

Supporting Information

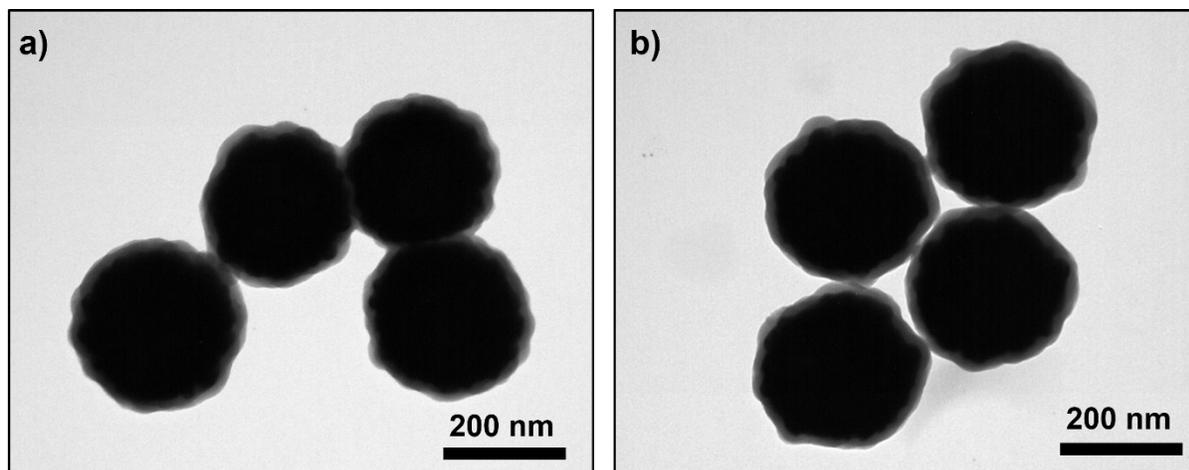


Figure S1. TEM images of silica-coated AgNS (AgNS@SiO₂): (a) 4-BBT labeled (AgNS₄-BBT@SiO₂), and (b) 4-CBT labeled (AgNS₄-CBT@SiO₂).

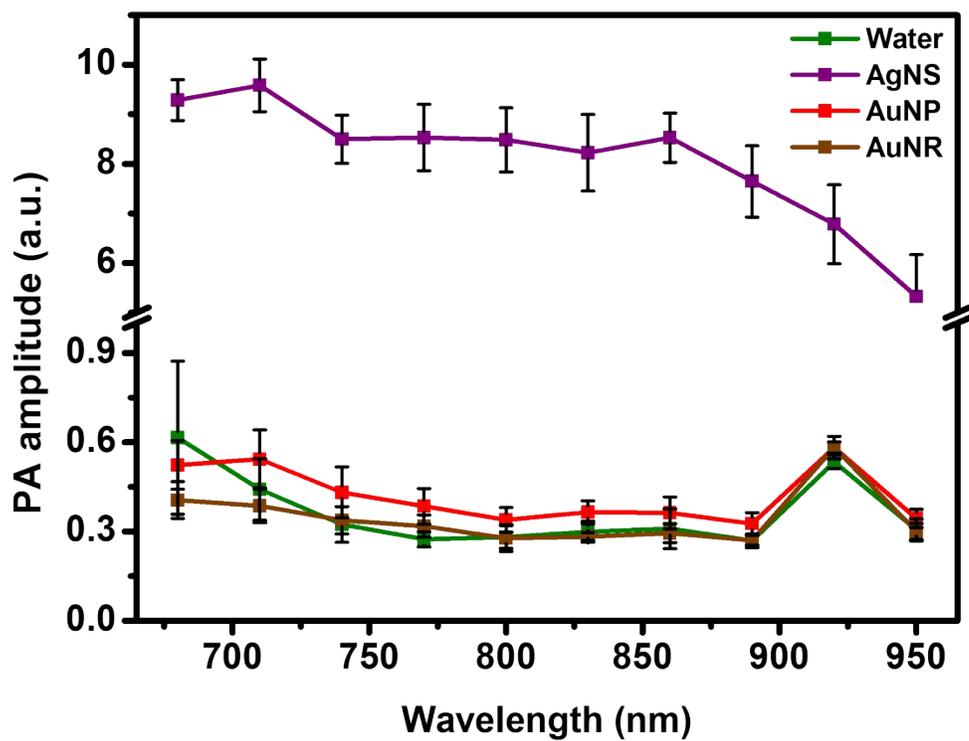


Figure S2. PA spectra of different kinds of nanoparticles (AgNS, AuNP and AuNR, 150 pM each) under various laser wavelength (680-900 nm) with D.I. water as a control.

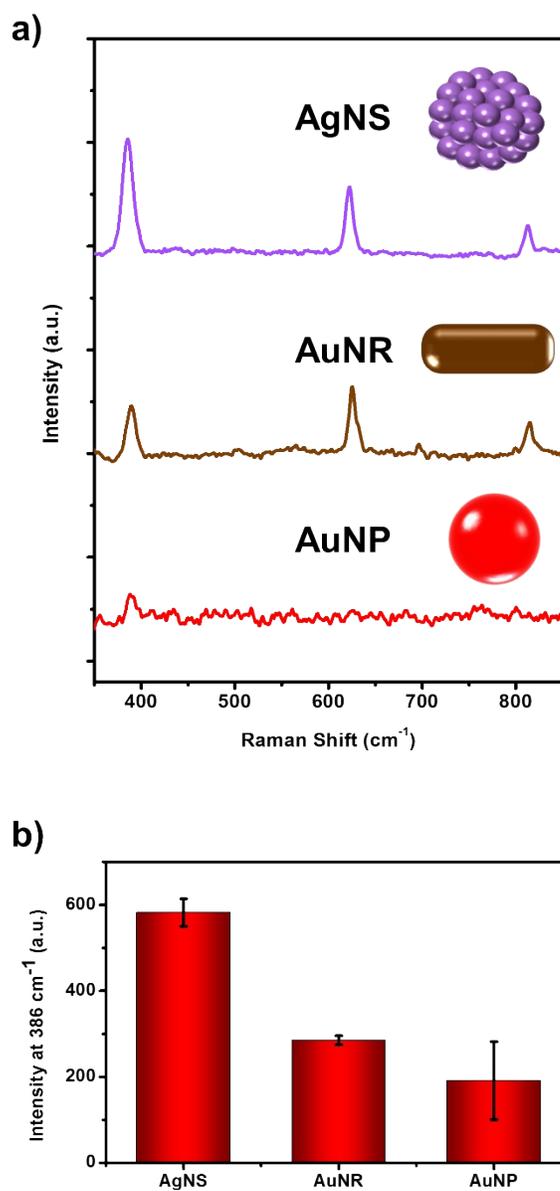


Figure S3. (a) SERS spectra of different kinds of nanoparticles (AgNS, AuNP and AuNR, 150 pM each), labeled with 4-FBT (1 mM). (b) SERS intensity profile (386 cm⁻¹ of 4-FBT) of each nanoparticle without normalization. SERS spectra were obtained using portable-Raman system by 785-nm photoexcitation, 30-mW laser power, and light acquisition time of 5 s

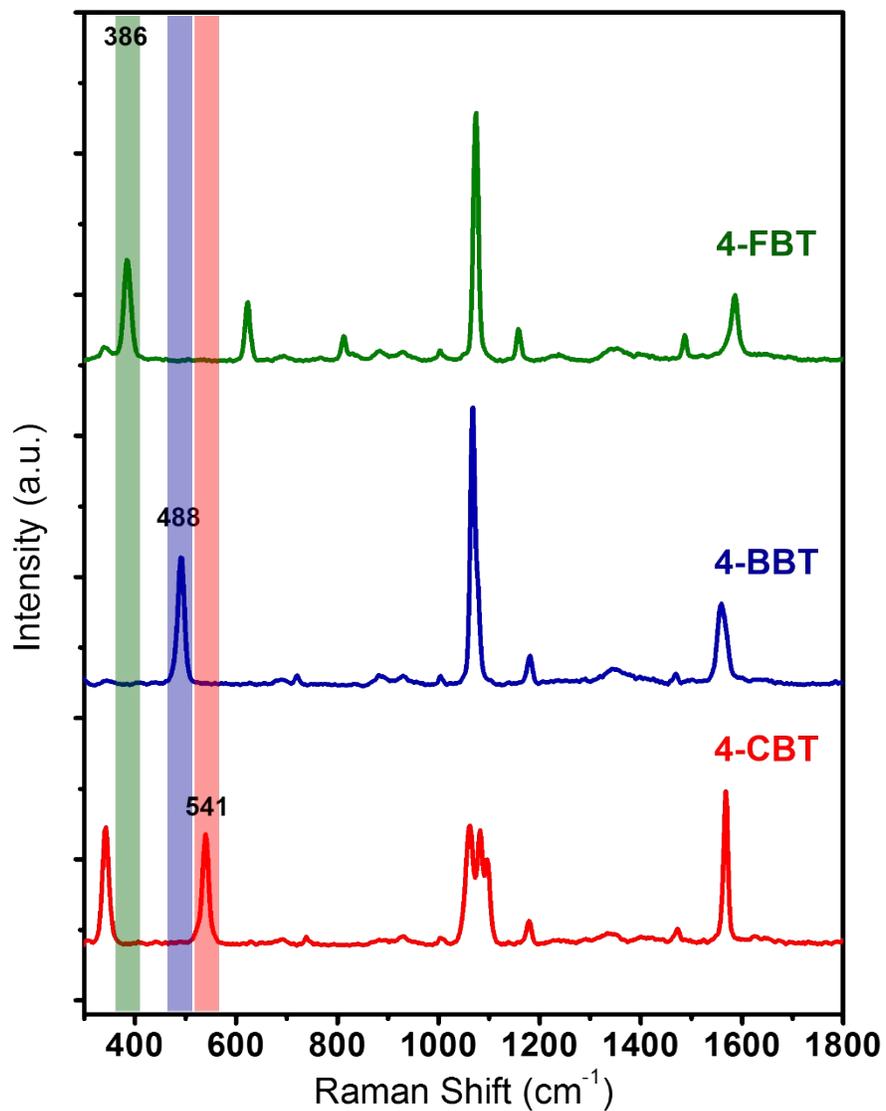


Figure S4. Full-range SERS spectra of AgNS₄-FBT@SiO₂ (green line), AgNS₄-BBT@SiO₂ (blue line) and AgNS₄-CBT@SiO₂ (red line). SERS spectra were obtained using portable-Raman system by 785-nm photoexcitation, 15-mW laser power, and light acquisition time of 3 s

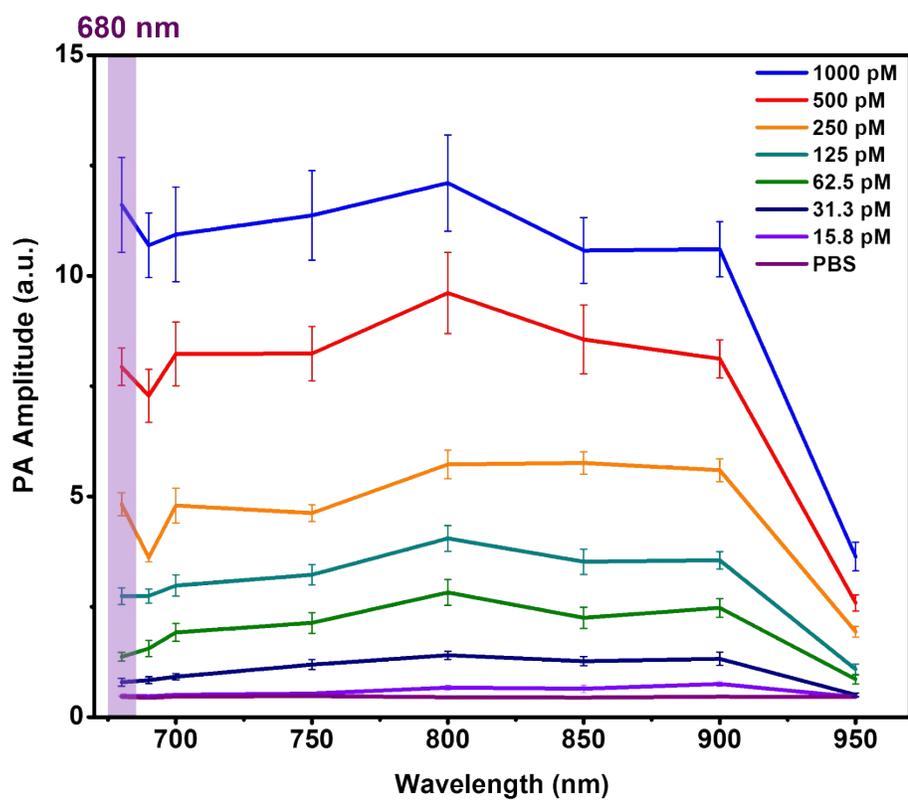


Figure S5. PA spectra of AgNS@SiO₂ at various concentrations under different laser wavelength. The range of wavelength is 680-950 nm, the concentration of AgNS@SiO₂ is from 1000 pM to 15.8 pM, and 1% BSA solution in PBS as a control.

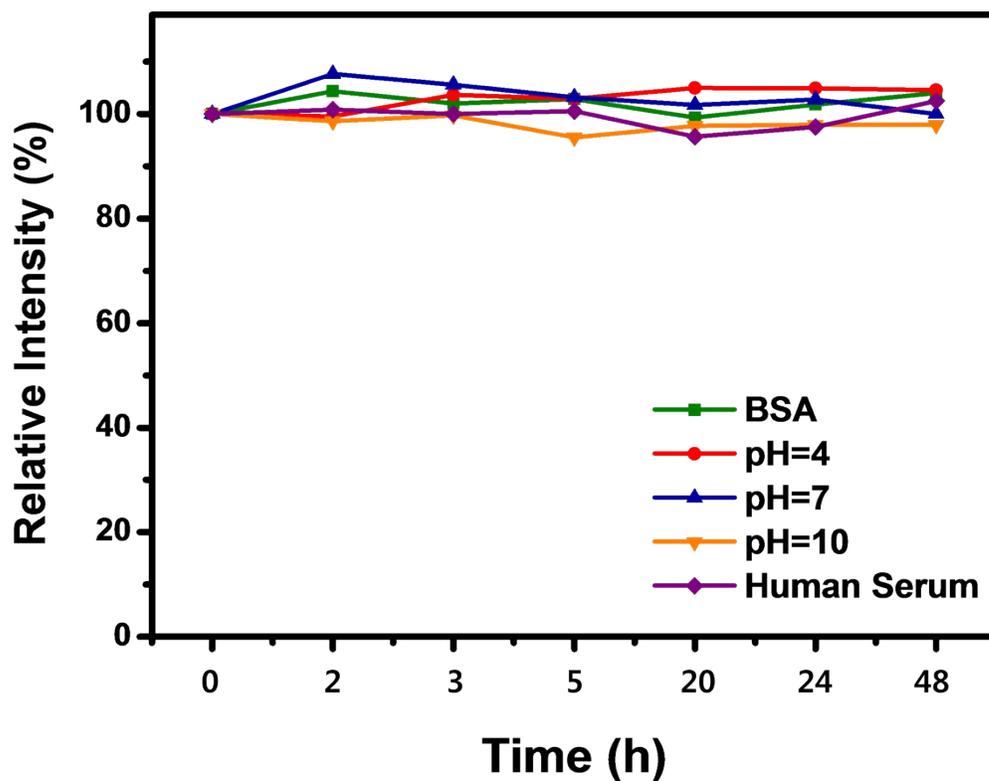


Figure S6. Relative SERS intensity profile of AgNS@SiO₂ with incubation time at various conditions for stability of our nanoprobe. 1075 cm⁻¹ of 4-FBT peak were used for analysis of this data.

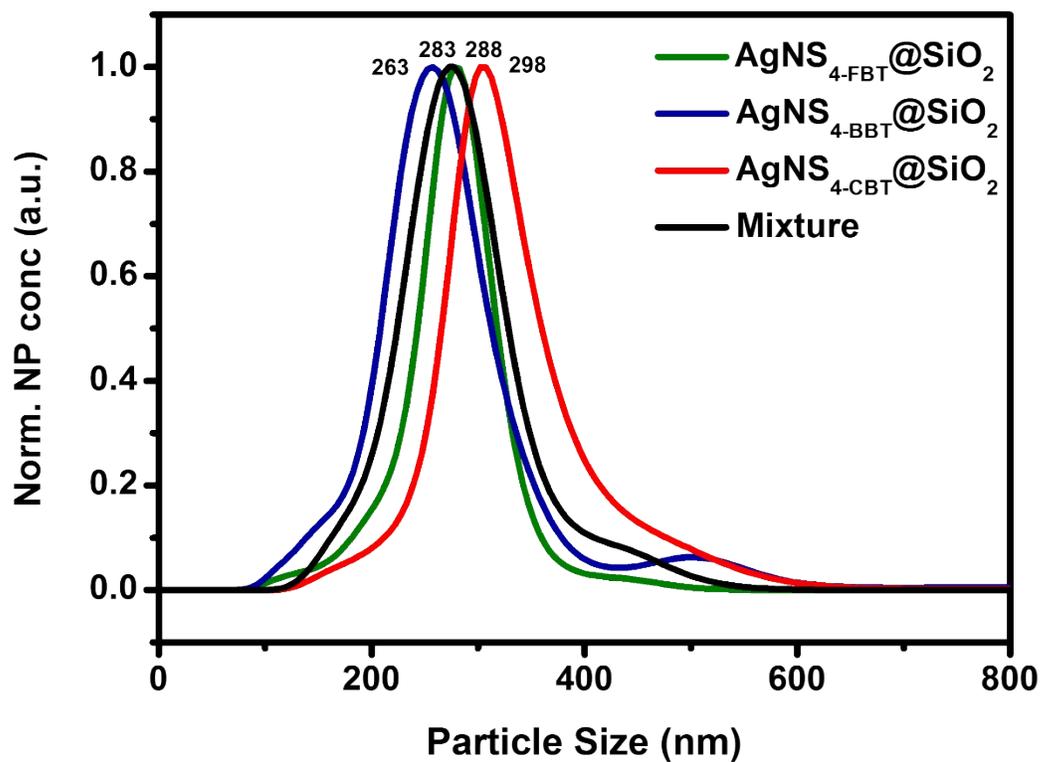


Figure S7. Size and distribution of each AgNS@SiO₂ measuring by nanoparticle tracking analysis (NTA)

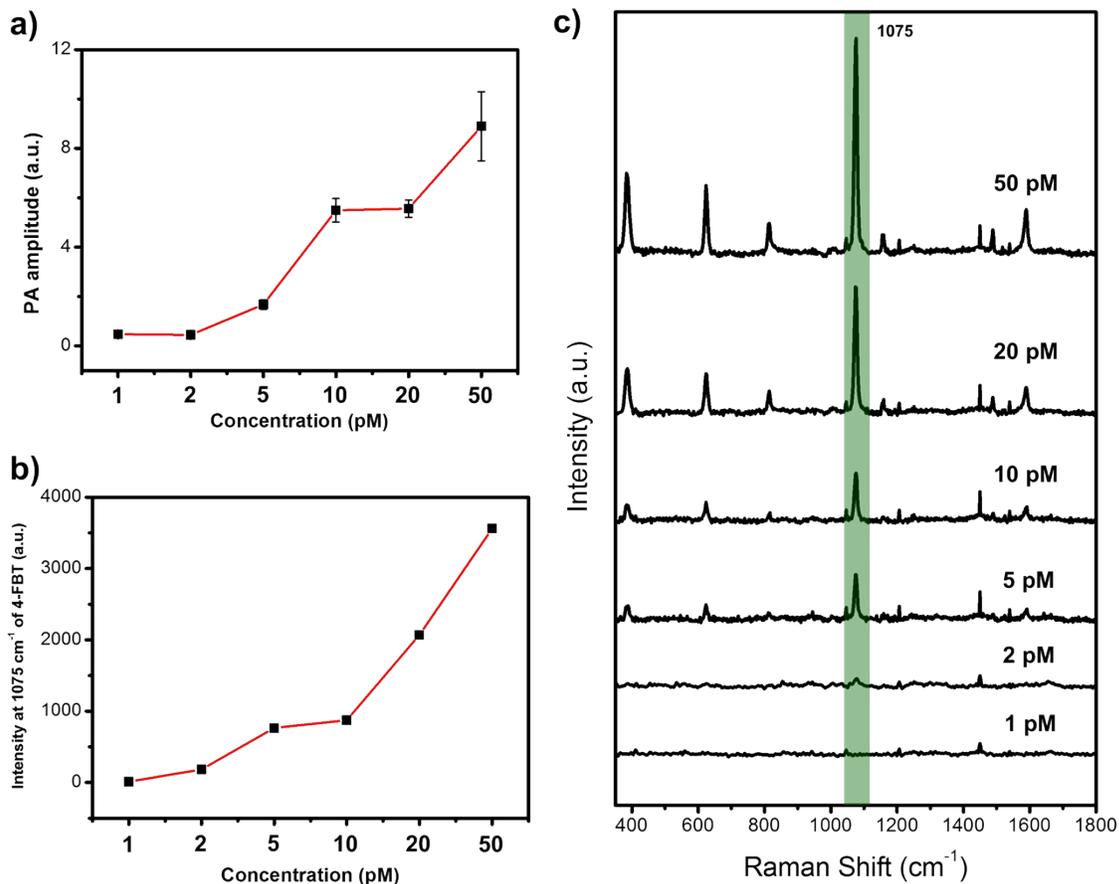


Figure S8. (a) PA spectrum with various concentration of AgNS@SiO₂ for showing PA sensitivity in vivo skin of rat. (b) SERS intensity about 1075 cm⁻¹ of 4-FBT with various concentration of AgNS_{4-FBT}@SiO₂ for showing SERS sensitivity in vivo skin of rat. (c) SERS spectrum with various concentration of AgNS_{4-FBT}@SiO₂. SERS spectra were obtained using portable-Raman system by 785-nm photoexcitation, 60-mW laser power, and light acquisition time of 10 s

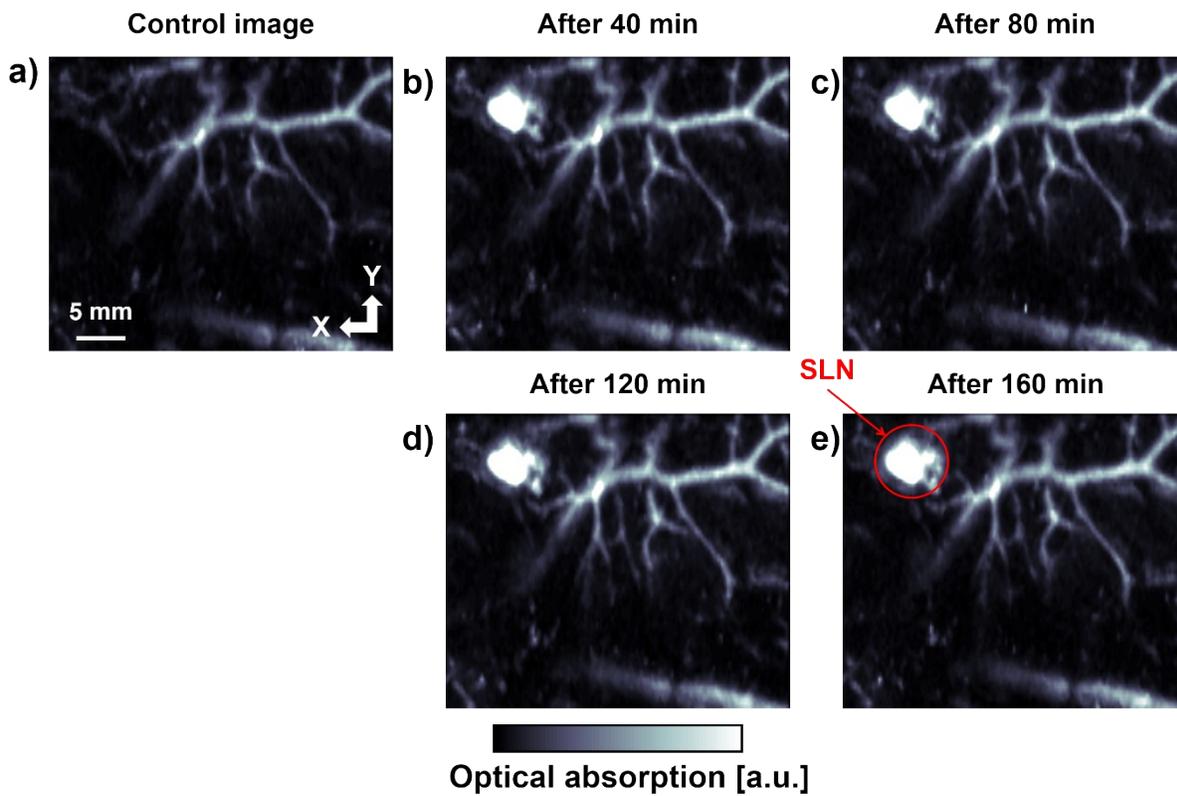


Figure S9. *In vivo* PA detection of axillary SLN of a rat with AgNS@SiO₂ mixture (1:1:1 ratio, 1 nM, 100 μ L). (a) Control PA MAP image of a rat's left axillary region. (b) Post-injection PA MAP image of a rat's left thigh after 40 min, (c) 80 min, (d) 120 min, and (e) 160 min of injections.

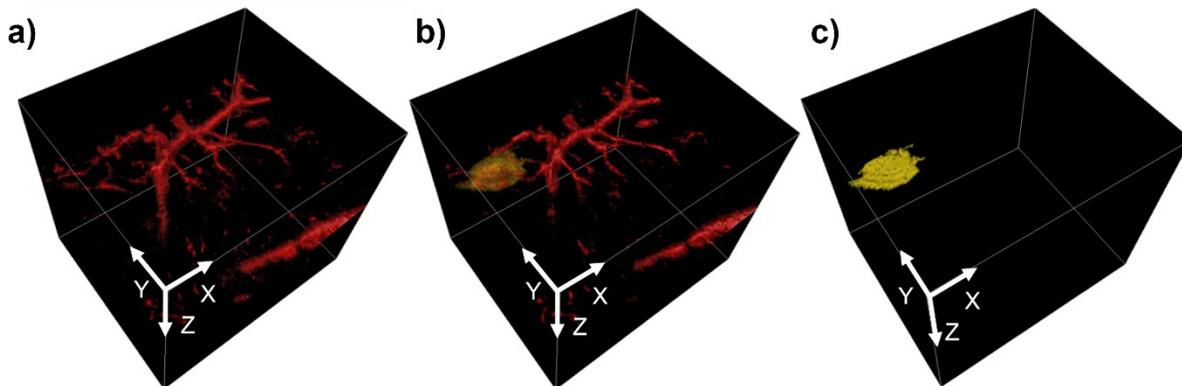


Figure S10. *In vivo* 3D PA images of axillary of a rat with AgNS@SiO₂ mixture (1:1:1 ratio, 1 nM, 100 μ L). (a) Control PA MAP 3D image of a rat's left axillary region. (b) Post-injection PA MAP 3D image of a rat's left thigh after injection (30 min). (c) Differences of PA SLN 3D images between (a) and (b).

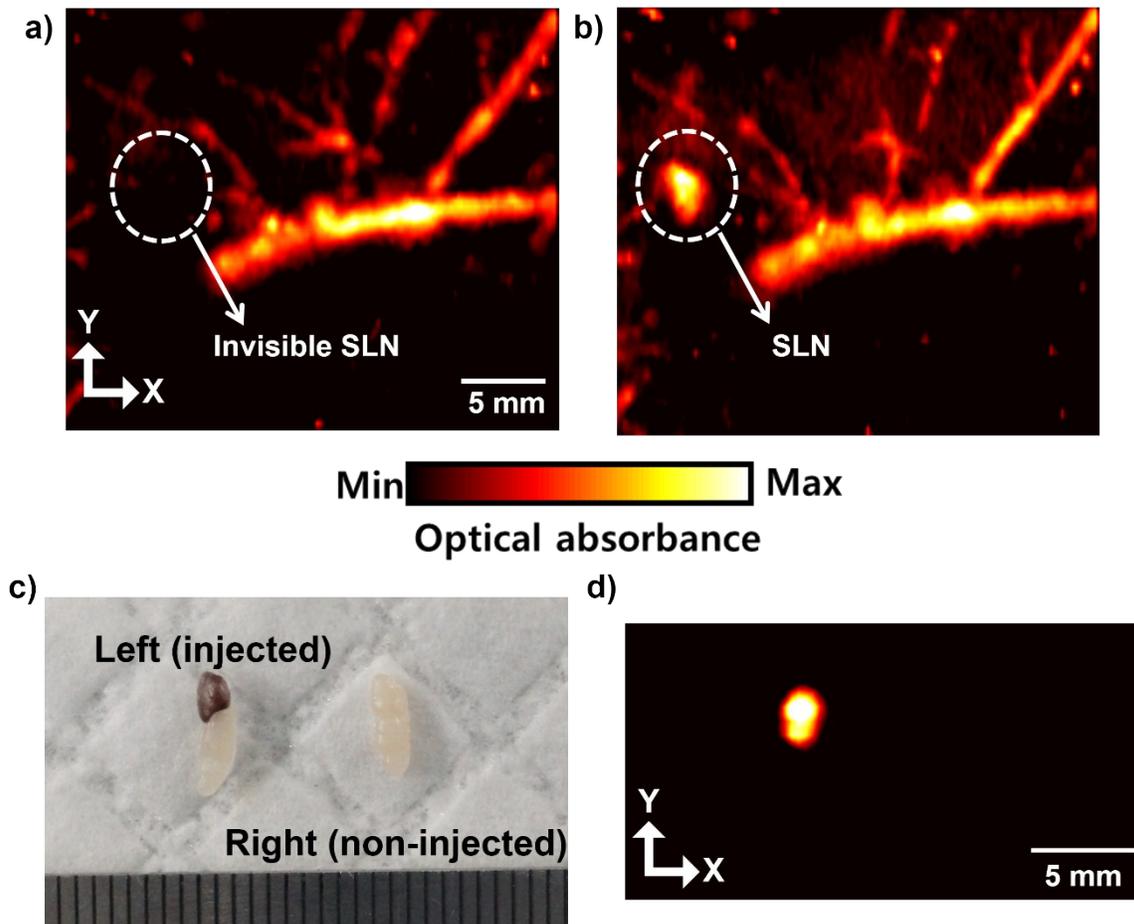


Figure S11. *In vivo* detection of axillary SLN of a rat with AgNS@SiO₂ mixture (ratio: 1:3:5, 1 nM, 100 μ L). (a) Control PA MAP image of a rat's left axillary region. (b) Post-injection PA MAP image of a rat's left thigh after injection. (c) Photograph of control and the injected SLN. (d) *Ex vivo* PA image of control and the injected SLN (Bottom)