Electronic Supplementary Material (ESI) for Nanoscale.

Design of a Novel Plasmonic Nanoconjugated Analytical Tool for Ultrasensitive Antigens Quantification.

Juan C. Fraire, [†,*] *Ruben D. Motrich,* [‡] *and Eduardo A. Coronado* [†,*]

[†]INFIQC, Centro Laser de Ciencias Moleculares, Departamento de Fisicoquímica, and [‡]CIBICI, Departamento de Bioquímica Clínica, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Córdoba, 5000, Argentina.

*E-mail: jfraire@fcq.unc.edu.ar; coronado@fcq.unc.edu.ar

SUPPLEMENTARY FIGURES

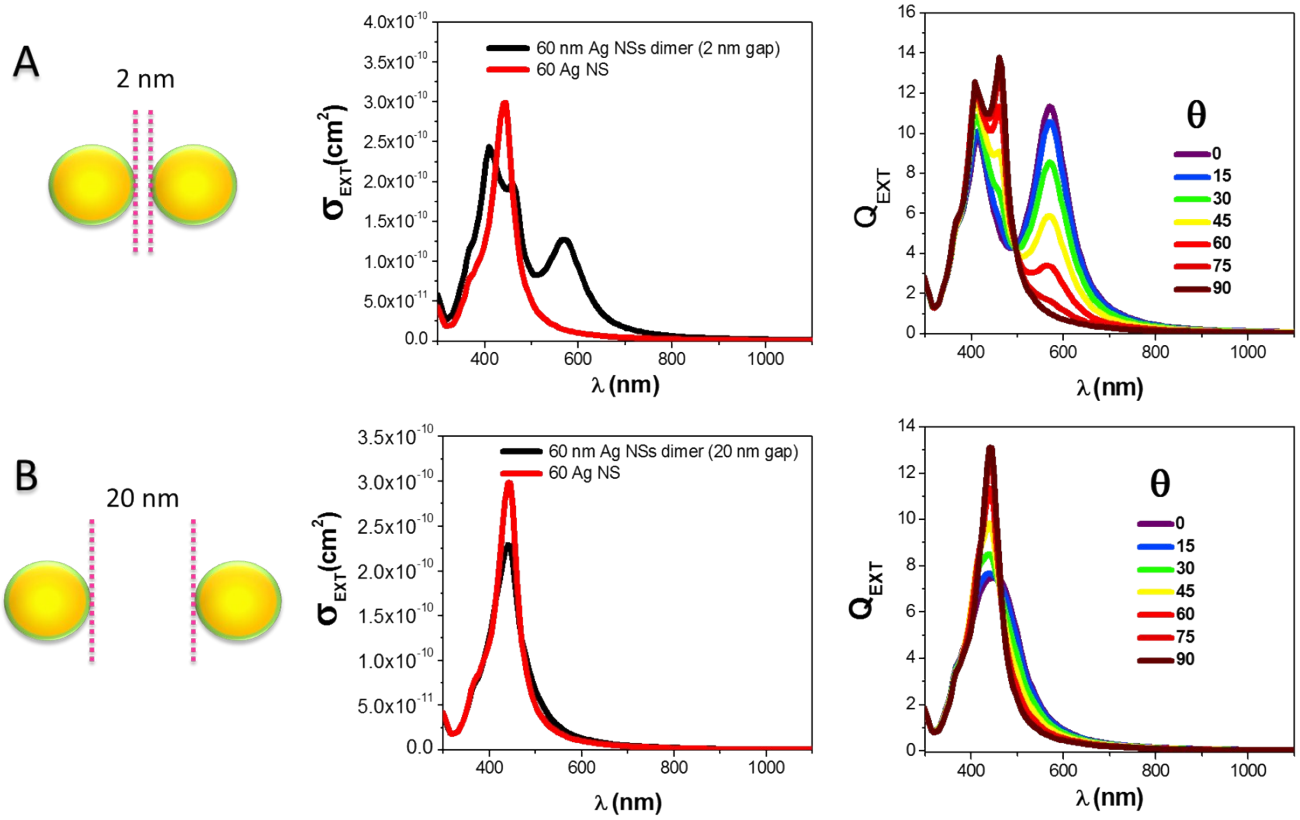

Figure S1: Theoretical simulations of the far-field optical response of Ag NS dimers. Average extinction cross section of the dimers (left panel), and extinction efficiency of the NS dimer at different orientations (averaged over 8 different orientations) (right panel). Simulations using GMM were performed for 60 nm Ag NS dimer with: a) 2 nm and b) 20 nm gap.

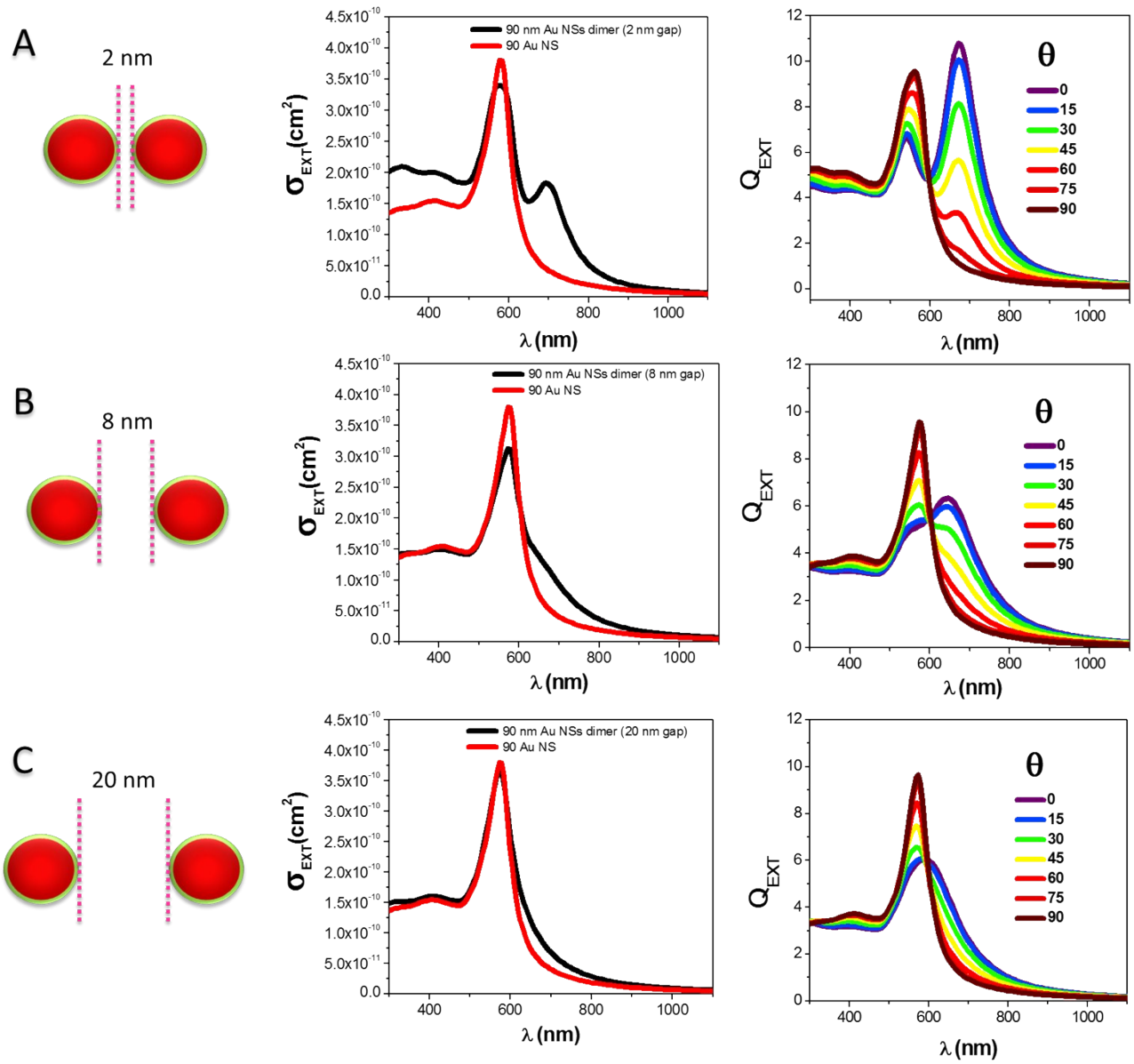

Figure S2: Theoretical simulations of the far-field optical response of Au NS dimers. Average extinction cross section of the dimers (left panel), and extinction efficiency of the NS dimer at different orientations (averaged over 8 different orientations) (right panel). Simulations using GMM were performed for 60 nm Ag NS dimer with: a) 2 nm, b) 8 nm and c) 20 nm gap.

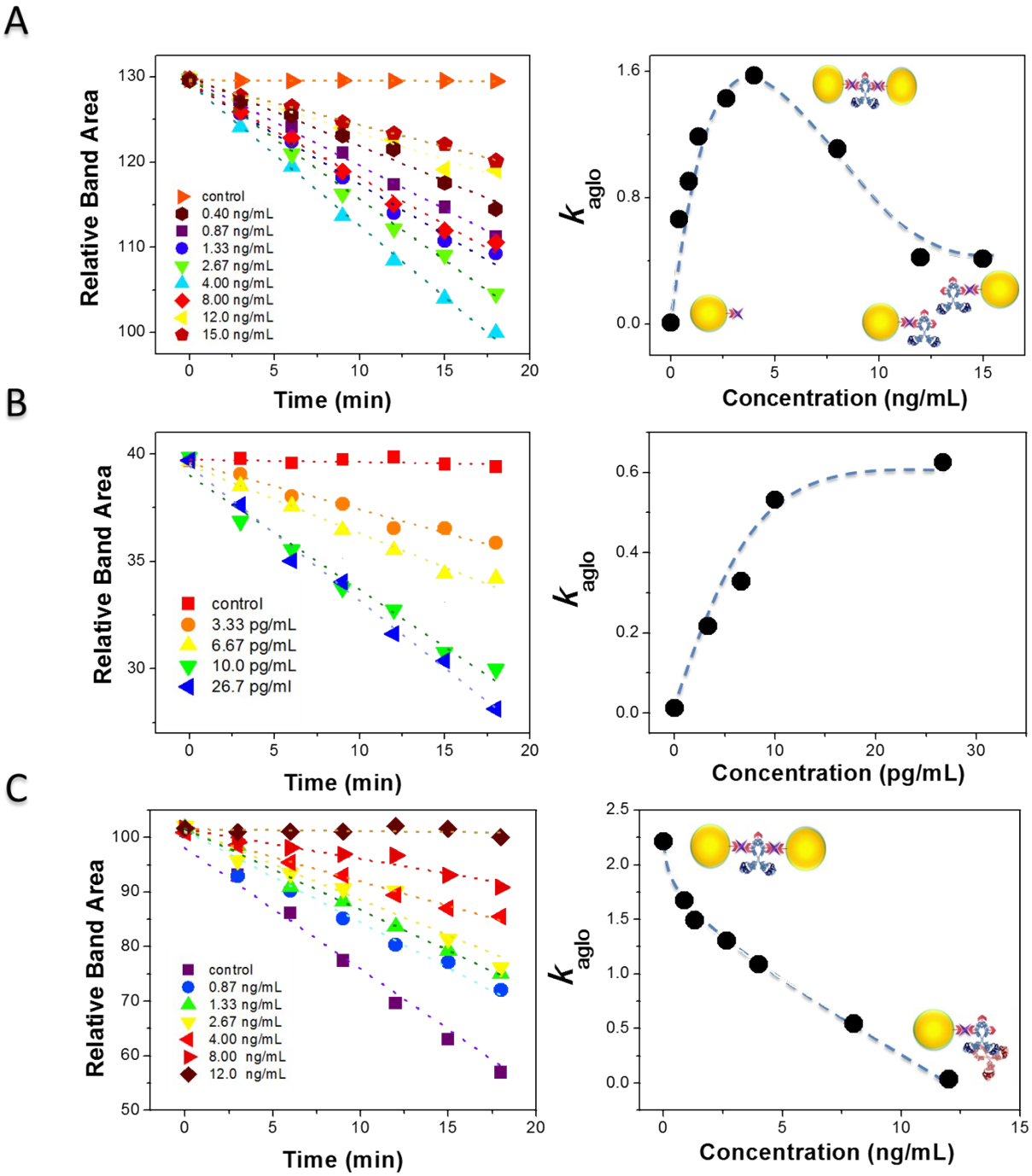

Figure S3: Kinetics measurements of the dimer formation using a biotinylated Goat Anti Rabbit IgG Antibody (Biot-IgG). a, Linear fitting of the integral of the extinction spectra (left panel), and trend of the agglomeration rate constant (k_{Aglo}) for dimers formation both as a function of the concentration of Biot-IgG. **b,** Effect of the dilution of the initial Ag NPs solution that leads to a lower detection limit: Linear fitting of the integral of the extinction spectra (left panel), and trend of k_{Aglo} for dimers formation both as a function of the concentration of Biot-IgG. **c,** Avoiding dimers formation due to the addition of purified rabbit IgG (antigen) to a solution of Ag NPs with Biot-IgG: Linear fitting of the integral of the extinction spectra (left panel), and trend of k_{Aglo} for dimers formation both as a function of the concentration of antigen. In every experiment the integral of the extinction spectrum was performed between 340 and 800 nm, and the blue dotted lines are a guide to the eye.

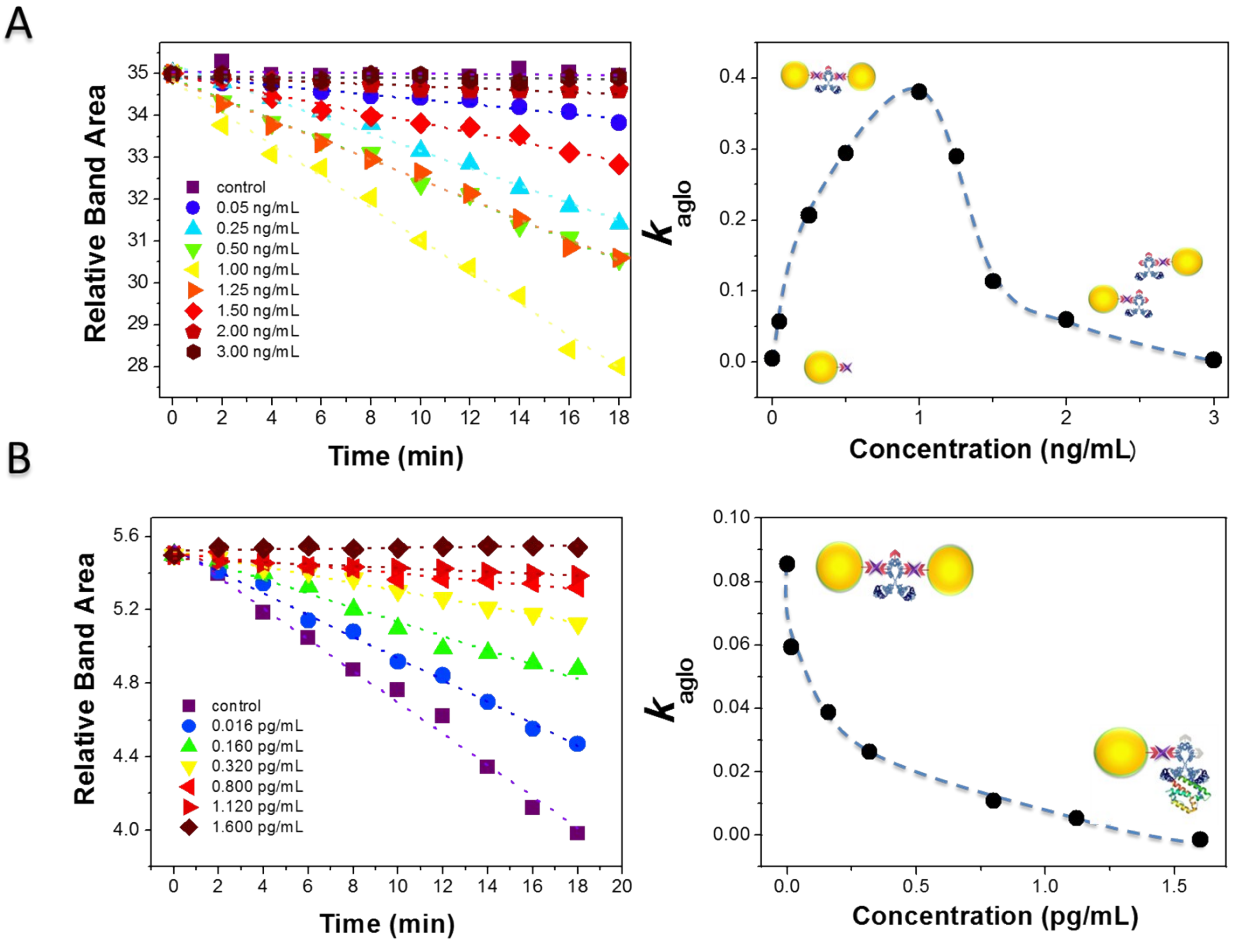

Figure S4: Kinetics measurements of the dimer formation using a biotinylated Anti IL-10 IgG Antibody (Biot-IgG). a, Linear fitting of the integral of the extinction spectra (left panel), and trend of the agglomeration rate constant (k_{Aglo}) for dimers formation both as a function of the concentration of Biot-IgG. **b,** Avoiding dimers formation due to the addition of recombinant IL-10 (antigen) to a solution of Ag NPs with Biot-IgG: Linear fitting of the integral of the extinction spectra (left panel), and trend of k_{Aglo} for dimers formation both as a function of the concentration of antigen. In every experiment the integral of the extinction spectrum was performed between 340 and 800 nm, and the blue dotted lines are a guide to the eye.

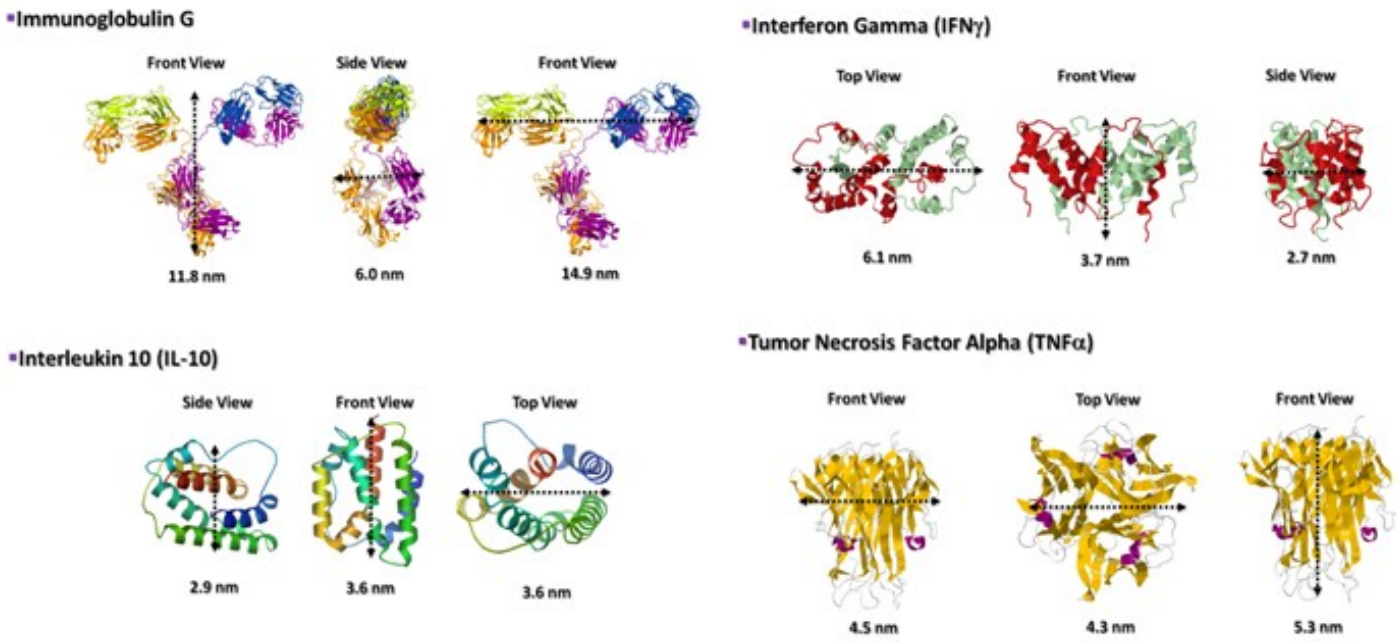

Figure S5: Structural parameters of the antigens used in this study. The differences guarantee that the impediment to the dimer formation is not a result of a steric repulsion; instead this could be attributed to a conformational change that "hides" the other biotins of the Biot-IgG.

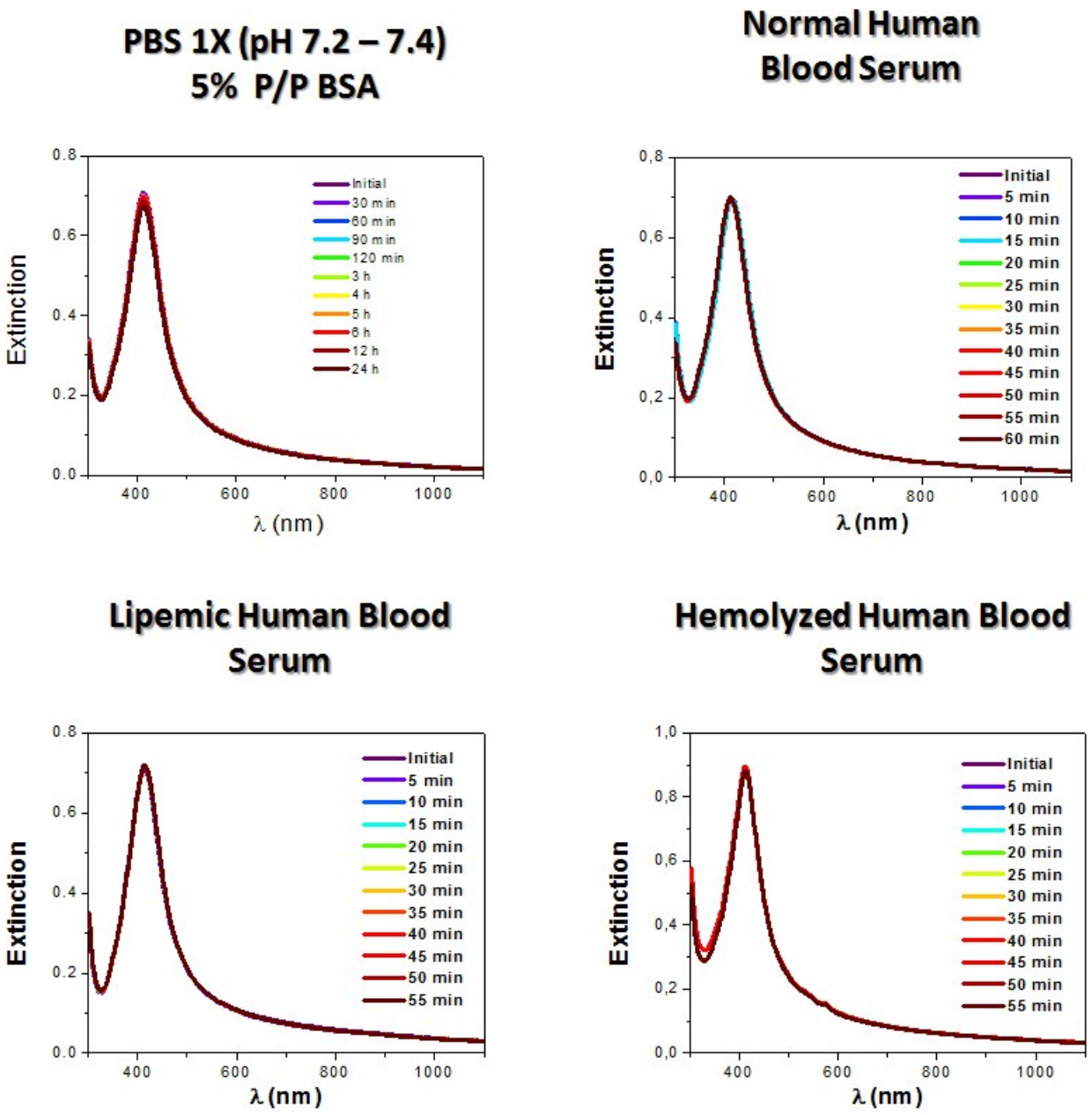

Figure S6: Spectral stability of the Ag NPs colloidal dispersion. The different figures depict the spectral stability of the functionalized Ag NPs after the addition of 50 µL of buffer or human blood serum.

		IDILA	ELISA
Assay time (sample processing to detection)		< 2 h	> 5 h
Cost	Instrument	Can be performed using ELISA Microplate Readers	ELISA Microplate Readers
	Per Assay	~US$10 (Ag nanoparticles, biotin HPDP, streptavidin, microplates, detection antibodies)	~US$65 (microplates, capture and detection antibodies, recombinant standards, avidin-HRP, assay diluents, coating buffer, TMB substrate, stop solution)
POC use		Easily applicable	Currently most wide spread used technique

Supplementary Table S1. Comparison of methods for antigen quantification.