Supporting Information

Rational design of multi-functional gold nanoparticles with controlled biomolecule adsorption: a multi-method approach for in-depth characterization

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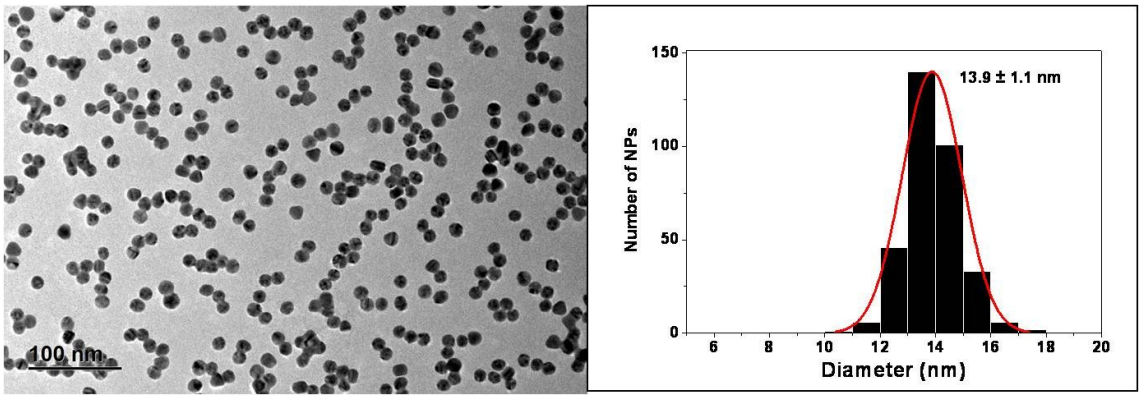

Figure S1. TEM characterization and size distribution analysis of pristine AuNPs showing uniform quasi-spherical morphology.

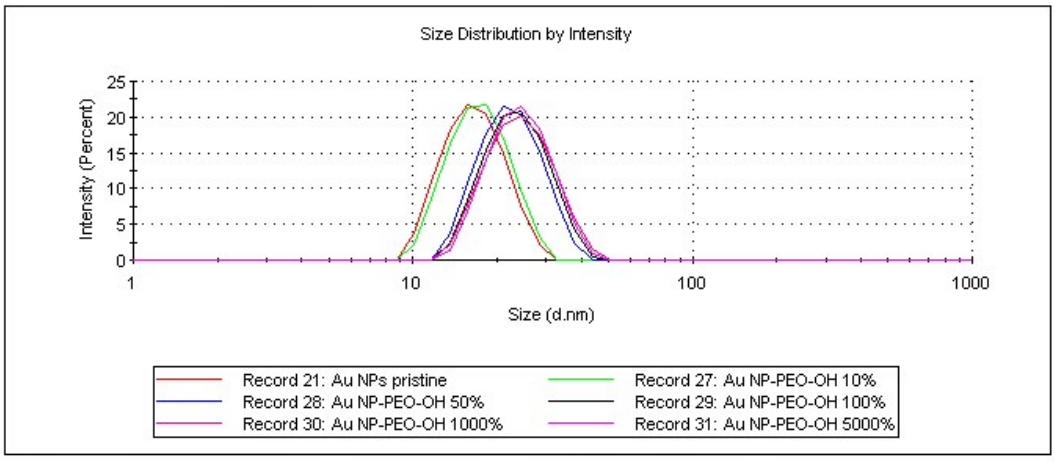

Figure S2. Hydrodynamic diameter by batch-mode DLS of pristine AuNPs and AuNP-PEO samples at different coating densities.

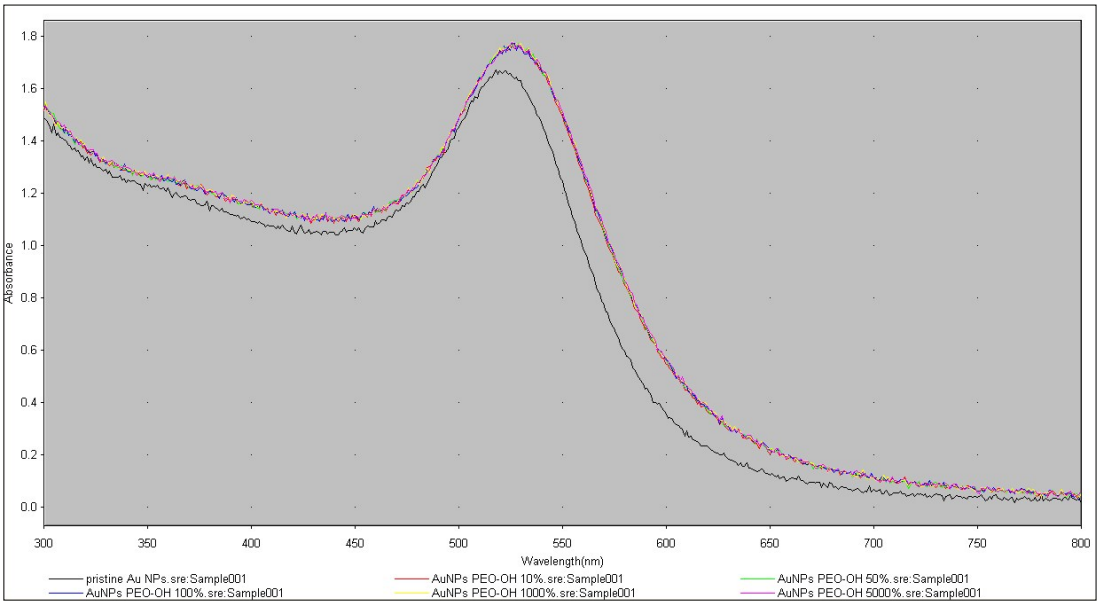

Figure S3. UV-vis absorption spectra of pristine AuNPs (λ_{max} = 523 nm) and AuNP-PEO samples (λ_{max} = 528 nm) at different coating densities.

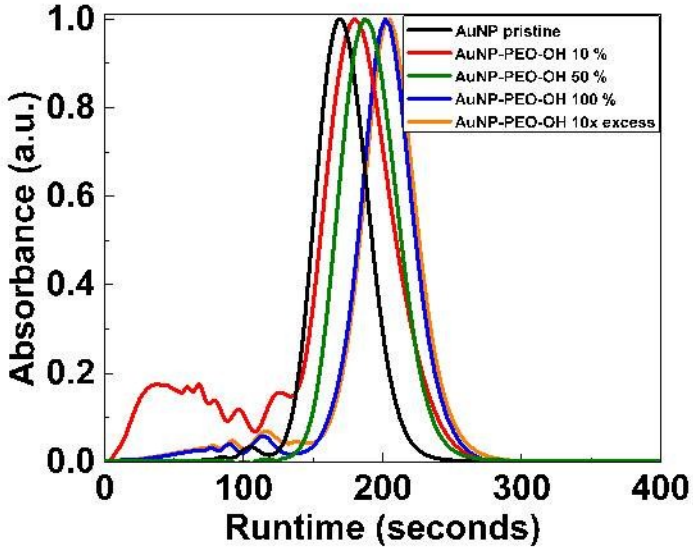

Figure S4. Sedimentation time by CLS of pristine AuNPs and AuNP-PEO samples with different surface densities (10, 50, 100 % theoretical coverage and 10x excess).

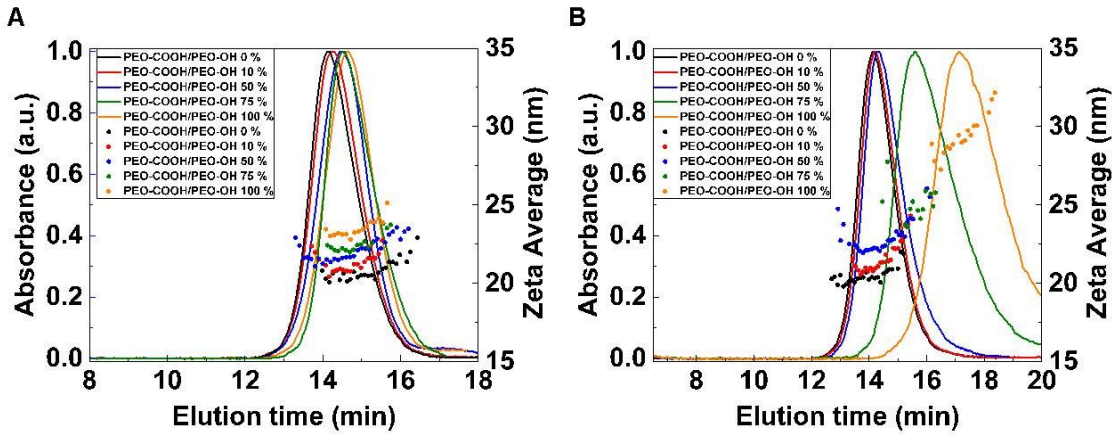

Figure S5. Separation by AF4 and size measurement by DLS in flow mode for AuNP-PEO samples with different ratios of PEO-COOH/PEO-OH ligands (from 0 % to 100 %) in the absence (A) and reacted (B) with HSA protein after pre-activation with EDC/NHS. Selected parts of the AF4 fractograms (UV-Vis traces)

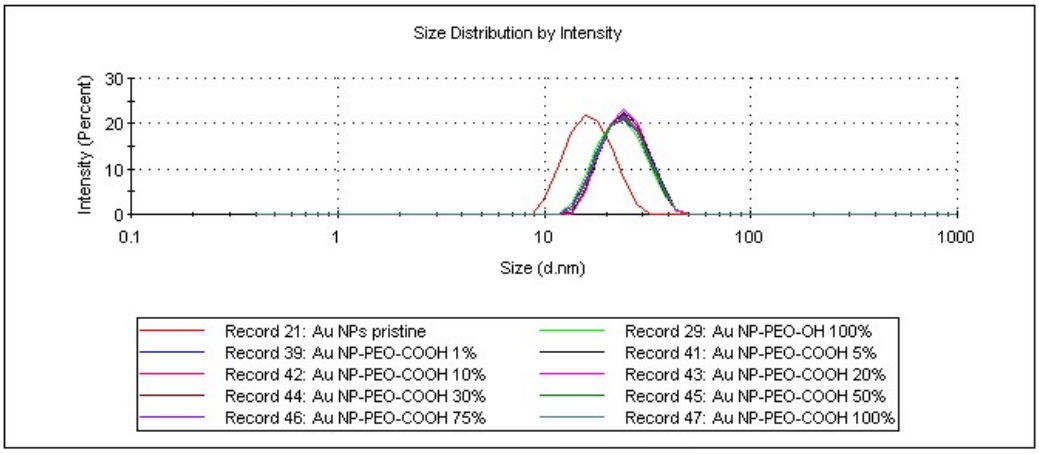

Figure S6. Hydrodynamic diameter by batch-mode DLS of pristine AuNPs and AuNP-PEO samples with different ratios of PEO-COOH/PEO-OH ligands (from 0 % to 100 %).

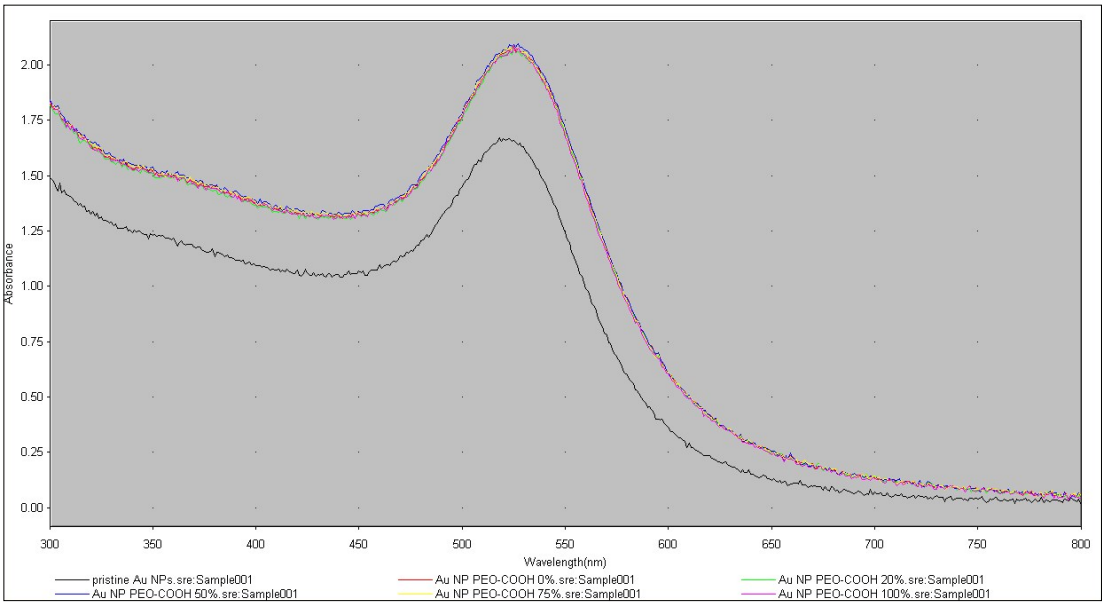

Figure S7. UV-vis absorption spectra of pristine AuNPs (λ_{max} = 523 nm) and and AuNP-PEO samples (λ_{max} = 526 nm) with different ratios of PEO-COOH/PEO-OH ligands (from 0 % to 100 %).

PEO-COOH/PEO-OH (%)	0		1		5		10		20		30		50		75		100	
HSA	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
density	6.4	6.5	6.4	6.3	6.0	6.1	5.7	5.9	5.8	5.6	5.5	5.6	5.3	5.2	4.9	4.2	4.8	2.6
DLS Size	20.8	20.5	20.8	20.8	21.3	21.0	21.7	21.5	21.6	21.8	22.2	22.1	22.6	22.6	23.5	24.9	23.4	30.0
stdev	0.6	0.5	0.7	0.5	0.6	0.5	0.5	0.8	0.6	0.6	0.7	0.5	0.6	0.6	0.6	0.8	0.5	1.3

Table S1. Determination of the densities of AuNP-PEO complexes with different ratios of PEO-COOH/PEO-OH ligands in the absence and presence of covalently bound HSA by the combination of hydrodynamic diameters obtained by AF4-DLS with the CLS data. The standard deviation is reported as stdev.

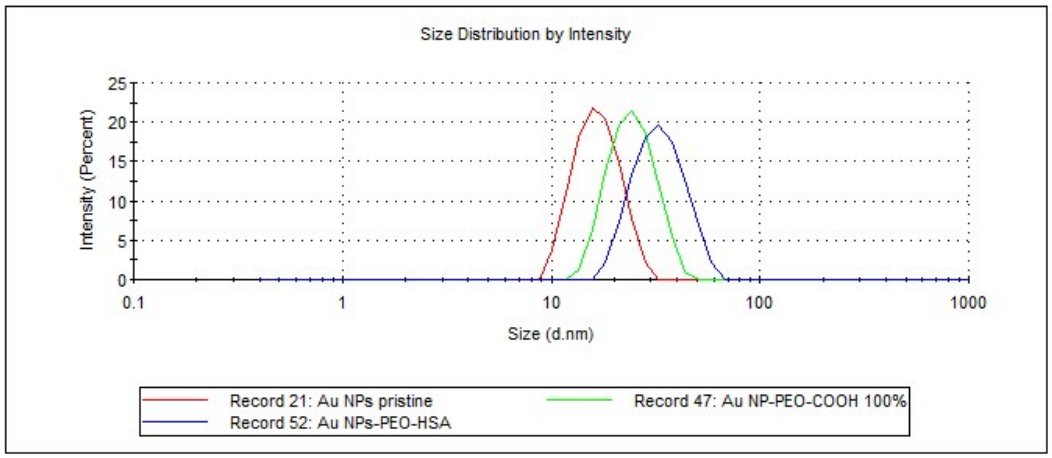

Figure S8. Hydrodynamic diameter by batch-mode DLS of pristine AuNPs, AuNP-PEO-COOH (100 % PEO-COOH coverage) and AuNP-PEO-HSA samples (100 % PEO-COOH coverage).

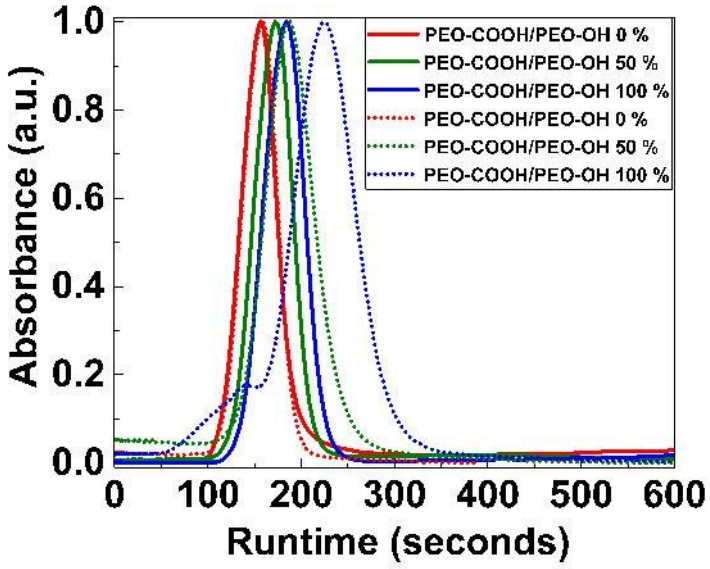

Figure S9. Sedimentation time by CLS of AuNP-PEO complexes with different ratios of PEO-COOH/PEO-OH ligands in the absence (continuous line) and presence (dashed line) of covalently bound HSA molecules.

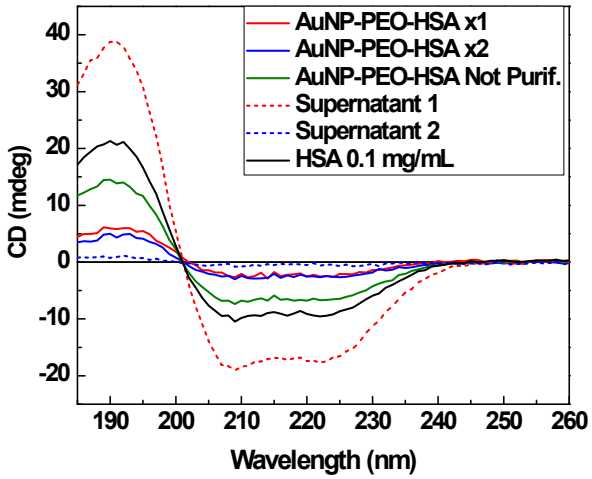

Figure S10. Selected CD spectra from Chirascan of AuNP-PEO-HSA complexes and their supernatants after centrifuge purification steps (either once or twice).