

Supporting Information for:

Facile Synthesis of Raman Active Phospholipid Gold Nanoparticles

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Materials.

60 nm gold nanoparticles were purchased from Ted Pella, Inc. Crystal violet was purchased from Sigma Aldrich. 1,2-dimyristoyl-*sn*-glycero-3-phosphocholine (DMPC), 1-myristoyl-2-hydroxy-*sn*-glycero-3-phosphocholine (MHPC), and 1,2-dipalmitoyl-*sn*-glycero-3-phosphothioethanol were purchased from Avanti Polar Lipids and used as received.

Methods.

Synthesis: A 10 μ M aqueous solution of crystal violet was prepared and kept stirring for at least 1 h for complete solubilization. 1.1 mL of 60 nm citrate stabilized AuNPs in aqueous solution were then stirred in a cuvette while being continuously monitored on a compact Raman system using 785nm excitation (Advantage Raman Series, Delta Nu). Fractions of crystal violet (11 μ L) were added intermittently until a stable Raman intensity was reached on the highest scattering peak at 1173cm⁻¹. The Raman coated AuNPs were then transferred to 20 mL scintillation vials, diluted 1:3 with distilled de-ionized H₂O and heated to 65°C with stirring. Upon reaching 55°C, the phospholipid solution (DMPC (5mg) and MHPC (5mg)) in 500 μ L 19:1 chloroform to methanol was added dropwise slowly. The organic solvents were allowed to evaporate and the bubbles formed by evaporating organic solvents were allowed to settle between each addition. After the final addition, the vial was left to cool to room temperature and then aliquoted into microcentrifuge tubes. The resulting nanoparticles were purified by

two rounds of centrifugation for 15 min at 500xg. The supernatant was removed after each centrifugation step and re-dispersed in distilled de-ionized H₂O

Characterization: RAP AuNPs were characterized by dynamic light scattering (Zetasizer Nano ZS90, Malvern Instruments), transmission electron microscopy (Hitachi H-7000 TEM) and UV-Vis Spectroscopy (Cary 50 UV-Vis Spectrophotometer, Varian).

Additional Data:

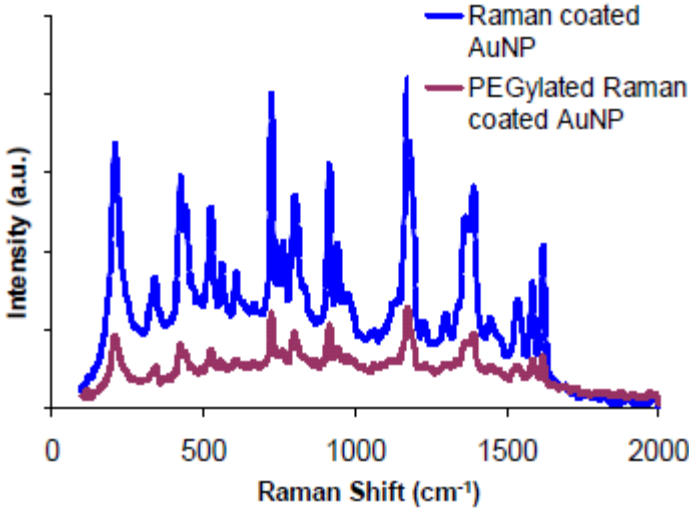


Figure S1. Raman spectra of AuNPs before and after being coated with thiol-PEG after multiple rounds of centrifugation.

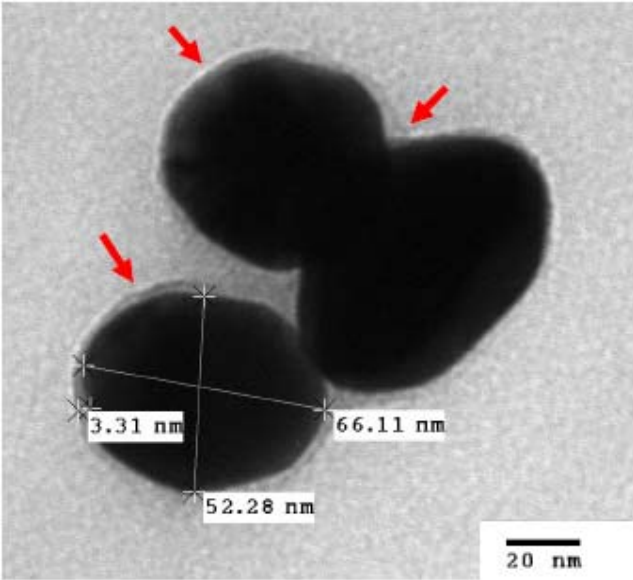


Figure S2. TEM images of RAP AuNPs clustered by TEM preparation clearly shows phospholipid coating (arrows) of approx. 3 nm surrounding the electron-dense AuNPs.

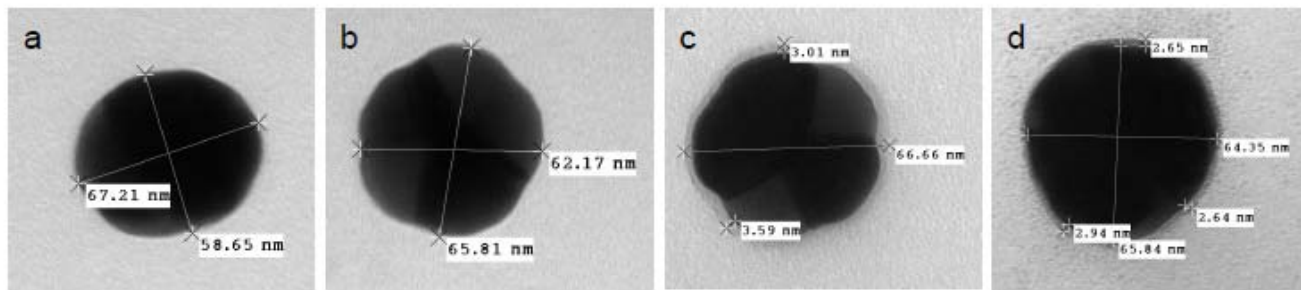


Figure S3. Analysis of TEM images showing citrate-stabilized AuNPs (a), Raman-coated AuNPs (b), phospholipid AuNPs (c) and RAP AuNPs (d), where the phospholipid coating on both (c) and (d) was approx. 3 nm.

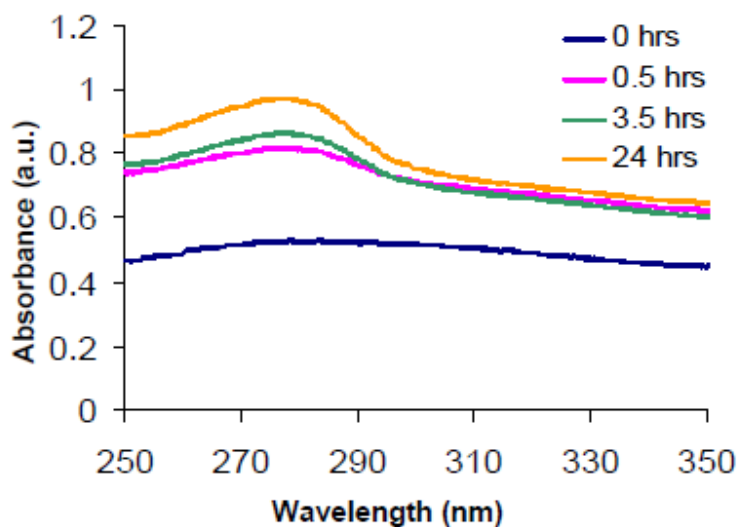


Figure S4. UV-Vis absorbance spectra showing possible protein adherence onto RAP gold after incubation in 10% fetal bovine serum in phosphate buffer saline.

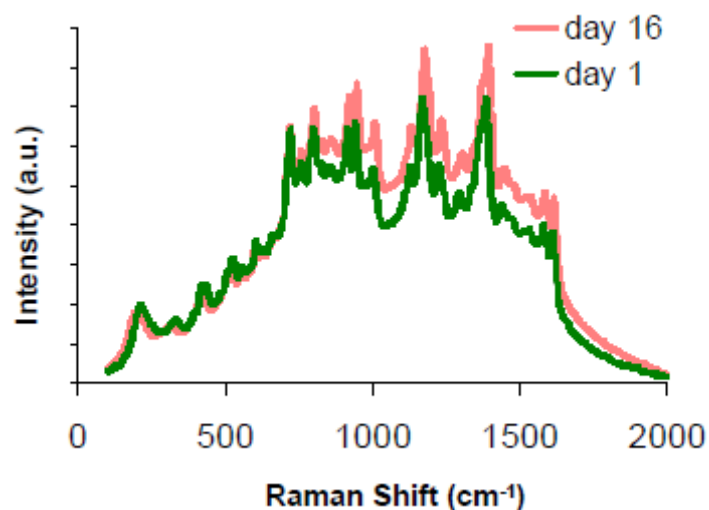


Figure S5. Raman spectra of RAP AuNPs before and after storage in distilled de-ionized water for 16 days at 4°C