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Electronic Supplementary Information

Gold nanorods as dual photo-sensitizing and imaging agents for two-photon photodynamic therapy

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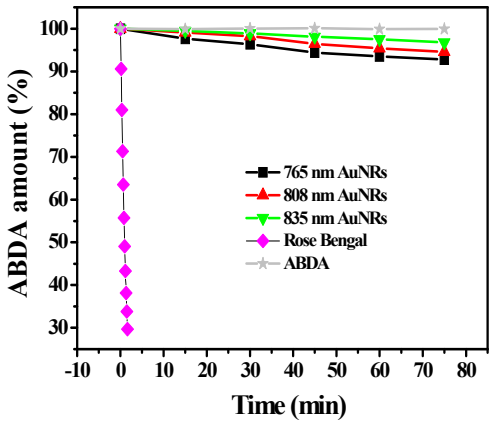

Figure S1. Photo-induced degradation of ABDA in the presence of RB, 765, 808 and 835 nm Au NRs for 75 min under one-photon excitation at 532 nm using a CW diode laser.

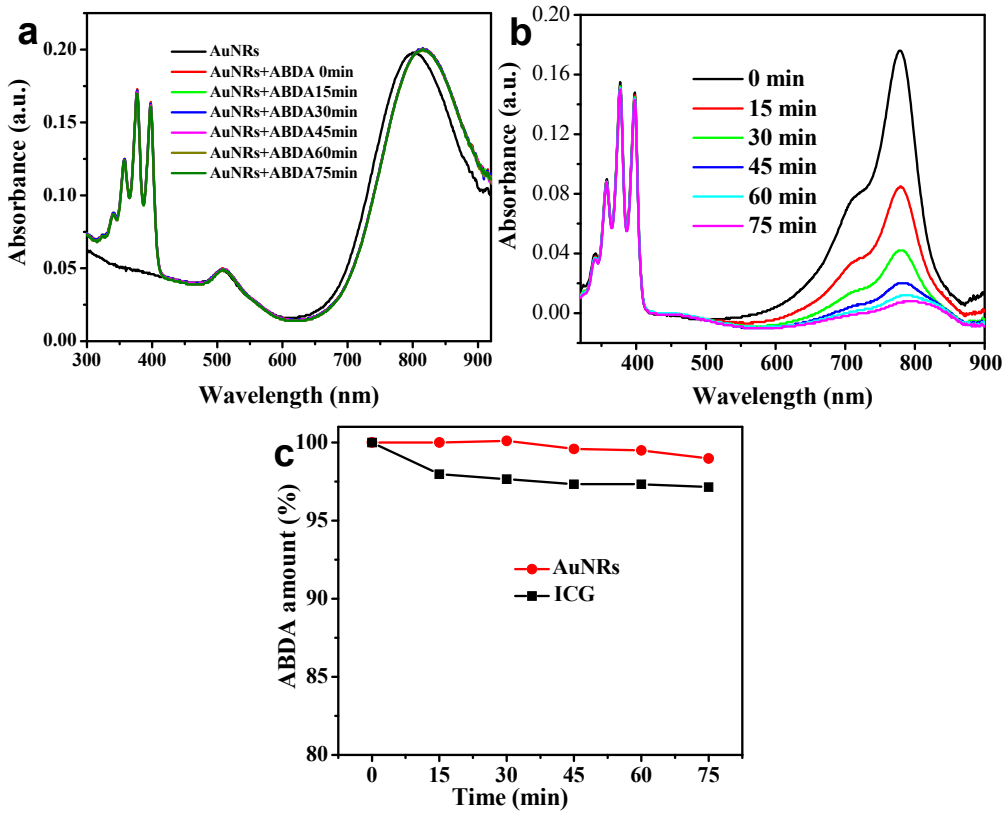

Figure S2. Absorption spectra of ABDA in the presence of 808 nm Au NRs (a) and Indocyanine Green (ICG) (b) under illumination of a CW laser at 808 nm. The laser power is 50 mW. (c) Photo-degradation rate of ABDA in presence of 808 nm Au NRs and ICG.

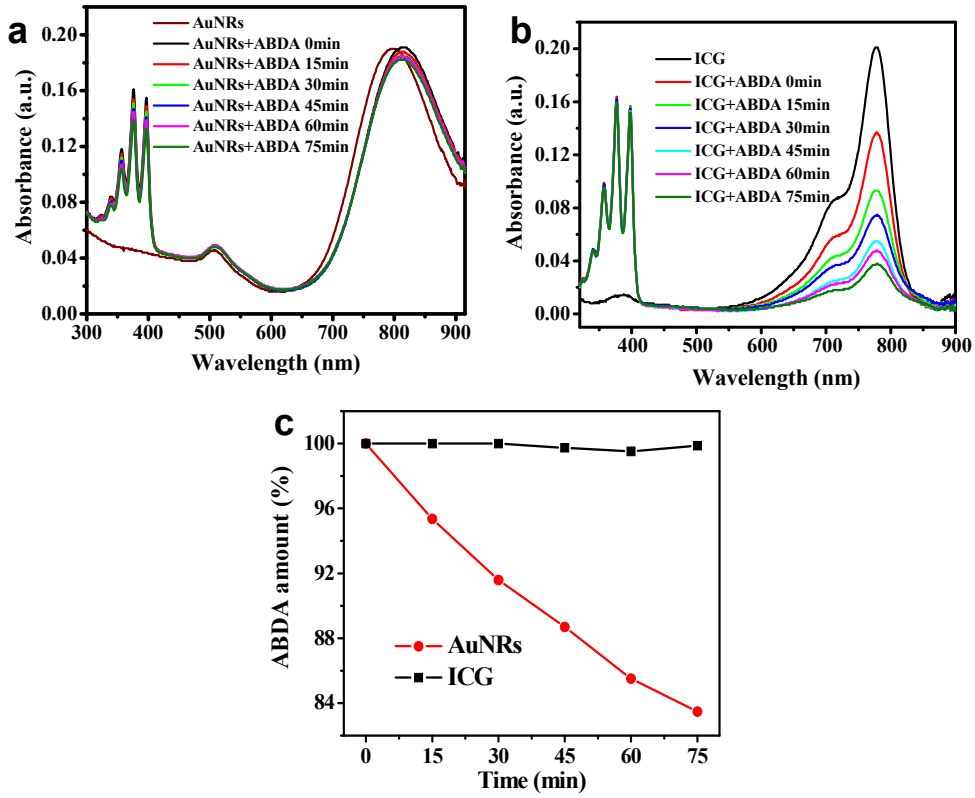

Figure S3. Absorption spectra of ABDA in the presence of 808 nm Au NRs (a) and Indocyanine Green (ICG) (b) under two-photon excitation using femtosecond laser pulses at 808 nm. The laser power is 50 mW. (c) Photo-degradation rate of ABDA in the presence of 808 nm Au NRs and ICG.

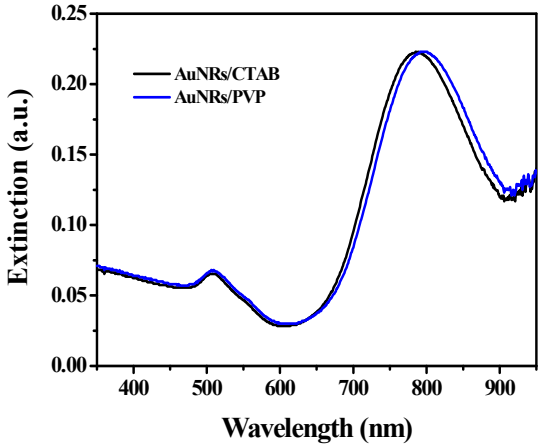

Figure S4. Extinction spectra of Au NRs/CTAB and Au NRs/PVP dispersed in DI water.

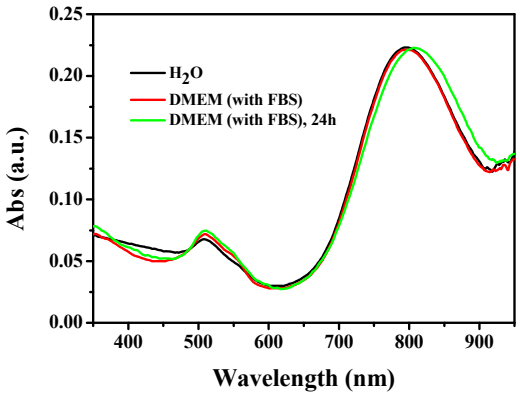

Figure S5. Extinction spectra of Au NRs/PVP dispersed in DI water, DMEM containing FBS medium before and after 24h.

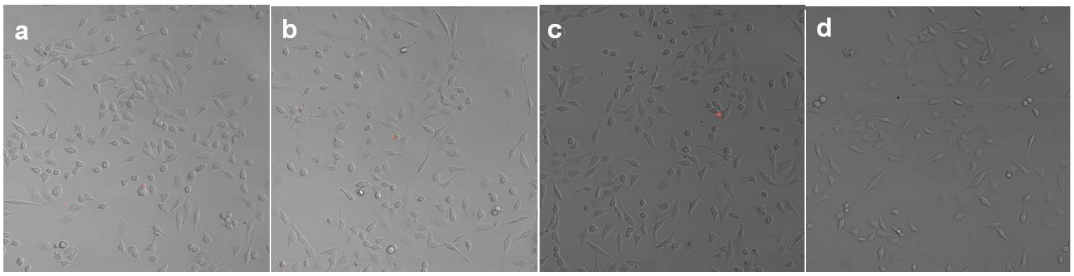

Figure S6. Merged transmission and EB fluorescence images of Au NRs/PVP and RB-loaded HeLa cells without femtosecond laser irradiation: 765 nm Au NRs/PVP (a), 808 nm Au NRs/PVP (b), 835 nm Au NRs/PVP (c) and RB (d).

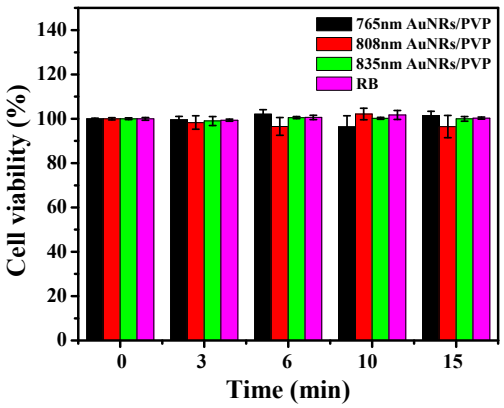

Figure S7. Time dependent cell viability of HeLa cancer cells after incubation with 765nm Au NRs/PVP, 808nm Au NRs/PVP and 835nm Au NRs/PVP under CW laser illumination at 808 nm. [AuNRs/PVP] = 40 pM, RB has the same peak absorbance as Au NRs/PVP.

Experimental procedure of measuring the temperature change of the cell incubation medium under femtosecond laser irradiation:

Appropriate amount of Au NRs/PVP solution was added into the DMEM solution to keep the final concentration of Au NRs/PVP at 40 pM. A femtosecond laser with central wavelength at 808 nm was used as the laser irradiation source with power density of 3 $W \cdot cm^{-2}$. The laser beam was first expanded and kept its size to be ~0.3 cm^2 by passing through a small hole. The temperature values of Au NRs/PVP solution under the irradiation of 808 nm femtosecond laser at different time intervals were monitored by using a thermometer. The data are shown in Figure S8.

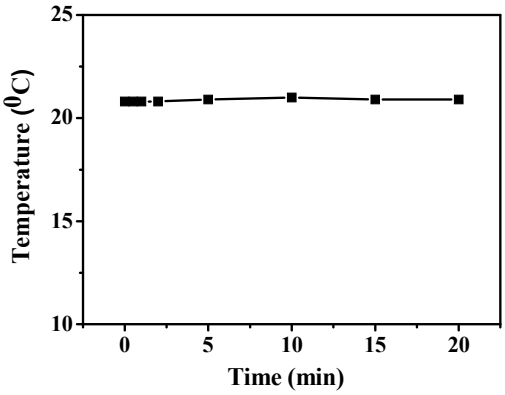

Figure S8. Temperature change of the cell incubation medium under femtosecond laser irradiation.

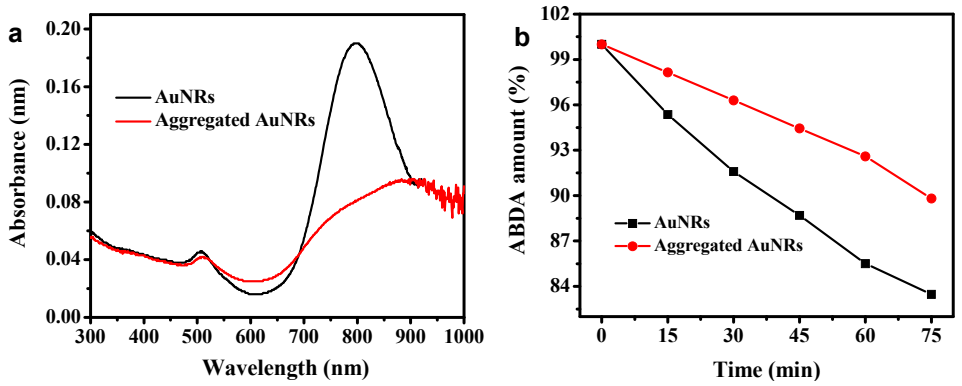

Figure S9. UV-Vis spectra (a) and singlet oxygen generation capability (b) of isolated Au NRs and cysteine induced aggregated Au NRs under two-photon excitation using femtosecond laser pulses at 808 nm. The laser power is 50 mW.