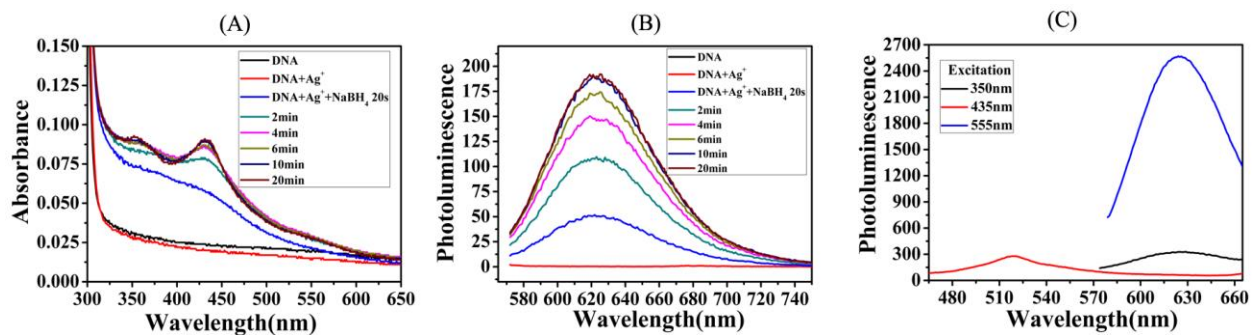


# Photoluminescence Mechanism of DNA-Templated Silver Nanoclusters: Coupling between Surface Plasmon and Emitter and Sensing of Lysozyme

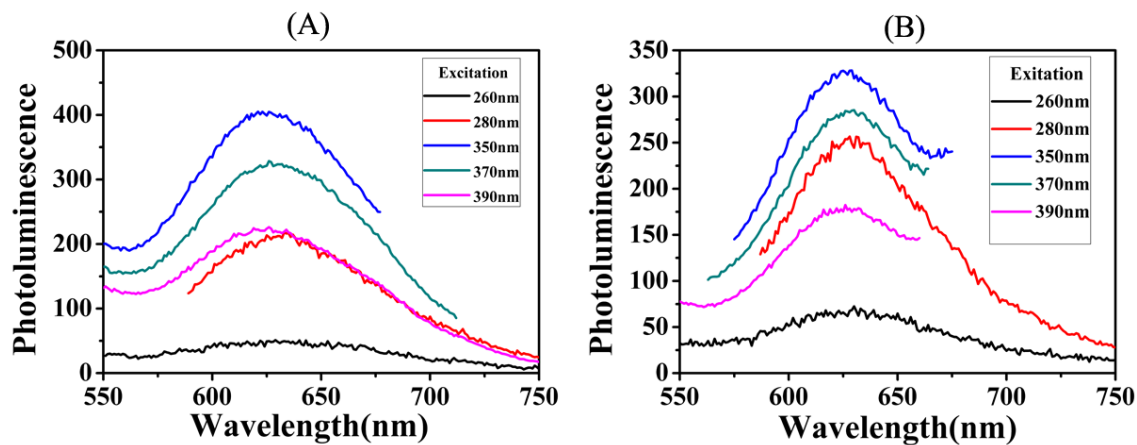
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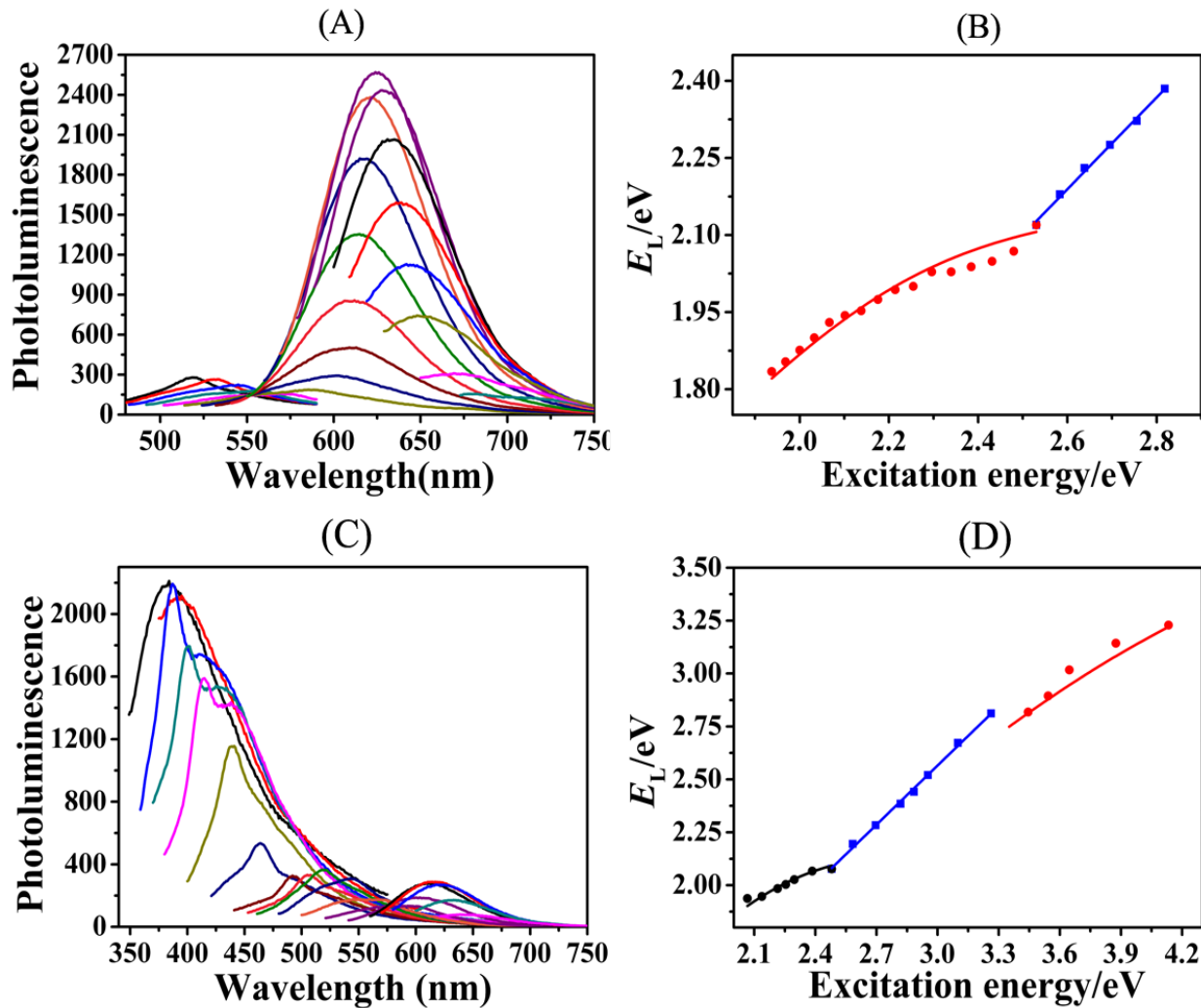
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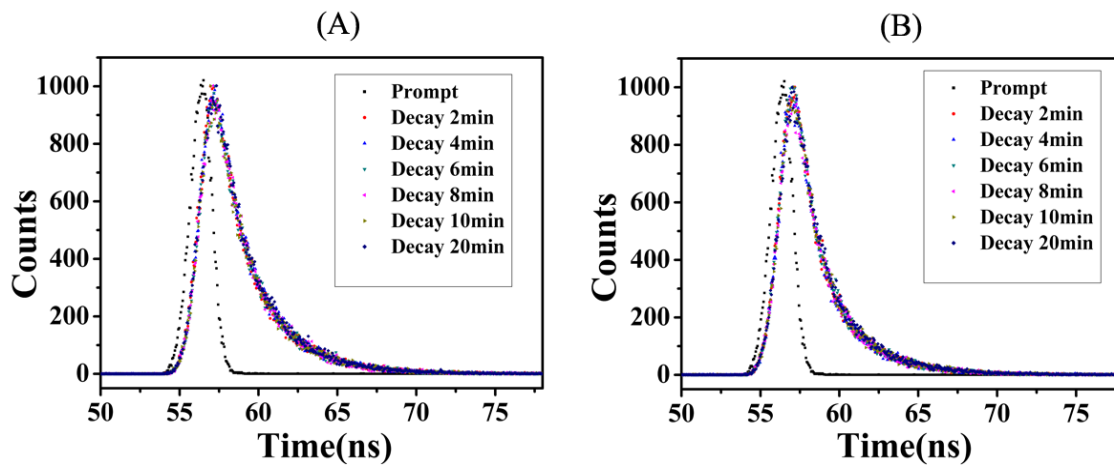
**Figure S1.** (A) UV-visible absorption of DNA4, DNA4+Ag<sup>+</sup>, and freshly prepared DNA4-AgNCs at various reaction times. (B) The corresponding photoluminescence spectra of DNA4, DNA4+Ag<sup>+</sup>, and DNA4-AgNCs at various reaction times. The photoluminescence spectra were measured at  $\lambda_{\text{ex}} = 555$  nm. (C) Photoluminescence spectra of DNA4-AgNCs under three excitation wavelengths: 350 nm, 435 nm and 555 nm.



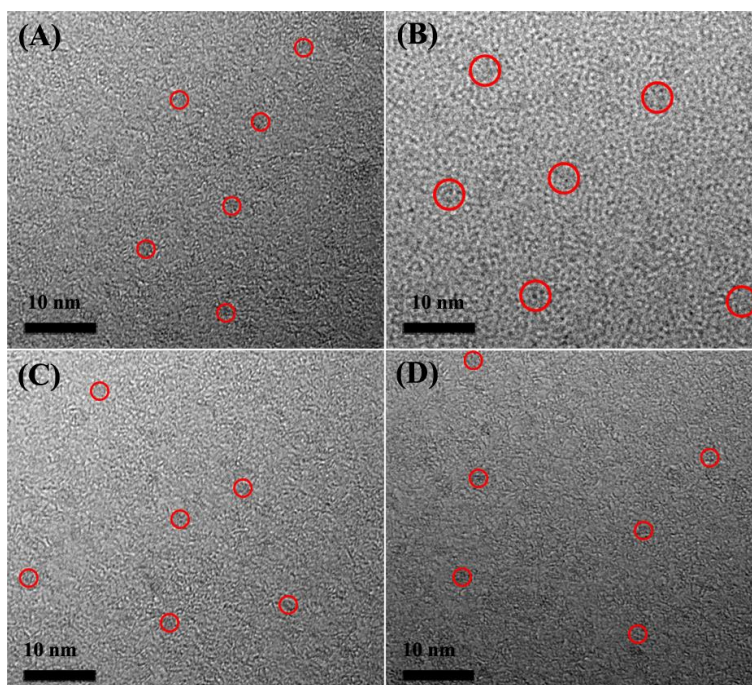
**Figure S2.** Photoluminescence spectra of DNA-AgNCs as a function of excitation wavelength in the near-UV range: (A) DNA1-AgNCs, and (B) DNA4-AgNCs.



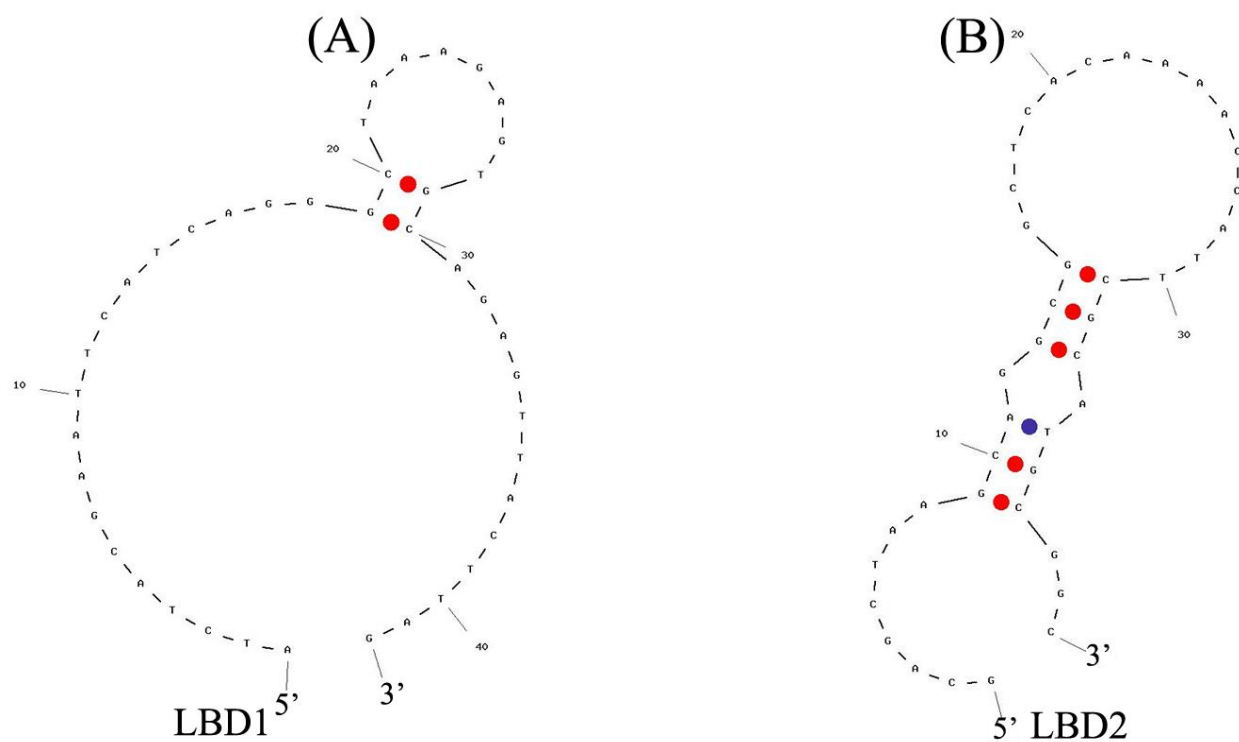
**Figure S3.** (A) Emission spectra as a function of excitation wavelength (from left to right, the excitation wavelength was from 440 to 610 nm with a 10 or 20 nm interval) and (B) Emission energy ( $E_L$ ) as a function of excitation energy of DNA4-AgNCs. (C) Emission spectra as a function of excitation wavelength (From left to right, the excitation wavelength was from 300 nm to 600 nm with a 20 nm interval) and (D) Emission energy ( $E_L$ ) as a function of excitation energy of DNA5-AgNCs. Solid dots and solid squares represent the experimental data. Solid red and black curve show the theoretical data calculated according to the Kretschmann geometry and solid blue line was the fitting line.



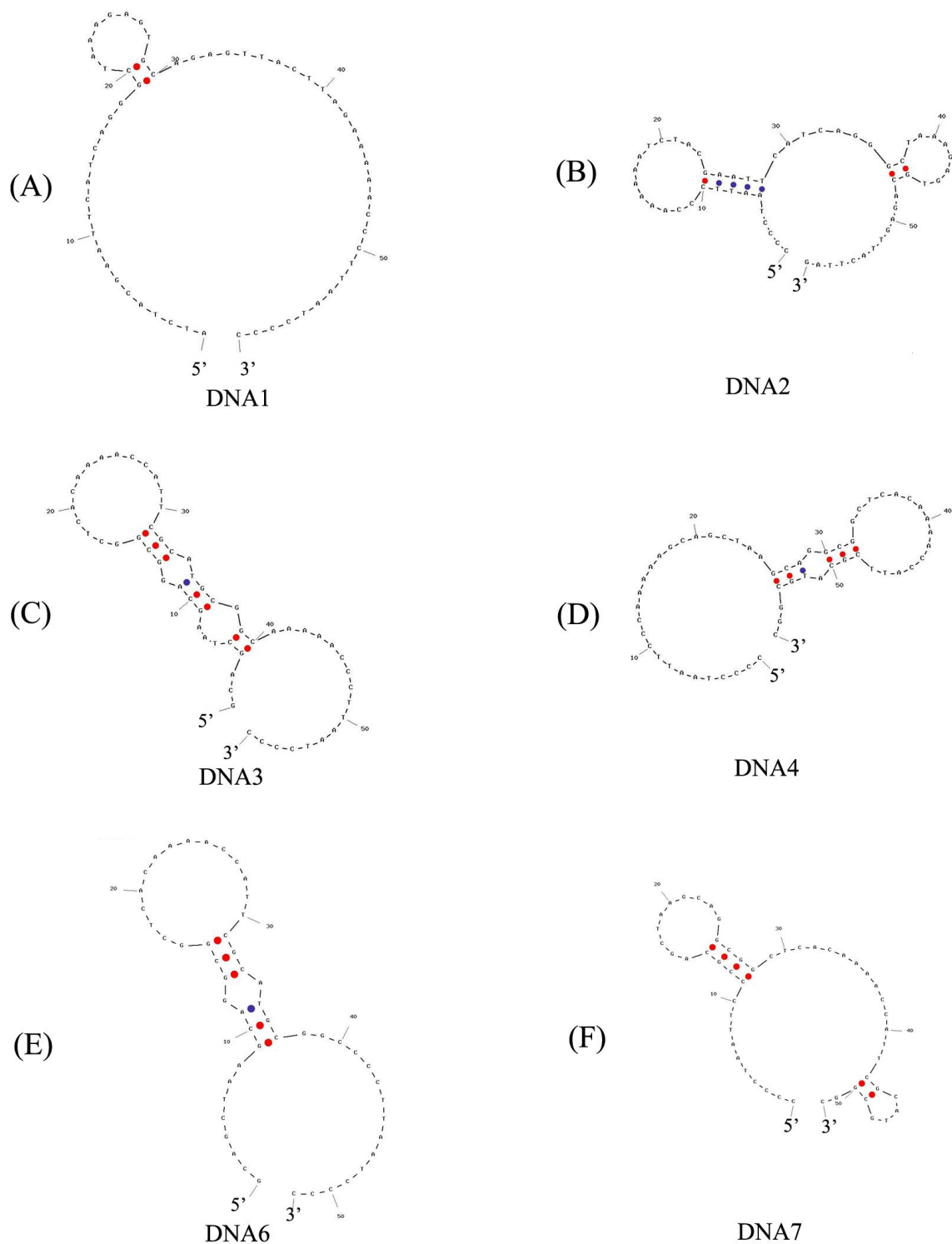
**Figure S4.** The evolution of fluorescence lifetime decay profiles of (A) DNA1-AgNCs and (B) DNA4-AgNCs under various reduction times after adding  $\text{NaBH}_4$ .



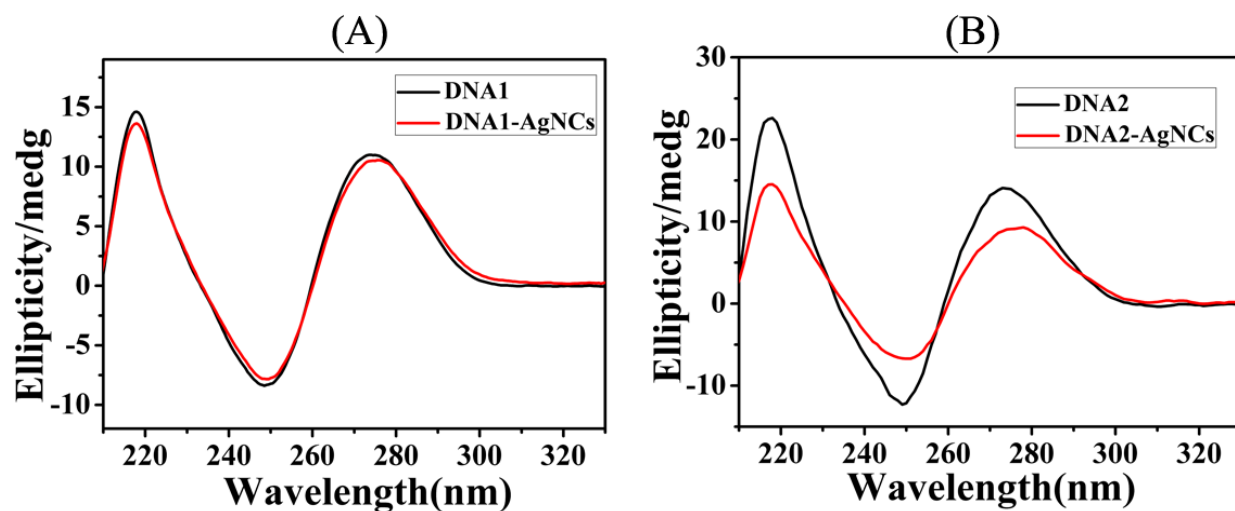
**Figure S5.** The transmission electron microscopy (TEM) images of the four designed DNA-AgNCs probes: (A) DNA1-AgNCs, (B) DNA2-AgNCs, (C) DNA3-AgNCs, and (D) DNA4-AgNCs.



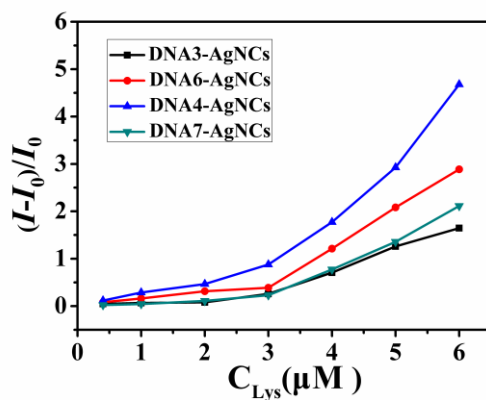
**Figure S6.** Hairpin structure of (A) LBD1 and (B) LBD2. The hairpin structure was calculated by “ OligoAnalyzer Tool ” available free of charge via the Internet at <http://www.idtdna.com/site>.



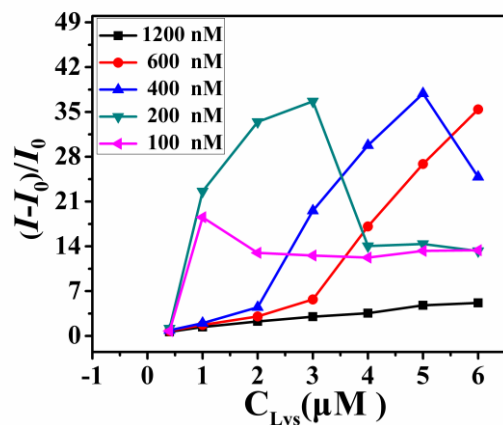
**Figure S7.** Hairpin structure of (A) DNA1, (B) DNA2, (C) DNA3, (D) DNA4, (E) DNA6 and (F) DNA7. The hairpin structure was calculated by “OligoAnalyzer Tool” available free of charge via the Internet at <http://www.idtdna.com/site>.



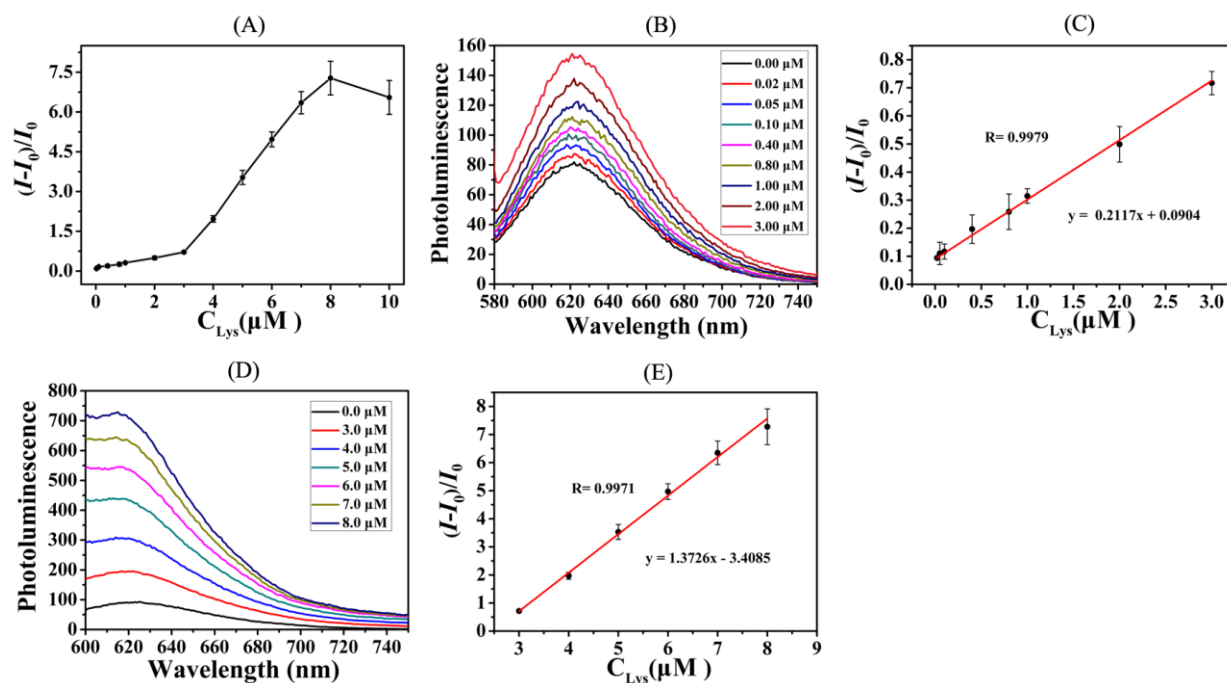
**Figure S8.** Circular dichroism (CD) spectra of (A) DNA1 and (B) DNA2 before (black) and after (red) the synthesis of AgNCs.



**Figure S9.** Responses of DNA3-AgNCs, DNA6-AgNCs, DNA4-AgNCs and DNA7-AgNCs to different concentrations of lysozyme.



**Figure S10.** The responses of concentration of DNA1-AgNCs probe to lysozyme.



**Figure S11.** (A) Plots of the photoluminescence enhancement,  $(I-I_0)/I_0$ , of DNA4-AgNCs versus the concentrations of lysozyme; (B) Photoluminescence spectra of DNA4-AgNCs in the presence of different lysozyme concentration from 0 to 3.0  $\mu\text{M}$  and (C) The linear region of photoluminescence changes vs lysozyme concentration from 0 to 3.0  $\mu\text{M}$ ; (D) Photoluminescence spectra of DNA4-AgNCs in the presence of different lysozyme concentration



from 3.0  $\mu\text{M}$  to 8.0  $\mu\text{M}$  and (E) The linear region of photoluminescence changes vs lysozyme concentration from 3.0  $\mu\text{M}$  to 8.0  $\mu\text{M}$ .