SUPPORTING INFORMATION

Quantitative PET tracking of intra-articularly administered [^{89}Zr]-peptide-decorated nanoemulsions

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Characterization of the senolytic peptide

The purity of the synthesized peptide was determined by high performance liquid chromatography (HPLC). The analysis was carried out with an Aeris peptide XB-C18 column (3.6 µm, 100 A, 4.6 x 150 mm) and a gradient from 10% to 90% Acetonitrile/ H2O with 0,1% Trifluoroacetic acid, in 15 minutes maintaining the column temperature at 60 ºC. The purity result >95%, and the final product could contain traces of TFA. The UV-Vis detector was set at 216 nm and the peptide retention time was 13.28 mins as shown in Figure S1a.

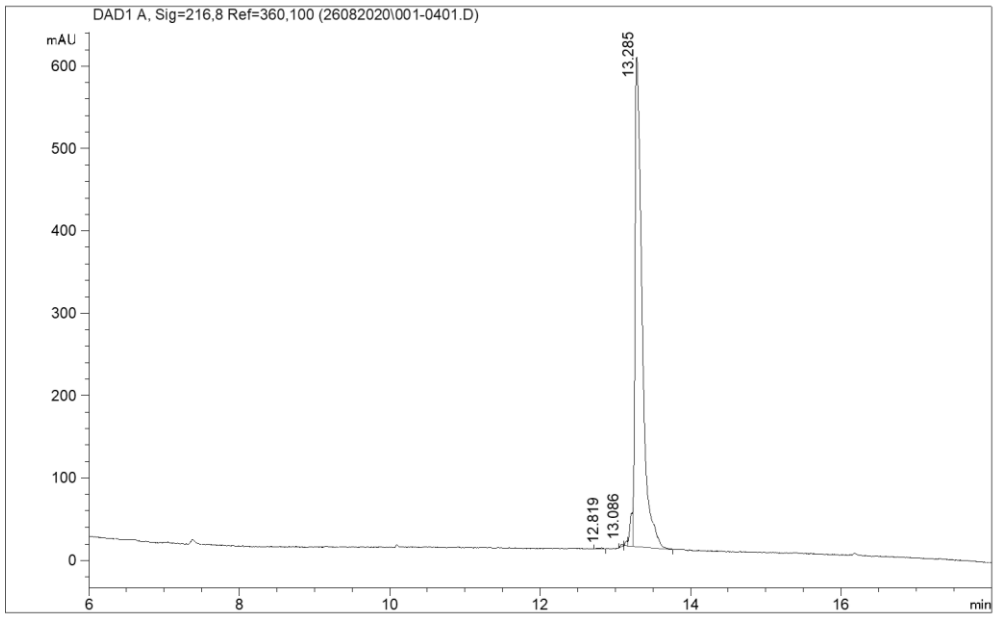

Figure S1a. Chromatogram showing the retention time of the synthesized senolytic peptide by HPLC.

The molecular weight mass was determined by mass spectrometry as shown in Figure S1b with an obtained value of 2792.651 g/mol.

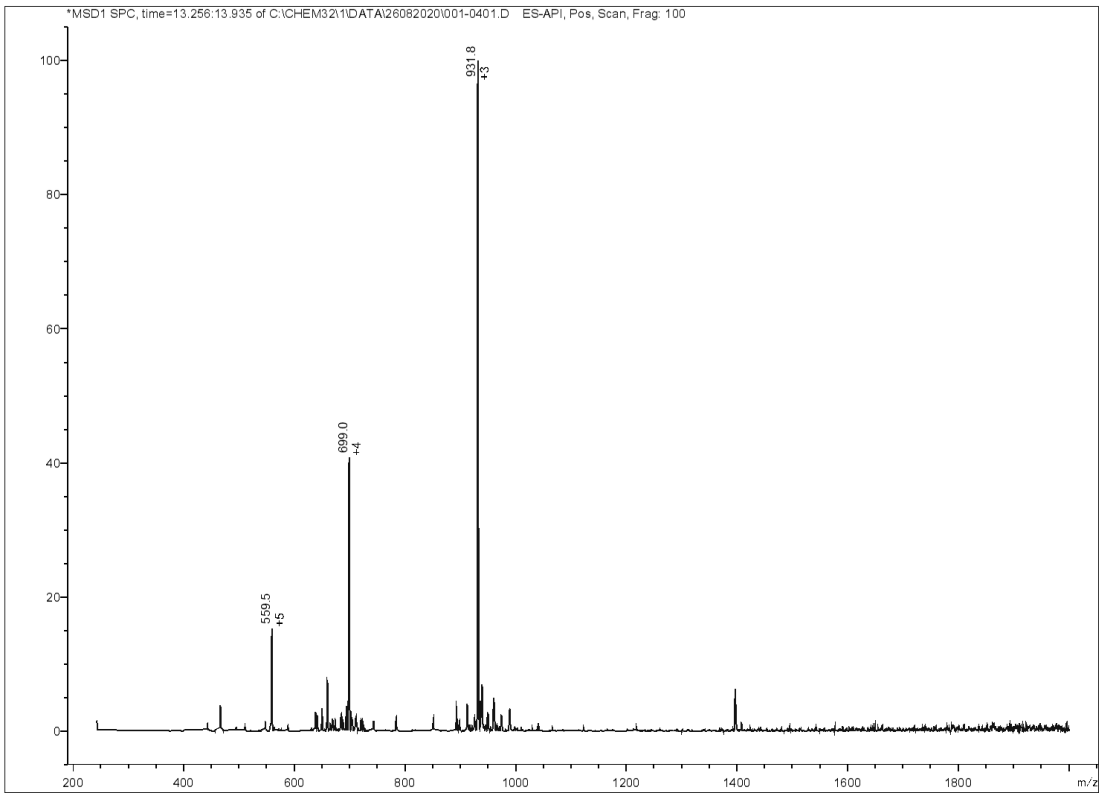

Figure S1b. Mass spectrometry of the synthesized senolytic peptide.

Table S1. Physicochemical properties of plain NEs without containing PEP measured by DLS and LDA.

Formulation	Size (nm)	PDI[a]	ZP[b] (mV)
NEs	138 ± 1	0.04 ± 0.01	− 25 ± 1

[a]PDI: Polydispersity Index; [b]ZP: Zeta Potential

Table S2:Mean ± SE body weight values of the animals of each group during the whole PET study.

Group	Radiotracer	PET time post radiotracer injection	weight (g) (mean ± SD)
Group 1	[^{89}Zr]-PEP	0.5 Hours	219.4±26.9

Group 2	[^{89}Zr]-PEP-NE	0.5 Hours	224.3±28.79
Group 3	Unchelated ^{89}Zr	0.5 Hours	180.5±0
Group 1	[^{89}Zr]-PEP	24 Hours	227.5±25.72
Group 2	[^{89}Zr]-PEP-NE	24 Hours	232±30
Group 3	Unchelated ^{89}Zr	24 Hours	191±0
Group 1	[^{89}Zr]-PEP	48 Hours	231.1±23.63
Group 2	[^{89}Zr]-PEP-NE	48 Hours	236.7±26.71
Group 3	Unchelated ^{89}Zr	48 Hours	195.5±0
Group 1	[^{89}Zr]-PEP	72 Hours	239.1±24.22
Group 2	[^{89}Zr]-PEP-NE	72 Hours	244.3±27.27
Group 3	Unchelated ^{89}Zr	72 Hours	203±0
Group 1	[^{89}Zr]-PEP	168 Hours	246±1.41
Group 2	[^{89}Zr]-PEP-NE	168 Hours	258±31.82
Group 3	Unchelated ^{89}Zr	168 Hours	247±0
Group 1	[^{89}Zr]-PEP	240 Hours	279.75±6.01
Group 2	[^{89}Zr]-PEP-NE	240 Hours	287.5±33.94
Group 3	Unchelated ^{89}Zr	240 Hours	280±0
Group 1	[^{89}Zr]-PEP	336 Hours	315.25±2.47
Group 2	[^{89}Zr]-PEP-NE	336 Hours	326.5±38.89
Group 3	Unchelated ^{89}Zr	336 Hours	315±0

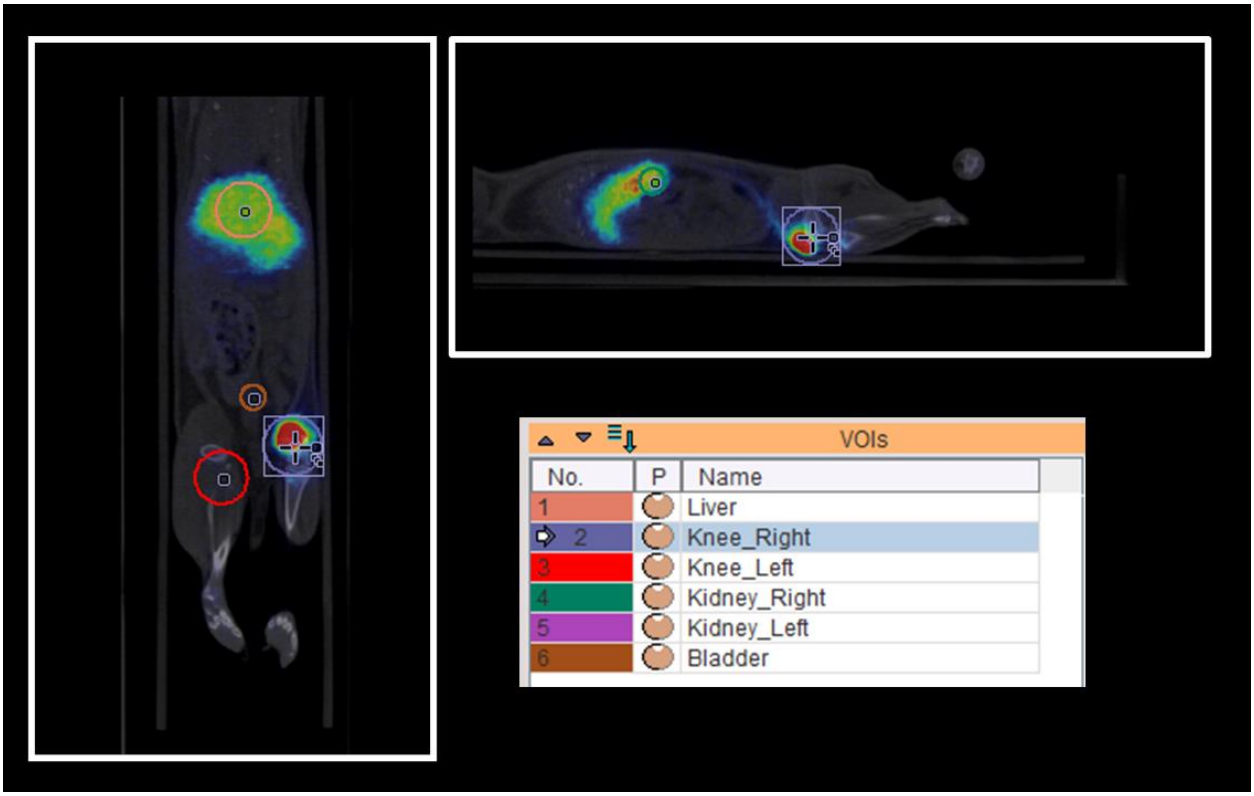

Figure S2. Example of a PET/CT image at 24 hours post radiotracer injection of one representative subject showing the manually drawn VOIS at different regions.