Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Table S1. Summary of the stress and strain achieved at the material fractures.

	Stress (MPa)	Strain (%)	Average stress (MPa)
Au-$(PEGSH)_4$a	-	-	No fracture
Au-$(PEGSH)_4$b	-	-	
Au-$(PEGSH)_4$c	-	-	
Au-$(PEGSH)_4$-BAG5a	0.038	46.7	0,039
Au-$(PEGSH)_4$-BAG5b	0.040	50.5	
Au-$(PEGSH)_4$-BAG5c	0.039	49.7	
Au-$(PEGSH)_4$-BAG10a	0.105	62.7	0,103
Au-$(PEGSH)_4$-BAG10b	0.113	65.1	
Au-$(PEGSH)_4$-BAG10c	0.091	65.9	
Au-$(PEGSH)_4$-BAG20a	0.192	72.8	0,16
Au-$(PEGSH)_4$-BAG20b	0.128	71.7	
Au-$(PEGSH)_4$-BAG20c	0.154	71.2	

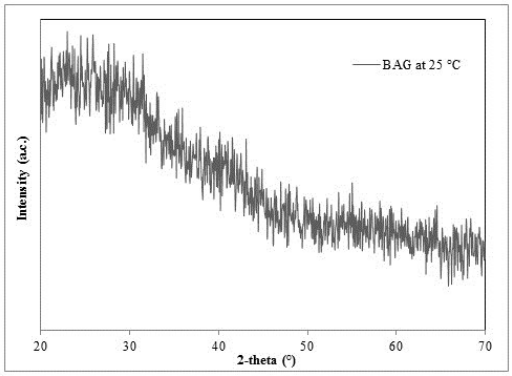

Fig. S1 XRD spectra of BAG particles with composition 70 n/n % SiO_2 and 30 n/n % CaO.

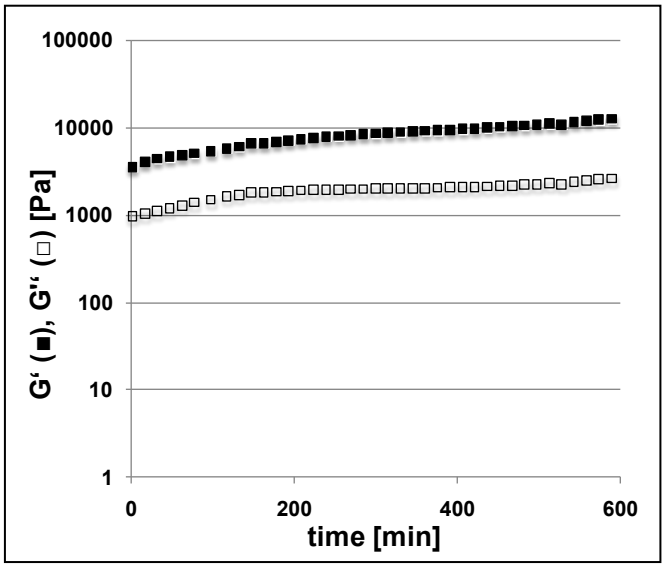

Fig. S2 Determination of the gelation time by recording variation of G’ (■) and G’’ (□) at 1 % deformation and 0.1 Hz in function of time for Au-$(PEGSH)_4$-BAG10 hydrogel nanocomposite directly injected on the rheometer plate. Note that G’ > G’’ from the start of the experiment. This indicates that the gel is already formed and the gelation occurred quasi instantaneously.

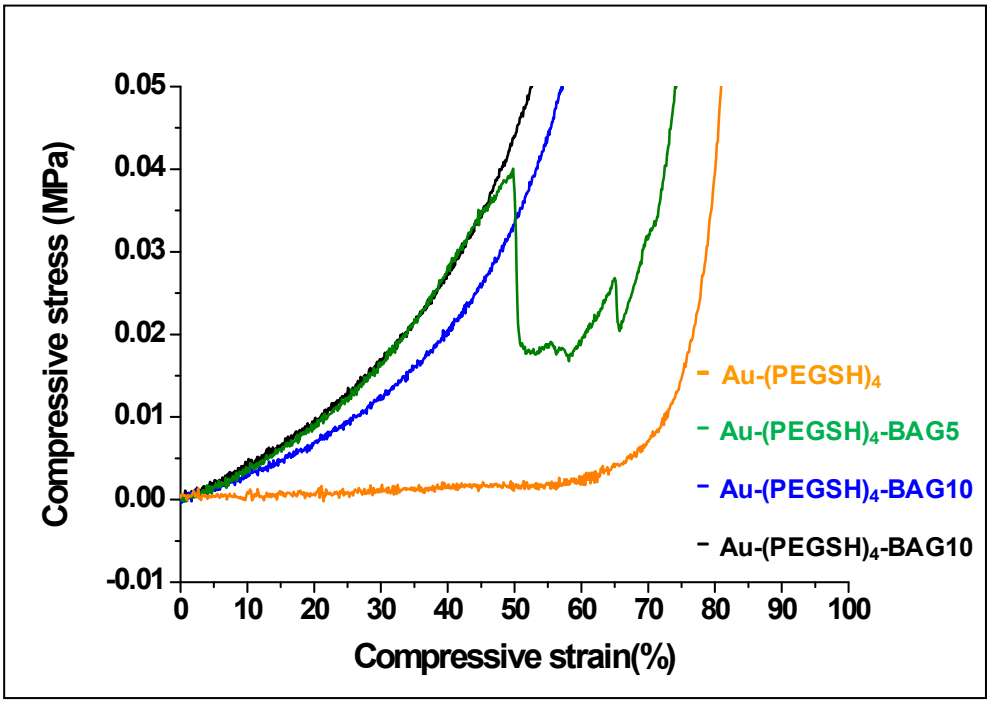

Fig. S3 Compression *vs* deformation curves for all hydrogel nanocomposites at low compressive stress.

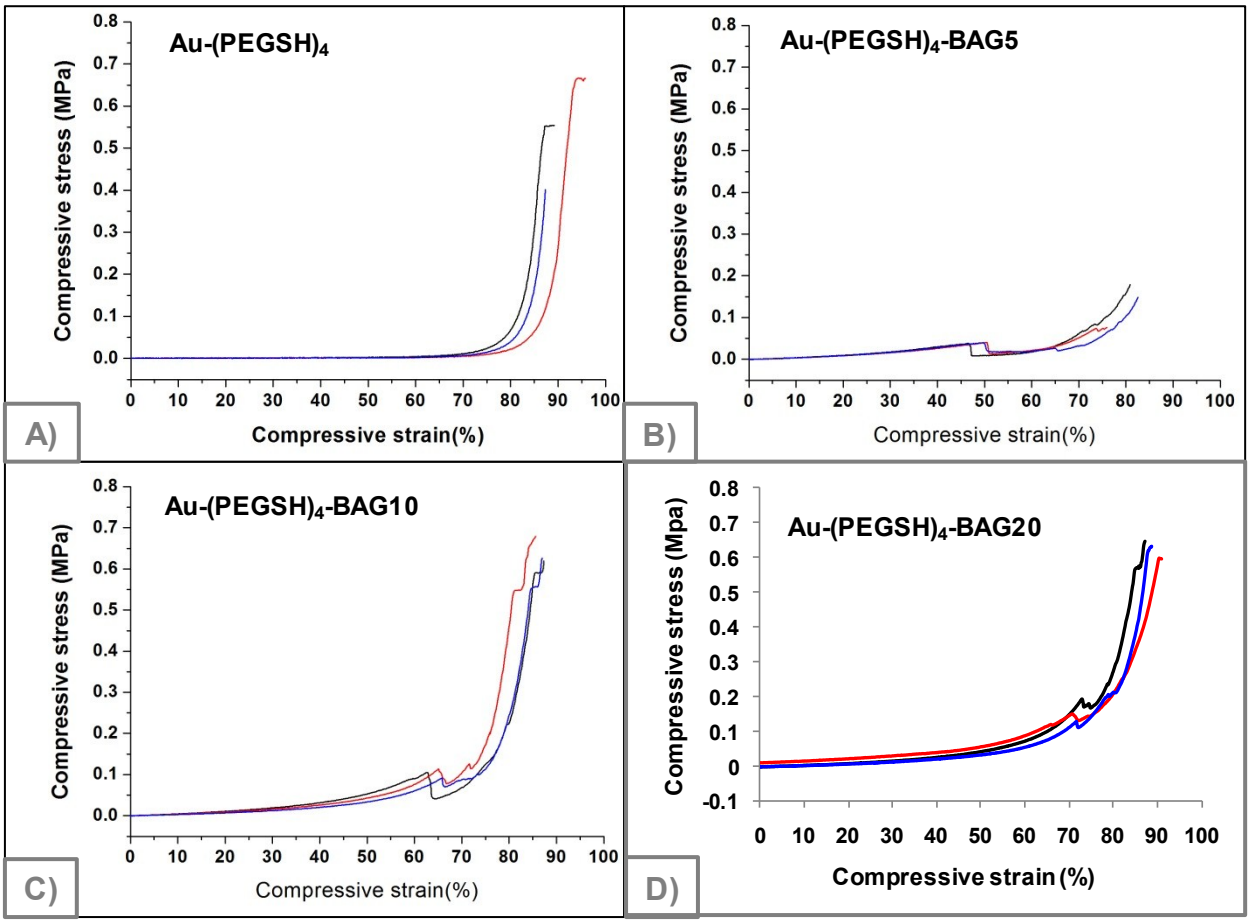

Fig. S4 Reproducibility of the compression *vs* deformation curves for all hydrogel nanocomposites prepared 3 times.

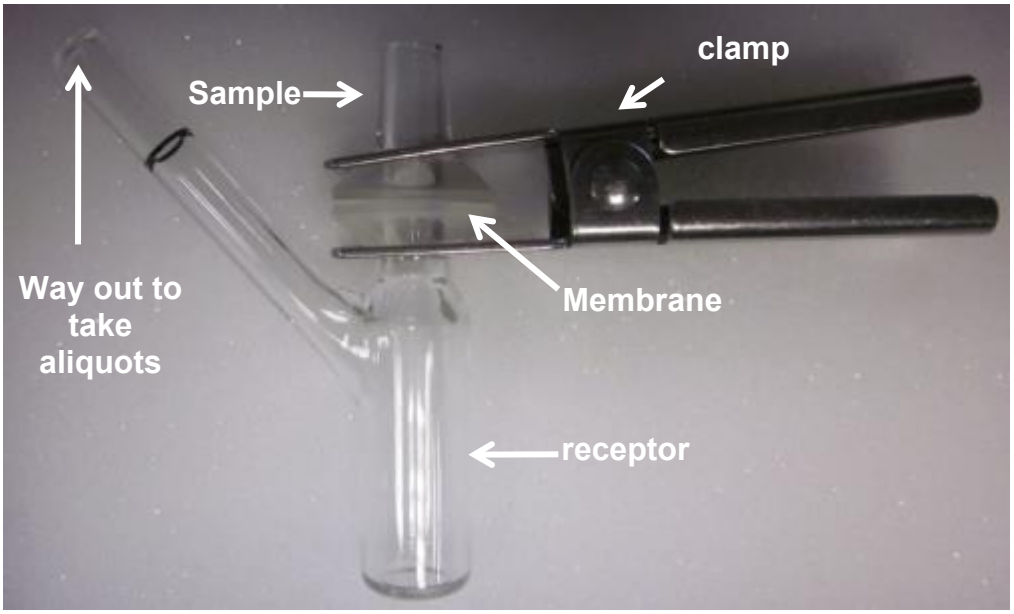

Fig. S5 Digital pictures of the Franz cell diffusion chamber.

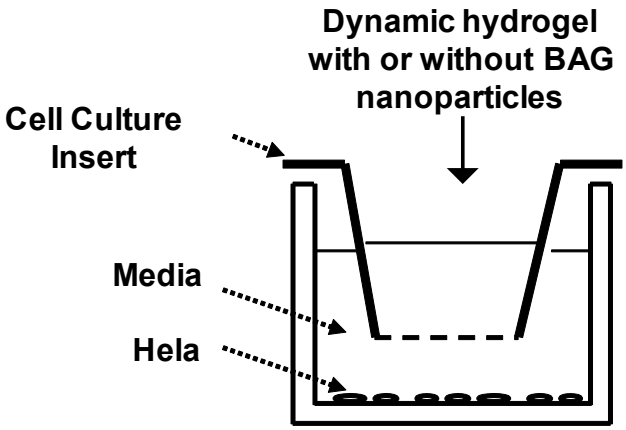

Fig. S6 Schematic representation of the cell culture insert used to evaluate the cytotoxicity of the product release by BAG nanoaprticle, Au-$(PEGSH)_4$ dynamic hydrogel and Au-$(PEGSH)_4$-BAG10 hydrogel nanoacomposite.

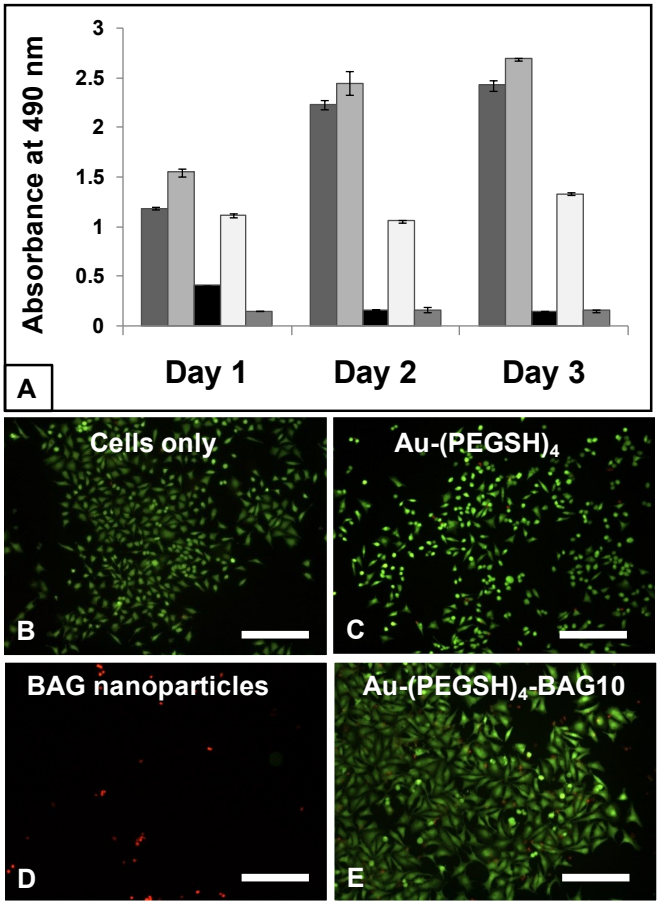

Fig. S7 (A) MTS assay at day 1, 2 and 3 for cells only (positive control experiment, dark grey), Au-$(PEGSH)_4$ dynamic hydrogel (light grey), BAG nanoparticles alone (black), Au-$(PEGSH)_4$-BAG10 (white) and triton X (surfactant as negative control, medium grey). The order of sample description id the same as the order of the representative bars. LIVE/DEAD assay after 3 days with healthy cells in green and dead cell in red for (B) cells only,(C) Au-$(PEGSH)_4$ dynamic hydrogel, (D) BAG nanoparticles alone, and (E) Au-$(PEGSH)_4$-BAG10 hydrogel nanocomposite (scale bar 200 μm).

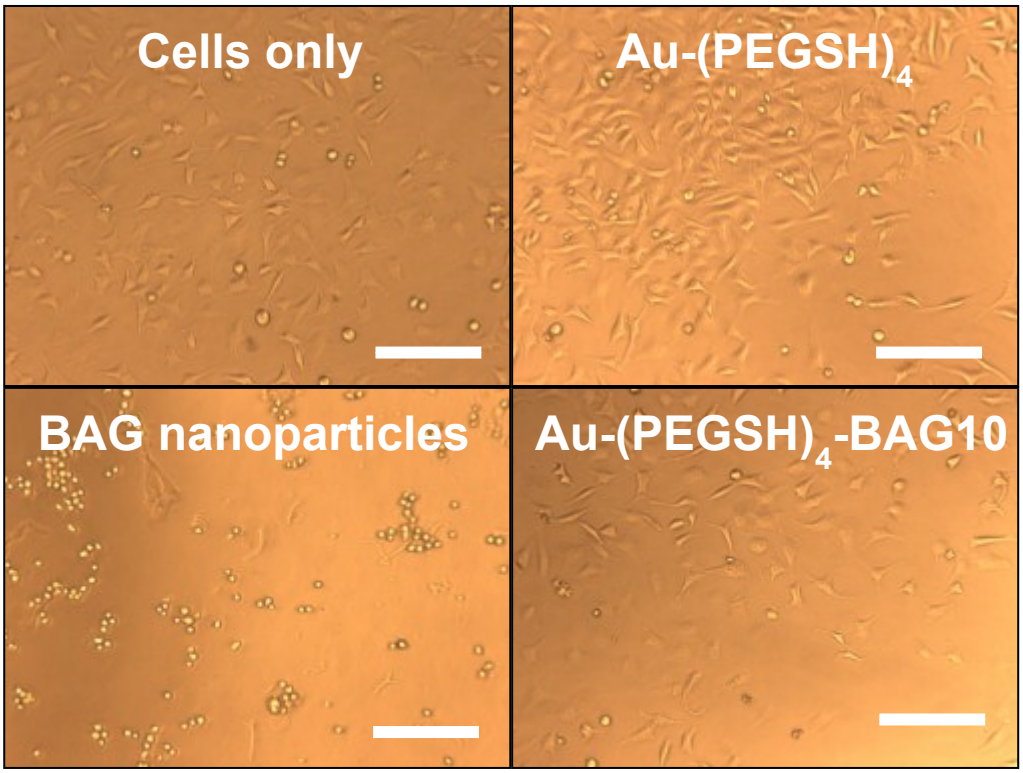

Fig. S8 Optical microscope pictures of HeLa cells after one day alone or in the presence of Au-$(PEGSH)_4$ dynamic hydrogel, BAG nanoparticles and Au-$(PEGSH)_4$-BAG10 hydrogel nanocomposites placed in an insert.

Fig. S9 Possible double syringe application of the Au-$(PEG)_4$-BAG10 nanocomposite hydrogel.