Bio-directed synthesis and nanostructural characterization of anisotropic gold nanoparticles

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SUPPORTING INFORMATION

Figure S1. **Histogram size distribution of Au-citrate nanoparticles.** Mean diameter 16.6 ± 2.2 nm.

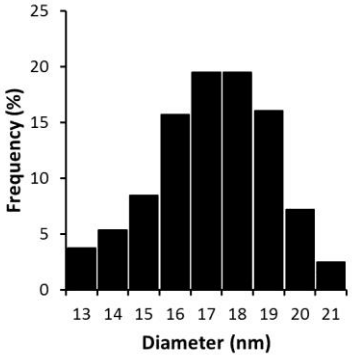


Figure S2. **Histograms size distribution of Au-Lys. (A)** Ratio 1:5, **(B)** Ratio 1:10, **(C)** Ratio 1:25, **(D)** Ratio 1:50, **(E)** Ratio 1:66, **(F)** Ratio 1:100.

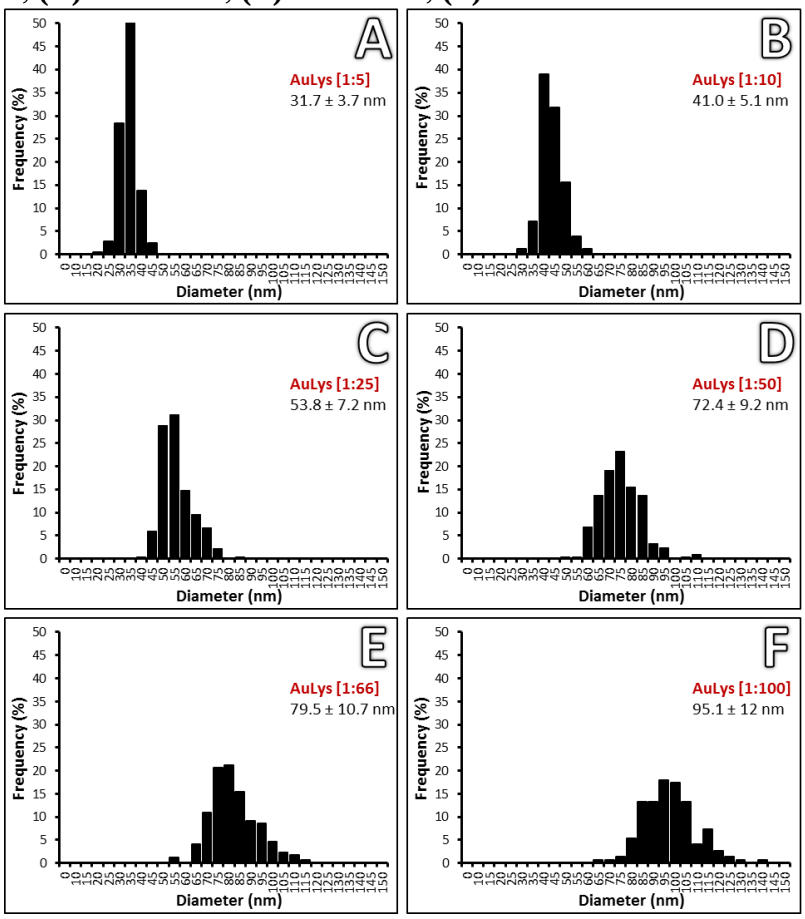


Figure S3. **STEM and EDX spectroscopy. (A)** Low voltage BF-STEM of AuLys (1:5), inserted figure shows thickness of organic coating. **(B)** Low voltage ADF-STEM of AuLys (1:5). **(C)** EDX spectra of AuLys (1:5). **(D)** Low voltage BF-STEM of AuLys (1:100). **(E)** Low voltage ADF-STEM of AuLys (1:100). **(F)** EDX spectra of AuLys (1:100). Imaging with UHR-FE-SEM In-lens HITACHI S5500, coupled with Duo BF/DF-STEM detector and solid state EDX spectrometer (Bruker), operated at accelerating voltage of 30 kV.

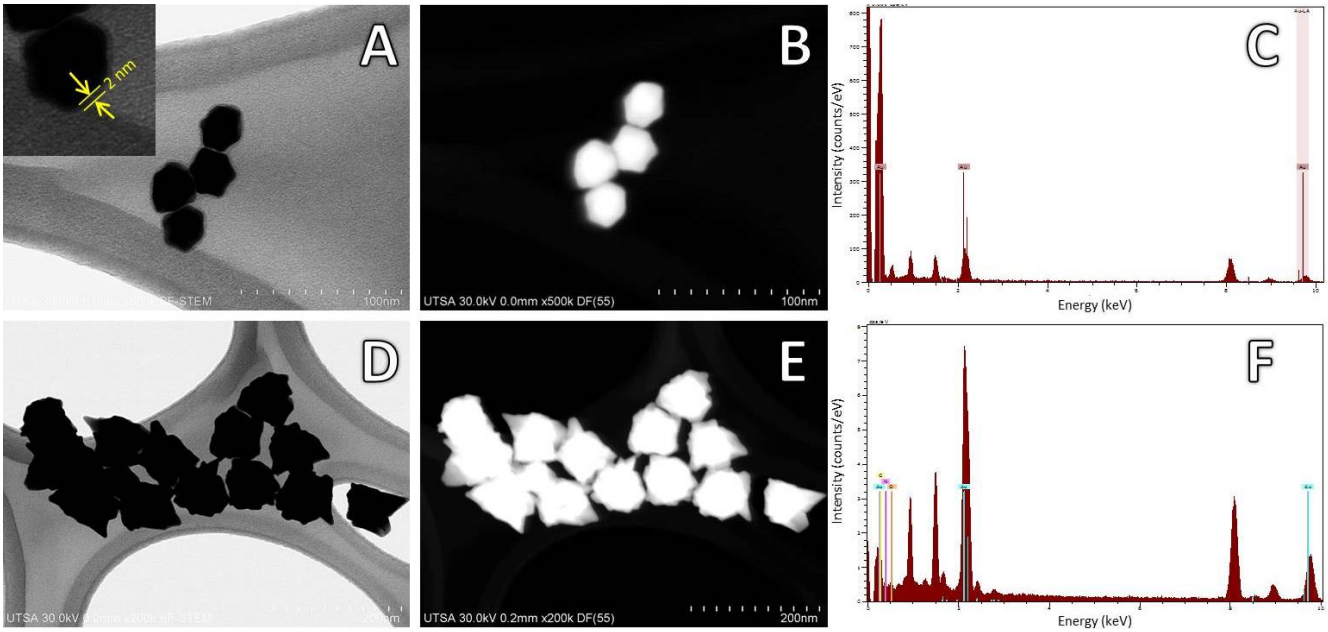


Figure S4. **Properties of AuLys nanoparticles. (A)** Zeta-potential. **(B)** Electrophoretic mobility. **(C)** Conductivity. Black line corresponds to parameters determined in Buffer Lys 25 mM, gray line corresponds to parameters determined in PBS Buffer pH 7-7.2.

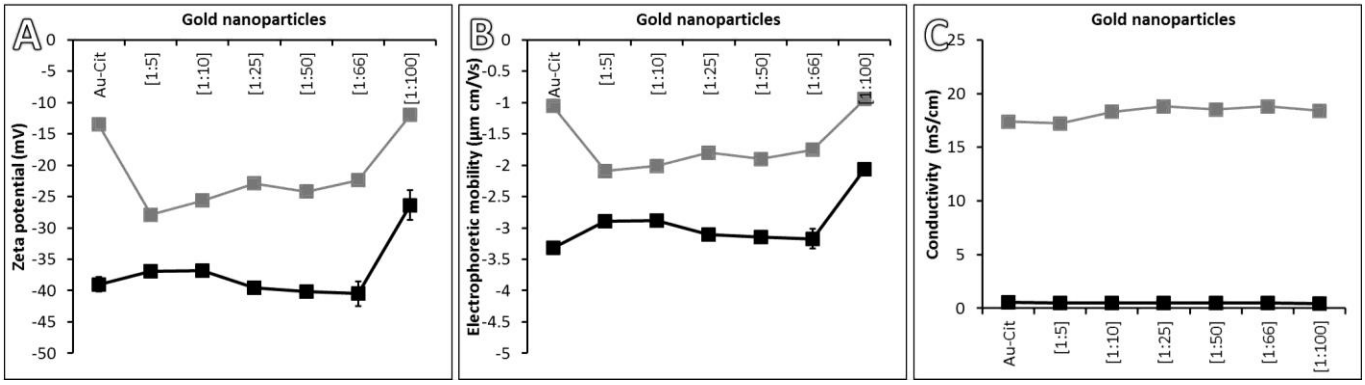


Figure S5. **Absorbance spectroscopy.** Monitoring absorption band at 325 nm corresponding speciation of Au(III) into Au(I) in Lys 25 mM buffer.

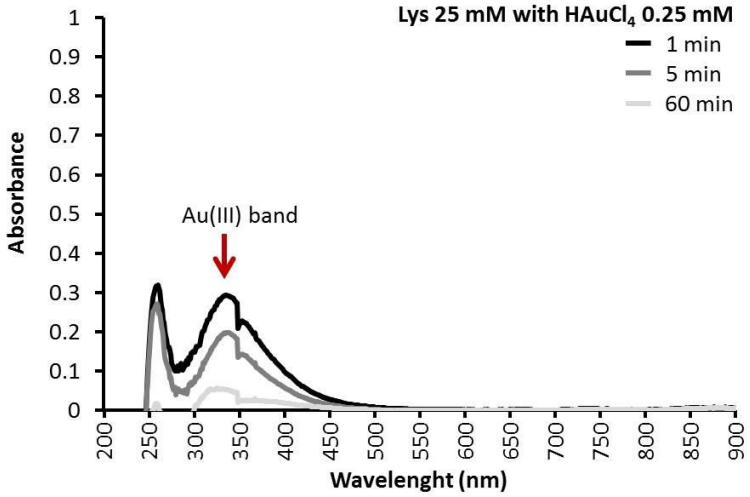


Figure S6. **Binding affinity (Molecular dynamics). (A)** Potential of mean force (PMF) calculated from the reversible work between Au(l) and one water molecule as a function of the separation distance between the molecules. The Rmin value was 1.52 Å in all calculation. Changing the epsilon value did not represent any significant different. **(B)** Binding free energy between of Gly or Lys with and Au(l). Error bars indicate SEM.

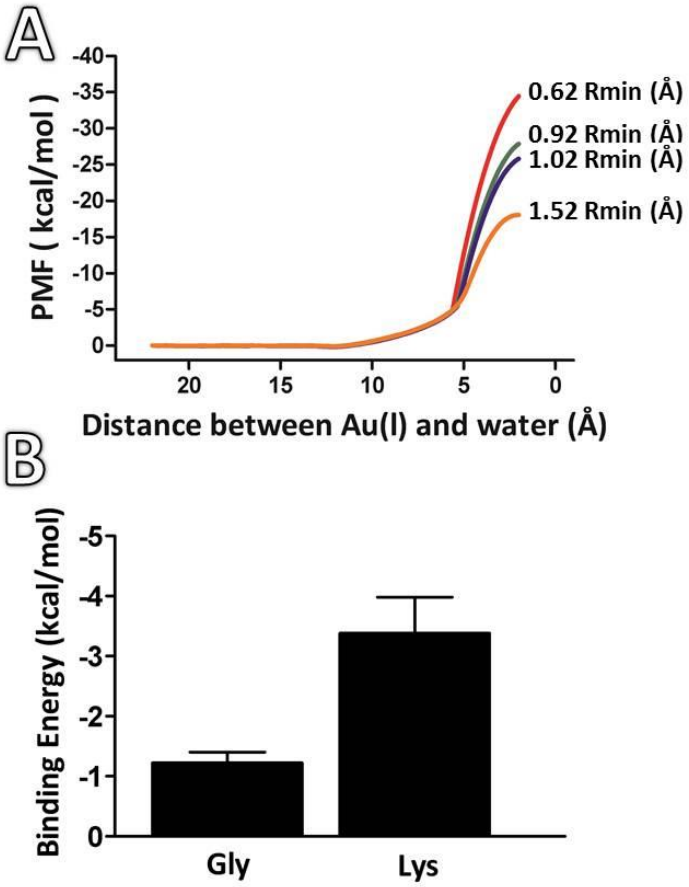
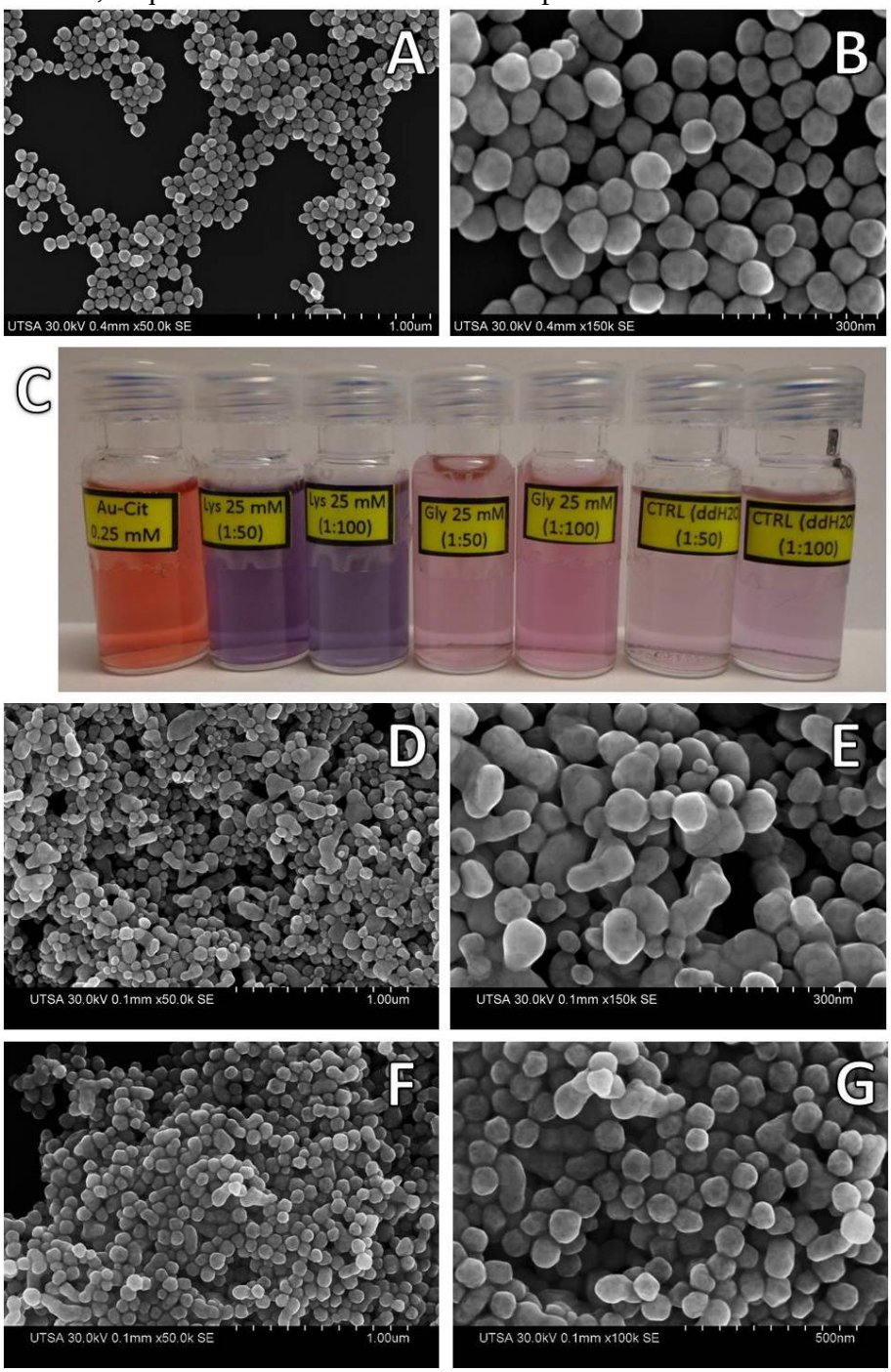


Figure S7. **UHR FE-SEM imaging of Au nanoparticles produced with Gly buffer and without amino acids. (A)** Low magnification imaging, Gly 1:50, **(B)** High magnification, Gly 1:50. **(C)** Microtubes containing nanoparticles produced with Lys, Gly or ddH_2O. **(D)** Low magnification imaging, ddH_2O 1:50, **(E)** High magnification, ddH_2O 1:50. **(F)** Low magnification imaging, ddH_2O 1:100, **(G)** High magnification, ddH_2O 1:100. Imaging with UHR-FE-SEM In-lens HITACHI S5500, acquisition with SE detector and operated at 30 kV.



Video S1. **Molecular dynamics simulation of interaction of Au(l) with Lys.**