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Reactive oxygen species-responsive clicked assembly of gold nanoparticles to enhance photothermal therapy

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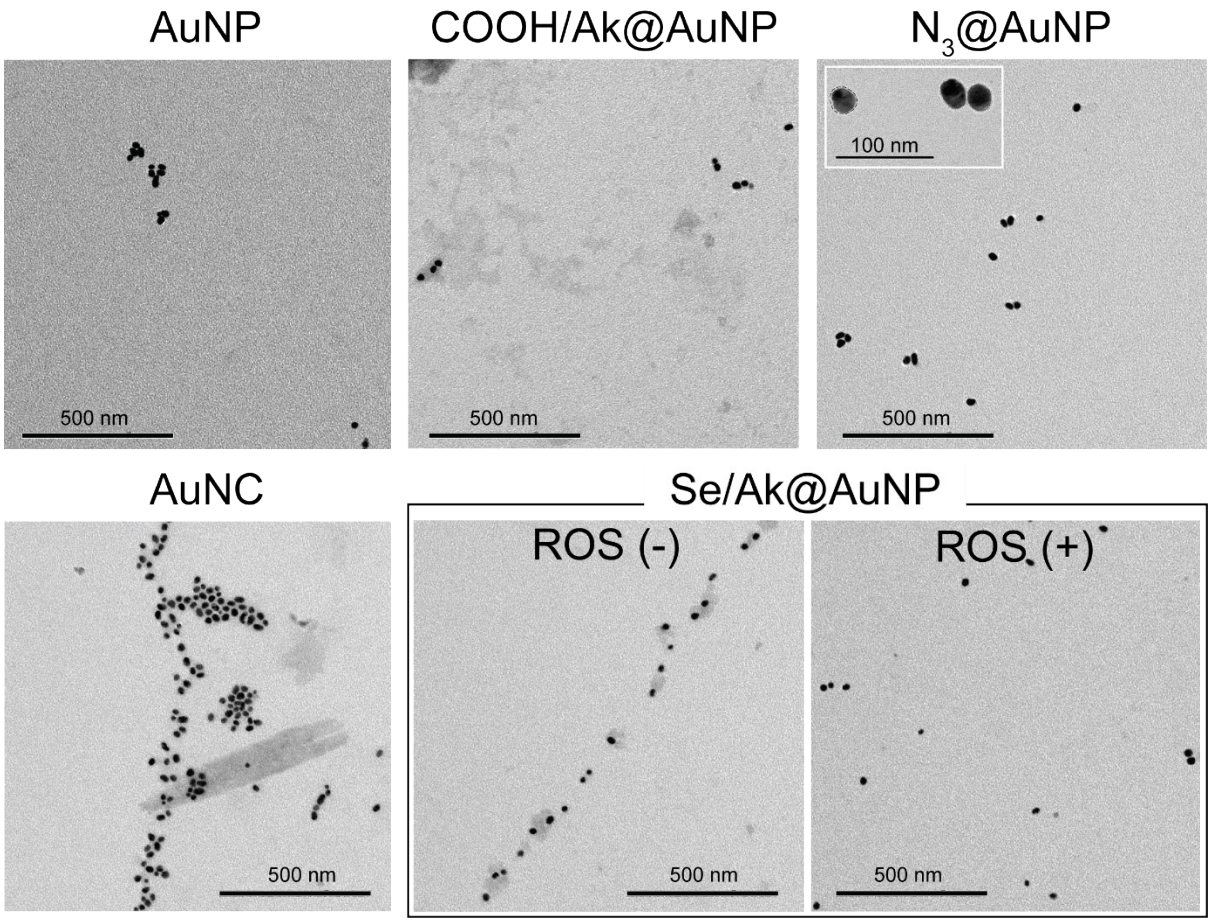

Figure S1. TEM images of AuNP, COOH/Ak@AuNP, N_3@AuNP, Se/Ak@AuNP and AuNC at lower magnification. Samples were diluted to avoid the overlapping of nanoparticles.

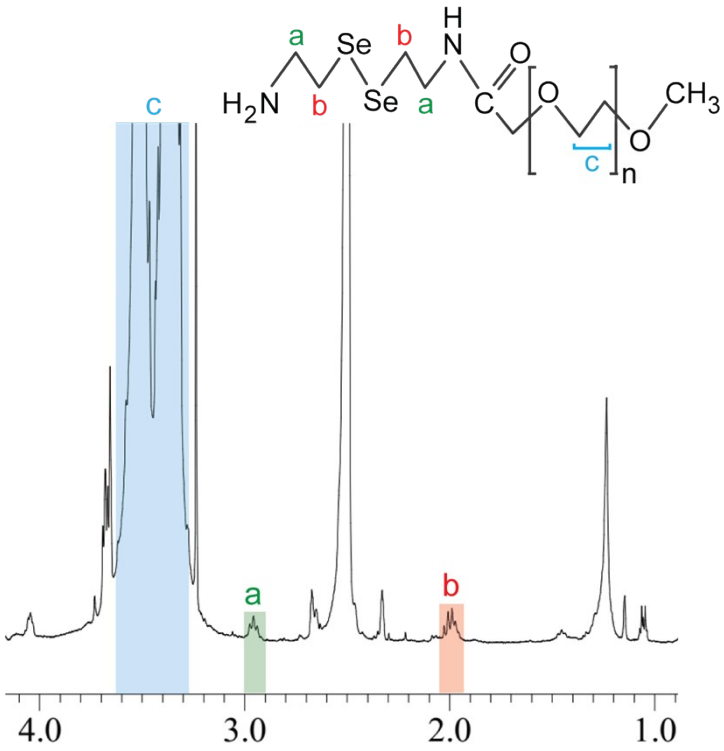

Figure S2. NMR spectrum of mPEG-Se conjugates. Methylene groups of selenocystamine at 2.95 – 2.88 and 1.99 – 1.91 ppm, and methylene group of mPEG-NHS at 3.60 – 3.21 ppm were observed on the spectrum of mPEG-Se.

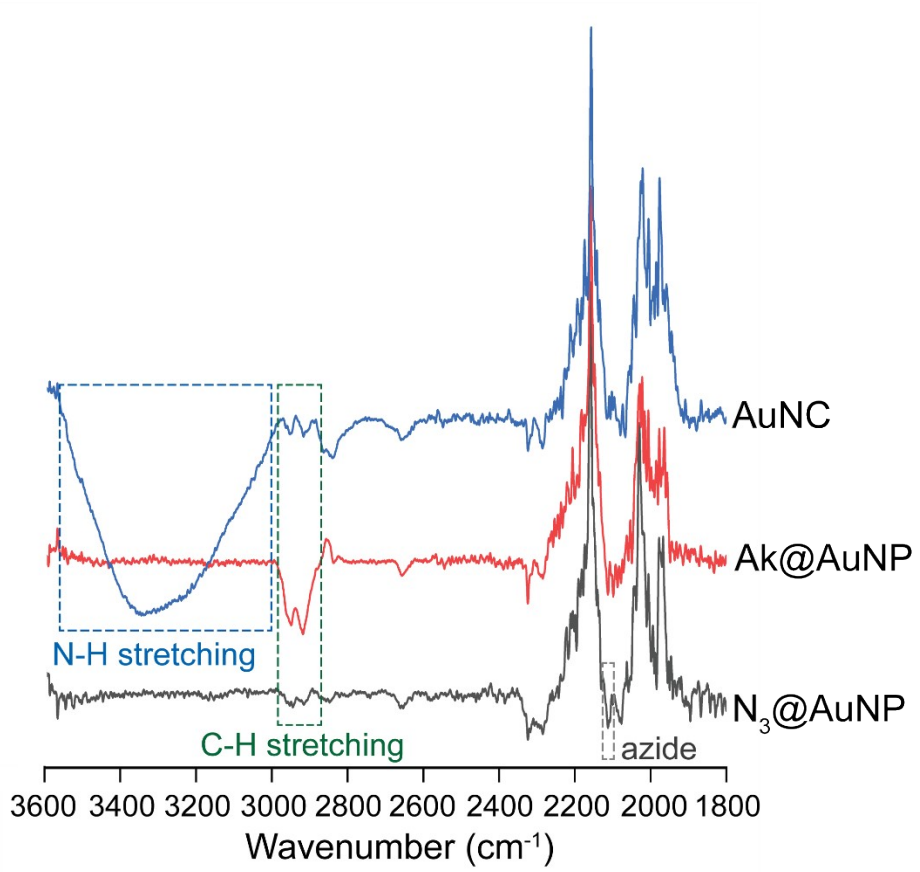

Figure S3. FT-IR spectra of N_3@AuNP, Ak@AuNP and AuNC. The presence of azide peak at 2112 cm-1 on N_3@AuNP spectrum, which was significantly decreased on AuNC spectrum, and the newly appeared peak of N-H in the range of 3500 – 2900 cm^{-1} of AuNC spectrum could indicate successfull click reaction.

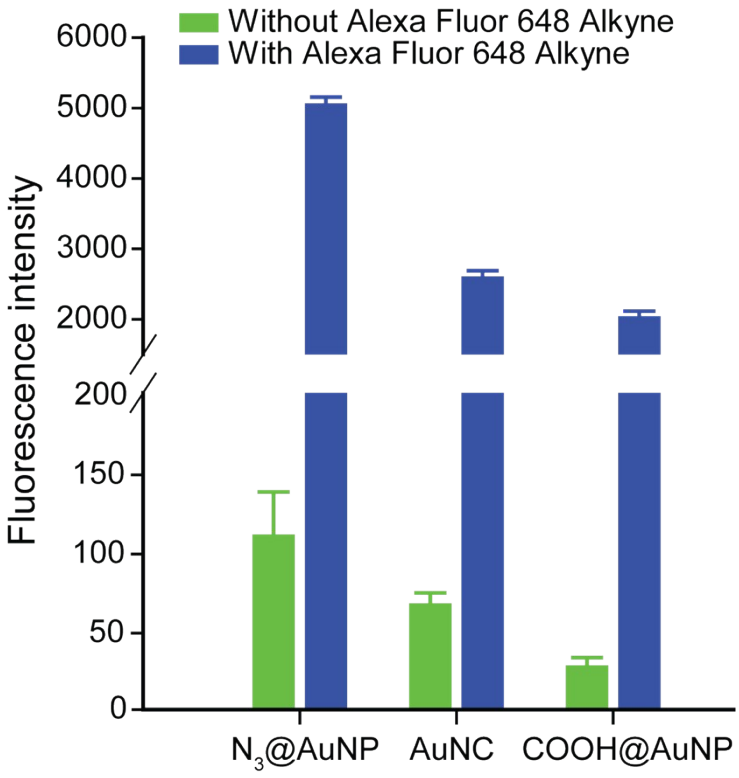

Figure S4. Fluorescence intensities of N_3@AuNP, AuNC and COOH@AuNP after 3-h reaction with fluorescent dye Alexa Fluor 648 Alkyne in the presence of 0.1 mM CuSO4 and 1 mM sodium ascorbate.

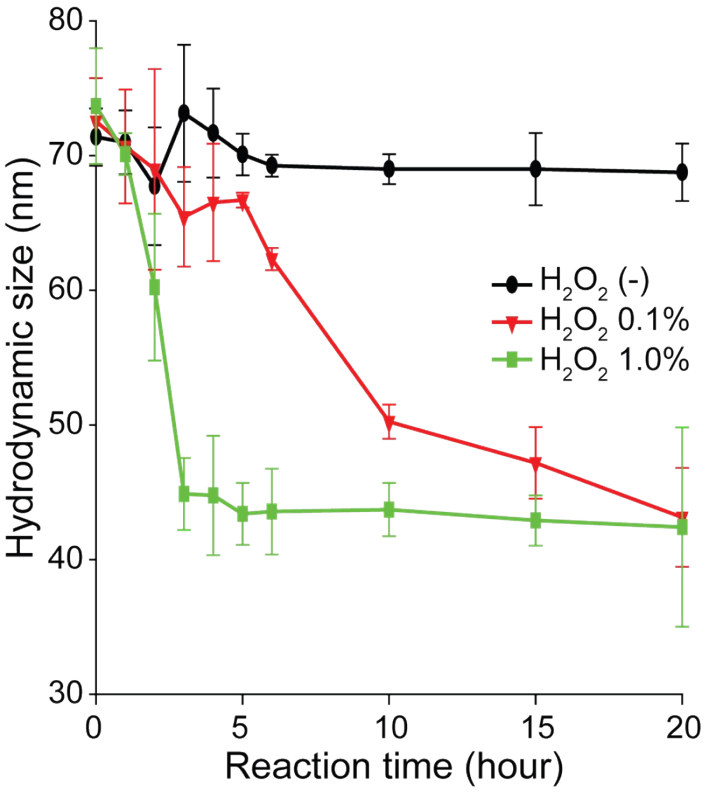

Figure S5. The effect of different concentrations of H_2O_2 solution and reaction times in the oxidation of diselenide linkers of Se/Ak@AuNPs. The reaction time was kept up to 20 h.

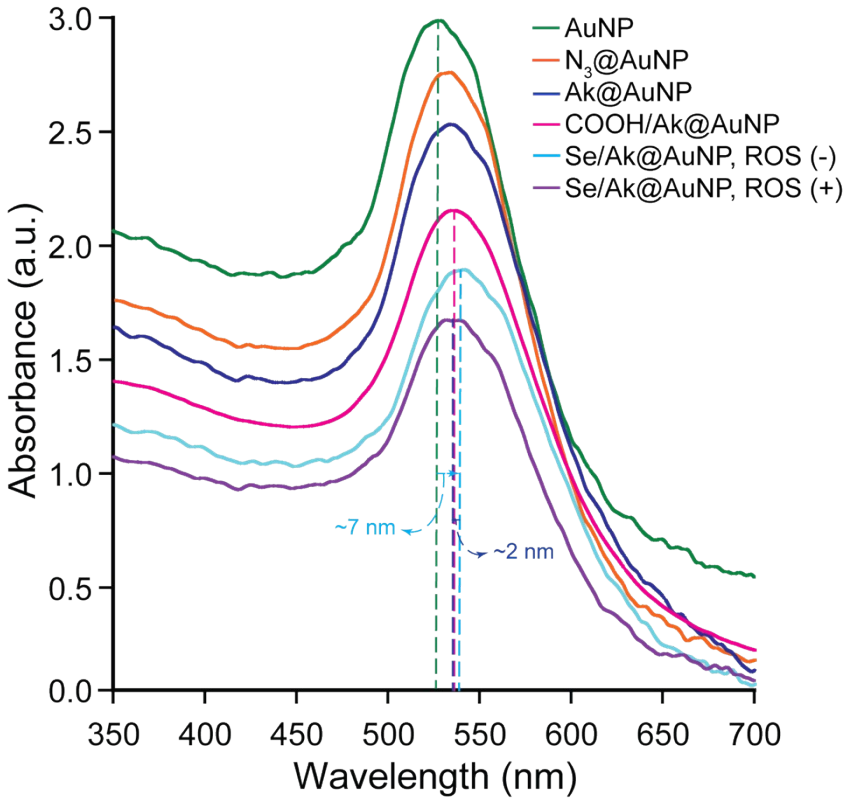

Figure S6. Absorbance spectrum of H_2O_2-oxidized Se/Ak@AuNPs exhibited a blue-shift of 2 nm compared to that of Se/Ak@AuNPs and closed to the peak of COOH/Ak@AuNPs at around 531 nm.

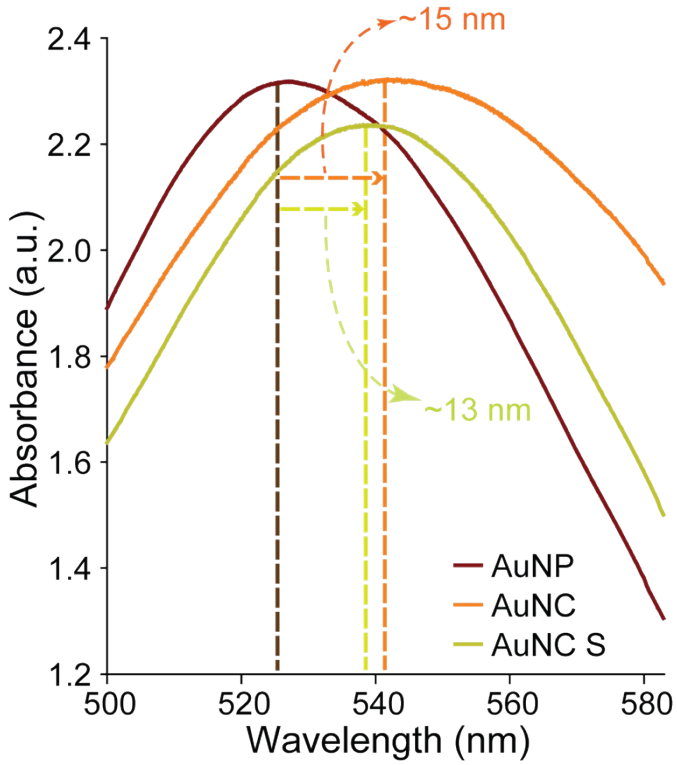

Figure S7. The absorbance of AuNC S (prepared by the reaction of Se/Ak@AuNPs and N_3@AuNPs (molar ratio = 10 : 1) in the presence of 0.1% of H_2O_2 and 5 mM $CuSO_4$ for 45 min) in comparison with AuNCs (prepared by the reaction between N_3@AuNPs and Ak@AuNPs (molar ratio = 1 : 1) in the presence of 0.375 mM of $CuSO_4$). The peak of AuNCs S was shifted to 539 nm which was similar to that of AuNCs at 542 nm compared with 526 nm of the peak of bare AuNPs.

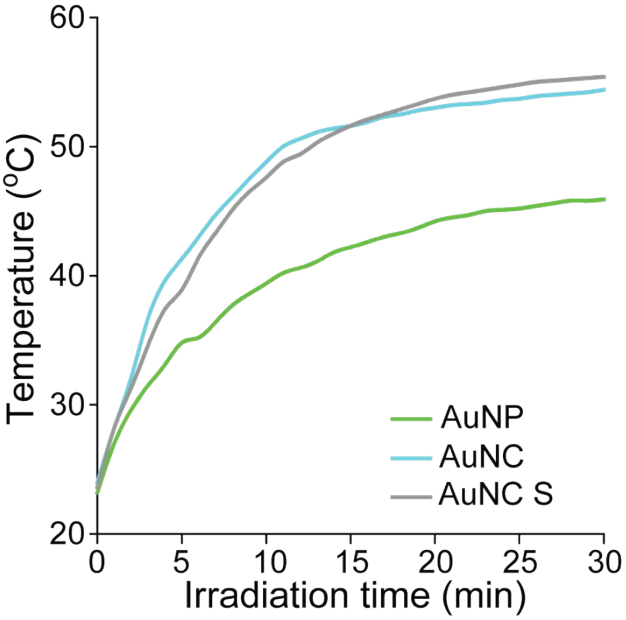

Figure S8. The photothermal conversion efficiency of AuNCs S compared to AuNCs. Au conc. was 0.1 mg/mL and laser power was 1 W/ cm^2. AuNCs were prepared by the reaction between Ak@AuNPs and N_3@AuNPs in the presence of 0.375 mM $CuSO_4$. AuNCs S were prepared by the reaction between Se/Ak@AuNPs and N_3@AuNPs in the presence of 0.1% H_2O_2 and 5 mM $CuSO_4$.