Supplementary Material (ESI) for Nanoscale

SUPPORTING INFORMATION

Single-Step Bifunctional Coating for Selectively Conjugable NanoParticles

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Figure S1

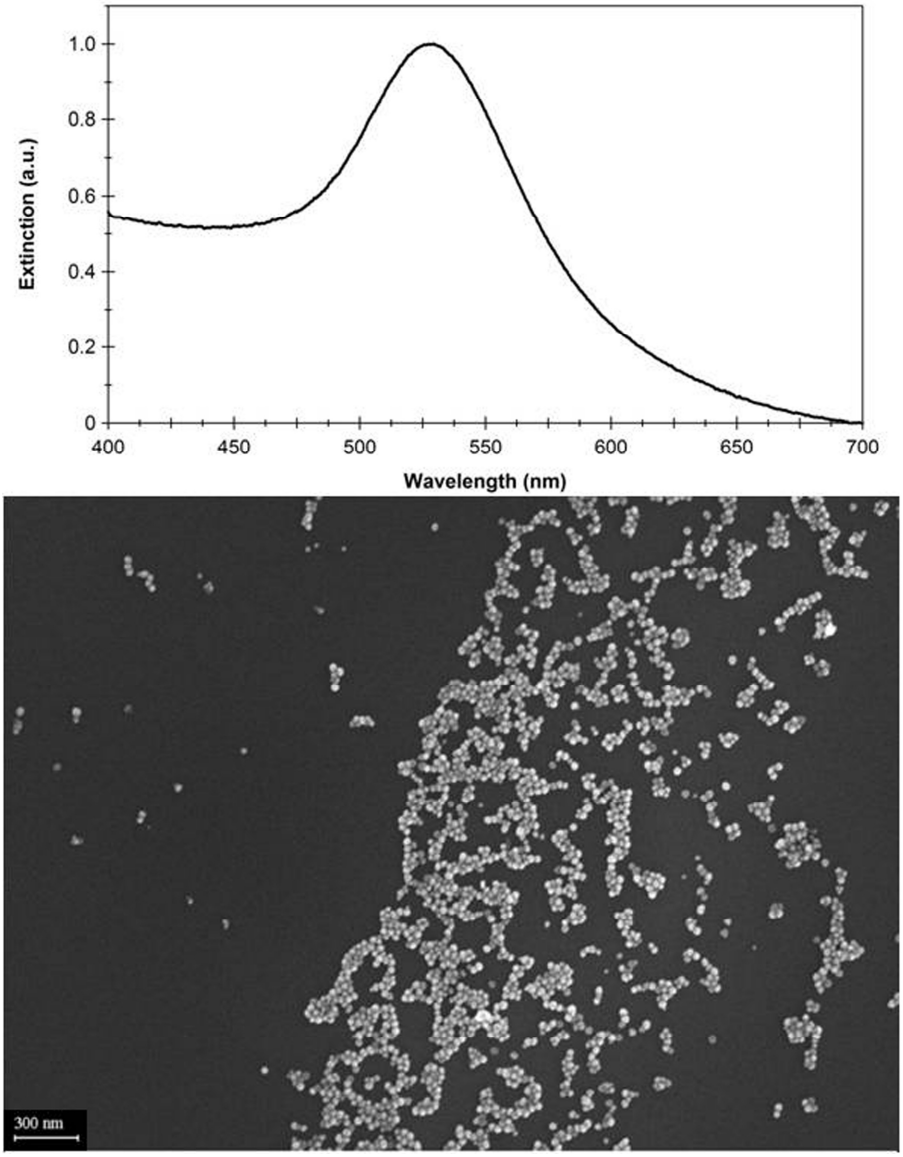

Figure S1. (Top) UV-Vis spectrum of 30 nm nanospheres AuNs. The spectrum is normalized on the maximum of the resonance band. (Bottom) Gold nanoparticles AuNs. Scanning electron microscopy images of monodispersed 30 nm gold nanoparticles prepared by acrylate/acrylic acid reduction of hydrogen tetrachloroaurate. The colloid was dropped on N-doped Si for microscopy observation. The bar indicates 300 nm.

Figure S2

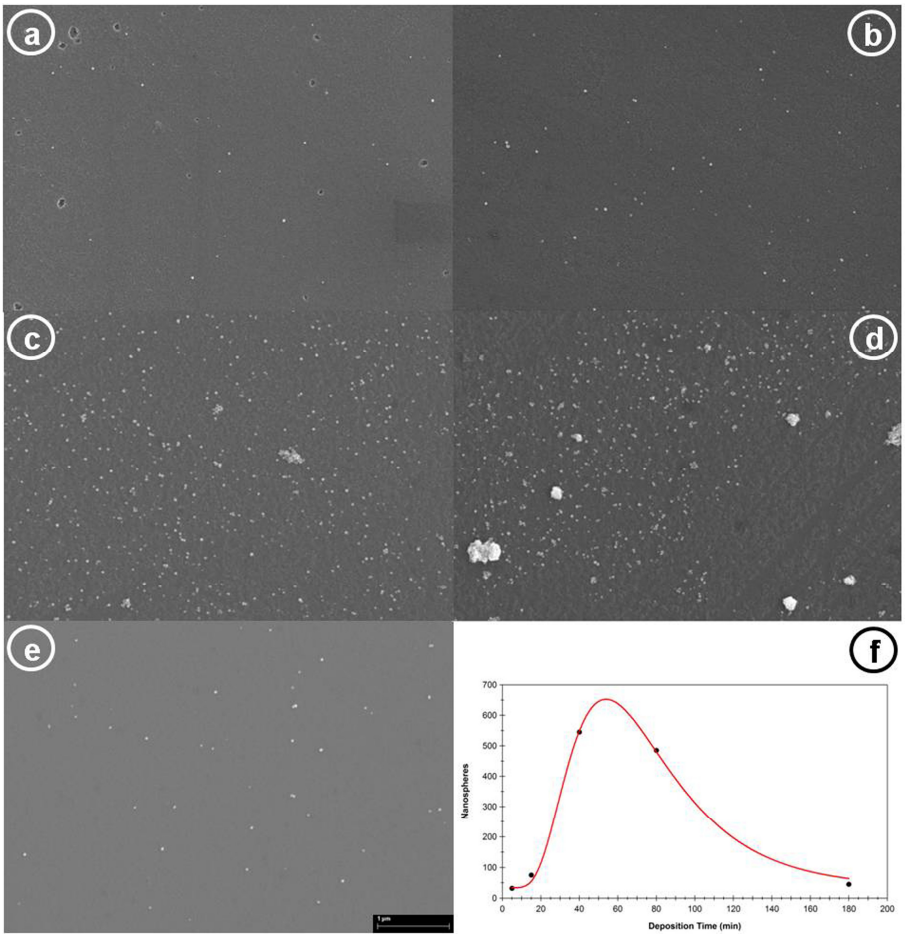

Figure S2. Scanning electron microscopy images of AuNsKB spreads on streptavidinated glass (see text) with different incubation time (a- 5'; b- 15'; c- 40'; d- 80'; e-180'). The scale bar is 1 μm for all images. The number of nanospheres was counted automatically by ImageJ. f) Plot of number of nanoparticles vs time of incubation. The red line is a guide for the eyes and seems to indicate an incubation time of ~50 min for maximum nanoparticles density on the modified surface.

Figure S3

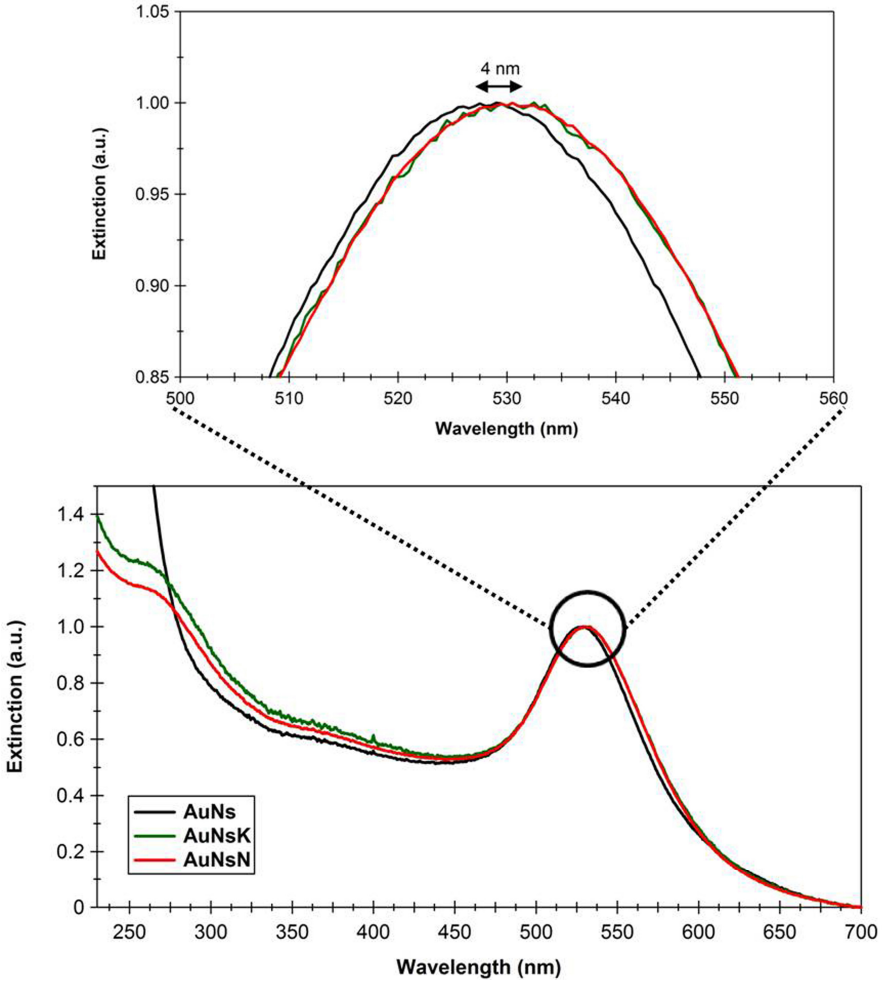

Figure S3. UV-Vis spectra of 30 nm gold nanospheres AuNs (black line), and the same particles after conjugation with peptides (K- green line, N- red line). Note in the zoom in the top panel the 4-nm red-shift in the plasmon peak due to the change in the local refractive index after the peptide substitution around the metallic surface. All spectra are normalized on their plasmon resonance band maximum.

Figure S4

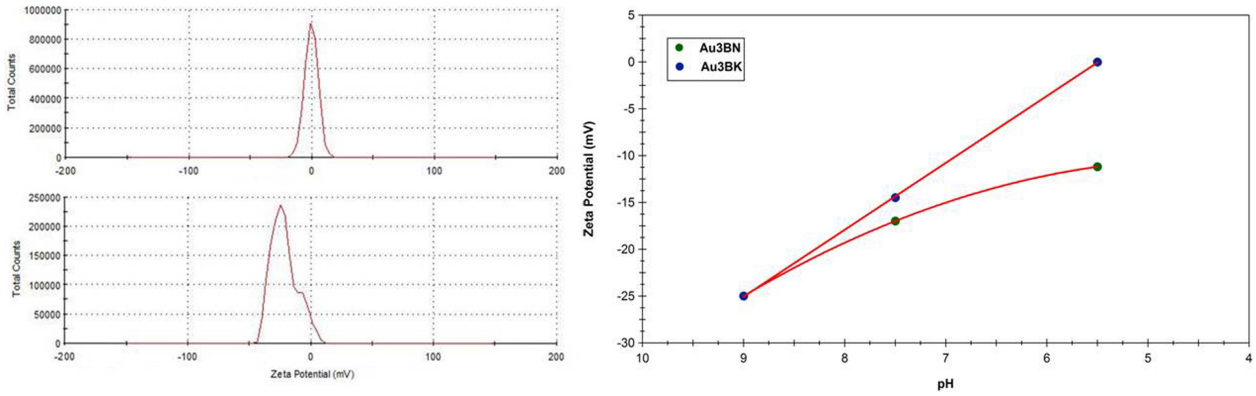

Figure S4. (Left panel) Example of dynamic light scattering (DLS) measures on AuNsK in MES pH 5.5 (top) and carbonate pH 9 (bottom). Plot of Zeta potential vs pH for AuNsK (blue dots) and AuNsN (green dots). A typical example of ζ-potential data at physiological pH are -17.8V for AuNsN, -14.1V for AuNsK, and -30.4V for AuNs.

Figure S5

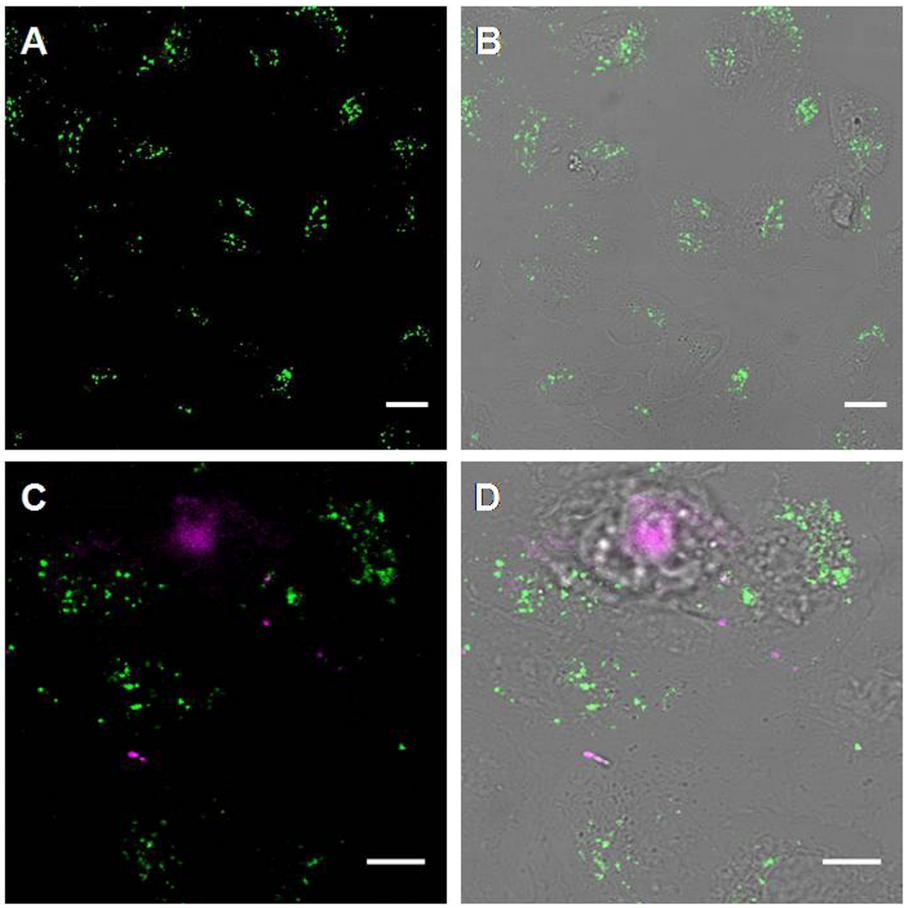

Figure S5. Images of human U2Os cells internalizing AuNsKS-StrepGFP system with the presence of propidium iodide (PI) show no cells membrane damage. A, C) Confocal fluorescence images excited at 488 nm and collected in the PI channel (565-650 nm, purple areas) merged with the green channel (495-560 nm, green areas). B, D) Bright field images merged with the green and the PI channel. Alive cells exhibit efficient nanoparticles uptake but not PI staining, confirming the integrity of plasma membrane. Some dead cells or debris (panels C, D) show PI staining but not nanoparticles or GFP uptake. All images are collected after the washing step; scale bars for all = 10 μm.

Figure S6

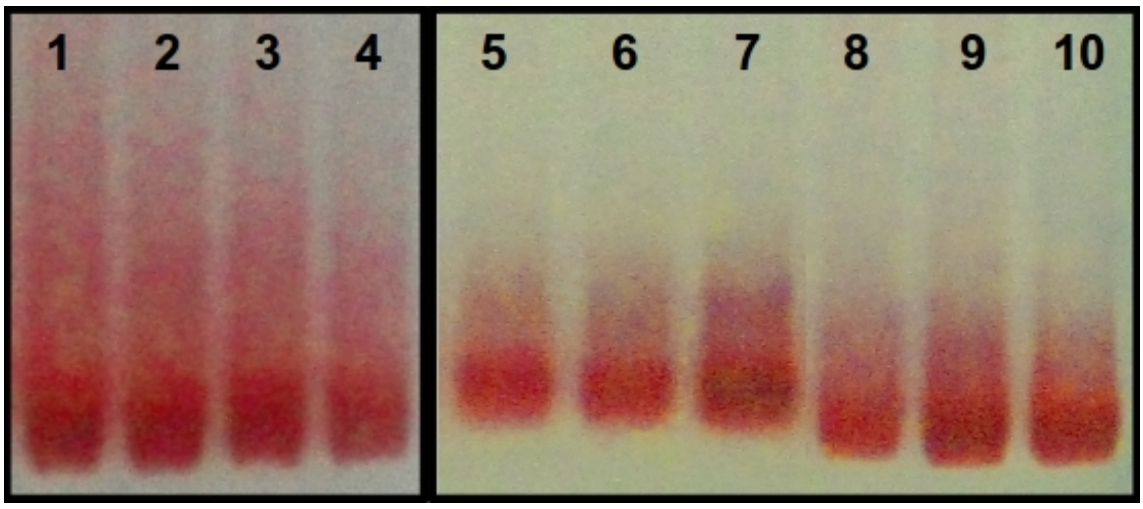

Figure S6. Agarose gel electrophoresis in TBE 0.5x. The lines 1-4 are glutathione (GSH) -coated nanoparticles after the addition of an excess of the other substituents (x10 or x100 in ratio of the calculated concentration of peptides on the metallic surface) under continuous stirring for 2 hour at RT. The lines 5-10 are the peptide-coated AuNs (with peptide K and peptide N) after 2 hour stirring at RT in presence of an excess of L-glutatione of 10x or 100x. The bands in lines 5, 6, and 7 (AuNsK, Au3NsK+GSH 10x, and AuNsK+GSH 100x) in the electrophoresis gel run with the same velocity and this is consistent with the impossibility of the glutathione to exchange the peptide coating on the nanoparticles. The same behaviour is observed for AuNsN; lines 8, 9, and 10. On the other hand, the bands of AuNs coated with glutathione (line 1) run with different velocity adding peptide K (line 2, 10x, and 3, 100x) or N (line 4, 100x). Therefore the GSH coating was substituted by the peptides K and N, but the GSH could not exchange the K- and N- peptide coating on the nanoparticles.