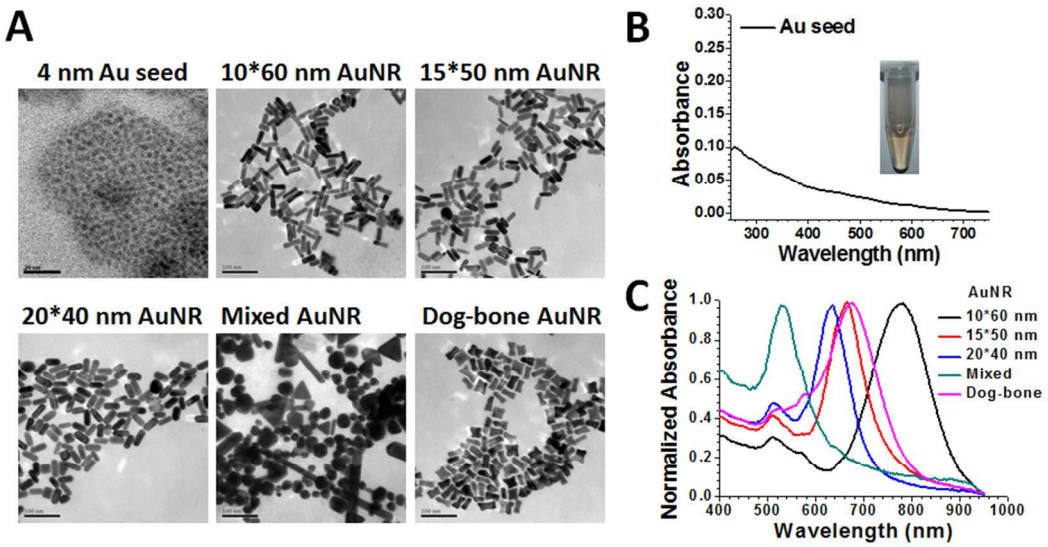

Figure S2. (A) TEM images of gold seed nanoparticles and AuNRs with different sizes and aspect ratios; (B) UV-Vis absorption spectrum (inset: photograph) of gold seed nanoparticles; (C) UV-Vis absorption spectra of AuNRs with different sizes and aspect ratios.

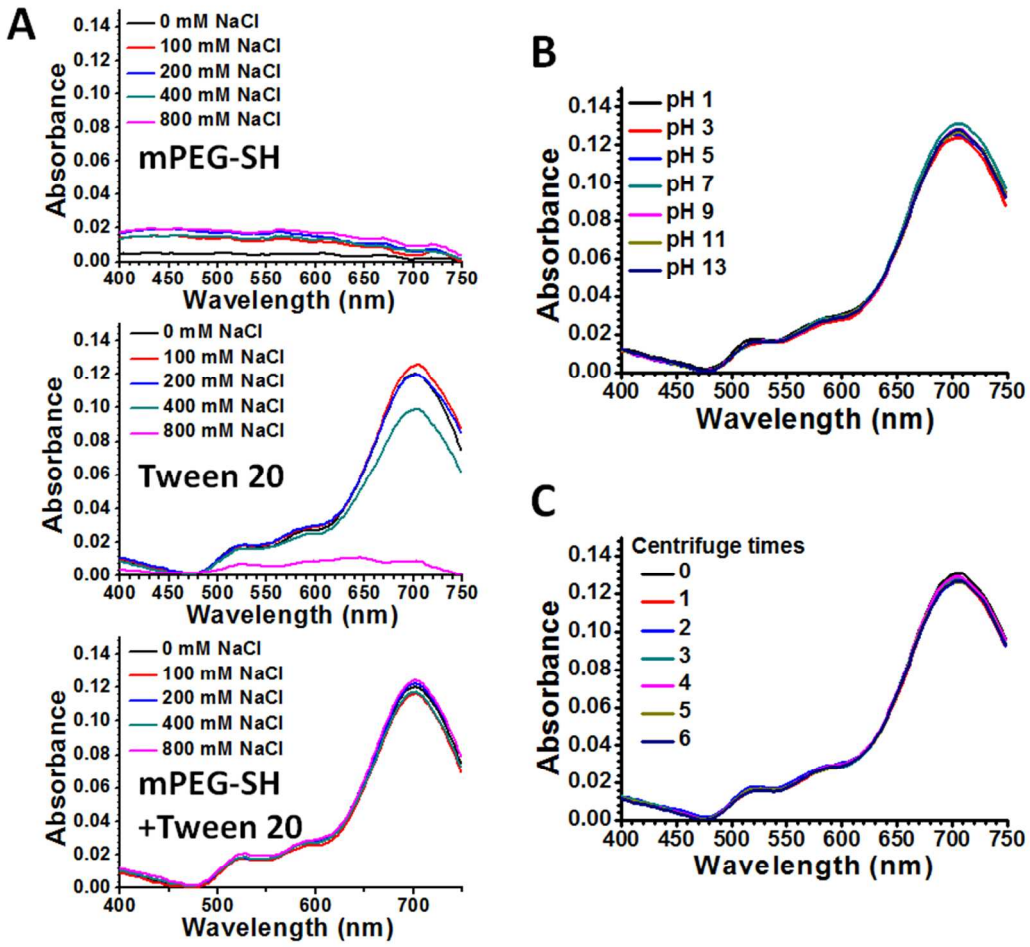

Figure S3. (A) The absorbance spectra of AuNRs (dog-bone) in different concentrations of NaCl. AuNRs were first surface-coated with mPEG-SH alone, Tween 20 alone, or a mixture of mPEG-SH and Tween 20, followed by 3 centrifugation/resuspension cycles. (B) The absorbance spectra of AuNRs (dog-bone) in different pH environments. (C) The absorbance spectra of AuNRs (dog-bone) after centrifugation and resuspension for different times. The AuNRs were first treated with a mixture of mPEG-SH and Tween 20. The concentrations of mPEG-SH and Tween 20 were 1 ~~μM~~ and 0.01 wt%, respectively.

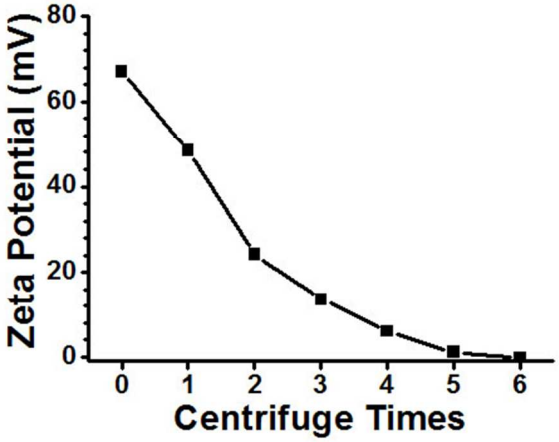

Figure S4. Zeta potential of AuNRs (dog-bone) after centrifugation and resuspension in 1 ~~μM~~ mPEG-SH and 0.01 wt% Tween 20 for different times.

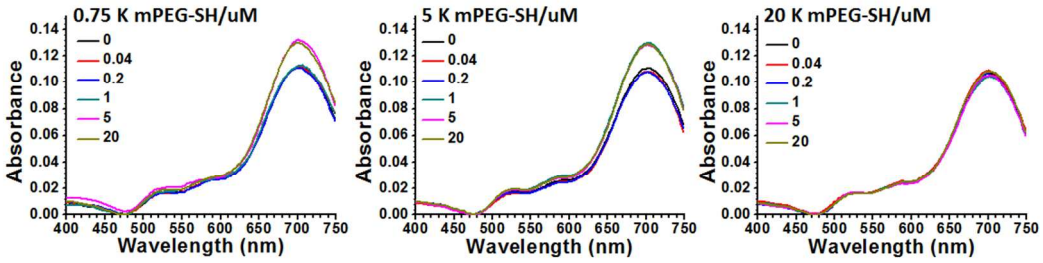

Figure S5. The absorbance spectra of AuNRs (dog-bone) after centrifugation/ resuspension for three times with different concentrations of mPEG-SH and 0.01 wt% Tween 20.

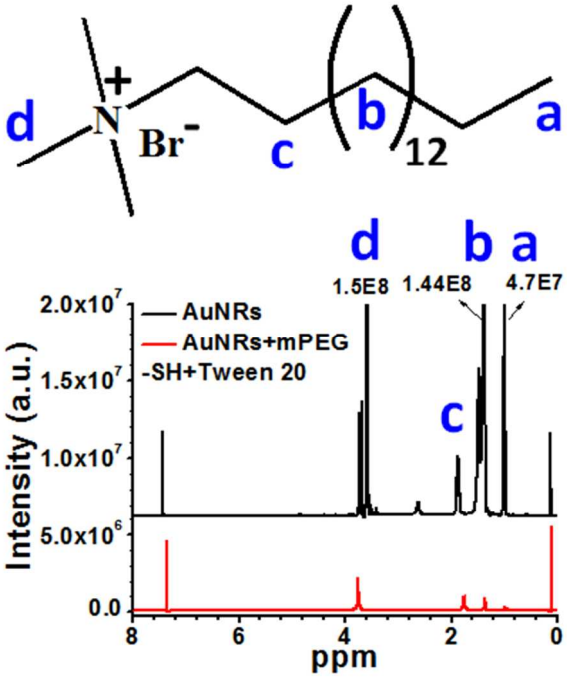

Figure S6. ^{1}H NMR spectra of AuNRs (dog-bone) capped with CTAB and mPEG-SH/Tween 20 mixture.

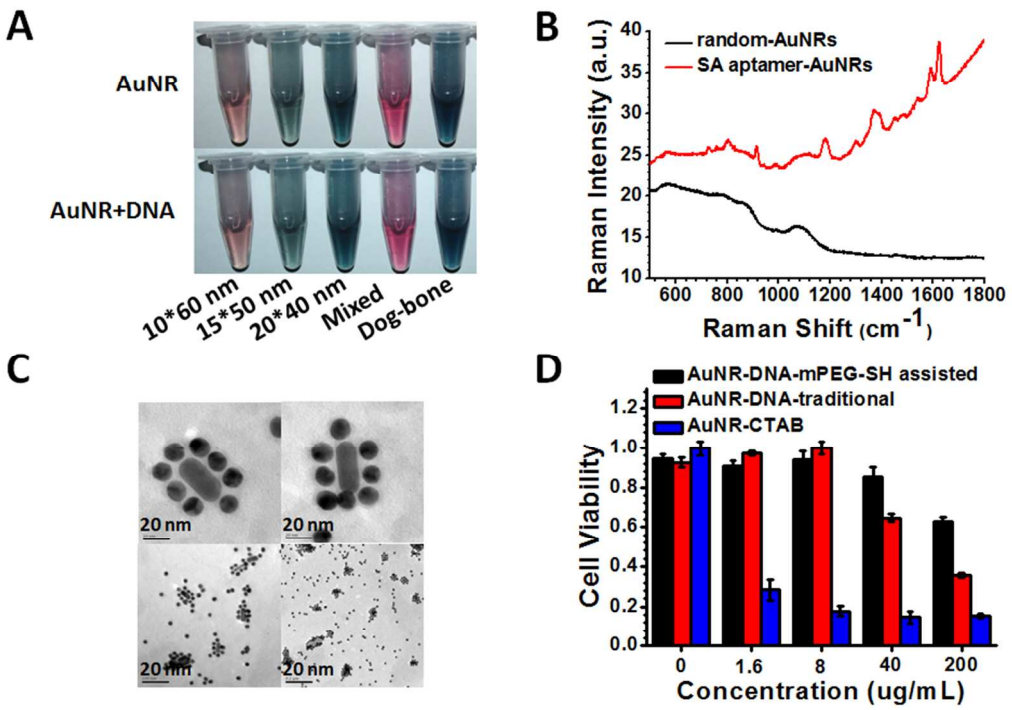

Figure S7. (A) Dispersity of AuNRs with different sizes and aspect ratios before and after loading thiolated DNA. (B) Raman spectra showing specific binding of sgc8–conjugated AuNRs with CEM cells; (C) Representative TEM images of DNA4-AuNP and DNA5-AuNR assemblies; (D) MTT assay showing the cytotoxicity of DNA-AuNR (dog-bone) conjugates prepared by mPEG-SH assisted or traditional methods and fresh prepared AuNR.

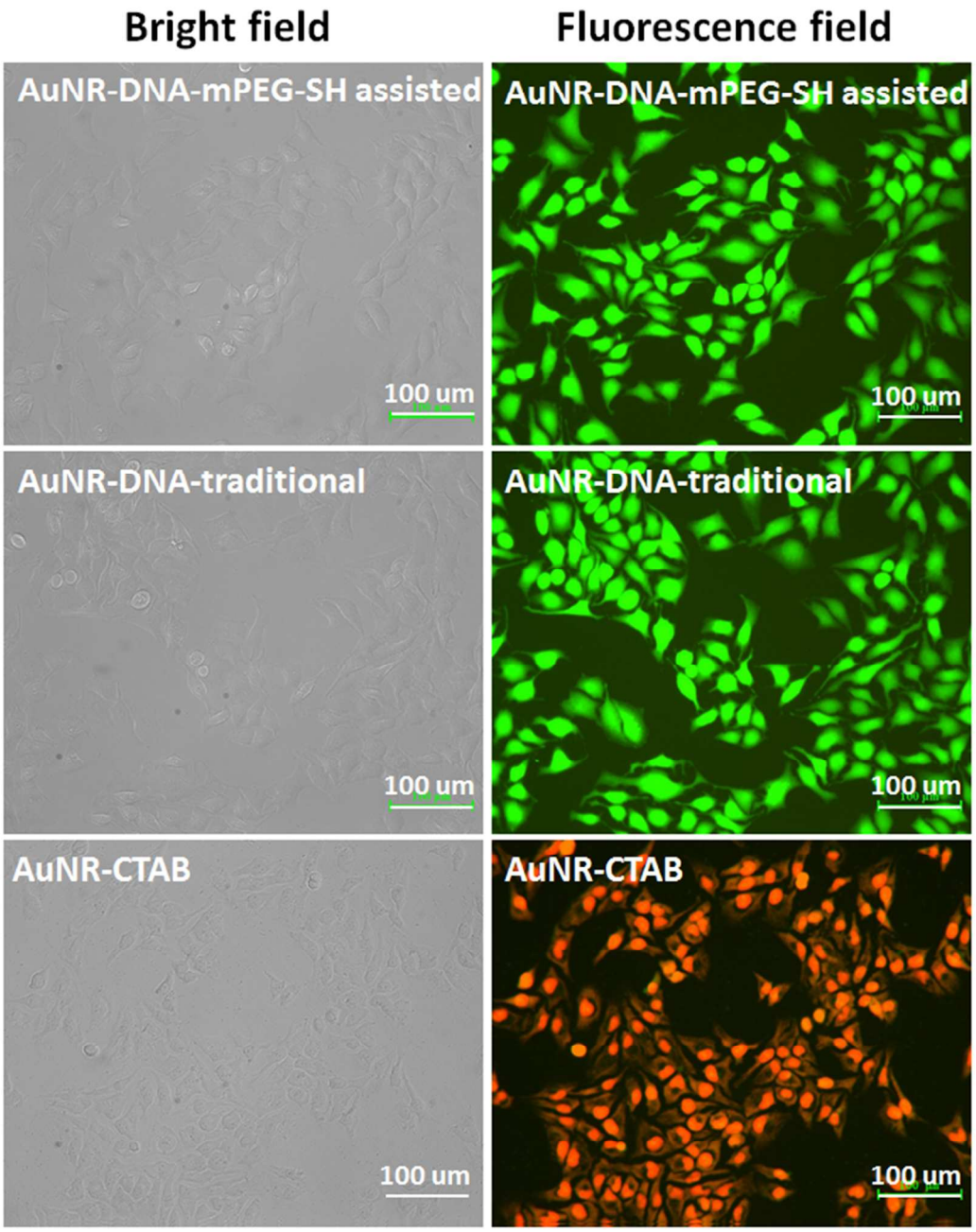

Figure S8. Fluorescent staining showing the cytotoxicity of DNA-AuNR (dog-bone) conjugates prepared by mPEG-SH/Tween 20-assisted or traditional methods and fresh prepared AuNR; left: bright field images of Hela cells after treated by different DNA-AuNR conjugates; right: corresponding merged fluorescence images of Hela cells after stained by Calcein-AM and Annexin V-PI.