

Supplementary Materials

Table S1. ANOVA of the BLI intensity of BM-MNC from young and old mice labeled with different concentrations of SPION_{NIRF-Rh}.

Variation source	Sum of squares	Degrees of freedom	Mean square	F	p
Applications	1.32x10 ¹⁴	7	1.88x10 ¹³	24.10	< 0.001
Residual	2.50x10 ¹³	32	7.81x10 ¹¹		

SPION_{NIRF-Rh}: multimodal nanoparticles; BM-MNC: bone marrow mononuclear cells; BLI: Bioluminescence.

Table S2. Post Hoc test of the BLI intensity of BM-MNC from young and old mice labeled with different concentrations of SPION_{NIRF-Rh}.

Groups		Mean difference	95% CI		P
			Lower Bound	Upper Bound	
ctrl_young	ctrl_old	8.66x10 ⁵	5.59x10 ⁵	1.55	1
	c10_young	1.77x10 ⁶	5.59x10 ⁵	3.17	0.094
	c10_old	2.28x10 ⁶	5.59x10 ⁵	4.09	0.008
	c30_young	3.48x10 ⁶	5.59x10 ⁵	6.22	< 0.001
	c30_old	4.13x10 ⁶	5.59x10 ⁵	7.39	< 0.001
	c50_young	5.21x10 ⁶	5.59x10 ⁵	9.32	< 0.001
	c50_old	5.13x10 ⁶	5.59x10 ⁵	9.18	< 0.001
ctrl_old	c10_young	9.06x10 ⁵	5.59x10 ⁵	1.62	1
	c10_old	1.42x10 ⁶	5.59x10 ⁵	2.54	0.454
	c30_young	2.61x10 ⁶	5.59x10 ⁵	4.68	0.001
	c30_old	3.27x10 ⁶	5.59x10 ⁵	5.84	< 0.001
	c50_young	4.34x10 ⁶	5.59x10 ⁵	7.77	< 0.001
	c50_old	4.27x10 ⁶	5.59x10 ⁵	7.63	< 0.001
c10_young	c10_old	5.12x10 ⁵	5.59x10 ⁵	0.92	1
	c30_young	1.70x10 ⁶	5.59x10 ⁵	3.05	0.127
	c30_old	2.36x10 ⁶	5.59x10 ⁵	4.30	0.005
	c50_young	3.44x10 ⁶	5.59x10 ⁵	6.15	< 0.001
	c50_old	3.36x10 ⁶	5.59x10 ⁵	6.01	< 0.001
c10_old	c30_young	1.19x10 ⁶	5.59x10 ⁵	2.14	1
	c30_old	1.85x10 ⁶	5.59x10 ⁵	3.30	0.066
	c50_jovens	2.92x10 ⁶	5.59x10 ⁵	5.23	< 0.001
	c50_old	2.85x10 ⁶	5.59x10 ⁵	5.09	< 0.001
c30_young	c30_old	6.52x10 ⁵	5.59x10 ⁵	1.17	1
	c50_young	1.73x10 ⁶	5.59x10 ⁵	3.10	0.114
	c50_old	1.65x10 ⁶	5.59x10 ⁵	2.96	0.162
c30_old	c50_young	1.08x10 ⁶	5.59x10 ⁵	1.93	1
	c50_old	1.00x10 ⁶	5.59x10 ⁵	1.80	1
c50_young	c50_old	-7.76x10 ⁵	5.59x10 ⁵	-0.14	1

SPION_{NIRF-Rh}: multimodal nanoparticles; BM-MNC: bone marrow mononuclear cells; BLI: Bioluminescence; ctrl: Control; c10: concentration of 10 µg Fe/mL of SPION_{NIRF-Rh}; c30: concentration of 30 µg Fe/mL of SPION_{NIRF-Rh}; c50: concentration of 50 µg Fe/mL of SPION_{NIRF-Rh}; CI: confidence interval.

Table S3. ANOVA test of the NIRF intensity of BM-MNC from young and old animals labeled with 10, 30, and 50 µg Fe/mL of SPION_{NIRF-Rh}.

Variation source	Sum of squares	Degrees of freedom	Mean square	F	p
Applications	3.82x10 ¹⁷	5	7.64X10 ¹⁶	132.20	< 0.001
Residual	1.39x10 ¹⁶	24	5.78x10 ¹⁴		

SPION_{NIRF-Rh}: multimodal nanoparticles; BM-MNC: bone marrow mononuclear cells; NIRF: Near-infrared fluorescence.

Table S4. Post Hoc test of the NIRF intensity of BM-MNC from young and old animals labeled with 10, 30, and 50 µg Fe/mL of SPION_{NIRF-Rh}.

Group		Mean difference	95% CI		95% CI
			Lower Bound	Upper Bound	
c10_young	c10_old	4.54x10 ⁷	1.52x10 ⁷	2.97	0.096
	c30_young	-1.30x10 ⁸	1.52x10 ⁷	-8.55	< 0.001
	c30_old	-1.21x10 ⁸	1.52x10 ⁷	-7.98	< 0.001
	c50_young	-2.51x10 ⁸	1.52x10 ⁷	-16.52	< 0.001
	c50_old	-2.51x10 ⁸	1.52x10 ⁷	-16.56	< 0.001
c10_old	c30_young	-1.75x10 ⁸	1.52x10 ⁷	-11.54	< 0.001
	c30_old	-1.66x10 ⁸	1.52x10 ⁷	-10.94	< 0.001
	c50_young	-2.97x10 ⁸	1.52x10 ⁷	-19.51	< 0.001
	c50_old	-2.97x10 ⁸	1.52x10 ⁷	-19.55	< 0.001
c30_young	c30_old	9.00x10 ⁶	1.52x10 ⁷	0.59	1
	c50_young	-1.21x10 ⁸	1.52x10 ⁷	-7.97	< 0.001
	c50_old	-1.21x10 ⁸	1.52x10 ⁷	-8.01	< 0.001
c30_old	c50_young	-1.30x10 ⁸	1.52x10 ⁷	-8.56	< 0.001
	c50_old	-1.31x10 ⁸	1.52x10 ⁷	-8.60	< 0.001
c50_young	c50_old	-6.00 x10 ⁶	1.52x10 ⁷	-0.04	1

SPION_{NIRF-Rh}: multimodal nanoparticles; BM-MNC: bone marrow mononuclear cells; NIRF: Near-infrared fluorescence; c10: concentration of 10 µg Fe/mL of SPION_{NIRF-Rh}; c30: concentration of 30 µg Fe/mL of SPION_{NIRF-Rh}; c50: concentration of 50 µg Fe/mL of SPION_{NIRF-Rh}; CI: confidence interval.

Table S5. ANOVA of the iron quantification internalized into BM-MNC from young and old animals labeled with 10, 30, and 50 µg Fe/mL of SPION_{NIRF-Rh} by ICP-MS.

	Variation source	Sum of squares	Degrees of freedom	Mean square	F	p
pg Fe/BM-MNC	Applications	27.73	5	5.55	790.89	< 0.001
	Residual	0.17	24	0.01		
n° de SPION _{NIRF-Rh} /BM-MNC	Applications	4.36x10 ⁹	5	8.75x10 ⁸	810.15	< 0.001
	Residual	2.59x10 ⁷	24	1.08x10 ⁶		

SPION_{NIRF-Rh}: multimodal nanoparticles; BM-MNC: bone marrow mononuclear cells; ICP-MS: Inductively Coupled Plasma Mass Spectrometry.

Table S6. Post Hoc test of the iron quantification internalized into BM-MNC from young and old animals labeled with 10, 30, and 50 µg Fe/mL of SPION_{NIRF-Rh} by ICP-MS.

Group	Mean difference	Std. error	t	p
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c10_young	c10_old	0.23	0.05	4.277	0.003
	c30_young	-1.31	0.05	-24.73	< .001
	c30_old	-1.11	0.05	-20.95	< .001
	c50_young	-2.33	0.05	-44.07	< .001
	c50_old	-2.10	0.05	-39.75	< .001
c10_old	c30_young	-1.54	0.05	-29.00	< .001
	c30_old	-1.34	0.05	-25.22	< .001
	c50_young	-2.56	0.05	-48.33	< .001
	c50_old	-2.33	0.05	-44.02	< .001
c30_young	c30_old	0.20	0.05	3.77	0.010
	c50_young	-1.02	0.05	-19.33	< .001
	c50_old	-0.79	0.05	-15.02	< .001
c30_old	c50_young	-1.22	0.05	-23.11	< .001
	c50_old	-0.99	0.05	-18.80	< .001
c50_young	c50_old	0.23	0.05	4.31	0.003

SPION_{NIRF-Rh}: multimodal nanoparticles; BM-MNC: bone marrow mononuclear cells; ICP-MS: Inductively Coupled Plasma Mass Spectrometry; Std. error: Standard error; c10: concentration of 10 µg Fe/mL of SPION_{NIRF-Rh}; c30: concentration of 30 µg Fe/mL of SPION_{NIRF-Rh}; c50: concentration of 50 µg Fe/mL of SPION_{NIRF-Rh}.

Table S7. ANOVA of T2 values of the MRI samples of BM-MNC labeled with SPION_{NIRF-Rh}.

Variation source	Sum of squares	Degrees of freedom	Mean square	F	p
Applications	12354.78	3	4118.26	732.52	< 0.001
Residual	67.47	12	5.62		

SPION_{NIRF-Rh}: multimodal nanoparticles; BM-MNC: bone marrow mononuclear cells; MRI: Magnetic resonance imaging.

Table S8. Post Hoc test of T2 values of MRI samples of BM-MNC from young and old animals labeled with 50 µg Fe/mL of SPION_{NIRF-Rh}.

Group		Mean difference	95% CI		95% CI
			Lower Bound	Upper Bound	
c50_young	ctrl_young	-55.42	1.68	-33.05	< 0.001
	ctrl_old	-56.64	1.68	-33.79	< 0.001
	c50_old	-0.93	1.68	-0.56	1
ctrl_young	ctrl_old	-1.22	1.68	-0.73	1
	c50_old	54.49	1.68	32.50	< 0.001
ctrl_old	c50_old	55.71	1.68	33.29	< 0.001

SPION_{NIRF-Rh}: multimodal nanoparticles; BM-MNC: bone marrow mononuclear cells; MRI: Magnetic resonance imaging; ctrl: Control; c50: concentration of 50 µg Fe/mL of SPION_{NIRF-Rh}.

Table S9. T test of the iron quantification internalized in BM-MNC from young and old animals labeled with SPION_{NIRF-Rh} by MRI.

	t	Degrees of freedom	p
pg Fe/BM-MNC	0.36	6	0.764
n° of SPION _{NIRF-Rh} /BM-MNC	0.30	6	0.770

SPION_{NIRF-Rh}: multimodal nanoparticles; BM-MNC: bone marrow mononuclear cells; MRI: Magnetic resonance imaging; ctrl: Control; c50: concentration of 50 µg Fe/mL of SPION_{NIRF-Rh}.