

Electronic Supporting Information

USPIO-PEG Nanoparticles Functionalized with a Highly Specific Collagen-binding Peptide: a Step towards MRI Diagnosis of Fibrosis

Hanene Belkahla^{1,2x}, Joana C. Antunes^{1x}, Yoann Lalatonne^{1,3}, Odile Sainte Catherine¹, Corinne Illoul², Clément Journé⁴, Martine Jandrot-Perrus¹, Thibaud Coradin², Véronique Gigoux⁶, Erwann Guenin^{1,7}, Laurence Motte^{1*}, Christophe Helary^{2*}

1- Université Sorbonne Paris Nord, Laboratory for Vascular Translational Science, LVTS, INSERM, UMR 1148, F- 93000 Bobigny, France.

Université de Paris, F-75018, Paris, France ; INSERM, F-75018, Paris, France

E-mail: laurence.motte@univ-paris13.fr

2-Sorbonne Université, CNRS, Laboratoire de la Chimie de la Matière Condensée (LCMCP), Paris, F-75005, France.

E-mail: christophe.helary@sorbonne-universite.fr

3- AP-HP, Hôpital Avicenne, Services de Biochimie et de Médecine Nucléaire service, F-93009 Bobigny, France

4- INSERM, UMR 1148, LVTS, Université de Paris, F-75018, Université Sorbonne Paris Nord, F-93430, Villetaneuse, France Inserm, Plateforme de Recherche FRIM 6-Inserm U1148, Université Paris Diderot, Paris, France

5-INSERM ERL1226—Receptology and Therapeutic Targeting of Cancers, Laboratoire de Physique et Chimie des Nano-Objets, CNRS UMR5215-INSA, Université de Toulouse III, F-31432 Toulouse, France

6-Sorbonne Universités, Université de Technologie de Compiègne, Integrated Transformations of Renewable Matter Laboratory (EA TIMR 4297 UTC-ESCOM), Compiègne, France

X: These authors contributed equally

* Corresponding authors: Christophe Helary and Laurence Motte

Email: christophe.helary@sorbonne-universite.fr

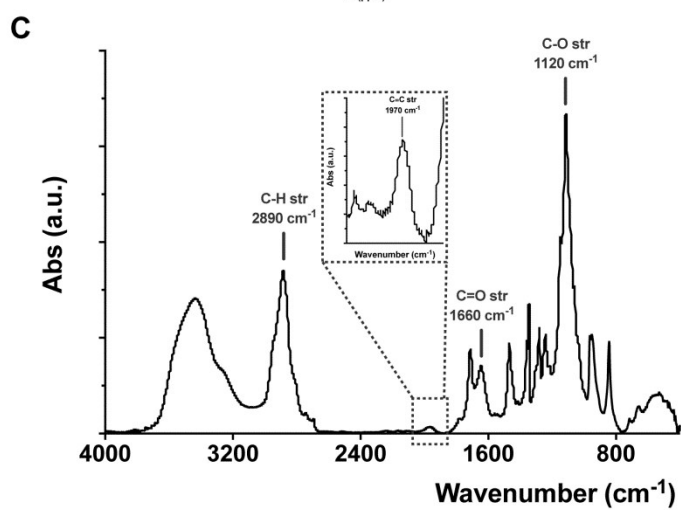
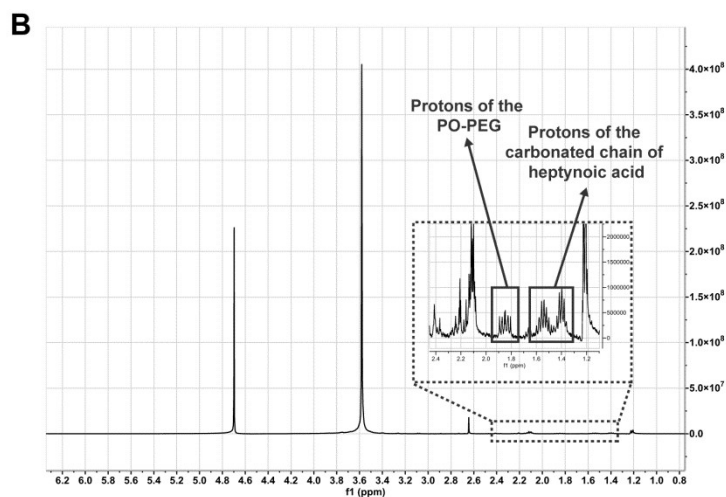
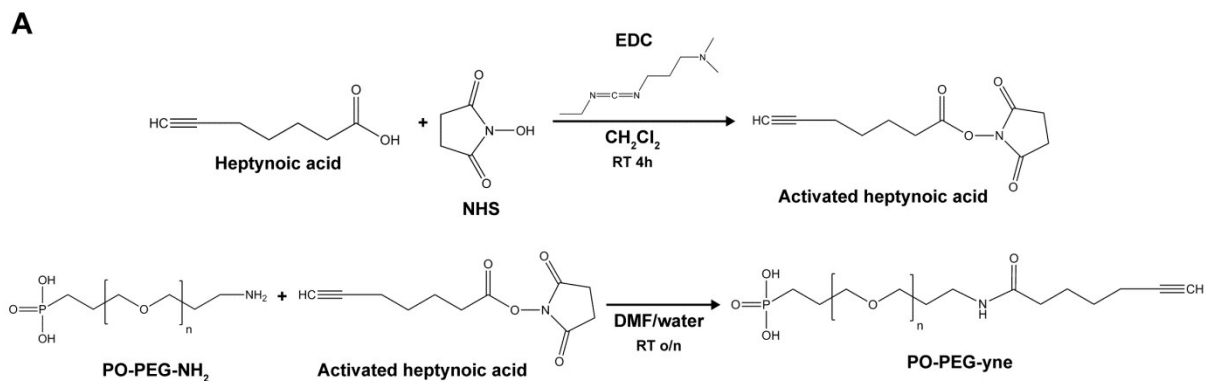


Figure ESI 1: PO-PEG-yne synthesis (A), NMR (B) and FTIR (C) spectra.

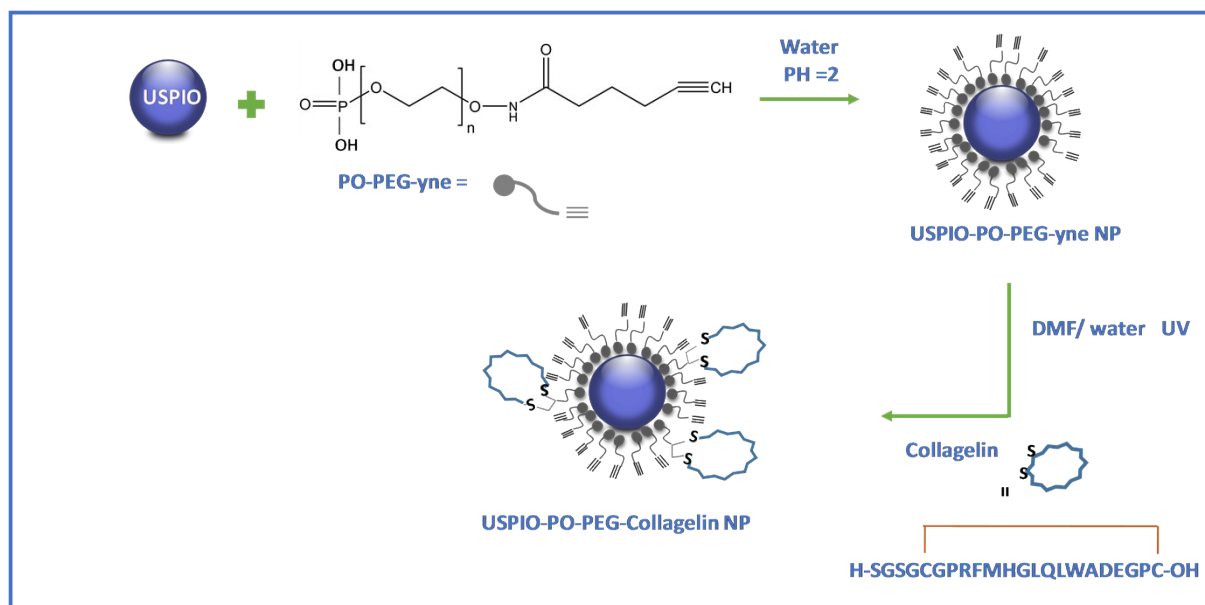


Figure ESI 2: Synthesis of PO-PEG-yne and click chemistry (thiol-yne reaction) to covalently linked Collagelin peptide onto USPIO NP surface.

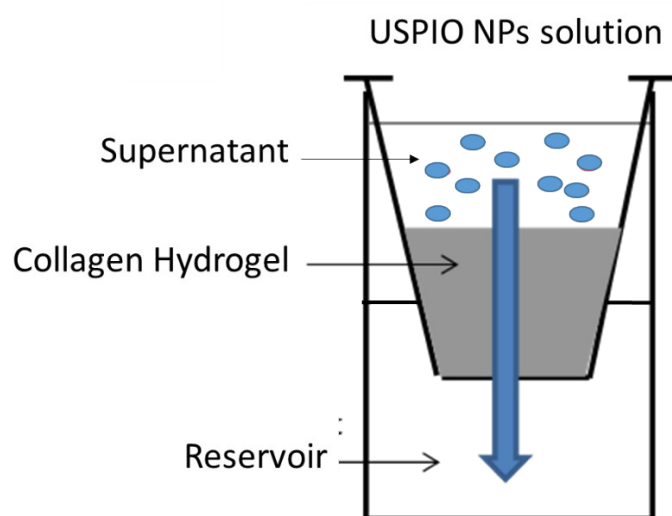


Figure ESI. 3: Diffusion of USPIO NPs through collagen hydrogels.

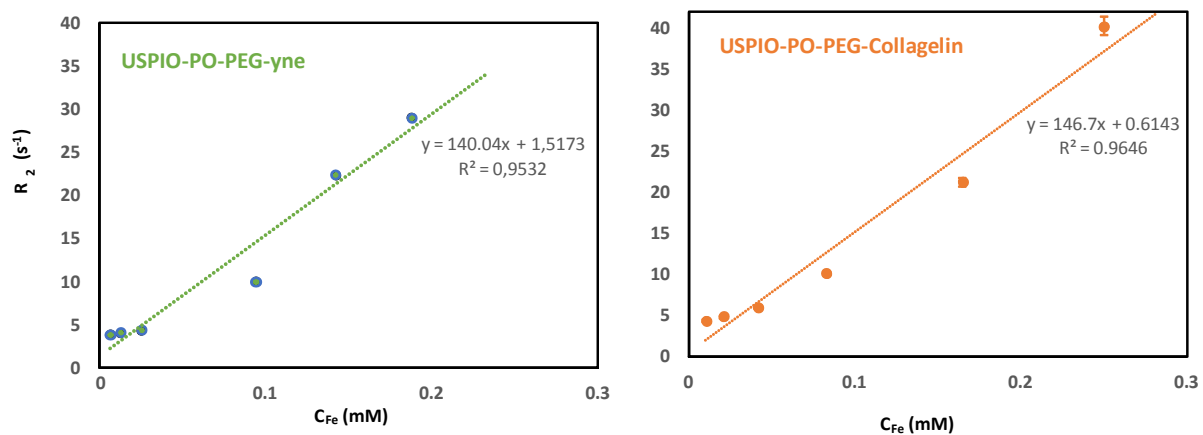


Figure. ESI 4: Proton transverse relaxation rates (R_2) measured at 7 T for USPIO-PO-PEG-yne and USPIO-PO-PEG-collagelin NPs

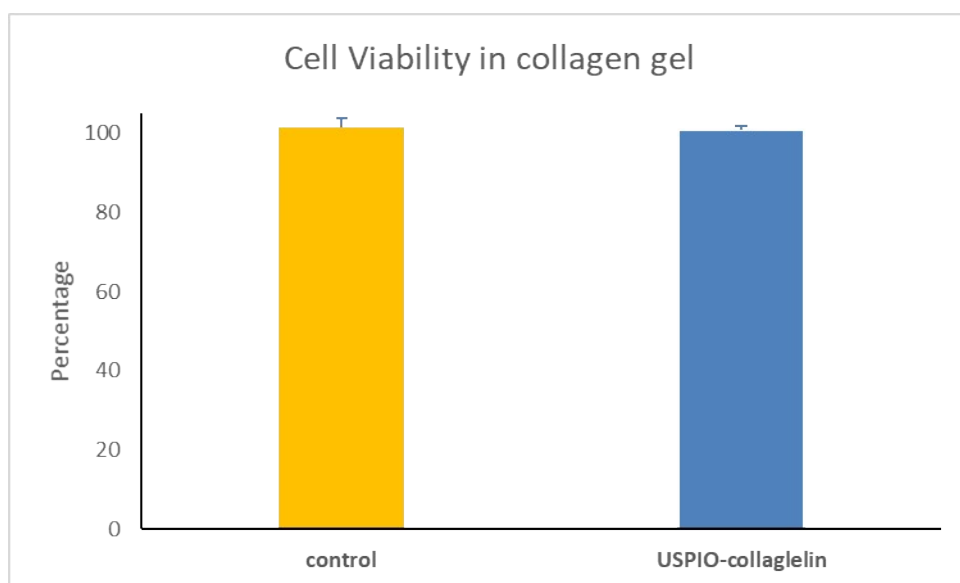


Figure. ESI 5: Cell viability within collagen hydrogels concentrated at 3 mg.mL^{-1}

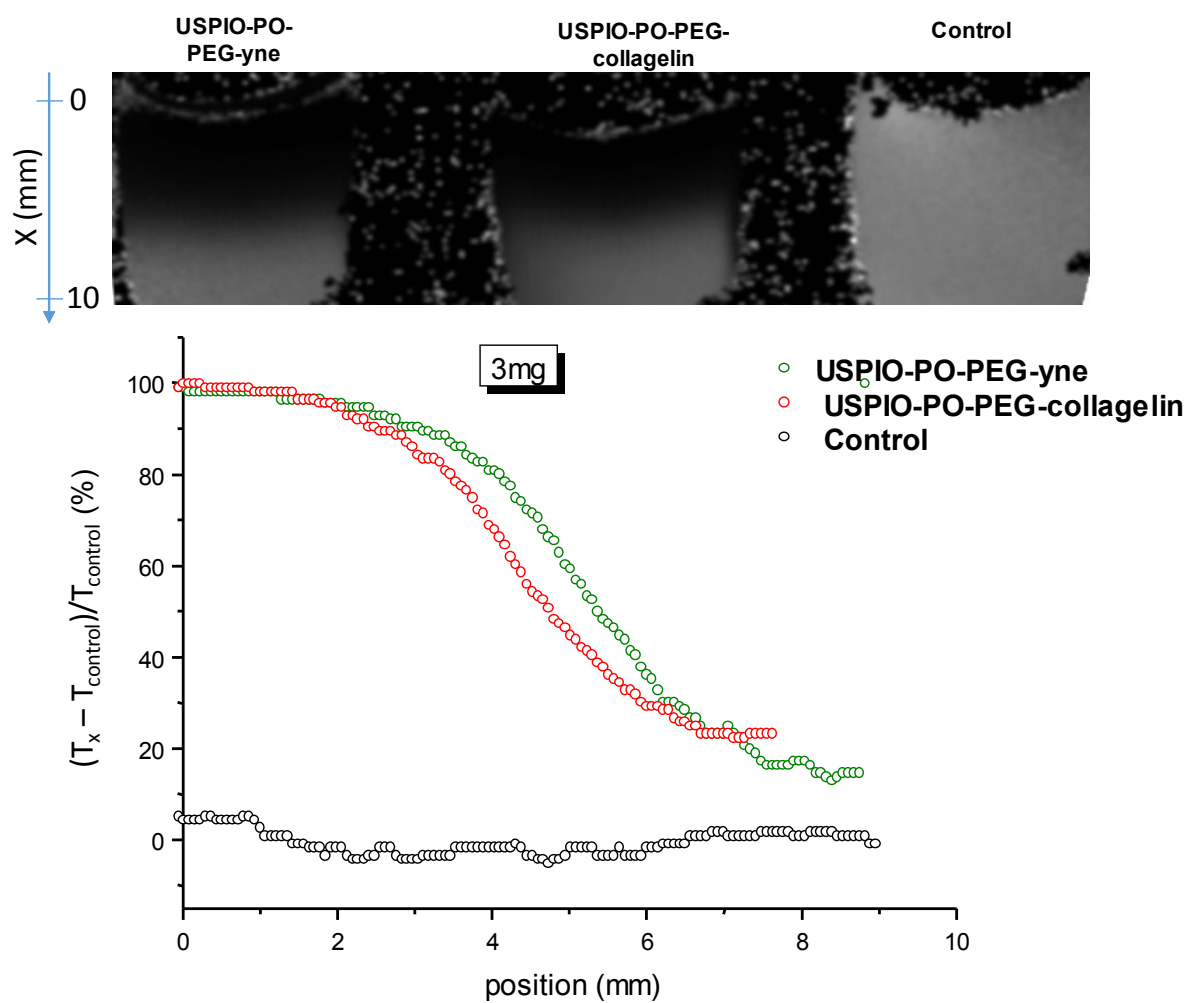


Figure ESI 6: Evolution of the T2 relaxation time through the thickness (position x) of 3 mg.mL^{-1} collagen hydrogels after a 72h incubation with USPIO-PO-PEG-yne NPs (green curve) or USPIO-PO-PEG-collagelin NPs (red curve).

Time (months)	USPIO-PO-PEG-yne (pH 7)	USPIO-PO-PEG-collagenin (pH 7)
0	$d_{H(Vol)} = 32.6 \pm 15 \text{ nm}$	$d_{H(Vol)} = 32.7 \pm 21.3 \text{ nm}$
1	$d_{H(Vol)} = 31.3 \pm 0.9 \text{ nm}$	$d_{H(Vol)} = 25.2 \pm 3.4 \text{ nm}$

Table ESI 1: hydrodynamic diameter variation after 1 month for USPIO-PO-PEG-yne and USPIO-PO-PEG-collagenin NPs.