Electronic Supplementary Material (ESI) for Dalton Transactions.

Water-soluble oxoglaucine-Y(III), Dy(III) complexes: In vitro and in vivo anticancer activity by triggering DNA damage, leading to S phase arrest and apoptosis

Jian-Hua Wei, Zhen-Feng Chen, Jiao-Lan Qin, Yan-Cheng Liu, Zhu-Quan Li, Taj-Malook Khan, Meng Wang, Yan-Hua Jiang, Wen-Ying Shen and Hong Liang**

Table S1 Crystallographic data and refinements of complex **1** and **2**

	1	**2**
Formula	$C_{41}H_{38}N_5O_{20}Y$	$C_{40}H_{36}N_5O_{20}Dy$
M_r	1009.87	1069.24
Crystal system	*Monoclinic*	*Monoclinic*
Space group	*P21/c*	*P21/c*
a/Å	12.0210(11)	11.998(3)
b/Å	14.1771(15)	14.175(4)
c/Å	24.200(2)	24.266(4)
α/°	90.00(3)	90.00(6)
β/°	93.80(10)	93.82(4)
γ/°	90.00(2)	90.00(7)
V/Å^3	4115.2(7)	4118.67 (14)
T/*K*	293(2)	293(2)
Z	4	2
D_c/g cm^{-3}	1.511	1.724
θ/°	2.22 to 25.02	2.84 to 26.37
F(000)	2702	2148
μ(Mo Kα)/mm^{-1}	0.905	0.905
Total no. reflns	18236	17473
No. indep. reflns	7255	8405
R_{int}	0.2258	0.0343
R1 [$I > 2\sigma(I)$]	0.0942	0.0430
*wR*2(all data)	0.2434	0.0937
Gof(F^2)	1.064	1.066

Table S2 Selected bond lengths (Å) and angles (°)for the complexes **1**, **2**

Complex **1**					
Y(1)—O(1)	2.351(7)	Y(1)—O(11)	2.462(9)	Y(1)—O(14)	2.386(9)
Y(1)—O(6)	2.370(9)	Y(1)—O(17)	2.534(9)	Y(1)—O(12)	2.427(10)
Y(1)—O(15)	2.452(10)	Y(1)—N(1)	2.590(10)	Y(1)—N(2)	2.578(9)
O(6)—Y(1)—O(12)	73.1(3)	O(1)—Y(1)—O(6)	78.2(3)	O(1)—Y(1)—O(12)	75.7(3)
O(14)—Y(1)—O(12)	120.1(3)	O(14)—Y(1)—O(15)	52.9(3)	O(12)—Y(1)—O(15)	145.7(3)
O(1)—Y(1)—O(14)	134.0(3)	O(6)—Y(1)—O(15)	134.0(3)	O(1)—Y(1)—O(11)	116.3(3)
O(1)—Y(1)—O(15)	88.7(3)	O(6)—Y(1)—O(14)	145.7(3)	O(6)—Y(1)—O(11)	112.4(3)
Complex **2**					
Dy(1)—O(1)	2.361(3)	Dy(1)—O(6)	2.386(3)	Dy(1)—O(12)	2.504(3)
Dy(1)—N(1)	2.598(3)	Dy(1)—N(2)	2.587(3)	Dy(1)—O(11)	2.546(3)
Dy(1)—O(14)	2.470(3)	Dy(1)—O(15)	2.429(3)	Dy(1)—O(17)	2.424(3)
O(1)—Dy(1)—O(6)	78.05(9)	O(1)—Dy(1)—O(17)	75.21(11)	O(1)—Dy(1)—O(15)	133.44(10)
O(1)—Dy(1)—N(2)	140.17(11)	O(6)—Dy(1)—N(2)	64.59(10)	O(1)—Dy(1)—N(1)	64.19(10)
O(6)—Dy(1)—O(15)	146.54(10)	O(6)—Dy(1)—O(17)	73.32(11)	O(6)—Dy(1)—N(1)	135.64(11)
O(15)—Dy(1)—N(2)	86.18(11)	O(17)—Dy(1)—N(2)	81.07(11)	O(17)—Dy(1)—N(1)	75.15(11)

Table S3. Distribution of metal for Dysprosium in Hep G2 cells which were exposure with complex 2 for 24 h. (a) Cyt. = cytosolic fraction: total soluble proteins from cytoplasm, (b) Memb. = Membrane fraction: membrane proteins, cellular organelles and organelles membranes, (c) Nucl. = Nuclear fraction: total nucleus soluble proteins and nuclear membrane proteins, (d) Cytosk. = cytoskeletal fraction: total cellular insoluble proteins and genomic DNA

Complex **2**	Cyt[a](ng)	Memb[b](ng)	Nucl[c](ng)	Cytosk[d](ng)
10 μM	160.7	1015.4	161.9	766.0
20 μM	353.7	1846.1	379.5	1071.1

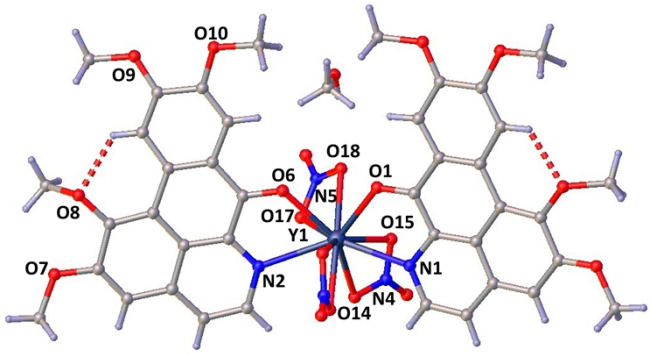
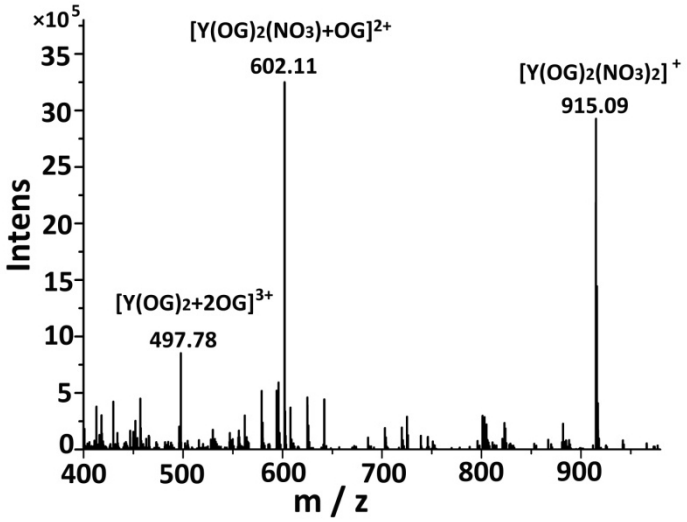
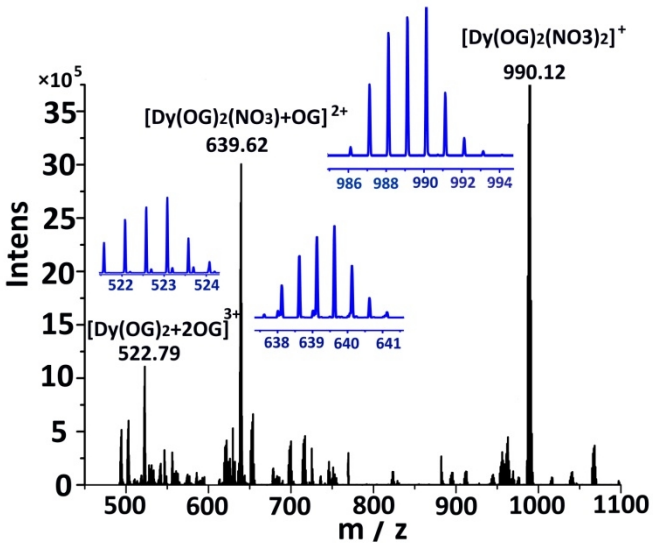


Figure S1. Crystal structure of complex **1**



ESI-MS spectrum of complex **1** in MeOH / H_2O (1:500)



ESI-MS spectrum of complex **2** in MeOH / H_2O (1:500)

Figure S2. ESI-MS spectrum of complexes

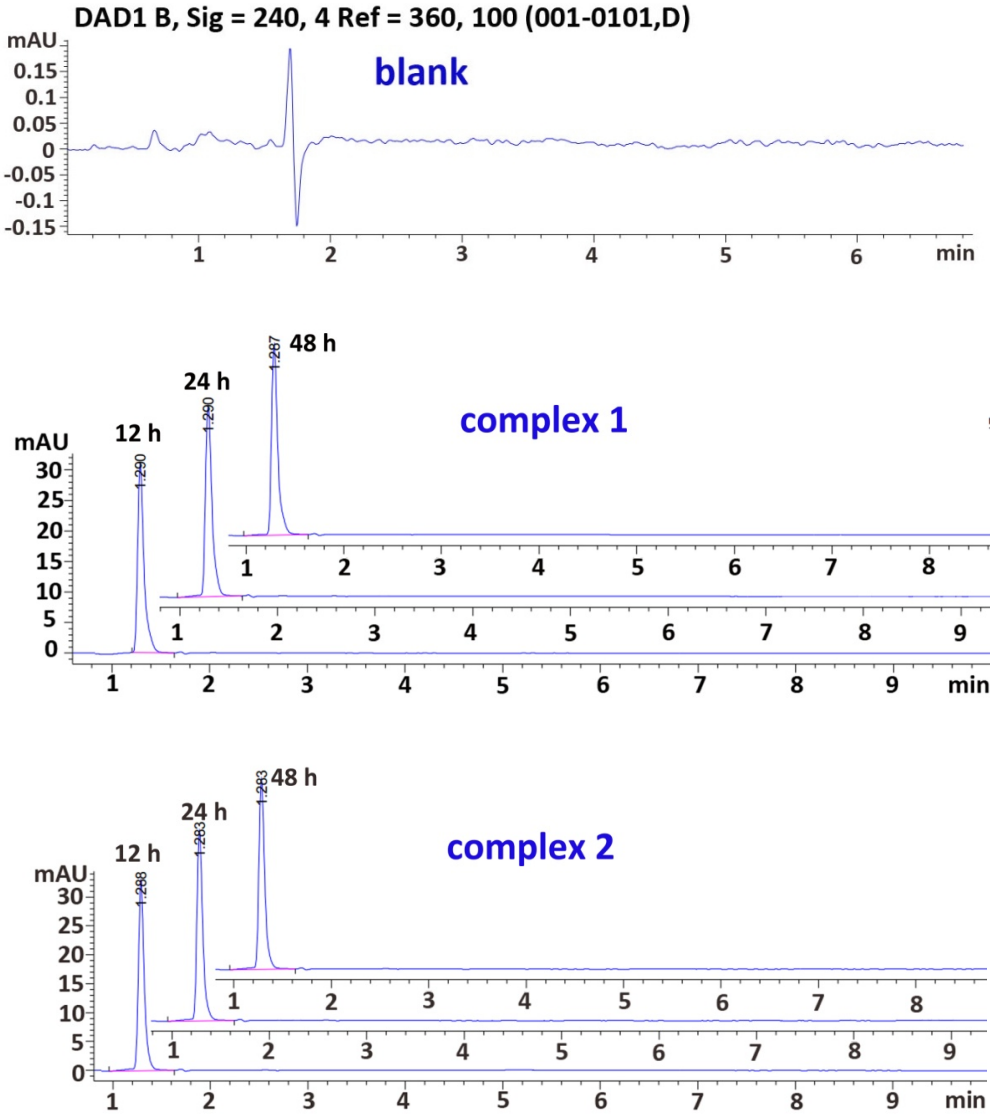


Figure S3. HPLC spectra for complexes **1** and **2** in aqueous solution (1 mg/mL) in the time courses of 12 h, 24 h and 48h, respectively. Column: reversed-phase C18 column (YMC HPLC COLUMN, 150×4.6mm I. D.). Column temperature: 35ºC. Mobile phase: Methanol/H_2O (5:95). Flow rate: 1.0 ml/min. Injection volume: 8 μM.

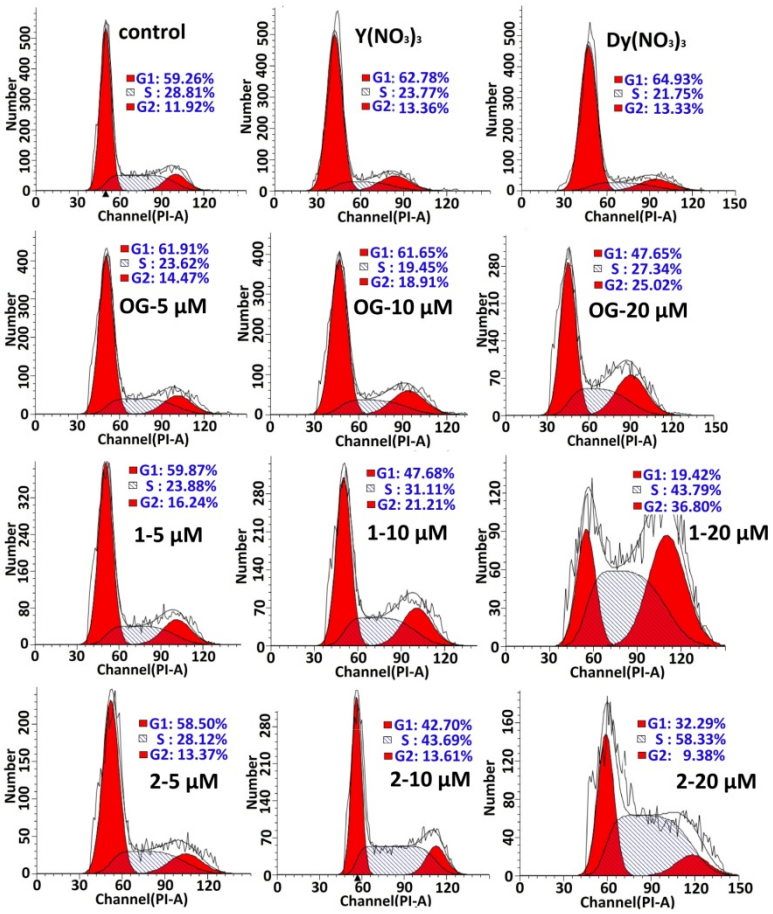


Figure S4. Cell cycle distribution of HepG2 cells exposed to the metal salts (20µM), OG and complexes **1**, **2** (5, 10, 20 µM) for 48 h. Effects on cell cycle progression of these compounds were examined according to the procedures described in the experimental section.

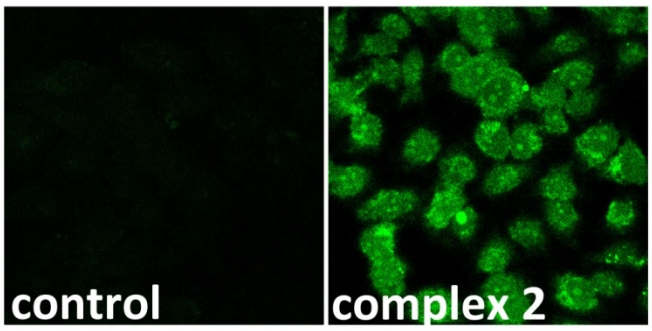


Figure S5. HepG2 cells treated by complex **2** at 10 µM for 24 h were analyzed by confocal microscope to detect DNA fragmentation (TUNEL, green).

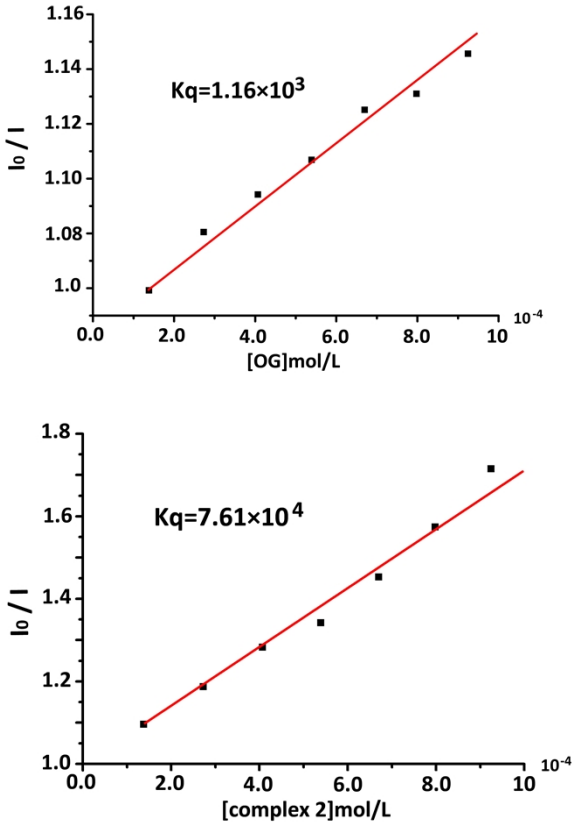
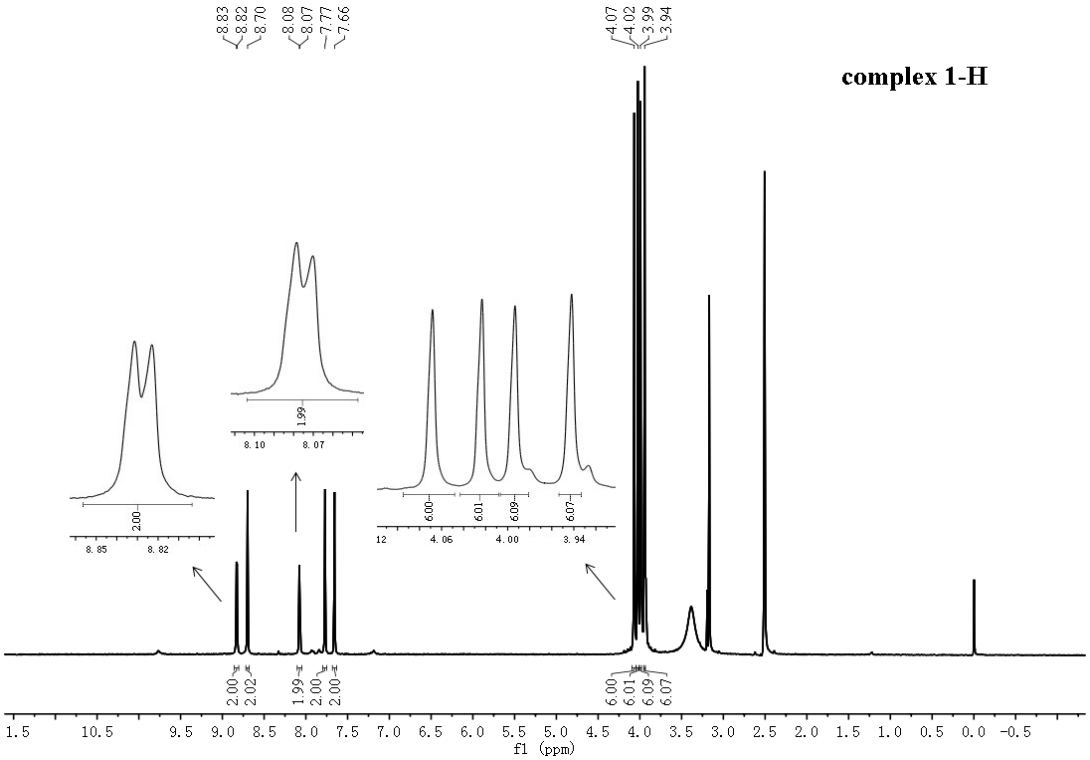


Figure S6. The quenching constants (K_q) of OG and complex **2**.

^{1}H NMR (600 MHz, DMSO) for complex **1**: δ 8.83 (d, *J* = 5.0 Hz, 1H), 8.70 (s, 1H), 8.07 (d, *J* = 4.9 Hz, 1H), 7.77 (s, 1H), 7.66 (s, 1H), 4.07 (s, 3H), 4.02 (s, 3H), 3.99 (s, 3H), 3.94 (s, 3H).



^{13}C NMR (151 MHz, DMSO) for complex **1**: δ 180.44 (s), 157.01 (s), 154.09 (s), 151.64 (s), 149.63 (s), 144.64 (s), 135.71 (s), 129.09 (s), 126.38 (s), 124.49 (s), 121.28 (s), 118.72 (s), 110.52 (s), 109.43 (s), 107.77 (s), 60.87 (s), 56.93 (s), 56.13 (s), 55.99 (s).