

Supporting Information

Gallium and indium complexes with new hexadentate bis(semicarbazone) and bis(thiosemicarbazone) chelators

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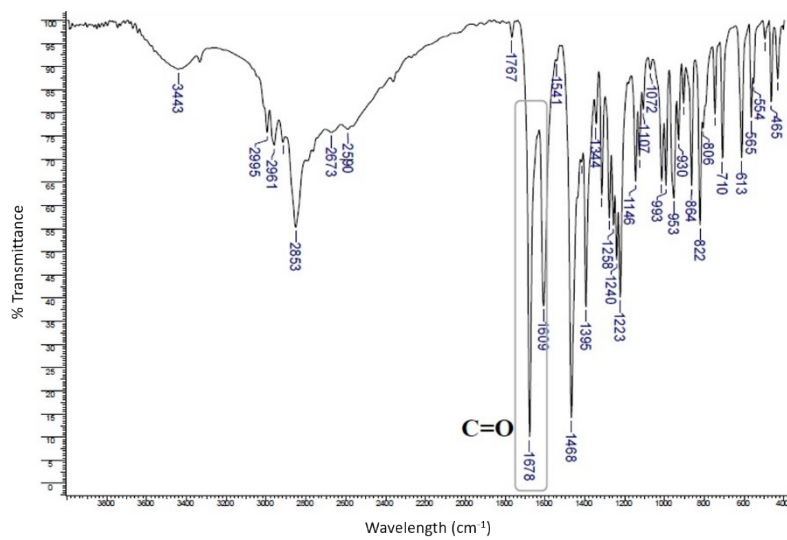


Fig. S1 IR spectrum of hfma.

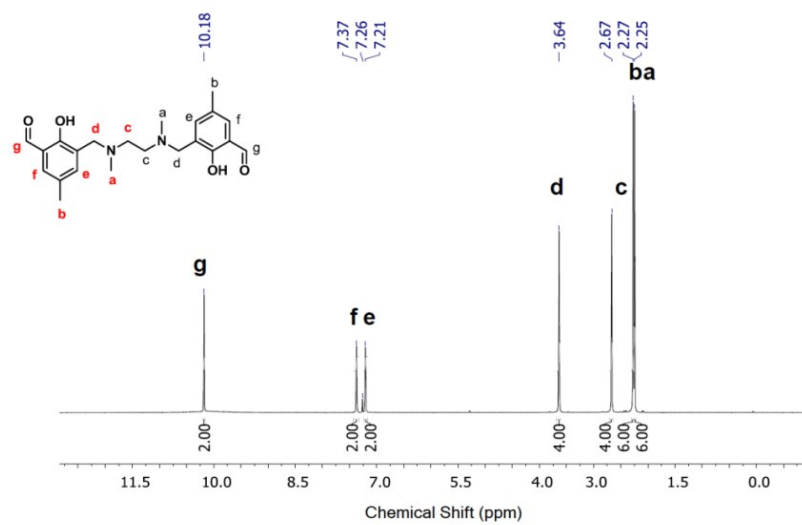


Fig. S2 ¹H spectrum of hfma in CDCl₃.

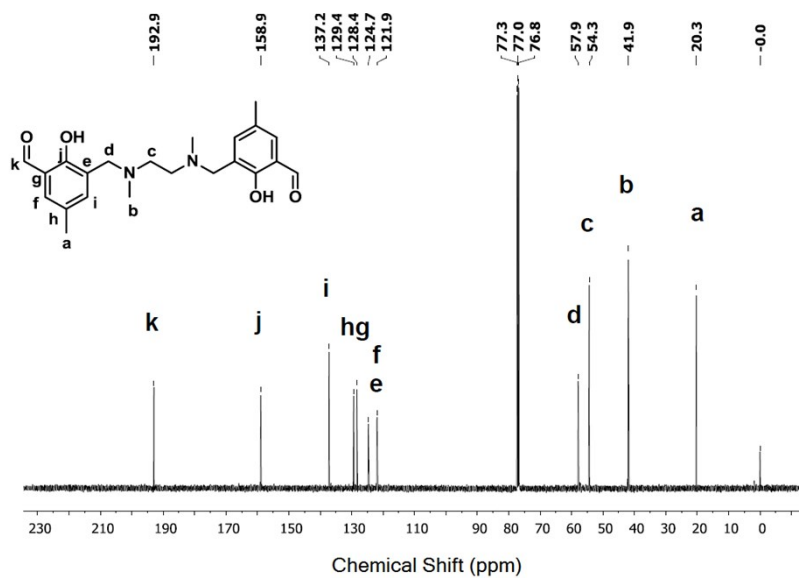


Fig. S3 ¹³C spectrum of hfma in CDCl₃.

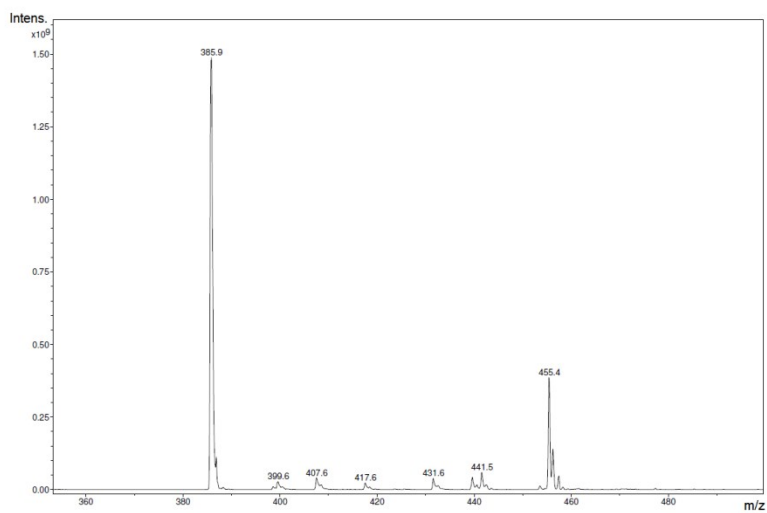


Fig. S4 LR-ESI(+)-MS spectrum of hfma.

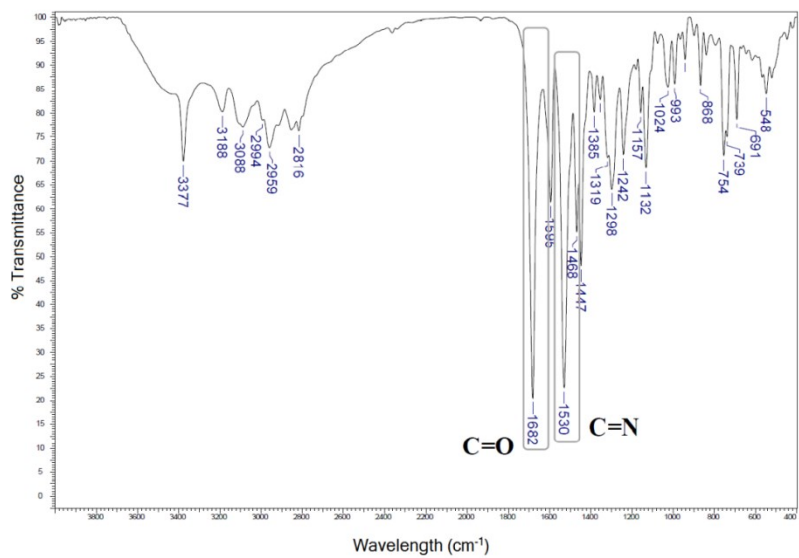


Fig. S5 IR spectrum of H₄bsc.

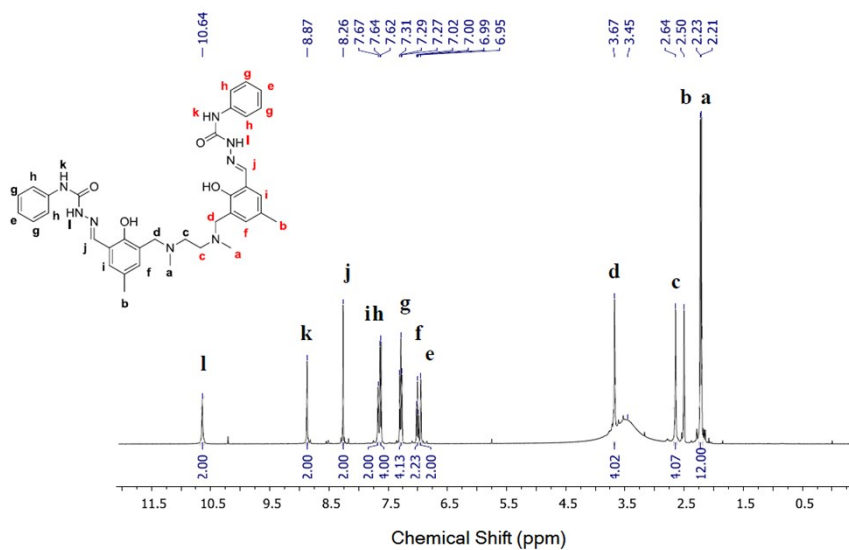


Fig. S6 ¹H spectrum of H₄bsc in DMSO-d₆.

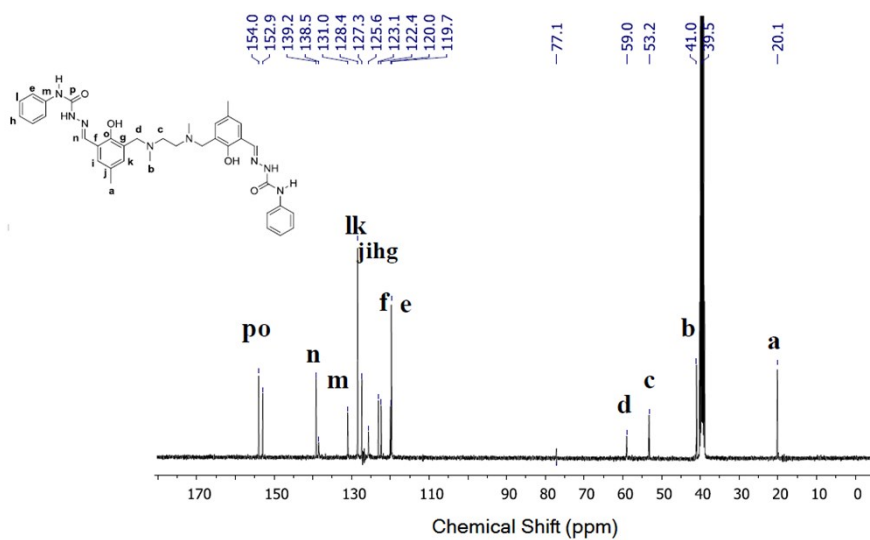


Fig. S7 ¹³C spectrum of **H₄bsc** in DMSO-*d*₆.

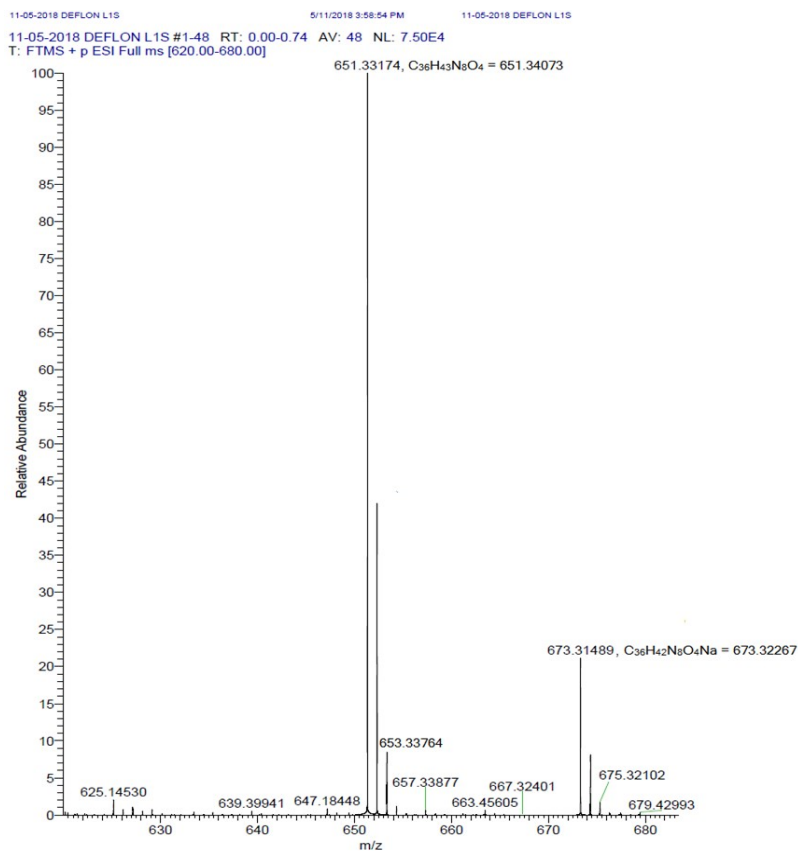


Fig. S8 HR-ESI(+)-MS spectrum of **H₄bsc**.

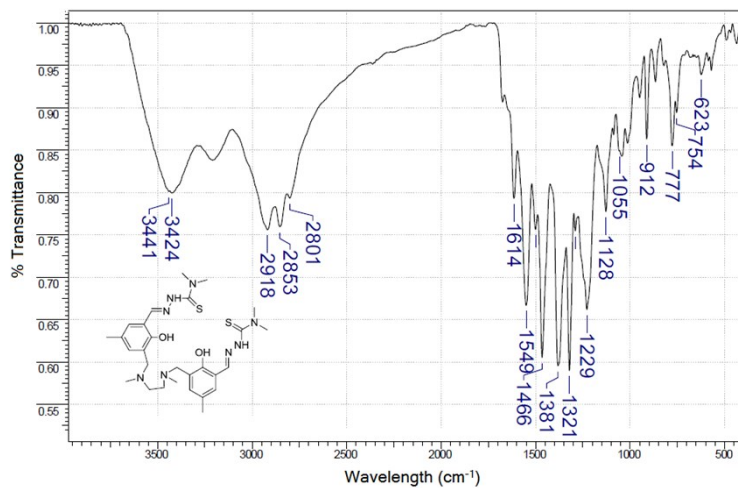


Fig. S9 IR spectrum of **H₄btsc**.

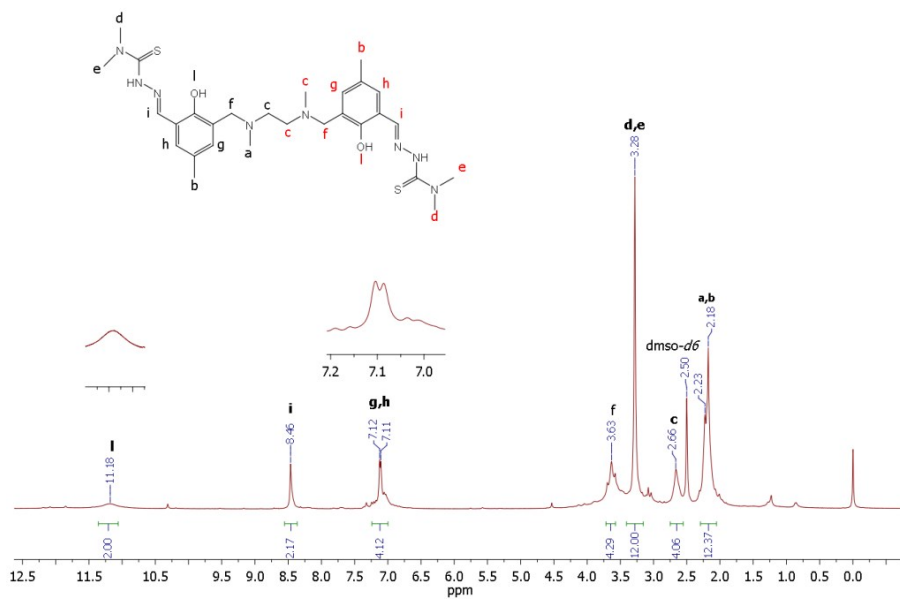


Fig. S10 ¹H spectrum of **H₄btsc** in DMSO-*d*₆.

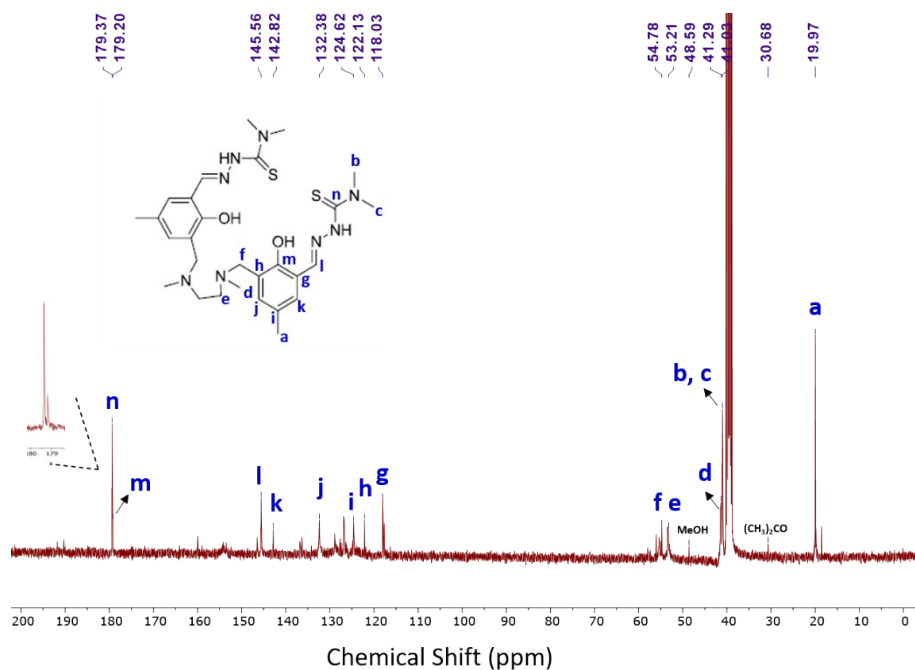


Fig. S11 ^{13}C spectrum of H_4btsc in $\text{DMSO-}d_6$.

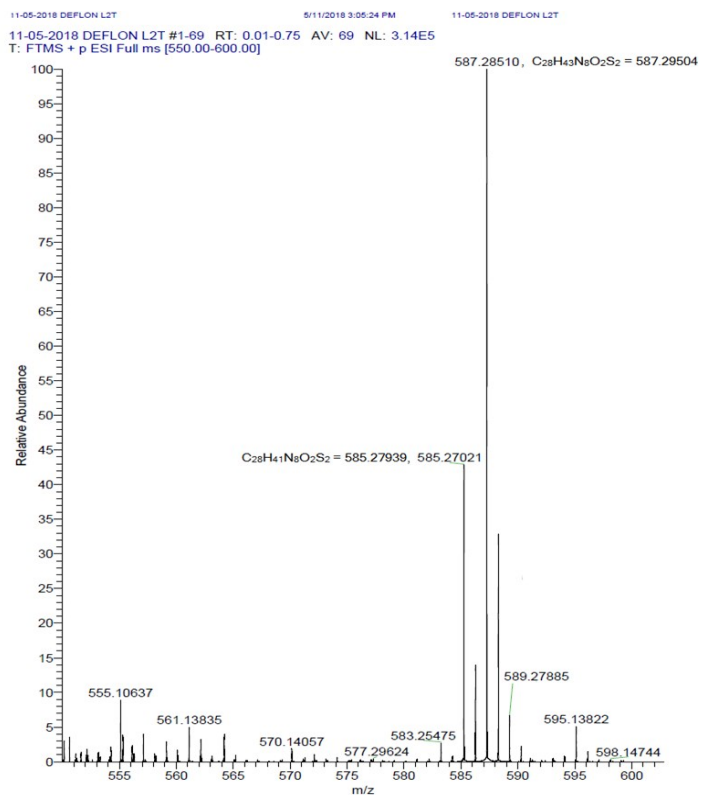


Fig. S12 HR-ESI(+)-MS spectrum of H_4btsc .

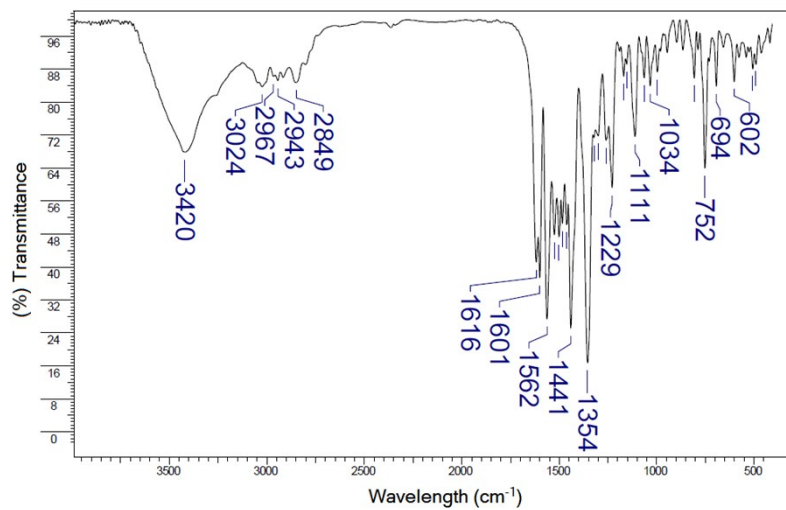


Fig. S13 IR spectrum of complex 1.

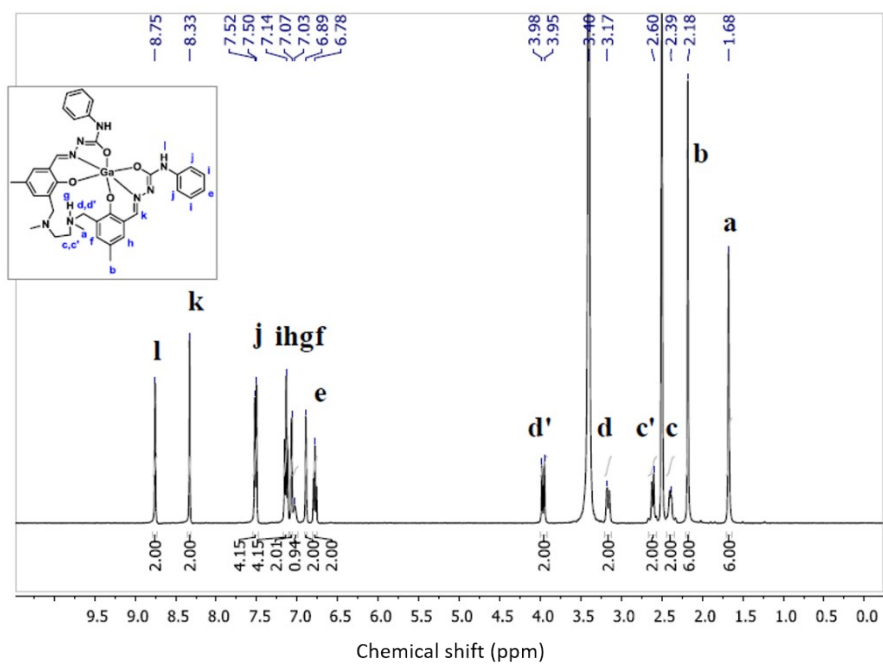


Fig. S14 ¹H spectrum of complex 1 in DMSO-d₆.

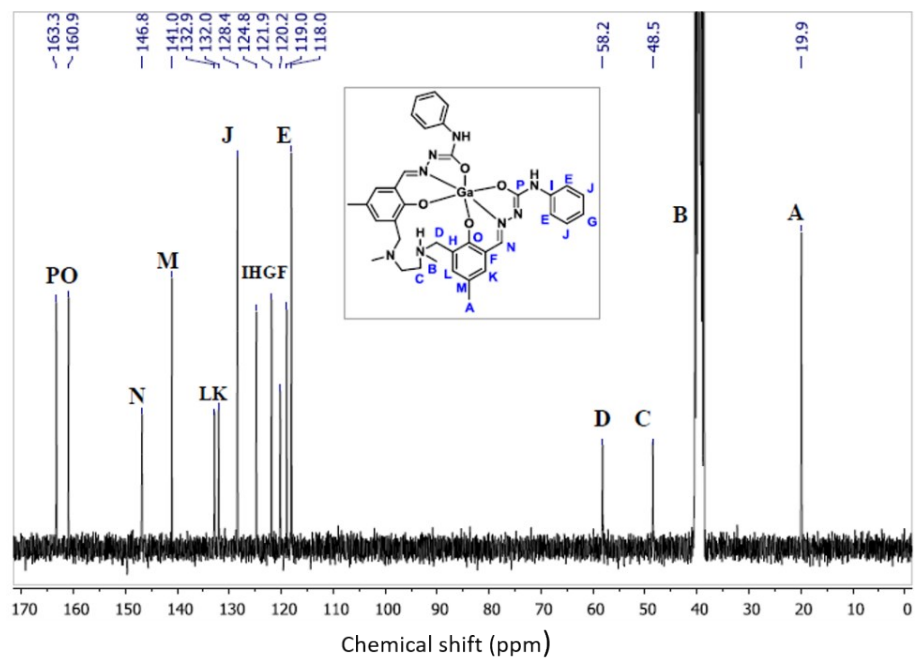


Fig. S15 ^{13}C spectrum of complex **1** in $\text{DMSO-}d_6$.

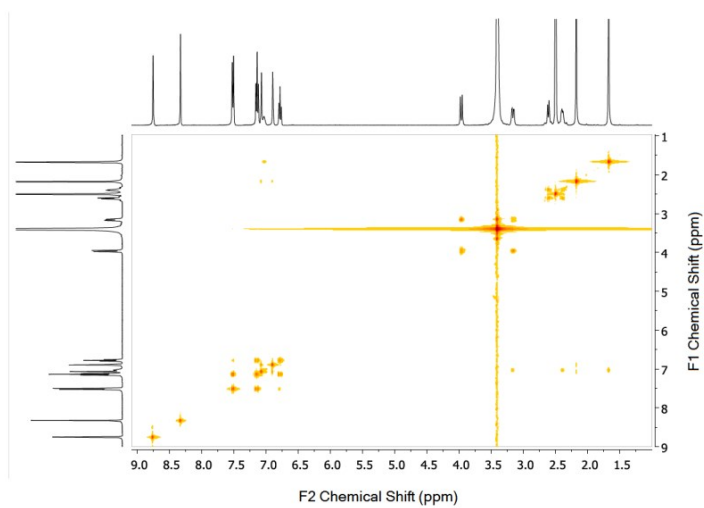


Fig. S16 COSY spectrum of complex **1** in $\text{DMSO-}d_6$.

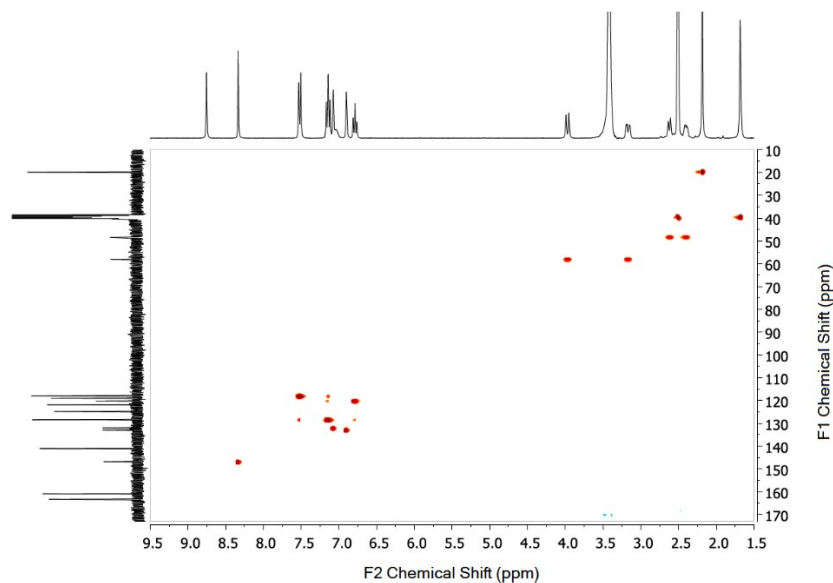


Fig. S17 HSQC spectrum of complex **1** in DMSO-*d*₆.

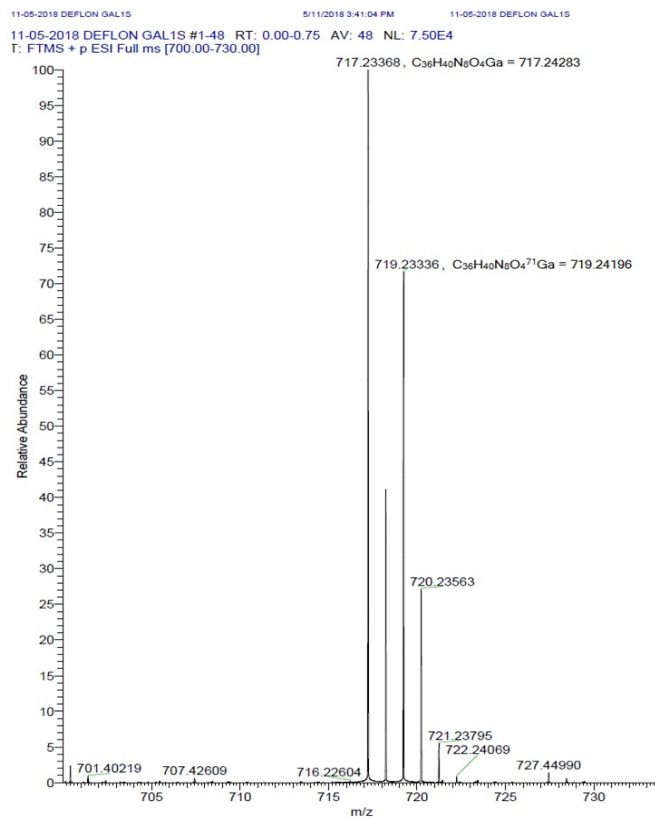


Fig. S18 HR-ESI(+)-MS spectrum of complex **1**.

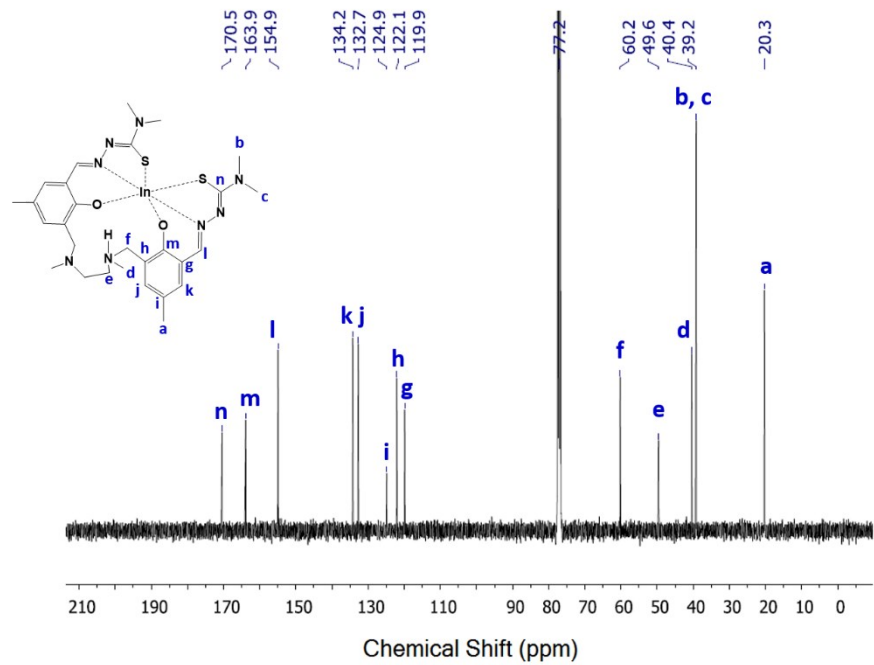


Fig. S21 ^{13}C spectrum of complex **2** in CDCl_3 .

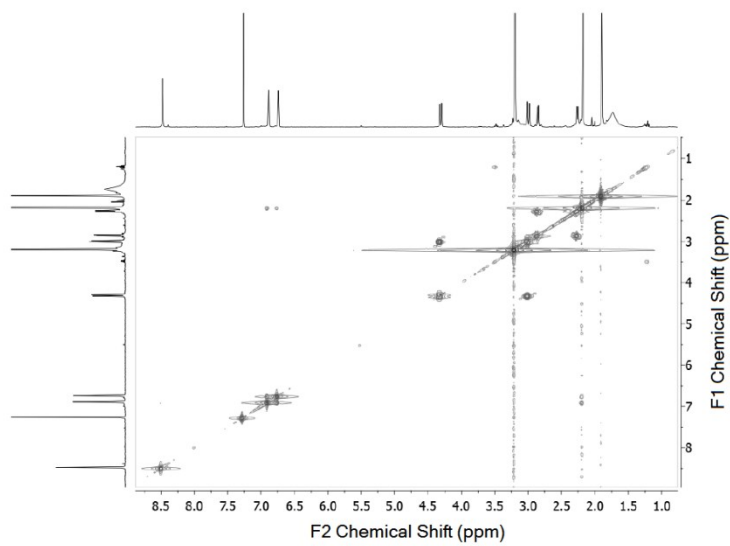


Fig. S22 COSY spectrum of complex **2** in $\text{DMSO-}d_6$.

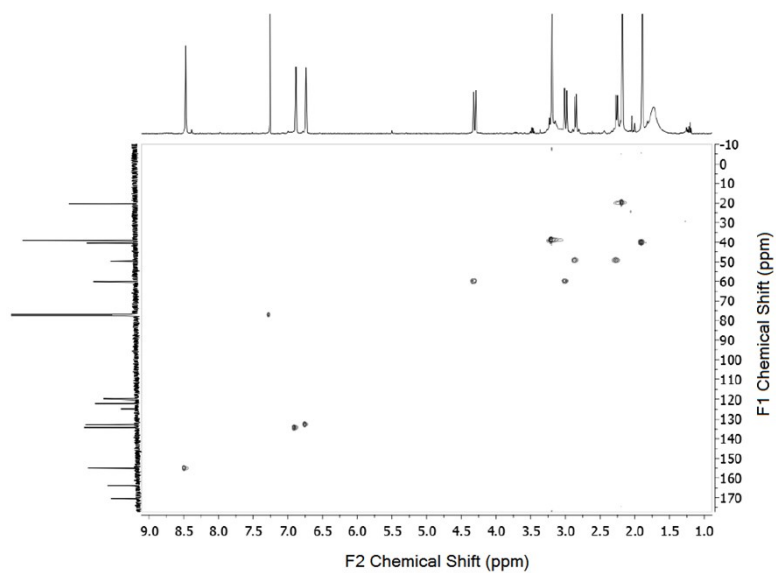


Fig. S23 HSQC spectrum of complex 2 in DMSO-*d*₆.

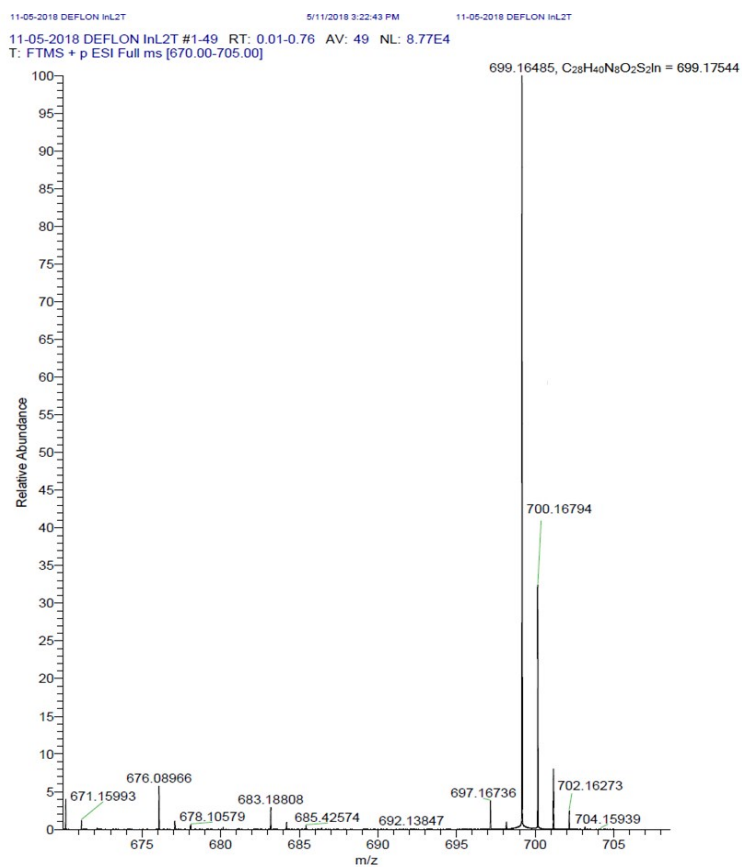


Fig. S24 HR-ESI(+)-MS spectrum of complex 1.

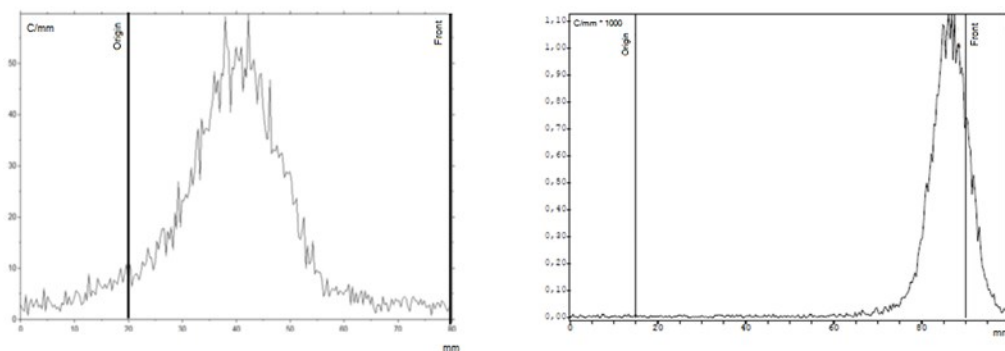


Fig. S25 Radiochromatograms of [$^{67}\text{Ga}(\text{Hbsc})$] (**1***) ($R_f = 0.33$) (left) and [$^{111}\text{In}(\text{Hbtsc})$] (**2***) ($R_f = 0.94$) (right), using ITLC-SG plates. Eluents: 0.5M AcOH in MeOH for **1*** and MeOH/ 6M HCl (95:5) for **2***.

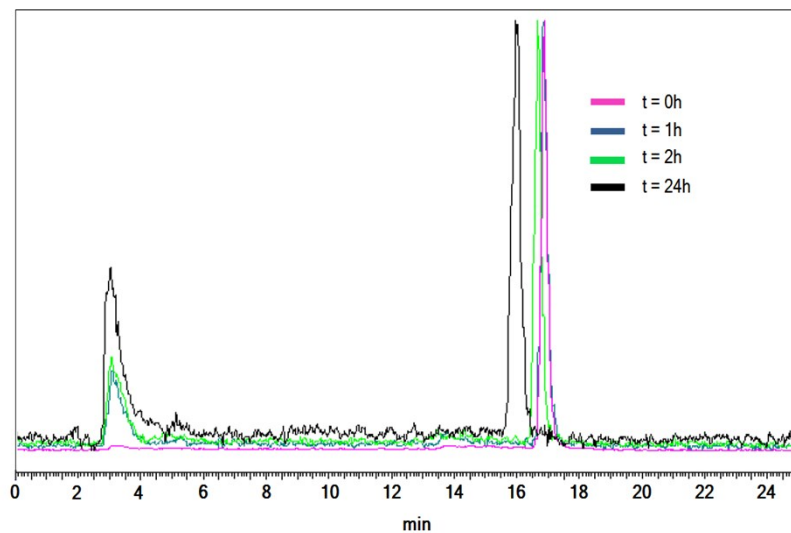


Fig. S26 HPLC chromatograms of **1*** in PBS buffer (pH 7.2) after $t = 0, 1, 2$ and 24h of incubation at 37°C .

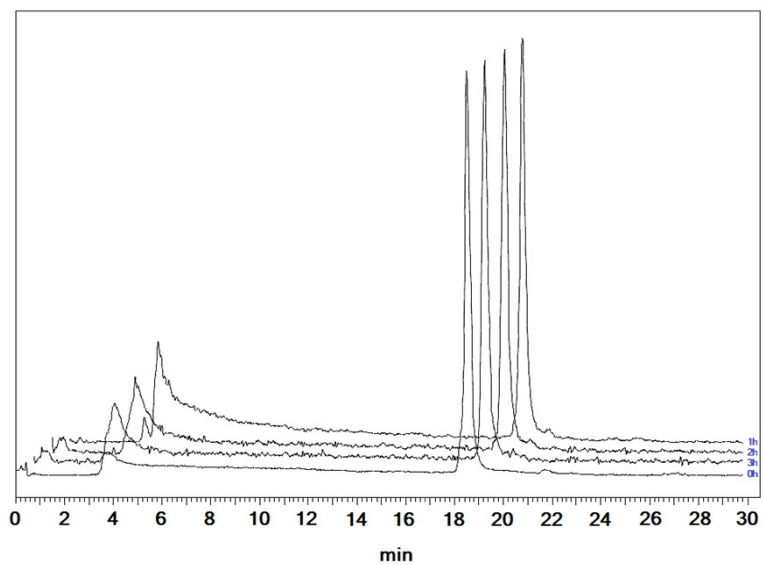


Fig. S27 HPLC chromatograms of **2*** in PBS buffer (pH 7.2) after t = 0, 1, 2 and 3h of incubation at 37°C.

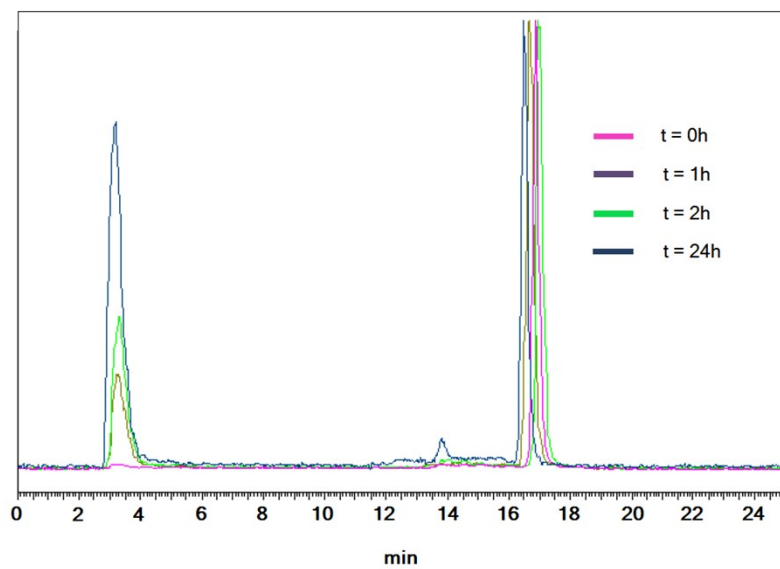


Fig. S28 HPLC chromatograms of **1*** in *apo*-transferrin after t = 0, 1, 2 and 24h of incubation at 37°C.

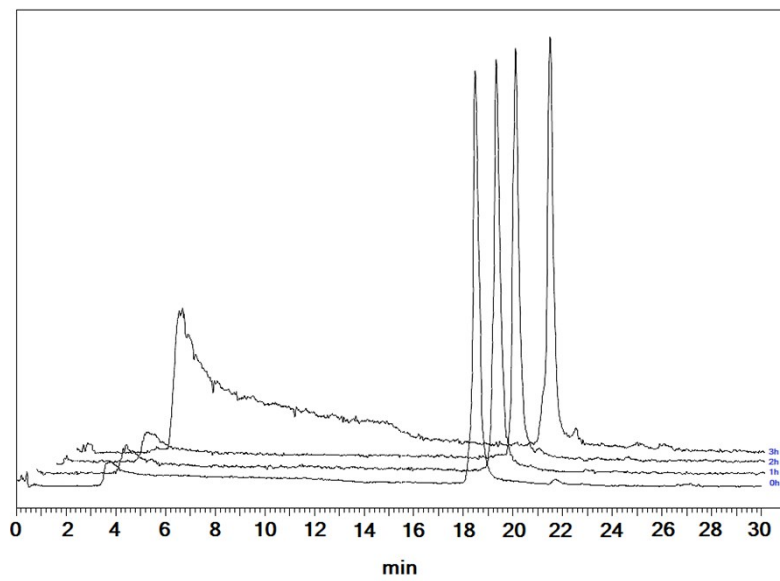


Fig. S29 HPLC chromatograms of **2*** in *apo*-transferrin after $t = 0, 1, 2$ and 3h of incubation at 37°C .

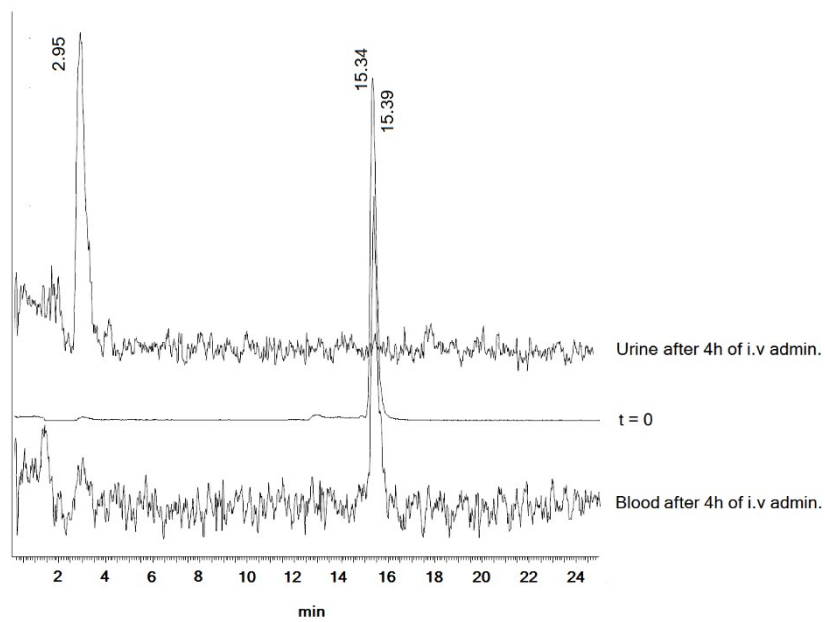


Fig. S30 HPLC chromatograms of urine and blood from CD-1 mice injected with **1*** complex ($t = 0$ correspond to **1*** after radiolabeling).

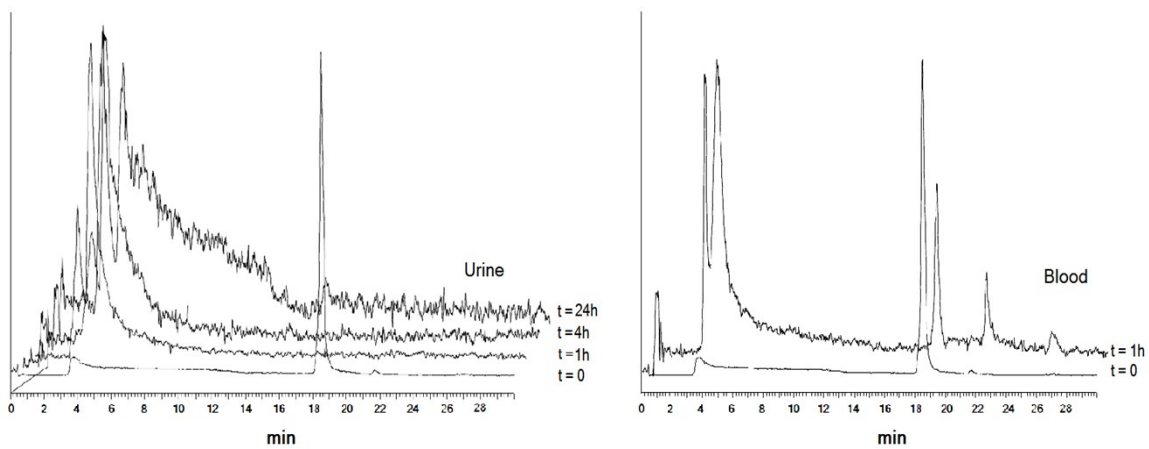


Fig. S31 HPLC chromatograms of urine and blood from CD-1 mice injected with **2*** complex (t = 0 correspond to **2*** after radiolabeling).

Table S1 Crystallographic data for complexes **1** and **2**.

	[Ga(Hbse)]·CH ₃ OH (1 ·CH ₃ OH)	[In(Hbtsc)]·CH ₃ OH (2 ·CH ₃ OH)
Empirical formula	C ₃₇ H ₄₃ GaN ₈ O ₅	C ₂₉ H ₄₃ InN ₈ O ₃ S ₂
Formula weight	749.51	730.65
Crystal system	Monoclinic	Monoclinic
Space group	C2/c	P2 ₁ /c
a (Å)	19.7797(12)	9.9982(2)
b (Å)	10.8099(6)	14.1528(4)
c (Å)	18.3616(11)	26.1451(7)
α (°)	90	90
β (°)	111.076(3)	95.532(2)
γ (°)	90	90
V (Å ³)	3663.4(4)	3682.37(16)
Z	4	4
Density (calculated) Mg m ³	1.359	1.318
Absorption coefficient, μ (mm ⁻¹)	0.805	0.794
θ range (deg.)	2.183-25.080	2.754-25.680
Index ranges	-21 ≤ h ≤ 23, -12 ≤ k ≤ 12, -21 ≤ l ≤ 20	-12 ≤ h ≤ 12, -17 ≤ k ≤ 17, -31 ≤ l ≤ 28
Reflections collected	16269	26949
Independent reflections	3260 / R _{int} = 0.0336	6855/R _{int} = 0.0541
Data/restraints/parameters	3260/1/250	6855/0/402
Absorption correction	Semi-empirical / multi-scan	Semi-empirical / multi-scan
Max. and min. transmission	0.938/0.849	0.9843/0.7419
R ₁ [<i>I</i> > 2σ(<i>I</i>)]	0.0447	0.0435
wR ₂ [<i>I</i> > 2σ(<i>I</i>)]	0.1157	0.1019
Goodness-of-fit on F ² , S	1.048	1.041

Table S2 Short contacts list of compounds [Ga(Hbsc)]·CH₃OH (**1**·CH₃OH) and In(Hbtsc)]·CH₃OH (**2**·CH₃OH)

[Ga(Hbsc)]·CH₃OH			
Short contacts	D (Å)	D--ΣVdW(Å)	Sym. oper
Complex...Solvent			
N1...C19	3.008(6)	-0.242	x,y,z
N1...H19C	2.590	-0.160	x,y,z
C2... H19C	2.796	-0.104	x,y,z
H1...O3	2.197	-0.523	x,y,z
H1...H3A	2.260	-0.140	x,y,z
H1...C19	2.093	-0.807	x,y,z
H1...H19A	2.051	-0.349	x,y,z
H1...H19C	1.839	-0.561	x,y,z
C7...C19	3.175(8)	-0.225	x,y,z
C7...H19C	2.272	-0.628	x,y,z
H7...C19	2.440	-0.460	x,y,z
H7...H19C	1.594	-0.806	x,y,z
C12...C19	3.245(8)	-0.155	-1/2+x,-1/2+y, z
C13...C19	3.315(8)	-0.085	-1/2+x,-1/2+y, z
C13...H19B	2.752	-0.148	-1/2+x,-1/2+y, z
N2...O3	2.873(9)	-0.197	1.5-x,-1/2-y,1-z
N2...C19	2.839(6)	-0.223	1.5-x,-1/2-y,1-z
N2...H19B	2.189	-0.561	1.5-x,-1/2-y,1-z
C8...H19B	2.709	-0.191	1.5-x,-1/2-y,1-z
H8...H19B	2.049	-0.351	1.5-x,-1/2-y,1-z
Complex... Complex			

C1...H6	2.756	-0.142	1/2-x,1/2+y,1/2-z
C5...H16A	2.849	-0.051	1/2-x,1/2+y,1/2-z
C6...H16A	2.731	-0.169	1/2-x,1/2+y,1/2-z
C8...C14	3.353	-0.047	1-x, -y,-z
N2...H15C	2.631	-0.119	1-x,- y,-z
[In(Hbtsc)]·CH₃OH			
Short contacts	D (Å)	D--ΣVdW(Å)	Sym. oper
Complex...Solvent			
N2...O3S	2.923	-0.157	x,y,z
N2...H3S	2.094	-0.656	x,y,z
Complex...Complex			
N2...H23C	2.738	-0.012	-x,-y,1-z
S1... H10A	2.879	-0.121	1+x,y,z
C5...H21A	2.847	-0.053	-1+x,y,z
C9 ... H27C	2.873	-0.027	-1+x,y,z
H9B...H27C	2.299	-0.101	-1+x,y,z
C13 ... H9A	2.810	-0.090	-x,1/2+y,1/2-z
C14 ...H9A	2.719	-0.181	-x,1/2+y,1/2-z
C20 ...H11A	2.856	-0.044	-x,1/2+y,1/2-z
C22 ...H28C	2.812	-0.088	1-x,-y,1-z
H27B ...H10B	2.320	-0.080	-x,-1/2+y,1/2-z
C27 ... C18	3.327(7)	-0.073	1-x,-1/2+y,1/2-z
H27C ... C18	2.801	-0.099	1-x,-1/2+y,1/2-z
C26 ... H4	2.846	-0.054	x,1/2-y,-1/2+z

Table S3 Biodistribution results of complexes **1*** and **2*** in female CD-1 mice showing organ and tissue uptake and overall excretion at 1, 4 and 24 h after i.v. administration. Biodistribution is expressed as percentage of injected dose per gram (% IA g⁻¹).

Organ	% IA g ⁻¹					
	1h		4h		24h	
	1*	2*	1*	2*	1*	2*
Blood	18.7 ± 2.1	2.9 ± 0.4	8.8 ± 0.4	1.0 ± 0.1	1.7 ± 0.2	0.6 ± 0.1
Liver	23.3 ± 4.2	35.3 ± 0.7	21 ± 4.2	32.0 ± 3.5	11.3 ± 2.7	29.3 ± 0.7
Intestine	21.8 ± 5.5	29.4 ± 2.4	31.1 ± 4.9	21.1 ± 8.9	5 ± 1	4.0 ± 0.5
Spleen	0.69 ± 0.07	2.0 ± 0.4	0.67 ± 0.08	3.0 ± 1	0.33 ± 0.03	2.3 ± 0.2
Heart	0.7 ± 0.1	0.4 ± 0.2	0.6 ± 0.2	0.20 ± 0.05	0.19 ± 0.03	0.2 ± 0.02
Lung	2.2 ± 0.4	1.5 ± 0.1	0.9 ± 0.1	1.1 ± 0.2	0.4 ± 0.2	0.8 ± 0.3
Kidney	2.1 ± 0.4	3.6 ± 0.6	1.3 ± 0.1	2.7 ± 0.5	0.8 ± 0.2	2.6 ± 0.1
Muscle	9.8 ± 1.7	7.1 ± 0.2	11.3 ± 2.5	5.0 ± 1.1	6.9 ± 1.5	4.5 ± 0.8
Bone	4.6 ± 0.5	3.2 ± 0.4	4.6 ± 0.3	3.3 ± 0.6	3.5 ± 0.9	3.7 ± 1.3
Stomach	1.4 ± 0.4	1.1 ± 0.2	0.9 ± 0.4	0.34 ± 0.06	0.6 ± 0.2	0.32 ± 0.05
Pancreas	0.36 ± 0.03	0.37 ± 0.04	0.29 ± 0.03	0.28 ± 0.05	0.22 ± 0.05	0.36 ± 0.01
Brain	0.19 ± 0.07	0.02 ± 0.00	0.09 ± 0.02	0.02 ± 0.00	0.02 ± 0	0.01 ± 0.00
Excretion (% I.D)	3.0 ± 0.9	2.0 ± 0.5	8.5 ± 6.0	17.9 ± 7.7	57.4 ± 2.7	37.1 ± 4.4