Supporting information for

Design of Polyazamacrocyclic Gd^{3+} Theranostic Agents Combining Magnetic Resonance Imaging and Two-Photon Photodynamic Therapy

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Material and Methods

Synthesis of the antenna

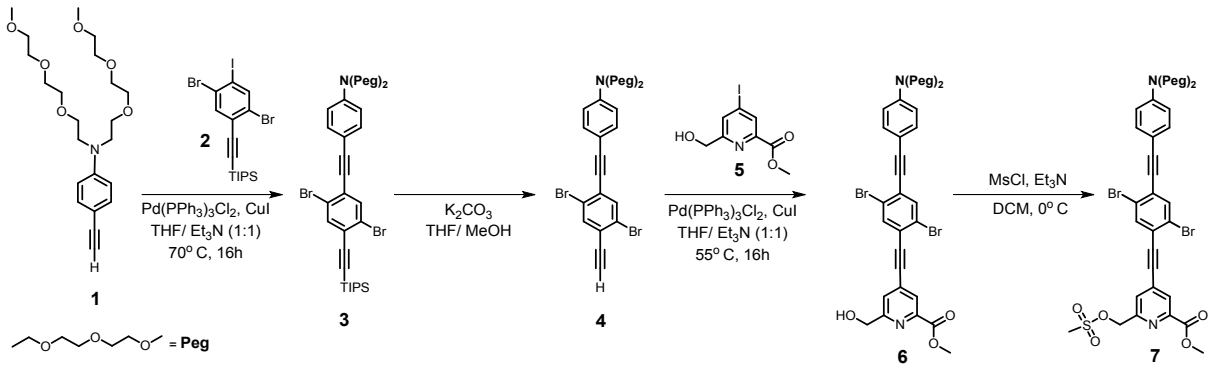


Figure S1 : Reaction scheme of the synthesized antenna.

Compound 3: A solution of **1** (500 mg, 1.11 mmol, 1.3 equiv.) and **2** (456 mg, 0.856 mmol, 1equiv.) in THF/NEt_3 (15 mL/15mL) was bubbled under argon for 1 hour. Then, CuI (5 mg, 0.026 mmol, 0.03 equiv.) and $Pd(PPh_3)_2Cl_2$ (30 mg, 0.043 mmol, 0.05 equiv.) were added and the mixture was stirred overnight at 55°C. The formed solid was filtered off and the filtrate concentrated under reduced pressure. The remaining crude residue was dissolved in CH_2Cl_2 and the organic layer was washed with water (3 × 15 mL) and brine (3 × 15 mL), dried over $MgSO_4$, filtrated and the dried under reduced pressure. The mixture was purified by column chromatography on silica with CH_2Cl_2 then CH_2Cl_2: MeOH (99:1) to give a yellow oil with 86% yield. ^{1}H NMR ($CDCl_3$, 300 MHz): 7.68 (s, 1H), 7.68 (s, 1H), 7.38 (d, J=9.1 Hz, 2H) 6.67 (d, J=9.1 Hz, 2H), 3.66-3.50 (m, 24H), 3.37 (s, 6H) 1.16-1.12 (m, 21H). ^{13}C NMR ($CDCl_3$, 75.47 MHz): 148.44, 136.53, 135.38, 135.26, 127.45, 125.33, 123.88, 122.94, 111.48, 108.66, 103.54, 98.73, 85.69, 71.97, 70.78, 70.71, 70.65, 68.40, 59.10, 50.89, 18.69, 11.30

Compound 4: Alkyne **3** (600 mg, 0.728 mmol) was dissolved in THF (15 mL) and 1 mL of tetrabutylammonium fluoride in THF (1M, 2 equiv.) was added. The mixture was stirred for 2h before evaporation of the solvent. The crude product was dissolved in water and the aqueous layer was extracted with diethyl ether (3 × 10 mL). Organic layers were combined, washed with brine, dried over $MgSO_4$, filtrated and evaporated until dryness. The crude product was used in the next step without any purification. ^{1}H NMR ($CDCl_3$, 300 MHz): 7.71

(s, 1H), 7.69 (s, 1H), 7.38 (d, J=9.1 Hz, 2H) 6.67 (d, J=9.1 Hz, 2H), 3.66-3.50 (m, 24H), 3.46 (s, 1H) 3.37 (s, 6H)

Compound 6: A solution of **5** (178 mg, 0.607 mmol, 1 equiv.) and **4** (486 mg, 0.728, 1.2 equiv.) in THF/NEt_3 (10 mL/10 mL) was bubbled under argon for 1 hour. Then, CuI (14 mg, 0.018 mmol, 0.03 eq) and $Pd(PPh_3)_2Cl_2$ (21 mg, 0.011 mmol, 0.05 equiv.) were added and the mixture was stirred overnight at 55°C. A solid was filtered off and the filtrate was concentrated under reduced pressure. The remaining crude residue was dissolved in CH_2Cl_2. The organic layer was washed with NH_4Cl (3 × 50 mL) and brine (3 × 50 mL), dried over $MgSO_4$, filtrated and dried under reduced pressure. The obtained mixture was purified on silica with CH_2Cl_2 then CH_2Cl_2: MeOH (99:1) to give a yellow oil with quantitative yield. ^{1}H NMR ($CDCl_3$, 300 MHz): 8.13 (s, 1H) 7.77 (s, 1H), 7.74 (s, 1H), 7.68 (s, 1H), 7.40 (d, J=9.1 Hz, 2H) 6.68 (d, J=9.1 Hz, 2H), 4.88 (s, 2H), 4.02 (s, 3H) 3.70-3.51 (m, 24H), 3.38 (s, 6H). ^{13}C NMR ($CDCl_3$, 75.47 MHz): 136.47, 135.56, 135.39, 125.77, 125.5, 123.33, 111.1, 108.38, 100.24, 93.2, 81.54, 71.96, 70.77, 70.61, 70.49, 68.39, 50.90, 29.73. ESI-HR-MS (positive, MeOH) *m/z* calcd. for $[C_{38}H_{45}Br_2N_2O_9]^+$: 831.1486, found: 831.1489, $[M+H]^+$; calcd. for $[C_{38}H_{44}Br_2N_{2Na}O_9]^+$: 853.1306, found: 853.1310, $[M+Na]^+$; calcd. for $[C_{38}H_{46}Br_2N_2O_9]^{2+}$: 416.0779, found: 416.0785, $[M+2H]^{2+}$.

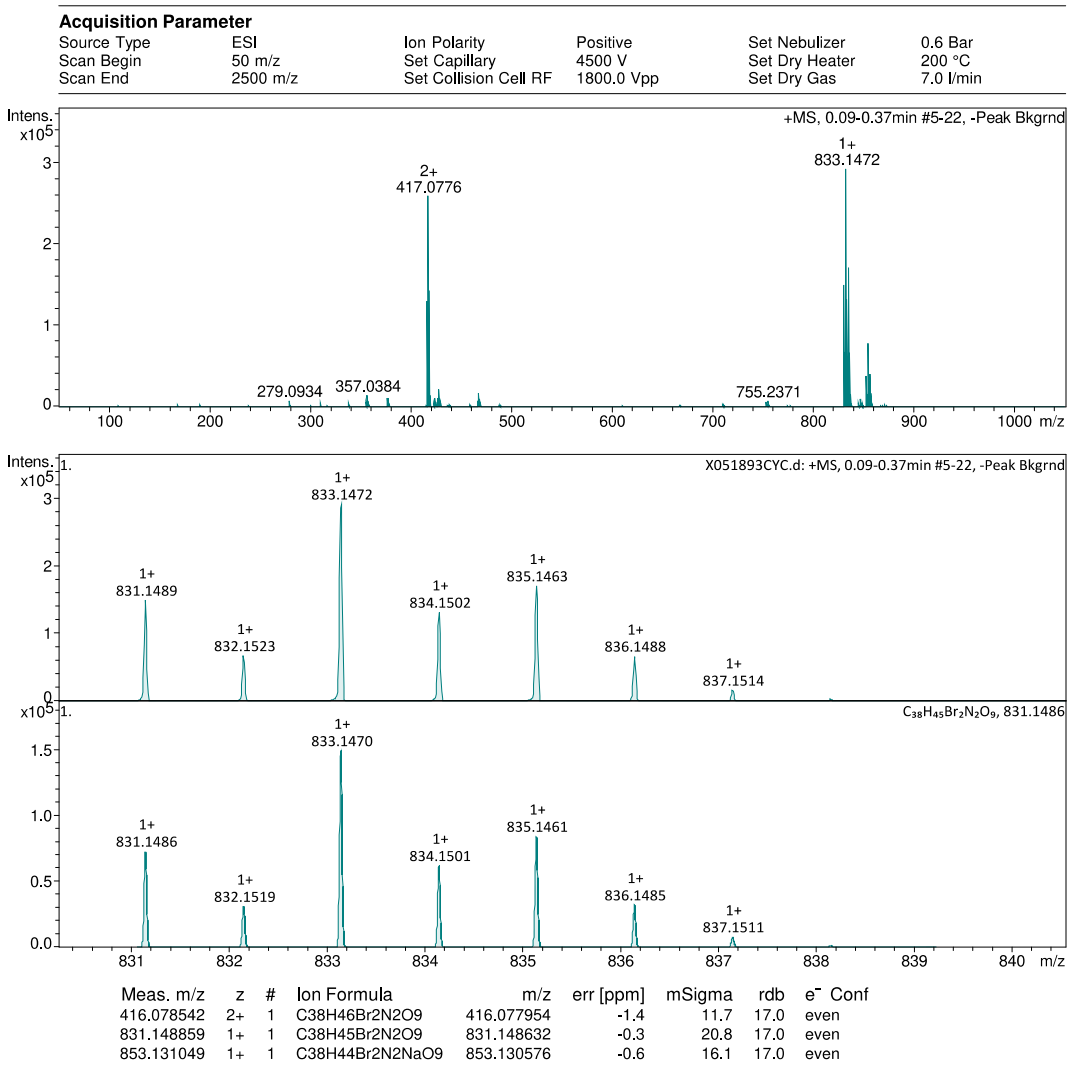
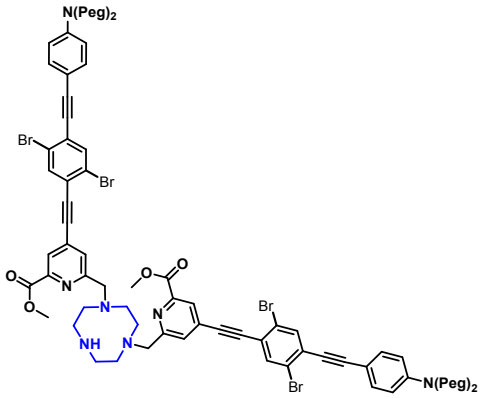


Figure S2 : HMRS of compound **6**.

Compound 7: Picolinate derivative **6** (100 mg, 0.120 mmol) was dissolved in THF (10 mL) and Et_3N (28 µL, 0.36 mmol, 3 equiv.). Mesyl chloride (22 mg, 0.19 mmol, 1.6 equiv.) in 2 mL of THF was added and the mixture was stirred at room temperature. When all the starting material was consumed (monitored by TLC), the solvent was removed under reduced pressure. The residue was then dissolved in CH_2Cl_2 and washed with saturated aqueous solution of NH_4Cl (3 × 5 mL) and with brine (3 × 5 mL). The desired compound was obtained in quantitative yields and was used without further purification.

Synthesis of compounds 8 and 9



8

To a solution of **tacn**·3HCl (13.6 mg, 0.0570 mmol, 1eq) in dried MeCN (7 mL), Na_2CO_3 (24 mg, 0.23 mmol, 4 equiv.) and NaI (34 mg, 0.23 mmol, 4 equiv.) were added and applied 3 cycles of vacuum/argon. To this solution, compound **7** (110 mg, 0.120 mmol, 2.1 equiv.) dissolved in dried MeCN (7 mL) was added dropwise and reaction mixture stir at 50°C for 16 h. The solvent was removed under reduce pressure, and the obtained residue dissolved in DCM and washed with water (3x mL) to remove the residual salts. The organic layer was then dried over $MgSO_4$, filtered and dried under reduce pressure. The crude was then purified on silica with CH_2Cl_2 then gradually to CH_2Cl_2: NH_3 (2M) in MeOH (99:3). Compound **8** was isolated as a yellow oil with 55% yield. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (s, 2H), 7.70 (d, *J* = 5.9 Hz, 4H), 7.60 (s, 2H), 7.37 (d, *J* = 8.7 Hz, 4H), 6.67 (d, *J* = 8.6 Hz, 4H), 4.06 (m, 10H), 3.65 – 3.51 (m, 48H), 3.36 (m, 18H), 3.04 (s, 3H), 2.79 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.82, 159.62, 148.57, 147.89, 136.37, 135.51, 133.39, 132.78, 128.99, 127.32, 125.93, 123.98, 123.33, 111.47, 108.40, 100.03, 92.49, 91.45, 85.56, 71.95, 70.75, 70.68, 70.62, 68.37, 60.39, 59.23, 59.07, 53.50, 53.22, 50.88, 50.37, 45.75. ESI-HR-MS (positive, MeOH): Cacld.: $[M+2H]^{2+}$=877.7008, $[M+H]^{+}$=1754.3961. Found: $[M+2H]^{2+}$= 877.7014, $[M+H]^{+}$=1754.3955.

Acquisition Parameter

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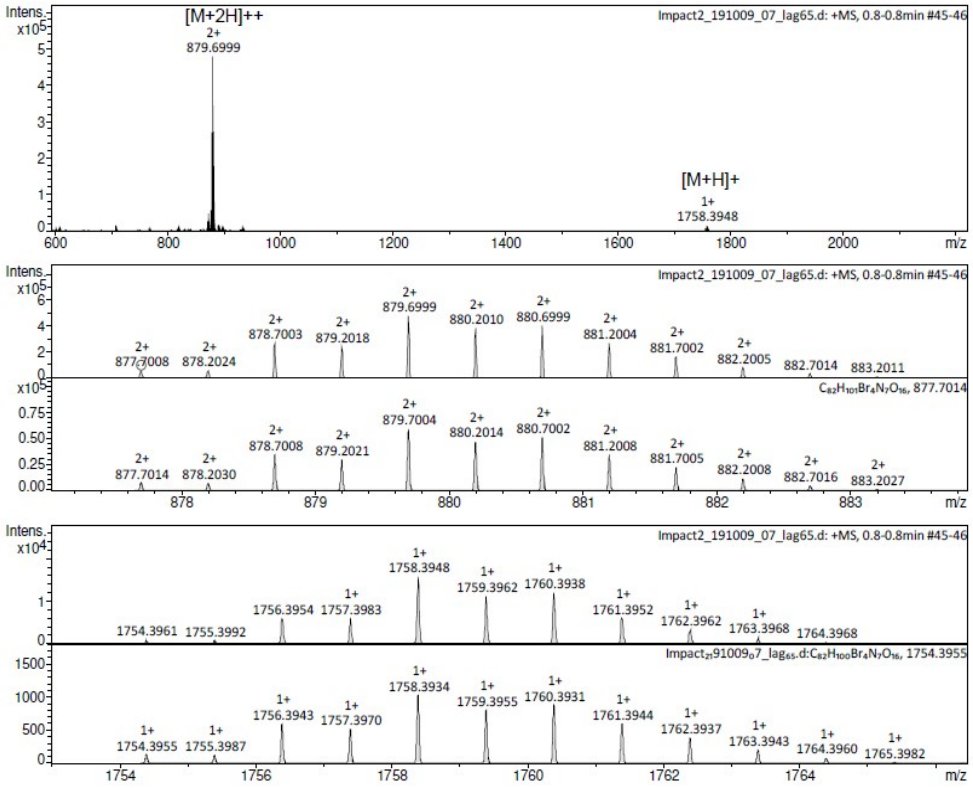
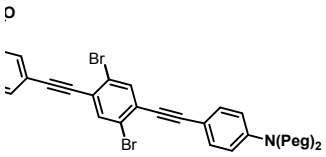
Scan End	3000 m/z	Set Collision Cell RF	1500.0 Vpp	Set Divert Valve	Source



Meas. m/z	Ion Formula	m/z	err [ppm]	mSigma
877.7008	C82H101Br4N7O16	877.7014	0.6	13.3
1754.3961	C82H100Br4N7O16	1754.3955	-0.4	110.5

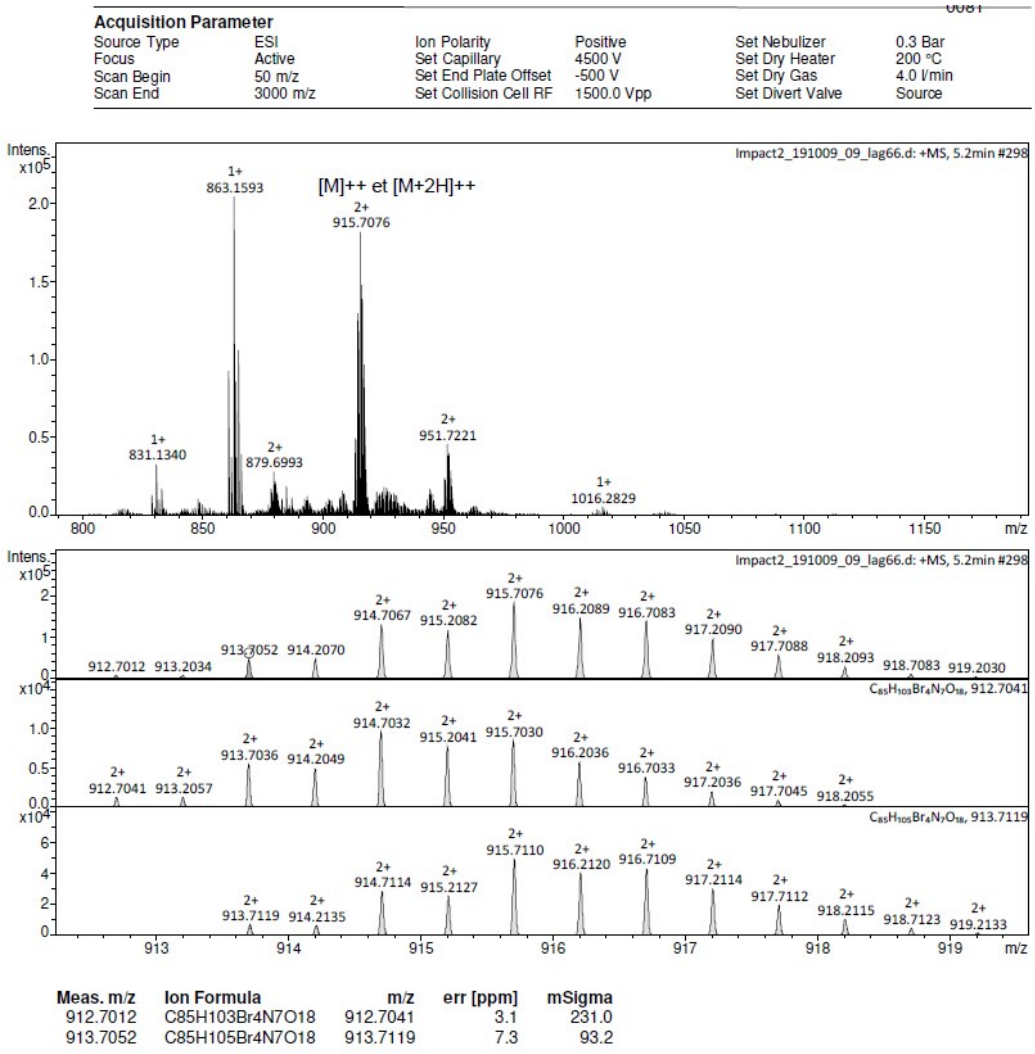
Figure S3 : HRMS of compound **8**.

9



To a solution of **8** (60 mg, 0.034 mmol, 1 equiv.) in dry MeCN (7 mL), Na_2CO_3 (8 mg, 0.06 mmol, 2 equiv.) and NaI (12 mg, 0.064 mmol, 2 equiv.) were added and 3 cycles of vacuum/argon were applied. To this solution, methyl chloroacetate (5.5 mg, 0.044 mmol, 1.3 equiv.) dissolved in dried MeCN (5 mL) was added dropwise and reaction mixture was stirred at 50°C for 16 h. The solvent was removed under reduce pressure, and the obtained residue dissolved in DCM and washed with water (3x mL) to remove the residual salts. The organic layer was then dried over $MgSO_4$, filtered and dried under reduce pressure. The crude was then purified on silica with CH_2Cl_2 then gradually to CH_2Cl_2: NH_3 (2M) in MeOH (99:5). The desired product **9** was obtained as a yellow oil in 48% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.07 (s, 2H), 7.97 (s, 2H,), 7.77 (s, 2H), 7.74 (s, 2H), 7.42 (d, J-8.7 Hz, 4H), 6.70 (d, J = 8.9 Hz, 4H), 4.00 (m, 10H), 3.71 – 3.52 (m, 53H), 3.37 (m, 18H), 2.99 (s, 6H). ESI-HR-MS (positive, MeOH) *m/z* calcd. for $[C_{85}H_{103}Br_4N_7O_{18}]^{2+}$ = 912.7041, found 912.7012, $[M]^{2+}$; calcd. for $[C_{85}H_{105}Br_4N_7O_{18}]^{2+}$ = 813.7119, found 813.7052, $[M+2H]^{2+}$.



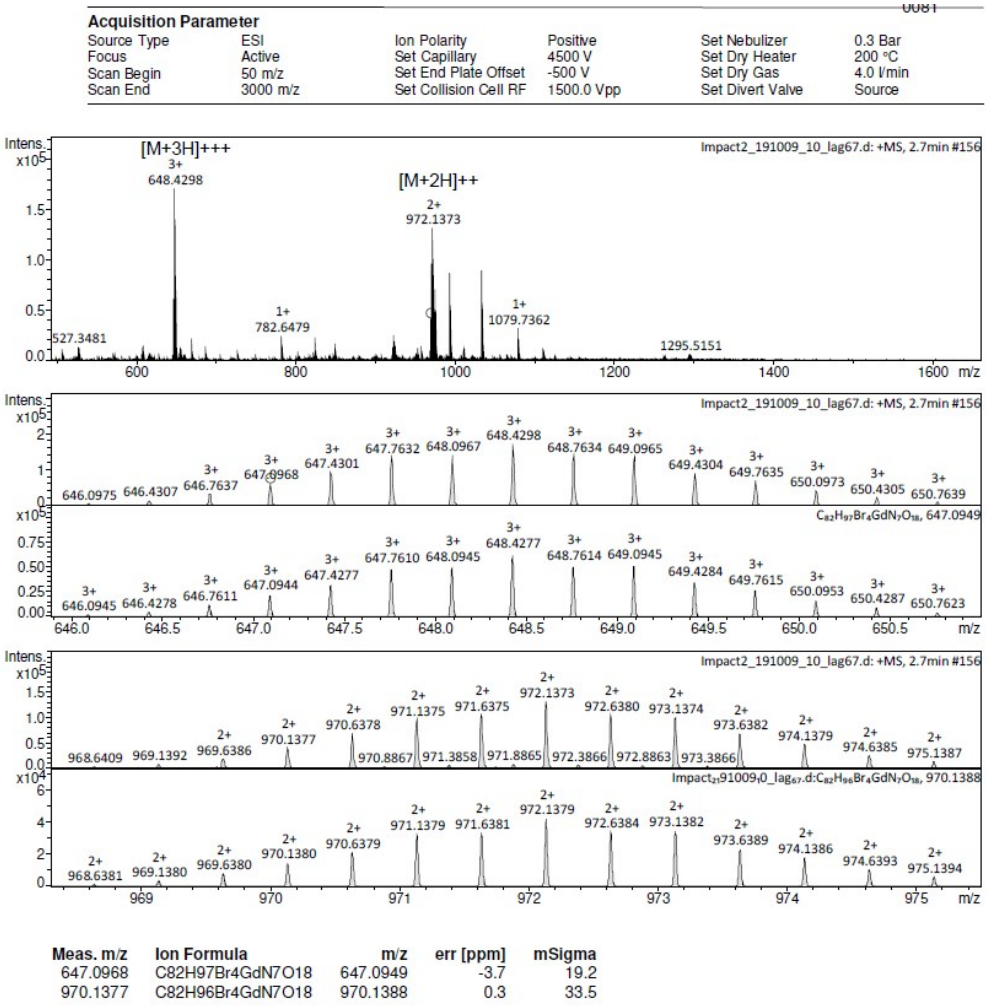
Meas. m/z	Ion Formula	m/z	err [ppm]	mSigma
912.7012	C85H103Br4N7O18	912.7041	3.1	231.0
913.7052	C85H105Br4N7O18	913.7119	7.3	93.2

Figure S4 : HRMS of compound **9**.

Complex [Gd**L2**(H_2O)]

To a solution of **9** (30 mg, 0.016 mmol, 1 equiv.) in THF/H_2O (2 mL/2 mL), 1M NaOH was added (1.5 mL). The reaction was heated at 40°C until complete consumption of the starting material (followed by mass-spectrometry). Then, the pH was adjusted to 6.0 with HCl 0.2 M followed by the addition of $GdCl_3 \cdot 6H_2O$ (9.0 mg, 0.024 mmol, 1.5 equiv.). The reaction mixture was stirred at room temperature for 16h. THF was then removed by evaporation, and the water layer was extracted with DCM (3 x 5 mL). The organic layer was evaporated and the remaining solid dried under vacuum giving the final complex with 93% yield. [Gd**L2**(H_2O)] is soluble in dichloromethane, chloroform, octanol and moderately in water.

ESI-HR-MS (positive, MeOH) *m/z* calcd. for $[C_{82}H_{97}Br4GdN_7O_{18}]^{3+}$ = 647.0949, found 647.0968, $[M+3H]^{3+}$; calcd. for $[C_{82}H_{96}Br4GdN_7O_{18}]^{2+}$ = 970.1388, found 970.1377, $[M+2H]^{2+}$.



Meas. m/z	Ion Formula	m/z	err [ppm]	mSigma
647.0968	C82H97Br4GdN7O18	647.0949	-3.7	19.2
970.1377	C82H96Br4GdN7O18	970.1388	0.3	33.5

Figure S5 : HRMS of compound [Gd**L2**(H_2O)].

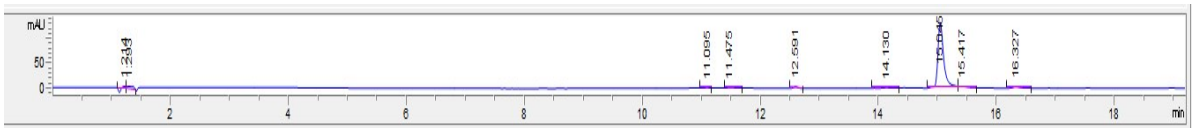
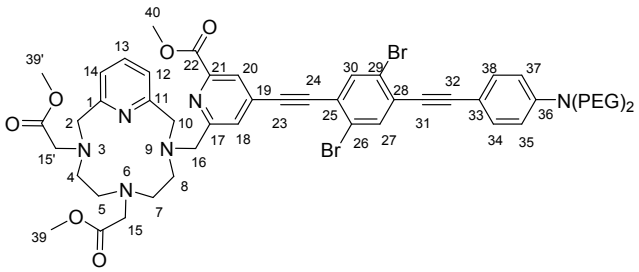


Figure S6 : Analytical HPLC of the [Gd**L2**(H_2O)] complex. Column: XBridge TM C18 HL 3.5 µ 400× 4.6 mm. Gradient: 95% H_2O 0-2 min, 5→100% ACN 2-18 min, 100% ACN 18-22 min. Flow: 1mL/min. Retention time = 15.045 min.

Synthesis of compound 11



A solution of bis acetate pyclen **10** (110 mg, 0.310 mmol) and Na_2CO_3 (174 mg, 1.64 mmol, 5.3 equiv.) in acetonitrile (7.8 mL) was stirred at 55°C for 40 min before dropwise addition of a solution of mesylated antenna **7** (300 mg, 0.330 mmol, 1.05 equiv.) solubilized in acetonitrile (6 mL). The reaction mixture was stirred at 55°C for 15h before the addition of 0.08 equiv. of antenna **7** (dissolved in 1mL of acetonitrile). The reaction mixture was stirred at 55°C for further 24h, salts were filtered off and the filtrate was evaporated to dryness. The residue was dissolved in $CHCl_3$ (20 mL) and washed with H_2O (3 x 20 mL). The combined organic phases were dried over $MgSO_4$, filtered and evaporated to dryness. Purification of the residue by column chromatography on activated alumina (eluent: CH_2Cl_2/MeOH 100/0.5 to 100/1.5) gave compound **11** (218 mg, 0.190 mmol, 60%) as an orange oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (s, 1H, H20), 7.75 (s, 1H, H27), 7.70 (s, 1H, H30), 7.61 (t, J = 7.7 Hz, 2H, H13+H18), 7.36 (d, J = 8.7 Hz, 2H, H34 + H38), 7.11 (d, J = 7.7 Hz, 1H, H14), 7.07 (d, J = 7.6 Hz, 1H, H12), 6.65 (d, J = 8.9 Hz, 2H, H35 + H37), 4.18 (d, J = 15.0 Hz, 2H, H16a + H2a), 4.03 (d, J = 15.0 Hz, 1H, H16b), 3.99 – 3.91 (m, 4H, H2b + H40), 3.82-3.69 (m, 6H, H39' + H10a + H15'), 3.66 (s, 3H, H39), 3.63 – 3.56 (m, 20H, CH_2 PEG), 3.53 – 3.48 (m, 5H, CH_2 PEG + H10b), 3.37 (d, J = 17.9 Hz, 1H, H15a), 3.34 (s, 6H, CH_3 PEG), 3.12 (d, J = 17.9 Hz, 1H, H15b), 2.86 – 2.63 (m, 3H, H8a + H4), 2.57 (d, J = 14.5 Hz, 1H, H8b), 2.39 (d, J = 13.8 Hz, 1H, H7a), 2.19 (d, J = 14.0 Hz, 1H, H5a), 1.86 (t, J = 10.6 Hz, 1H, H7b), 1.74 (t, J = 11.5 Hz, 1H, H5b). ^{13}C NMR (75 MHz, $CDCl_3$) δ 174.2, 172.9 (C=O acetate), 165.5 (C22), 159.7 (C17), 158.8, 158.1 (C1+C11), 148.6 (C36), 146.9 (C21), 138.3

(C13), 136.4 (C27), 135.4 (C30), 133.5 (C19), 133.3 (C34+C38), 129.1 (C25), 128.5 (C18), 125.4 (C20), 123.9 (C29), 123.2, 123.0 (C26+C28), 121.2 (C12), 120.8 (C14), 111.4 (C35+C37), 108.12 (C33), 100.2 (C32), 93.2 (C31), 91.4 (C23), 85.4 (C24), 71.8, 70.6, 70.5, 70.4, 68.2 (CH_2 PEG), 63.3 (C2), 61.8 (C16), 60.8 (C10), 59.6 (C15'), 58.9 (CH_3 PEG), 57.0 (C7), 55.9 (C15), 55.0 (C4+C5), 54.7 (C8), 53.2 (C40), 52.3 (C39), 51.9 (C39'), 50.7 (CH_2 PEG). ESI-HR-MS (positive, MeOH) *m/z* calcd. for $[C_{55}H_{69}Br_2N_6O_{12}]^+$: 1163.3335, found: 1163.3309, $[M+H]^+$; calcd. for $[C_{55}H_{68}Br_2N_6NaO_{12}]^+$: 1185.3154, found: 1185.3165, $[M+Na]^+$; calcd. for $[C_{55}H_{70}Br_2N_6O_{12}]^{2+}$: 582.1704, found: 582.1697, $[M+2H]^{2+}$; calcd. for $[C_{55}H_{69}Br_2N_6NaO_{12}]^{2+}$: 593.1613, found: 593.1608, $[M+H+Na]^{2+}$; calcd. for $[C_{55}H_{71}Br_2N_6O_{12}]^{3+}$: 388.4493, found: 388.4495, $[M+3H]^{3+}$.

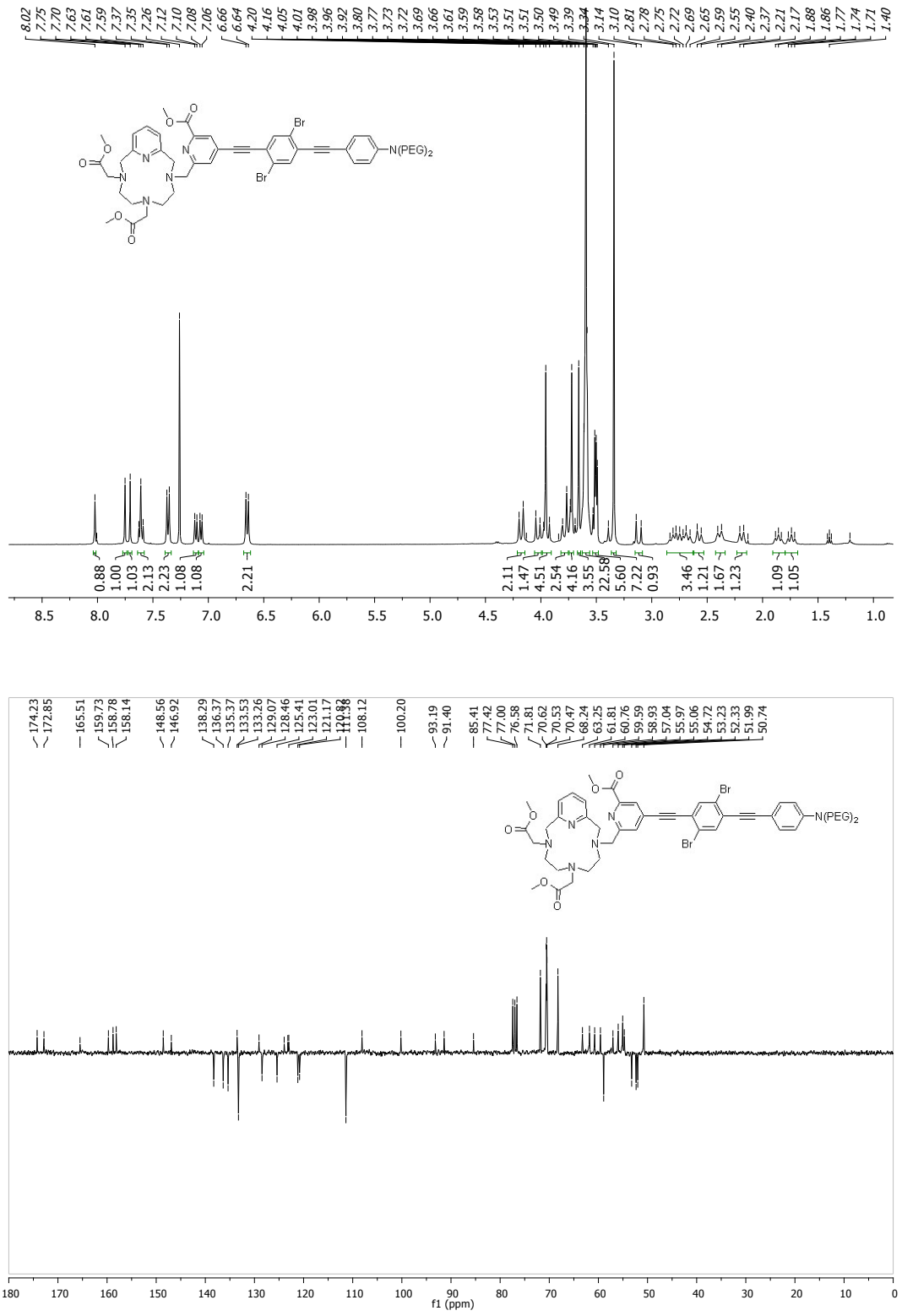
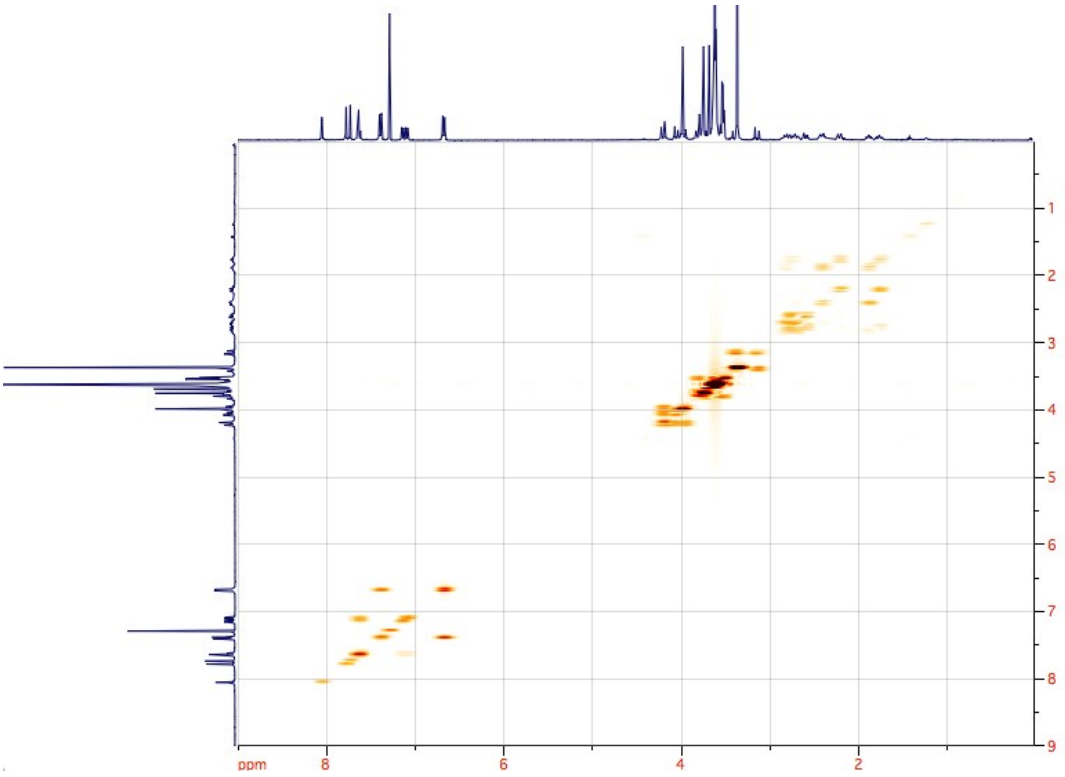
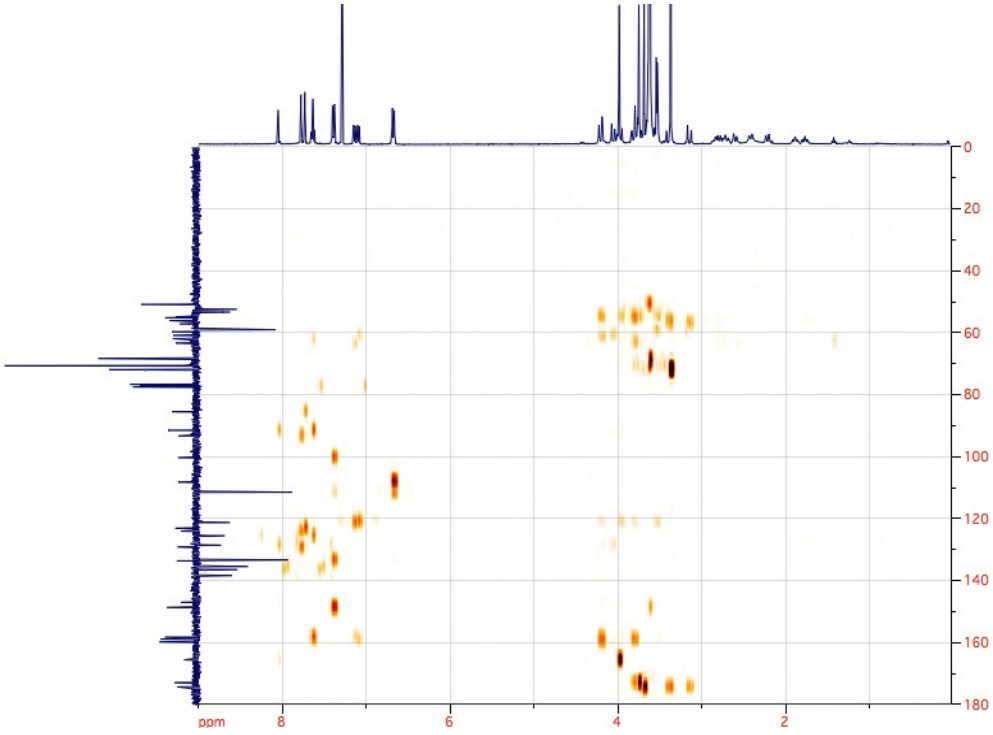


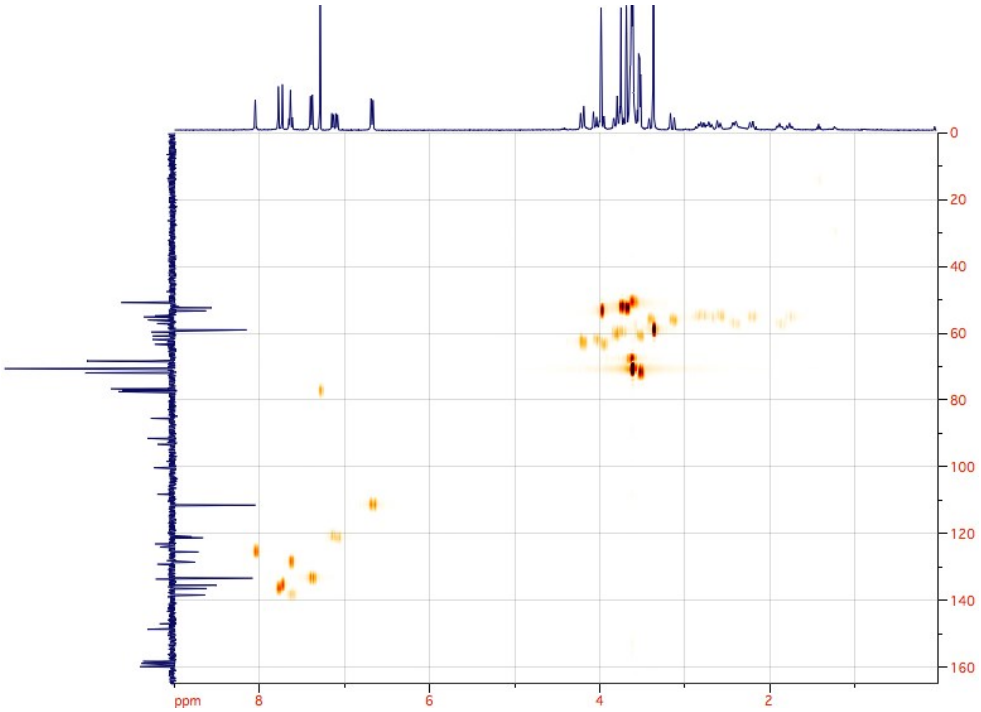
Figure S7 : ^{1}H and ^{13}C and NMR of compound **11**.



Cosy NMR of compound **11**



HMBC NMR of compound **11**



HSQC NMR of compound **11**

Figure S8 : 2D NMR of compound **11**.

Acquisition Parameter

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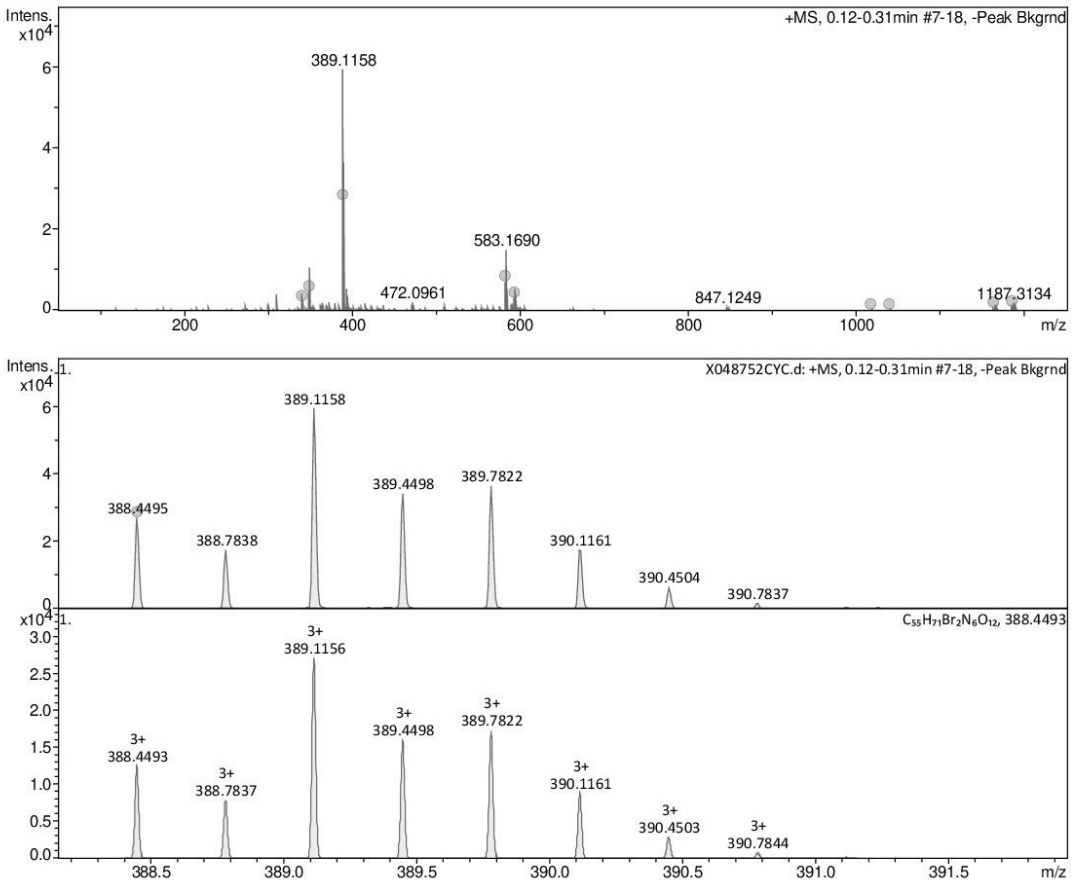
Scan End	2500 m/z	Set Collision Cell RF	1800.0 Vpp	Set Dry Gas	7.0 l/min



Meas. m/z	z	#	Ion Formula	m/z	err [ppm]	mSigma	rdb	e⁻ Conf
339.751330	3+	1	C48H57Br2N6O9	339.751244	-0.3	32.6	24.0	even
	3+	2	C47H61Br2N2O13	339.750798	-1.6	33.4	19.0	even
348.422975	3+	1	C49H63Br2N2O13	348.422681	-0.8	20.5	20.0	even
	3+	2	C50H59Br2N6O9	348.423127	0.4	21.3	25.0	even
388.449526	3+	1	C55H71Br2N6O12	388.449342	-0.5	16.2	24.0	even
	3+	2	C59H75Br2O14	388.450237	1.8	25.2	23.0	even
582.169738	2+	1	C55H70Br2N6O12	582.170374	1.1	22.7	24.0	even
593.160882	2+	1	C55H69Br2N6NaO12	593.161346	0.8	41.4	24.0	even

Meas. m/z	z	#	Ion Formula	m/z	err [ppm]	mSigma	rdb	e⁻ Conf
1017.240064	1+	1	C48H55Br2N6O9	1017.239178	-0.9	139.9	24.0	even
	1+	2	C52H59Br2O11	1017.241863	1.8	146.5	23.0	even
1039.223598	1+	1	C48H54Br2N6NaO9	1039.221122	-2.4	144.4	24.0	even
	1+	2	C52H58Br2NaO11	1039.223808	0.2	152.3	23.0	even
	1+	3	C53H54Br2N4NaO7	1039.225145	1.5	158.5	28.0	even
	1+	4	C54H50Br2N8NaO3	1039.226482	2.8	164.8	33.0	even
1163.330932	1+	1	C55H69Br2N6O12	1163.333472	2.2	29.0	24.0	even
	1+	2	C50H69Br2N8O14	1163.329450	-1.3	33.6	20.0	even
1185.316503	1+	1	C59H72Br2NaO14	1185.318102	1.3	25.1	23.0	even
	1+	2	C55H68Br2N6NaO12	1185.315417	-0.9	29.9	24.0	even

Figure S9 : HRMS of compound **11.**

Synthesis of Complex [Gd**L3**(H_2O)]

A solution of compound **11** (66 mg, 57 µmol) and 1M KOH (755µL) in THF (3.8 mL) was stirred at room temperature for 22h until total saponification of the three methyl ester functions. The pH was then adjusted to 6 with HCl 0.2 N before addition of $GdCl_3.6H_2O$ (32 mg, 85 µmol, 1.5 equiv.) and the reaction mixture was then stirred at room temperature for 22h before evaporation of THF. H_2O (10 mL) and CH_2Cl_2 (20 mL) were added to the residual mixture. The organic phase was recolted, dried over $MgSO_4$, filtered and evaporated to dryness to give complex [Gd**L3**(H_2O)] (29 mg, 23 µmol, y = 40%, purity = 95%) as an orange oil. The aqueous phase was evaporated to dryness and co-evaporated with MeOH. The residue was dissolved in a mixture of CH_2Cl_2/MeOH and the residual white solid was filtered on cotton. The filtrated was evaporated to dryness and the residue was submitted to a dialysis process (cut-off of the membrane: 100-500 Da) to remove the salts in excess and to give more complex [Gd**L3**(H_2O)] (40 mg, 31 µmol, y = 55%, purity = 91%). ESI-HR-MS (positive, MeOH) *m/z* calcd. for $[C_{52}H_{61}Br_2GdN_6O_{12}]^{2+}$: 638.5972, found: 638.5955, $[M+2H]^{2+}$; calcd. for $[C_{52}H_{62}Br_2GdN_6O_{12}]^{3+}$: 426.0672, found: 426.0666, $[M+3H]^{3+}$; m/z 565(2+) : fragmentation (-PEG). [Gd**L3**(H_2O)] is soluble in dichloromethane, chloroform, octanol and in water.

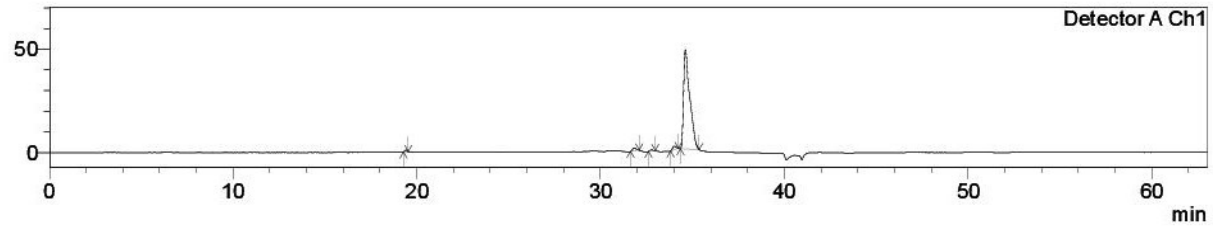
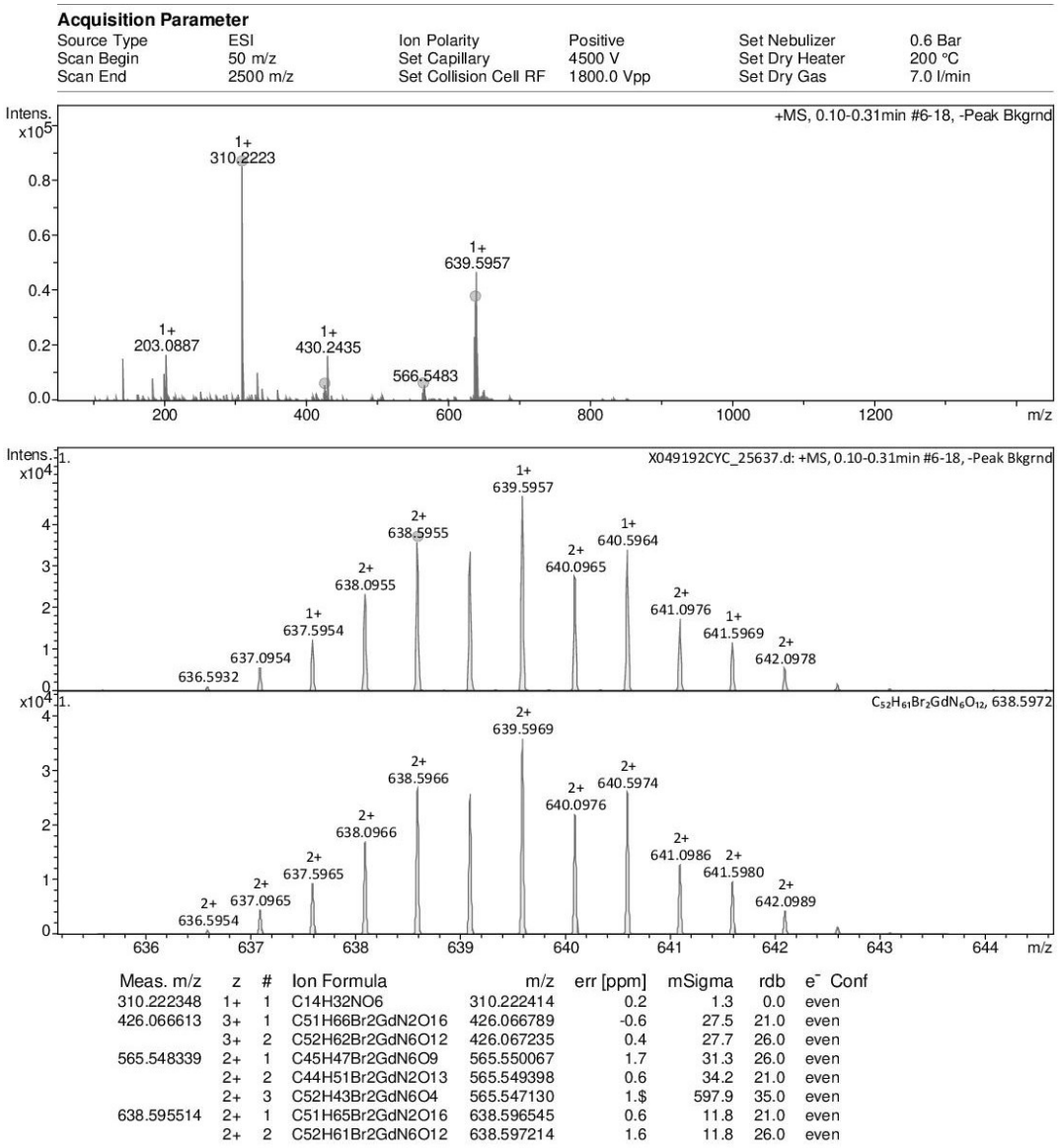


Figure S10 : Analytical HPLC of the [Gd**L3**(H_2O)] complex. Column: Vision HT C18 HL 5 µ 250× 4.6 mm. Gradient: 95% H_2O 0-8 min, 5→80% ACN 8-38 min, 80% ACN 38-48 min, 80→5% ACN 48-53 min; 95% H_2O 53-63 min. Flow: 1mL/min. retention time = 34.619 min. Purity = 95%.



Meas. m/z	z	#	Ion Formula	m/z	err [ppm]	mSigma	rdb	e⁻ Conf
310.222348	1+	1	C14H32NO6	310.222414	0.2	1.3	0.0	even
426.066613	3+	1	C51H66Br2GdN2O16	426.066789	-0.6	27.5	21.0	even
	3+	2	C52H62Br2GdN6O12	426.067235	0.4	27.7	26.0	even
565.548339	2+	1	C45H47Br2GdN6O9	565.550067	1.7	31.3	26.0	even
	2+	2	C44H51Br2GdN2O13	565.549398	0.6	34.2	21.0	even
	2+	3	C52H43Br2GdN6O4	565.547130	1.$	597.9	35.0	even
638.595514	2+	1	C51H65Br2GdN2O16	638.596545	0.6	11.8	21.0	even
	2+	2	C52H61Br2GdN6O12	638.597214	1.6	11.8	26.0	even

Figure S11 : HRMS of complex [Gd**L3**(H_2O)]**.**

Photophysical properties

Normalised excitation vs emission spectra for all studied compounds

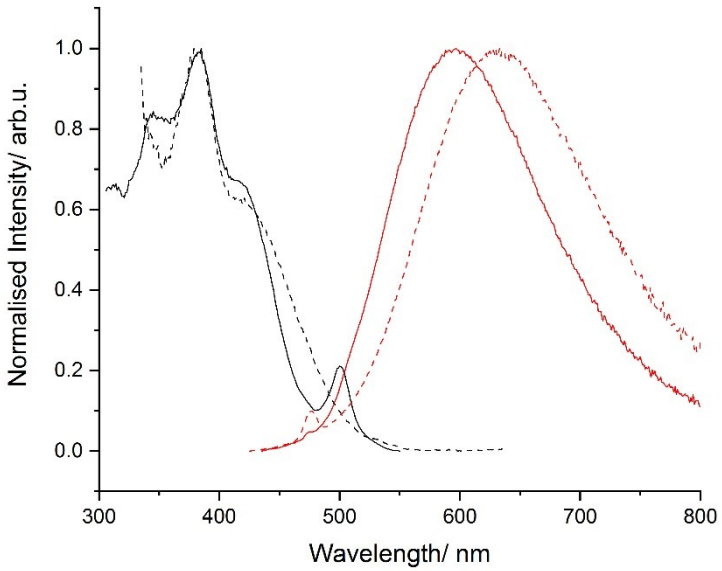


Figure S12 : Normalised excitation (λ_{em}= 575 nm) (black trace) and emission (λ_{exc}= 375 nm) (red trace) of **9** in diluted DCM (full trace) and H_2O (dashed trace).

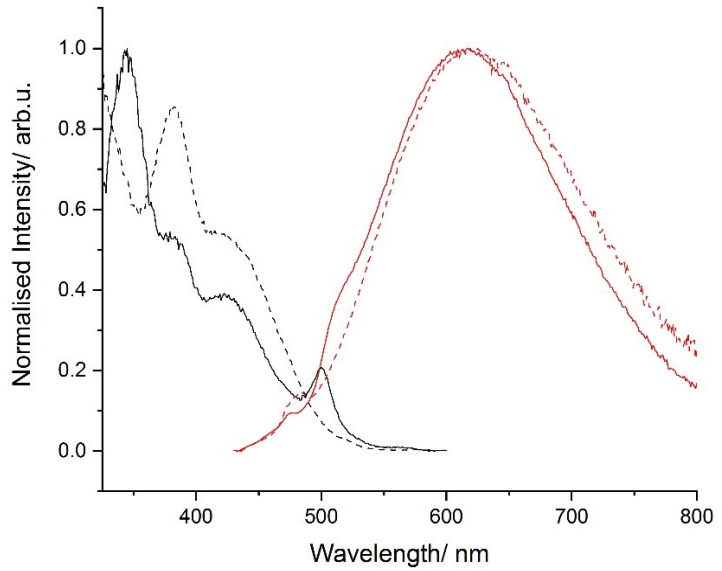


Figure S13 : Normalised excitation (λ_{em}= 575 nm) (black trace) and emission (λ_{exc}= 375 nm) (red trace) of **9** in diluted DCM (full trace) and H_2O (dashed trace).

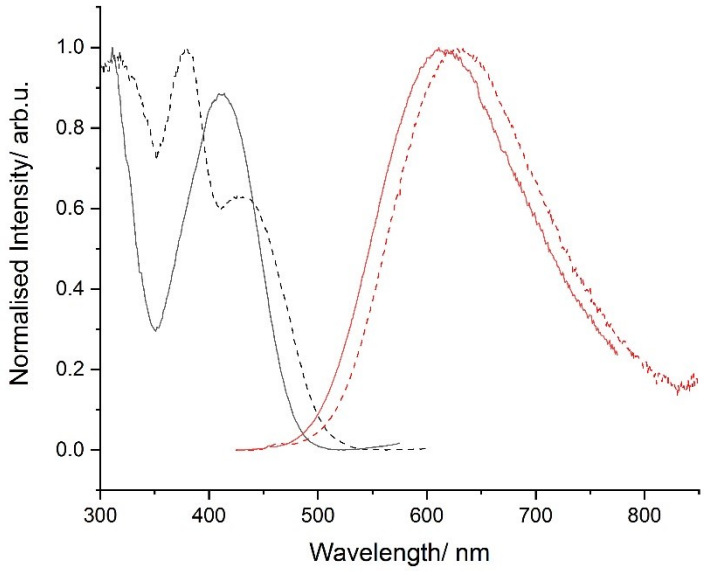


Figure S14 : Normalised excitation (λ_{em}= 575 nm) (black trace) and emission (λ_{em}= 375 nm) (red trace) of **11** in diluted chloroform (full trace) and H_2O (dashed trace).

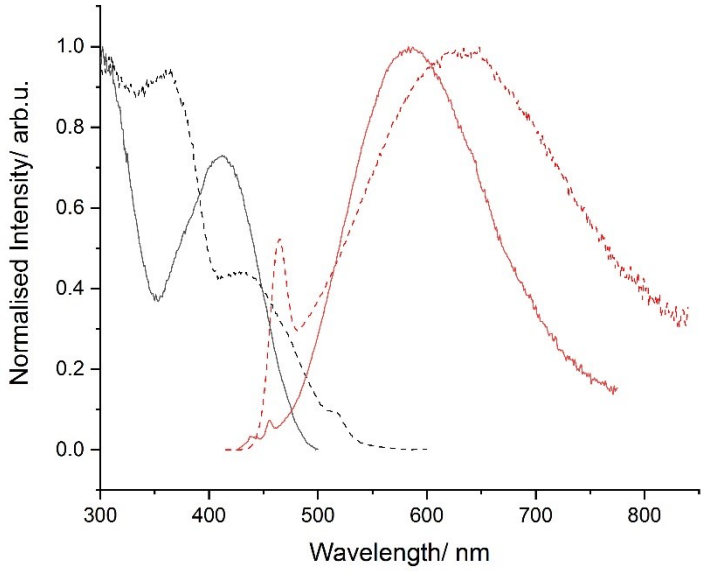


Figure S15 : Normalised excitation (λ_{em}= 575 nm) (black trace) and emission (λ_{em}= 375 nm) (red trace) of **11** in diluted chloroform (full trace) and H_2O (dashed trace).

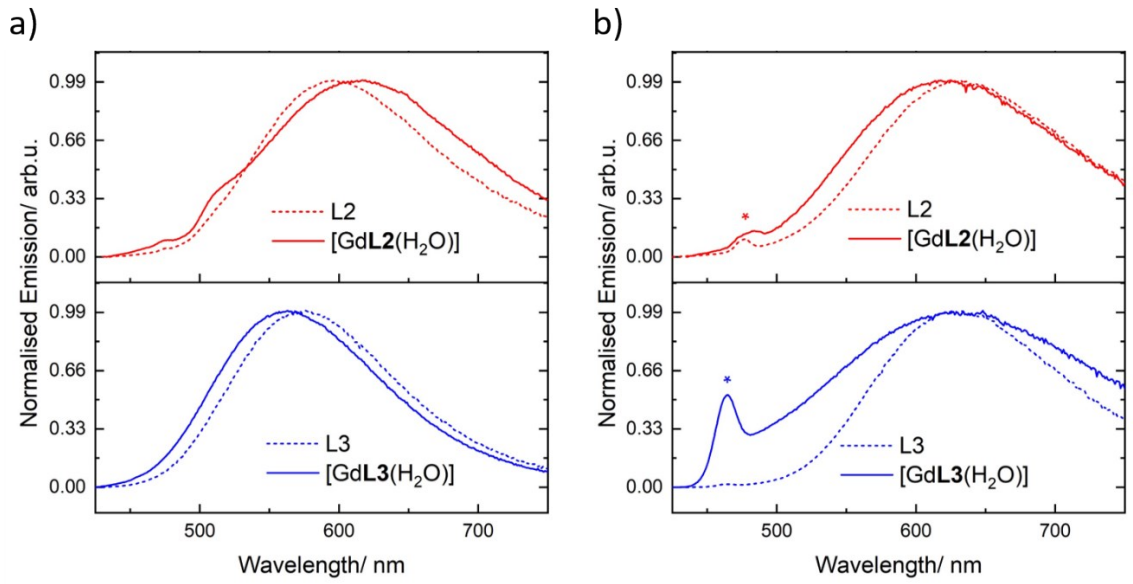


Figure S16 : Normalised emission spectra of ester ligand **9** (red full trace) and corresponding [Gd**L2**(H_2O)] complex (red dashed trace), and ester ligand **11** (blue full trace) and corresponding [Gd**L3**(H_2O)] complex (blue dashed trace) in diluted dichloromethane (a) and water (b) at room temperature.

Fluorescence quantum yields studies

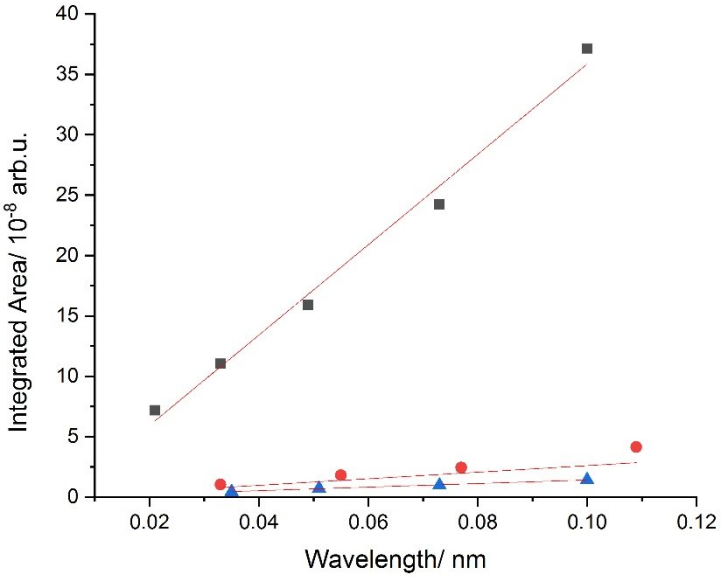


Figure S17 : Integrated emission area according to optical density of Coumarine-153 (black squares), **9** (red circles), [Gd**L2**(H_2O)] (blue triangles) derivatives in DCM at room temperature.

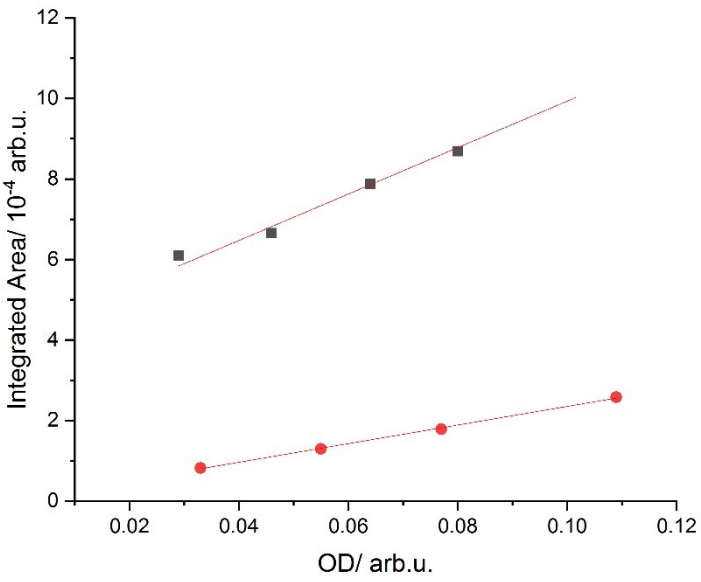


Figure S18 : Integrated singlet oxygen emission area according to optical density of phenalenone (black squares) and [Gd**L2**(H_2O)] in DCM at room temperature.

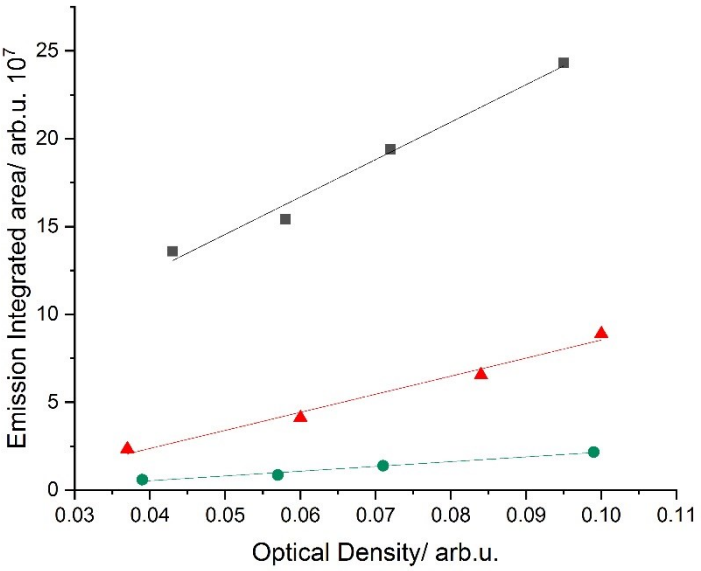


Figure S19 : Integrated emission area according to optical density of Coumarine-153 (black squares), **11** (red triangles), [Gd**L3**(H_2O)] (green circles) derivatives in DCM at room temperature.

Generation of singlet oxygen in dichloromethane studies

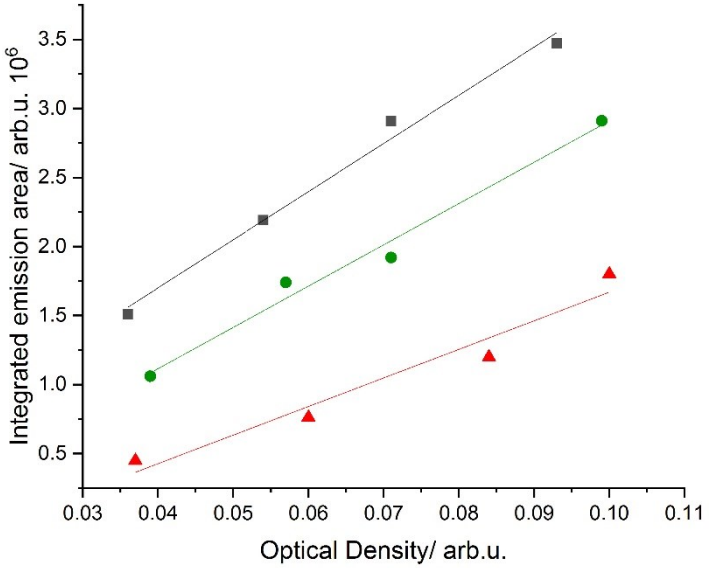


Figure S20 : Integrated singlet oxygen emission area according to optical density of phenalenone (black squares), **11** (red triangles), [Gd**L3**(H_2O)] (green circles) derivatives in DCM at room temperature.

Generation of singlet oxygen in water studies

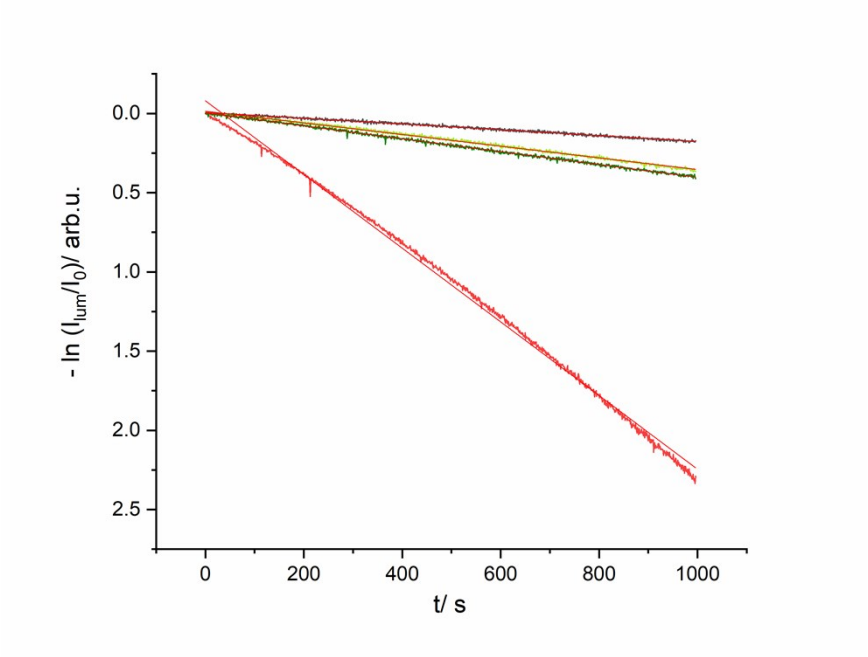


Figure S21 : Logarithmic plot of the evolution of DPAA luminescence intensity (I_{lum}) vs time upon continuous irradiation of the sample at 400 nm, DPAA alone (black trace), DPAA + phenalenone (red trace), DPAA + **11** (light green trace) and DPAA + [Gd**L3**(H_2O)] (dark green trace). Red lines correspond to linear fitting of the data. Slopes standard errors and correlation coefficients are featured in table S1.

Table S1.

Compound	Intercept	Slope	Residual Sum of squares	Pearson's r	S-Square (COD)	Adj. R-Square
DPAA	-0.00618 ± 3.25295E4	1.82176E-4 ± 5.65548E-7	0.02628	0.99524	0.99049	0.99050
DPAA + Phenalenone	-0.8057 ± 0.00221	0.00233 ± 3.84128E-6	1.21249	0.99865	0.99729	0.99729
DPAA + 11	-0.01403 ± 4.10247E-4	3.67904E-4 ± 7.13244E-7	0.0418	0.99814	0.99627	0.99627
DPAA + [GdL3(H_2O)]	-0.00312 0.9962703.9476E-4	4.0668E-4 0.99627 6.86319E-7	0.03871	0.99859	0.99717	0.99717

Determination of relaxivities and MRI Applications

Table S2. Quantitative assessment of T_1 and T_2 relaxation times of [Gd**L3**(H_2O)] samples by MR imaging performed at 1.5 and 3 T magnetic field. Data presented in Table were obtained without strict temperature control are reported in ms and mean±SD. T_1 and T_2 relaxation times were converted relaxivity values as follows: r_{1p} = 9.96 and r_{2p} = 11.21 $mM^{-1}s^{-1}$ (at 1.50 T) and r_{1p} = 15.23 and r_{2p} = 24.60 $mM^{-1}s^{-1}$ (at 3.0 T).

	1.5 T		3.0 T	
samples	**T_1-weighted**	**T_2-weighted**	**T_1-weighted**	**T_2-weighted**
50 mM HEPES	1003±97	1557±7	1274±12	1074±6
0.087 mM	543±55	511±11	584±61	323±5
0.116 mM	479±42	432±6	485±62	270±7
0.174 mM	371±33	298±12	356±56	191±6
0.347 mM	230±33	165±13	208±59	102±5
0.579 mM	153±31	106±24	139±66	66±4

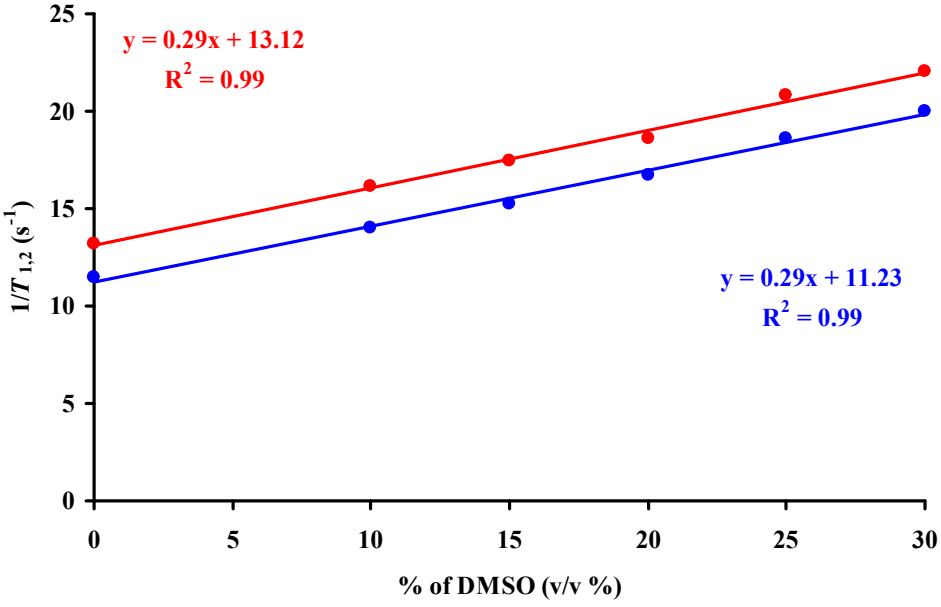


Figure S22 : Dependence of the r_{1p} (blue) and r_{2p} (red) relaxivities of $GdCl_3$ on the solvent composition in DMSO/H_2O solvent system (0.15 M NaCl, 25 °C, 1.41 T field strength).

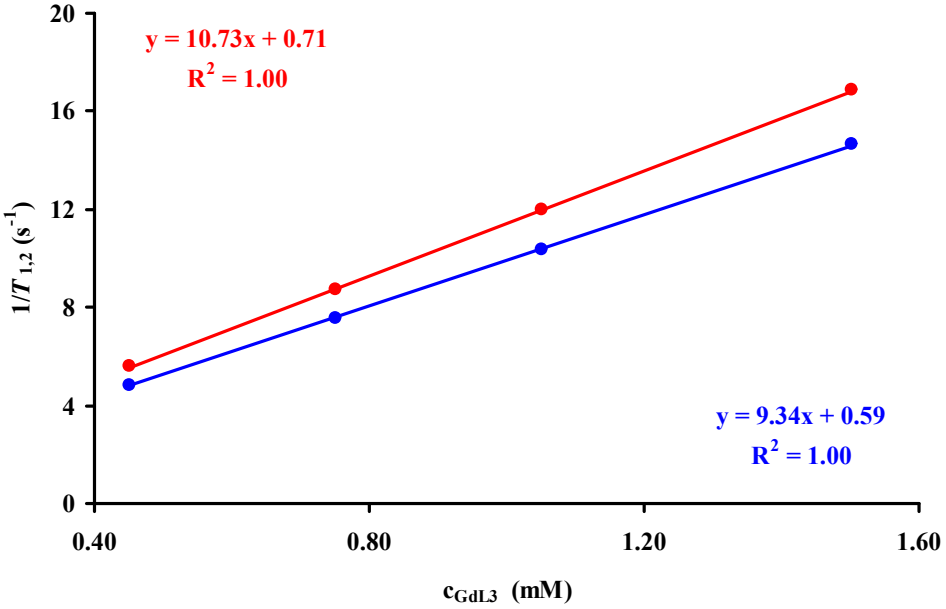


Figure S23 : Determination of r_{1p} (blue) and r_{2p} (red) relaxivities of the parent [Gd(**pc2a1pa**)(H_2O)] complex in 32% (v/v%) of DMSO/H_2O at 1.41 field strength (pH=7.40, I=0.15 M NaCl, 25 °C).

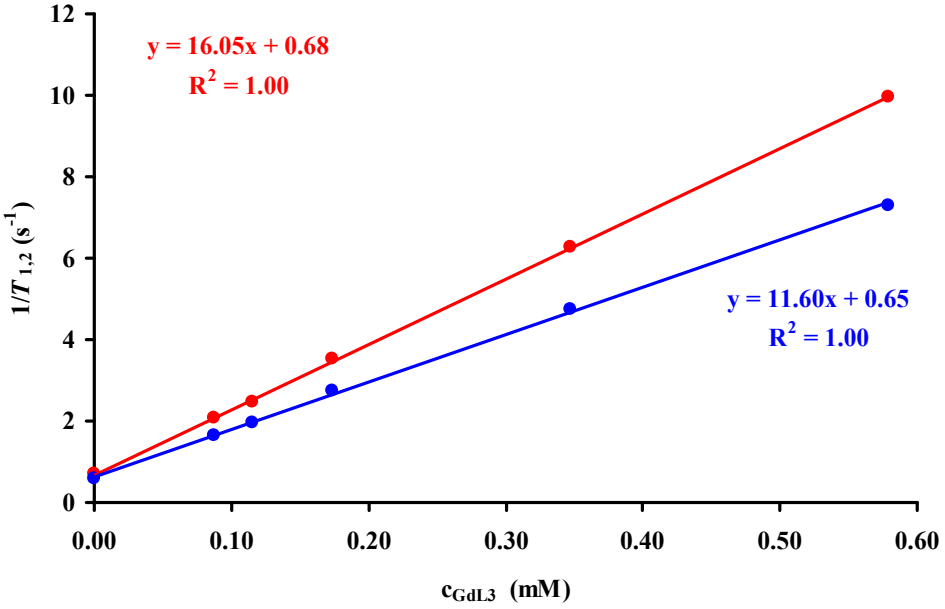


Figure S24 : Determination of r_{1p} (blue) and r_{2p} (red) relaxivities of [Gd**L3**(H_2O)] in 32% (v/v%) of DMSO/H_2O at 1.41 field strength (pH=7.40, I=0.15 M NaCl, 25 °C).