

Supporting Information

Antibody-Conjugated Mesoporous Silica Nanoparticles for Brain Microvessel Endothelial Cells Targeting

Meryem Bouchoucha^{a,b,c,d,†}, Éric Béliveau^{e,f,d,e,†}, Freddy Kleitz^{a,d,e,}, Frédéric
Calon^{e,f,d,e,*}, Marc-André Fortin^{b,c,d,e,*}*

^a Department of Chemistry, Université Laval, Québec (QC), G1V 0A6, Canada.

^b Department of M.M.Materials Engineering, Université Laval, Québec (QC), G1V 0A6, Canada.

^{cb} Centre de recherche du centre hospitalier universitaire de Québec (CR-CHUQ), axe Médecine régénératrice, Québec (QC), G1L 3L5, Canada.

^{de} Centre de recherche sur les matériaux avancés (CERMA), Université Laval, Québec (QC), G1V 0A6, Canada.

^{ed} Faculty of Pharmacy, Université Laval, Québec (QC), G1V 0A6, Canada.

^{fe} Neurosciences Axis, Centre de recherche du CHU de Québec, Québec (QC), Canada.

[†] Equal contribution

* Corresponding authors

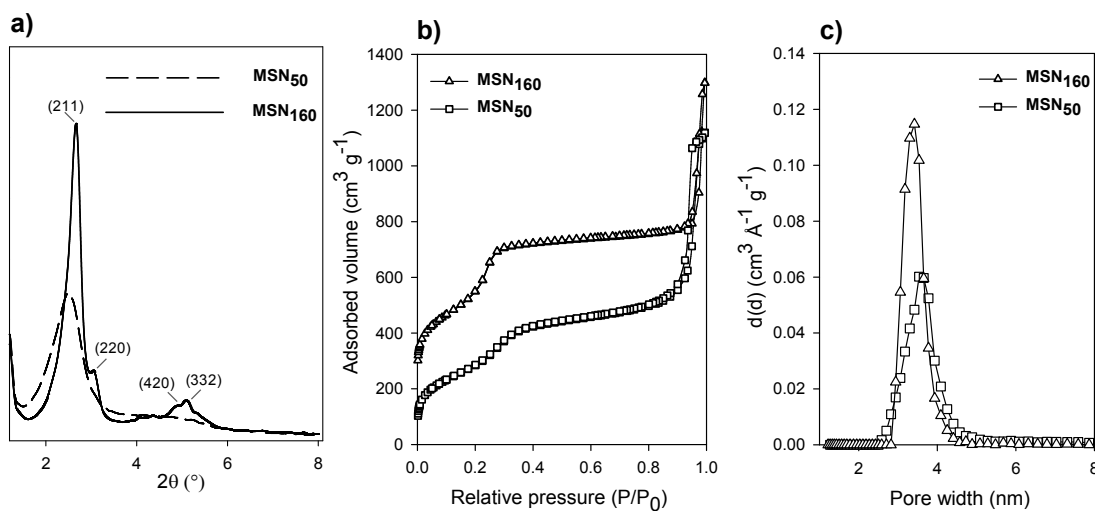


Figure S1. Powder XRD patterns (a), N₂ physisorption isotherms (-196 °C) and (b) respective NLDFT pore size distributions (c) of small and large nanoparticles. The isotherm for large MSN (MSN₁₆₀) is offset vertically by 200 cm³ g⁻¹ STP.

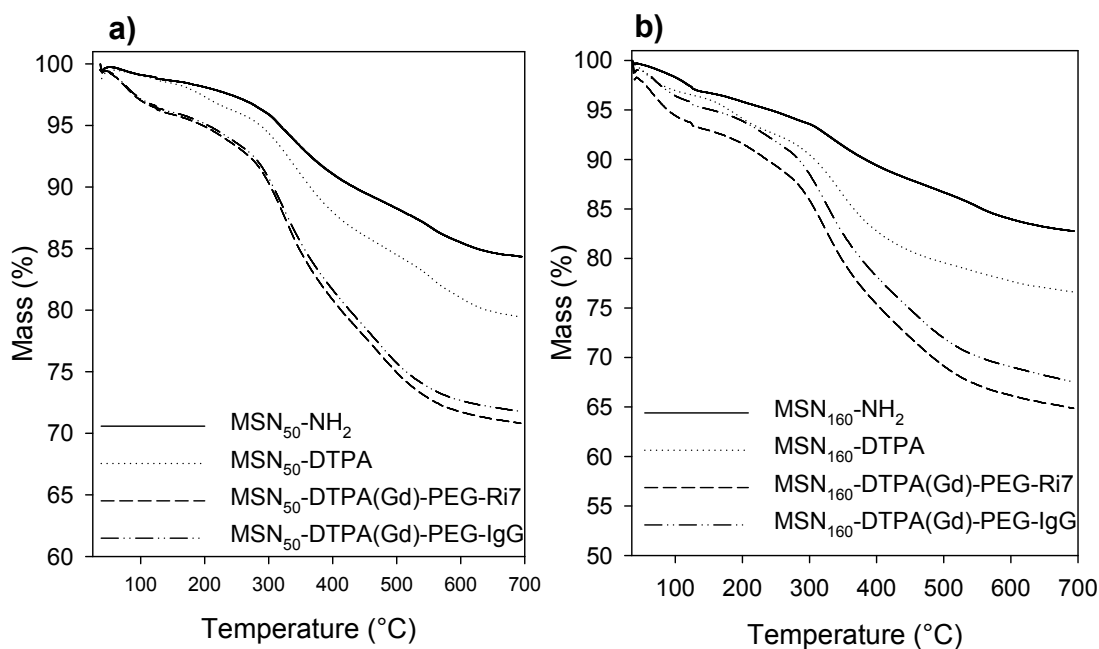


Figure S2. Thermogravimetric analysis of small and large functionalized mesoporous silica nanoparticles (a and b, respectively).

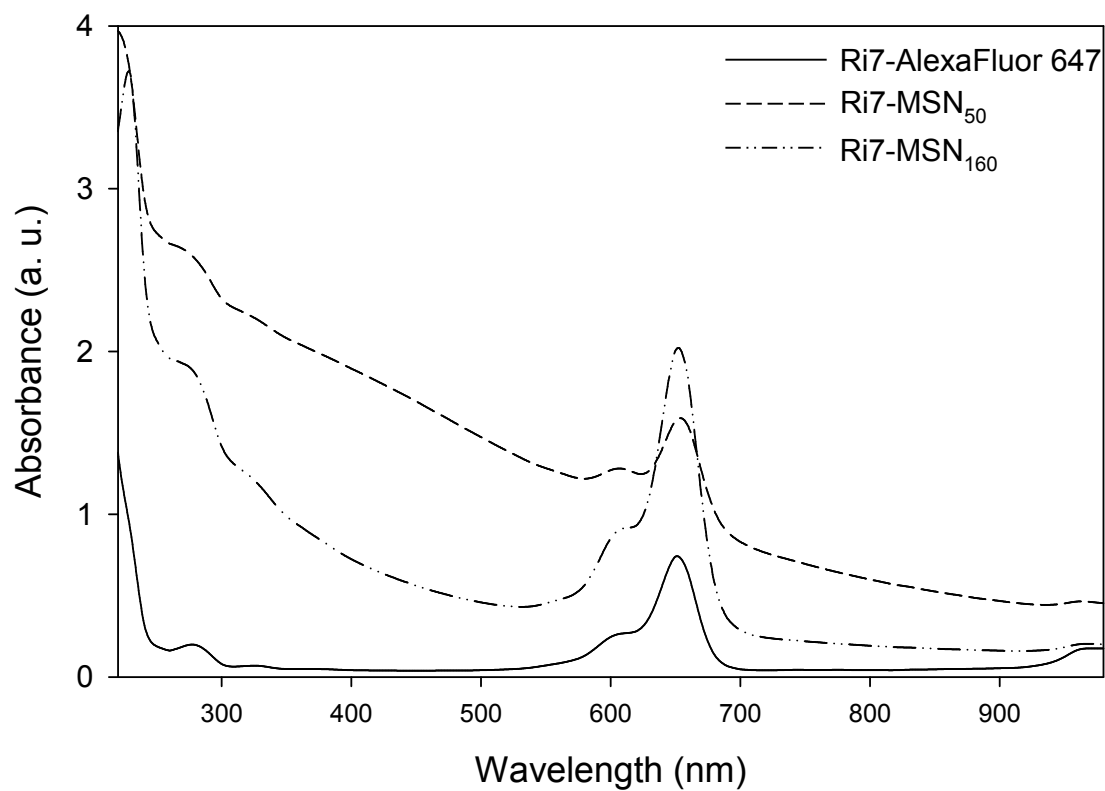


Figure S3. UV-Visible spectra of Ri7 labeled with AlexaFluor647 before and after conjugation to small and large mesoporous nanoparticles.

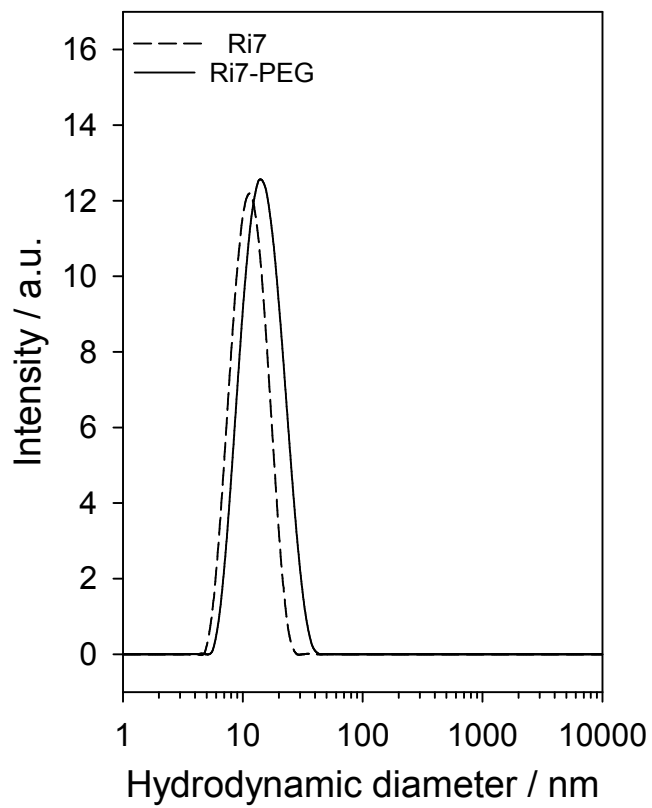


Figure S4. DLS analyses of Ri7 antibody before and after PEG grafting.

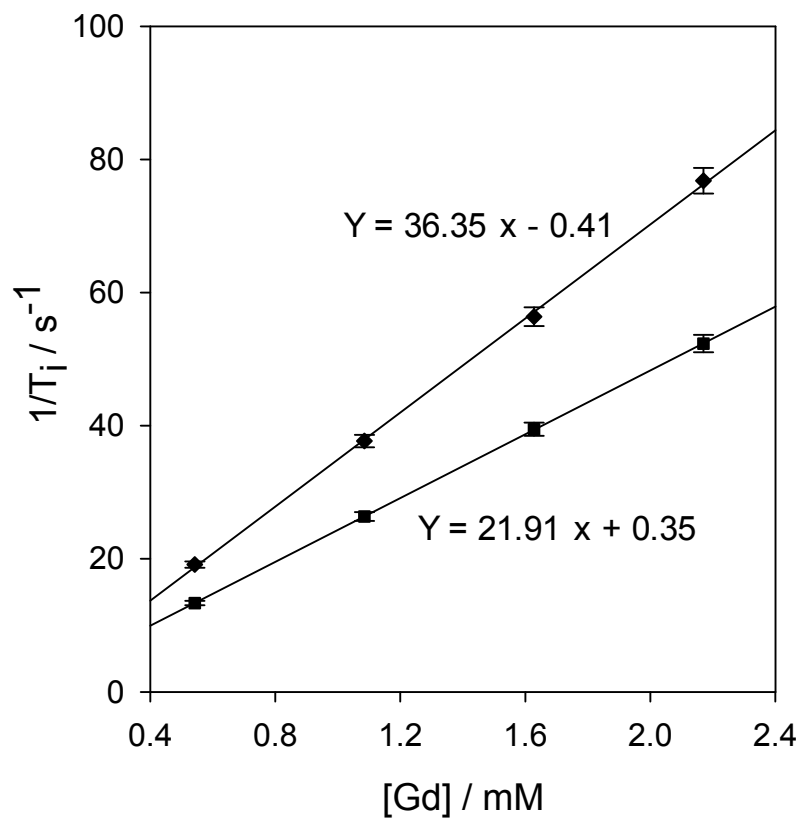


Figure S5. Longitudinal ($1/T_1 + C$, squares) and transverse ($1/T_2 + C$, diamonds) relaxation rates of Ri7-MSN (i.e. MSN-DTPA(Gd)-PEG-Ri7) nanoparticles, as a function of Gd^{3+} concentration values.

Supporting Information

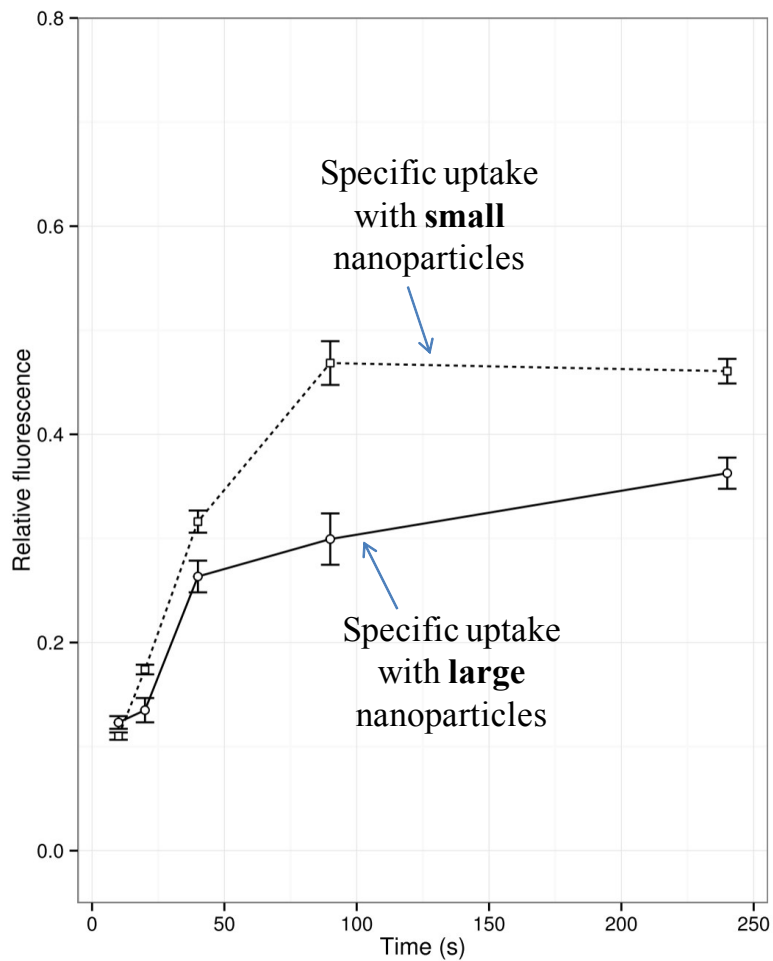


Figure S6. Specific uptake of mesoporous silica nanoparticles, obtained by subtracting the fluorescence values of Ri7^{fl}-MSN uptake of that of IgG^{fl}-MSN.

Supporting Information

TABLES.

Table S1. Hydrodynamic diameters and polydispersion indexes of the nanoparticles, before and after antibody bioconjugation.

MSN _x	Solution	Time	Hydrodynamic diameter [nm]			Polydispersion index (PDI)
			Number mode	Intensity mode	Z-average	
MSN ₅₀	Water	24 h	57	96	85	0.141
		1 week	61	101	98	0.131
	PBS	24 h	62	95	91	0.145
		1 week	59	103	97	0.155
MSN ₅₀ -DTPA(Gd)-Ri7	Water	24 h	82	151	141	0.205
		1 week	89	160	150	0.154
	PBS	24 h	75	165	147	0.200
		1 week	88	155	151	0.166
MSN ₁₆₀	Water	24 h	181	206	195	0.045
		1 week	181	202	193	0.018
	PBS	24 h	182	210	199	0.058
		1 week	195	219	208	0.037
MSN ₁₆₀ -DTPA(Gd)-Ri7	Water	24 h	220	255	245	0.115
		1 week	224	259	243	0.063
	PBS	24 h	240	290	265	0.195
		1 week	227	295	257	0.221