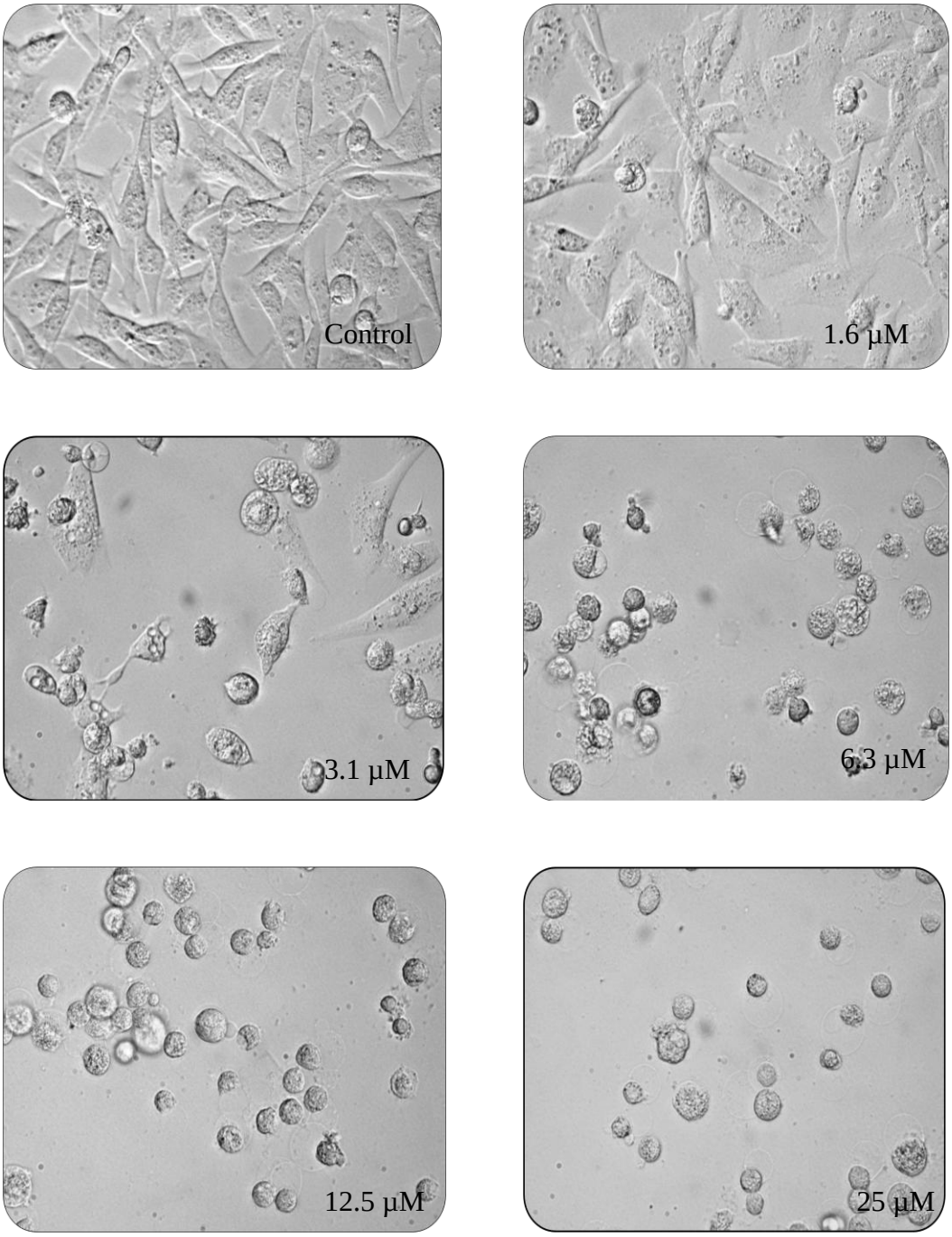
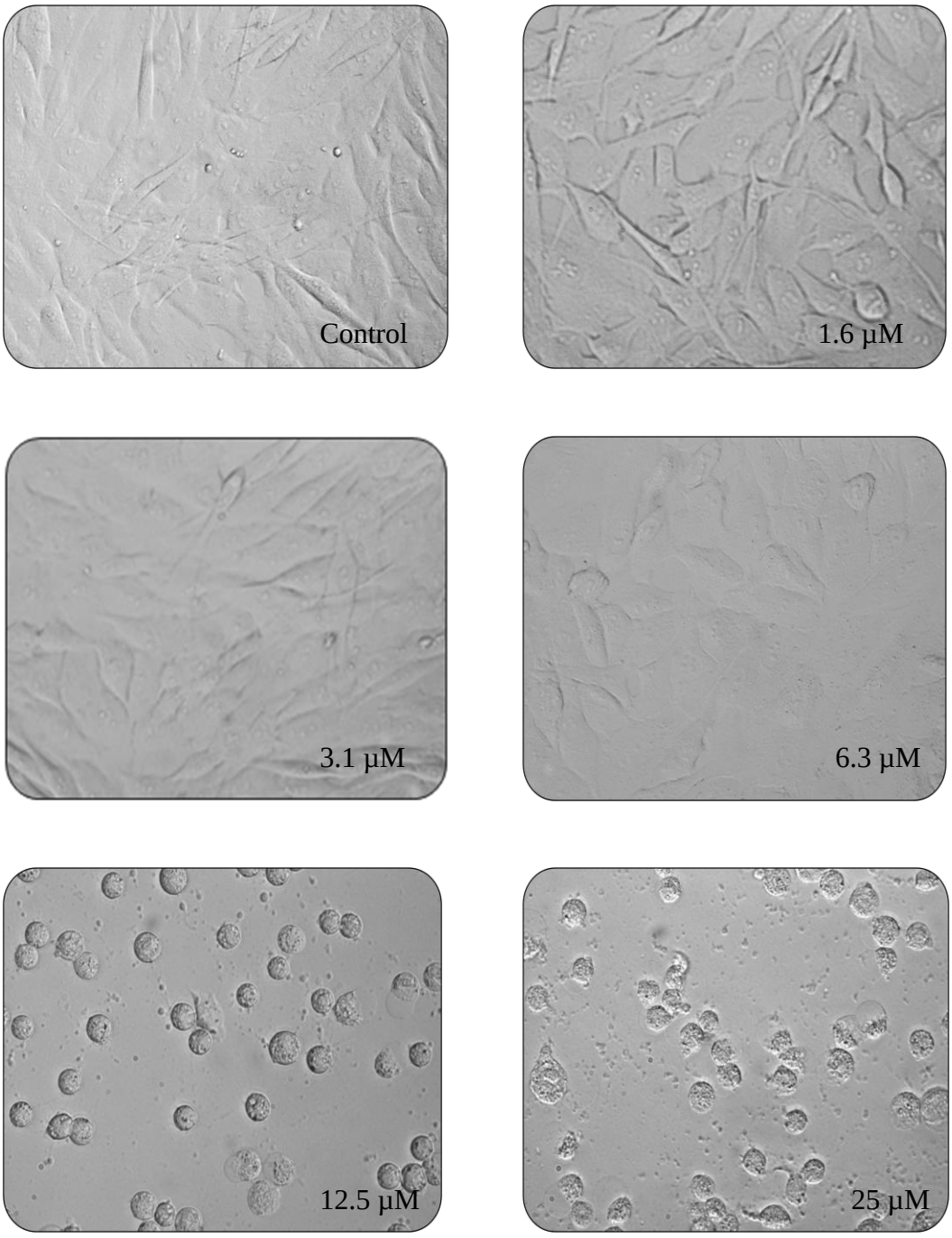
Electronic Supplementary Material (ESI) for Metallomics.

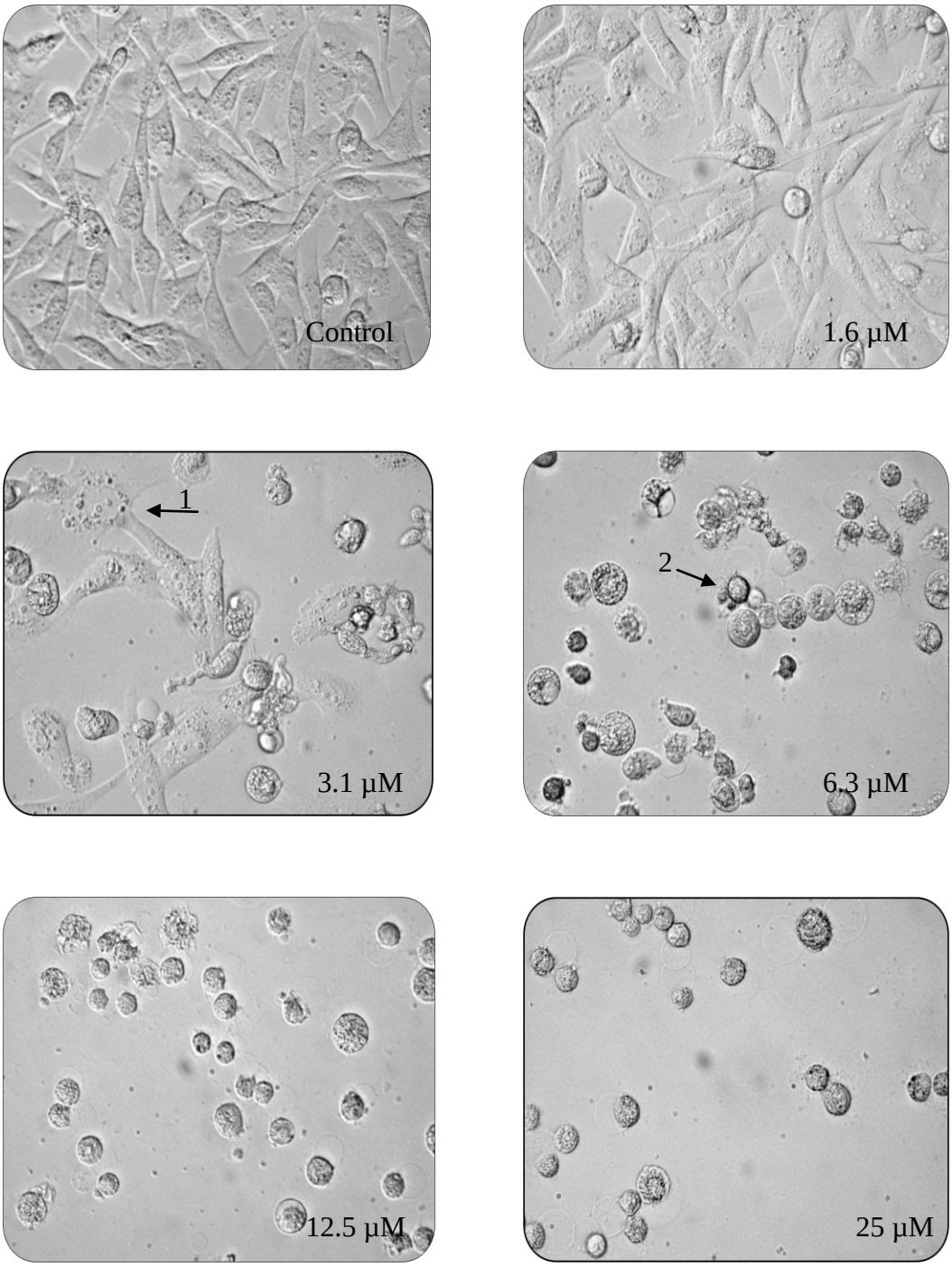
Supplementary Figures 1.1-1.5, 2.1-2.2, 3 and 4; Supplementary Table 1



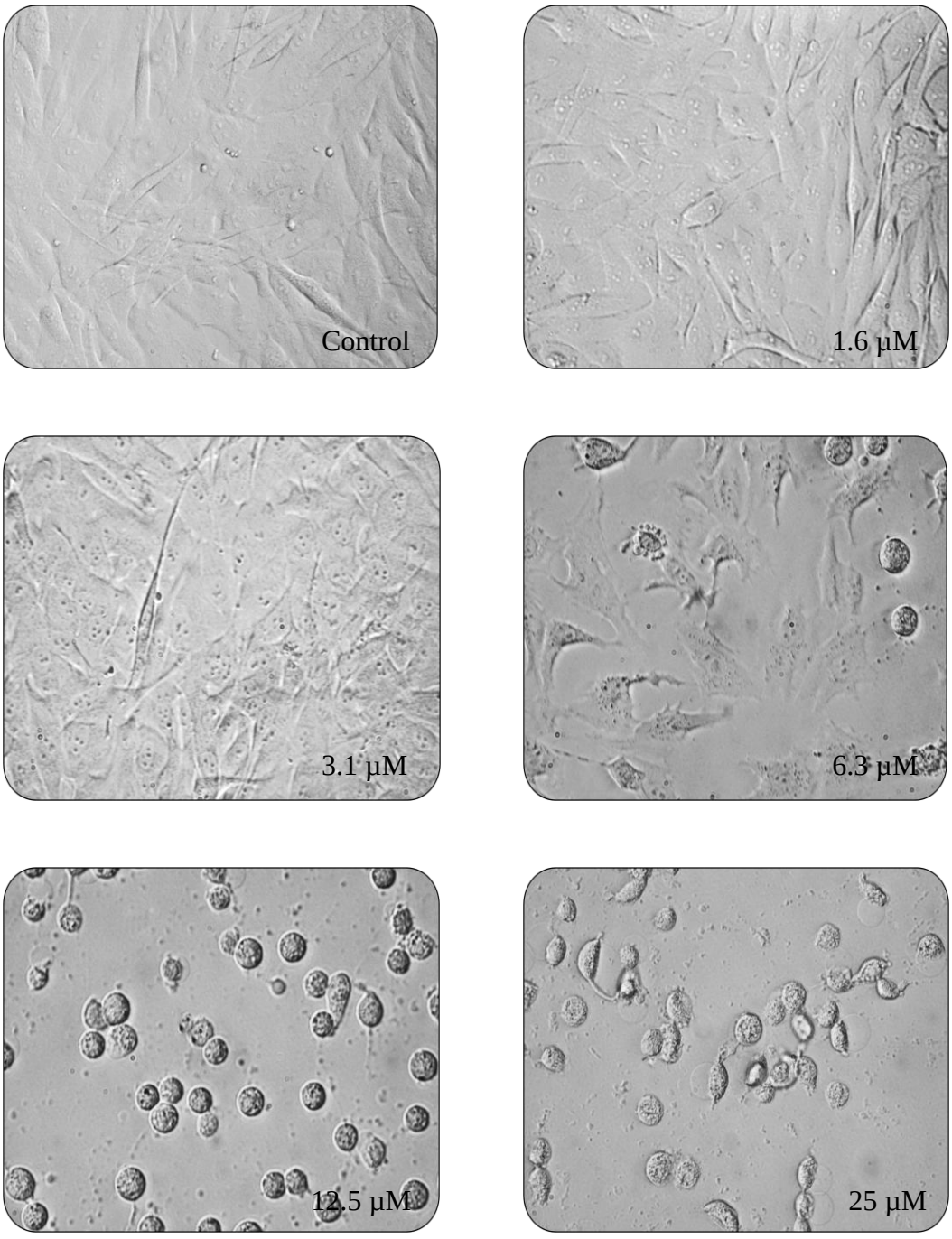
Sup Fig. 1.1A Morphological changes in MDA-MB-231 cells treated for 24 h with $[Cu(phen)(gly)(H_2O)]NO_3$ **1** at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions.



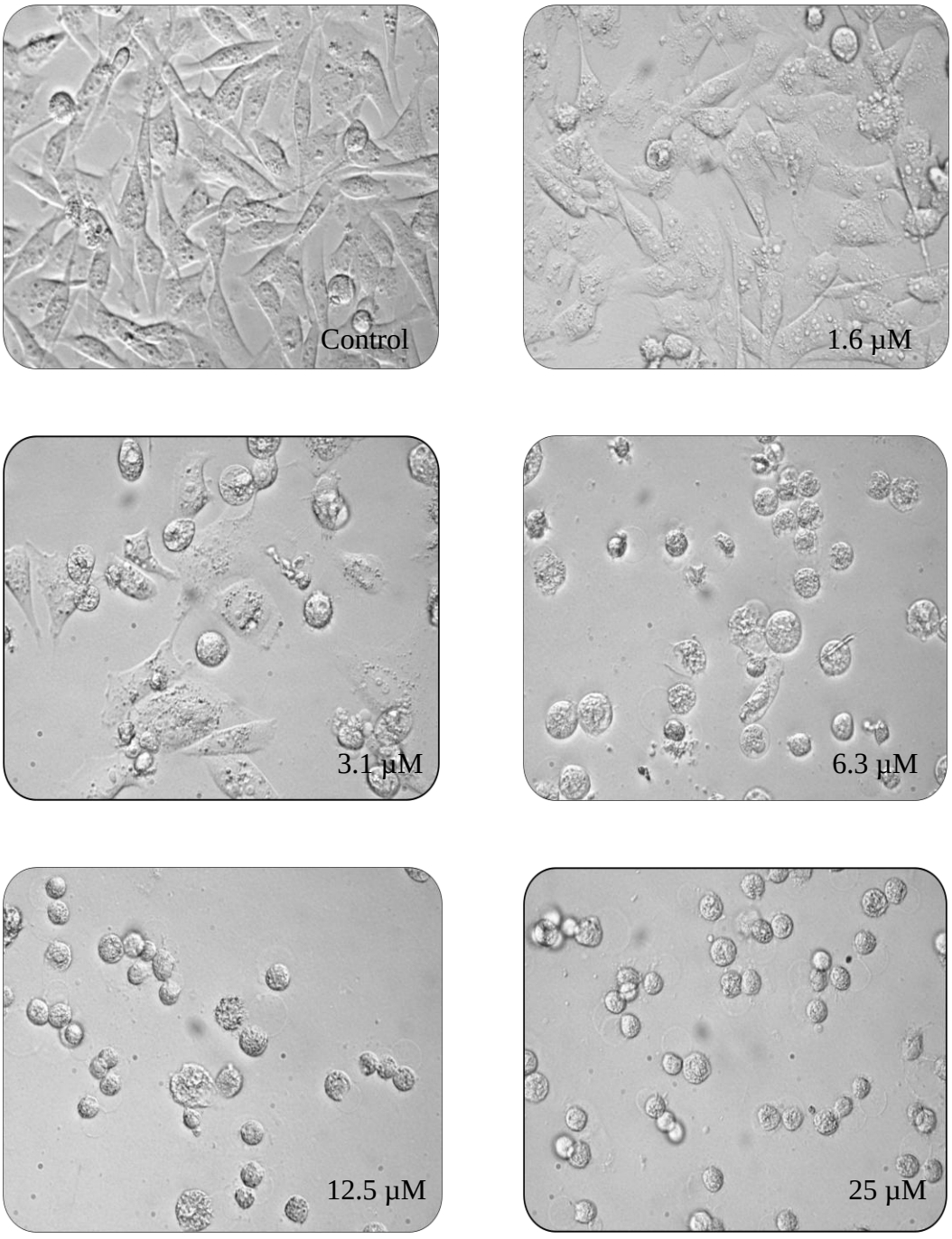
Sup Fig. 1.1B Morphological changes in MCF10A cells treated for 24 h with [Cu(phen)(gly) (H_2O)]NO_3 **1** at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions.



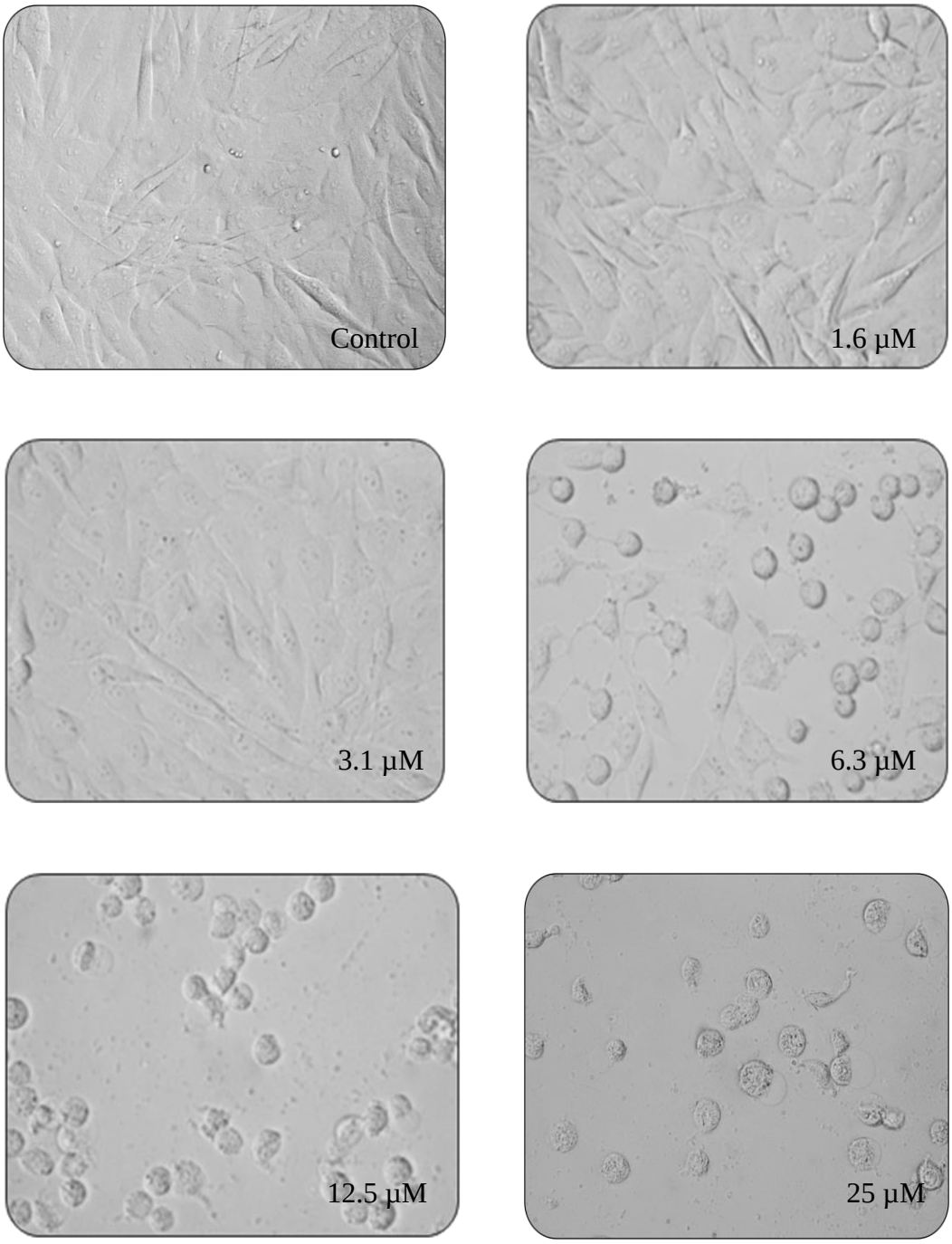
Sup Fig. 1.2A Morphological changes in MDA-MB-231 cells treated for 24 h with [Cu(phen)(DL-ala)(H_2O)]NO_3 **2** at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions. Arrow (1) condensation of chromatin, (2) membrane bleb.



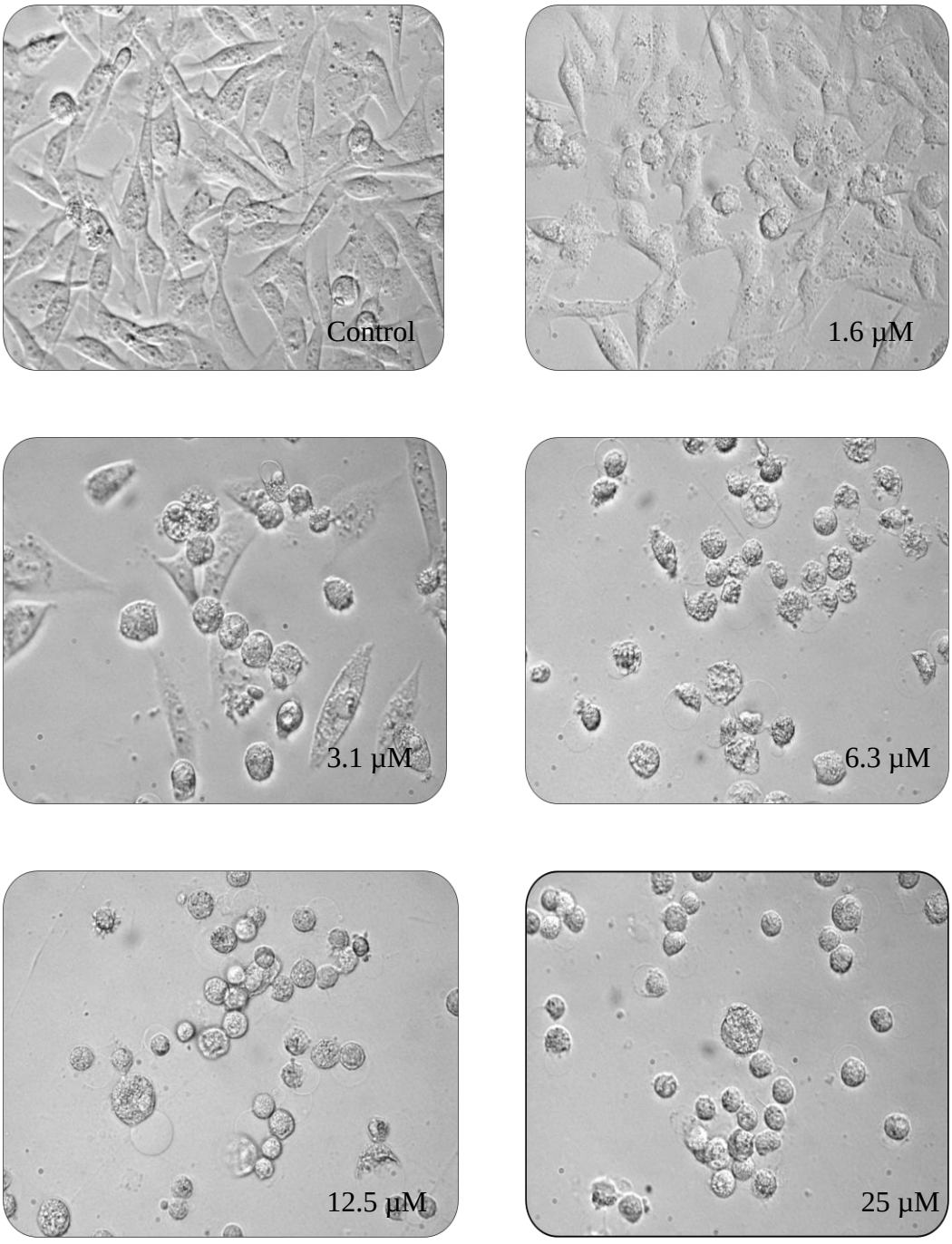
Sup Fig. 1.2B Morphological changes in MCF10A cells treated for 24 h with [Cu(phen)(DL-ala) (H_2O)]NO_3 **2** at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions.



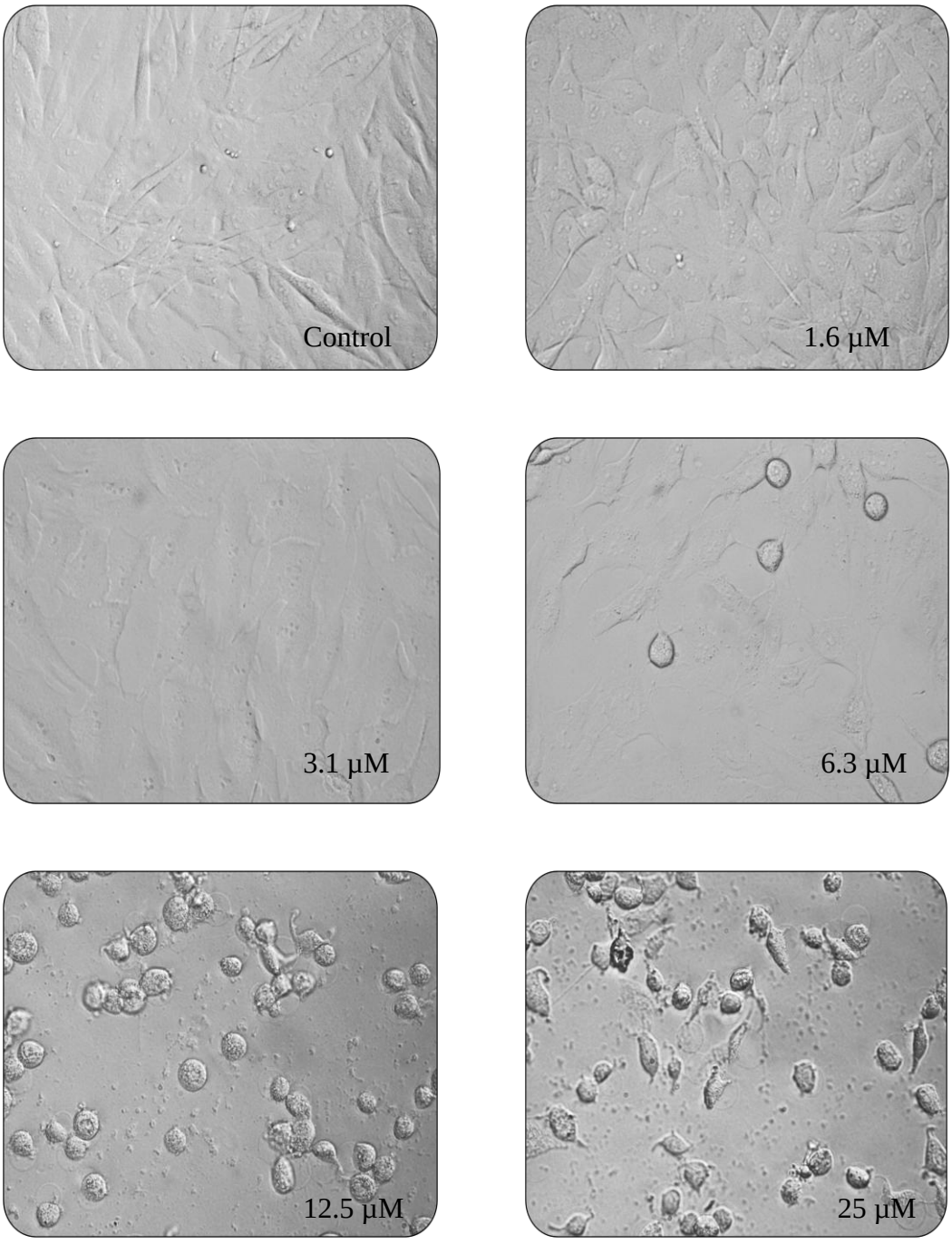
Sup Fig. 1.3A Morphological changes in MDA-MB-231 cells treated for 24 h with [Cu(phen)(sar)(H_2O)]NO_3 **3** at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions.



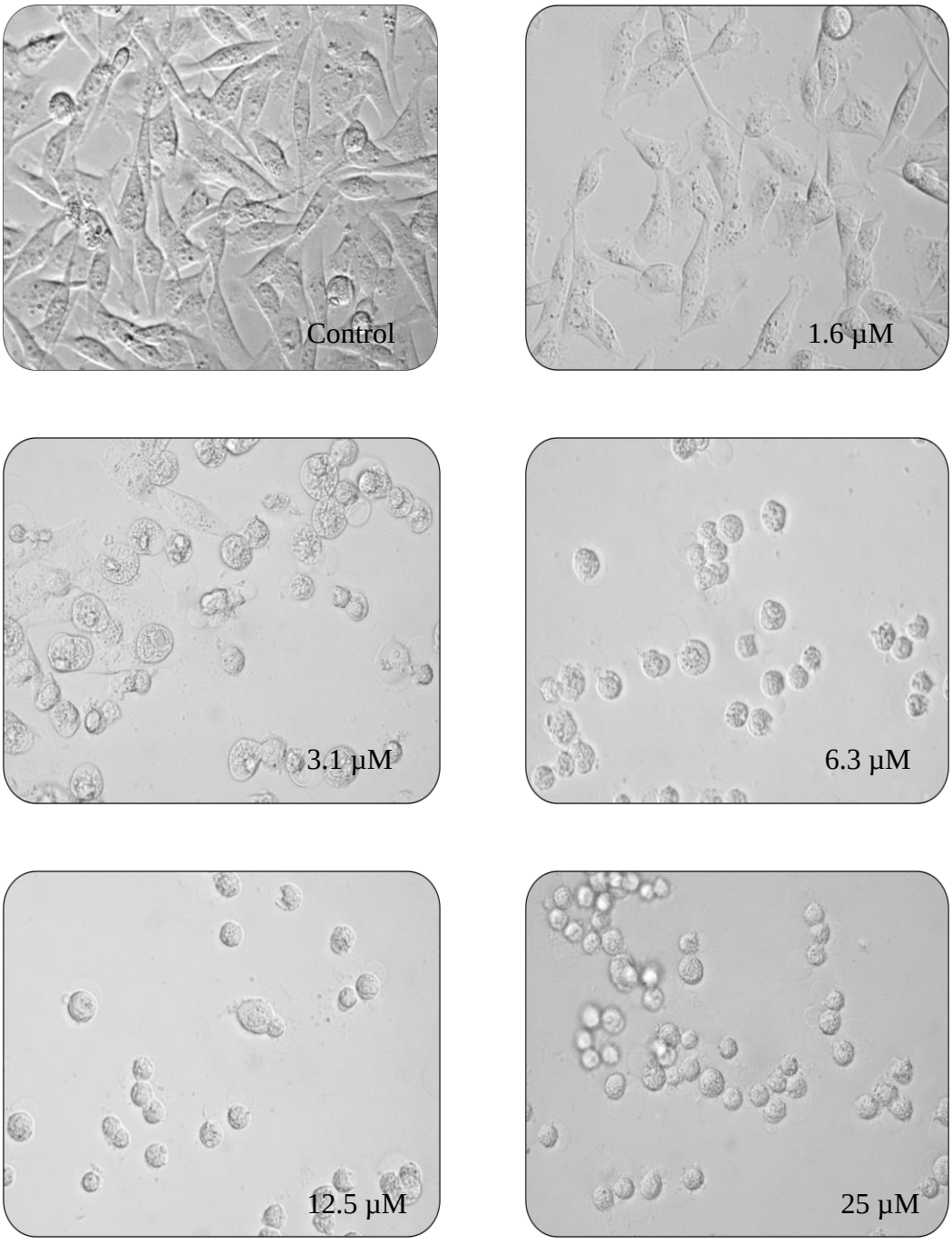
Sup Fig. 1.3B Morphological changes in MCF10A cells treated for 24 h with [Cu(phen)(sar) (H_2O)]NO_3 **3** at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions.



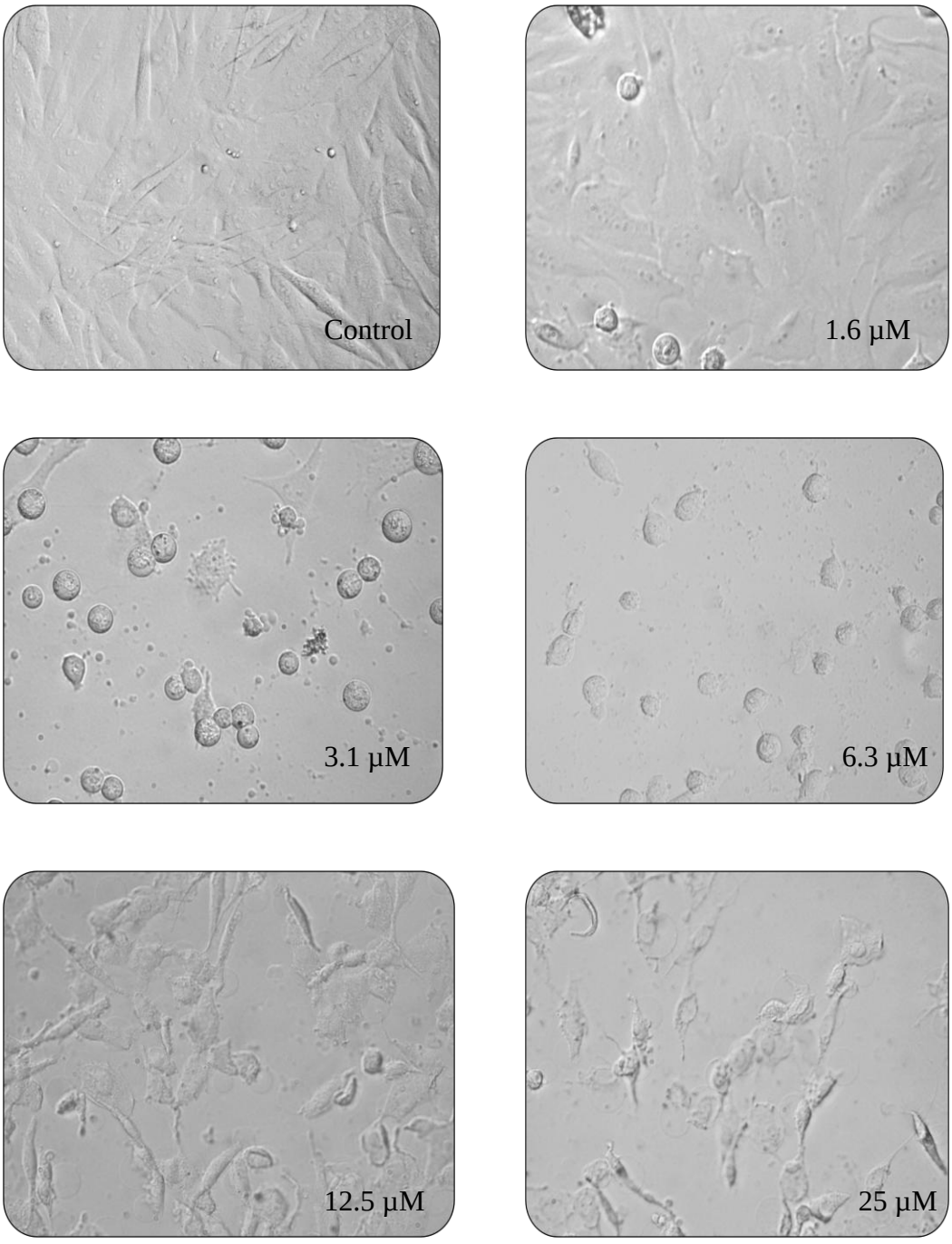
Sup Fig. 1.4A Morphological changes in MDA-MB-231 cells treated for 24 h with [Cu(phen)(C-dMg)(H_2O)]NO_3 **4** at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions.



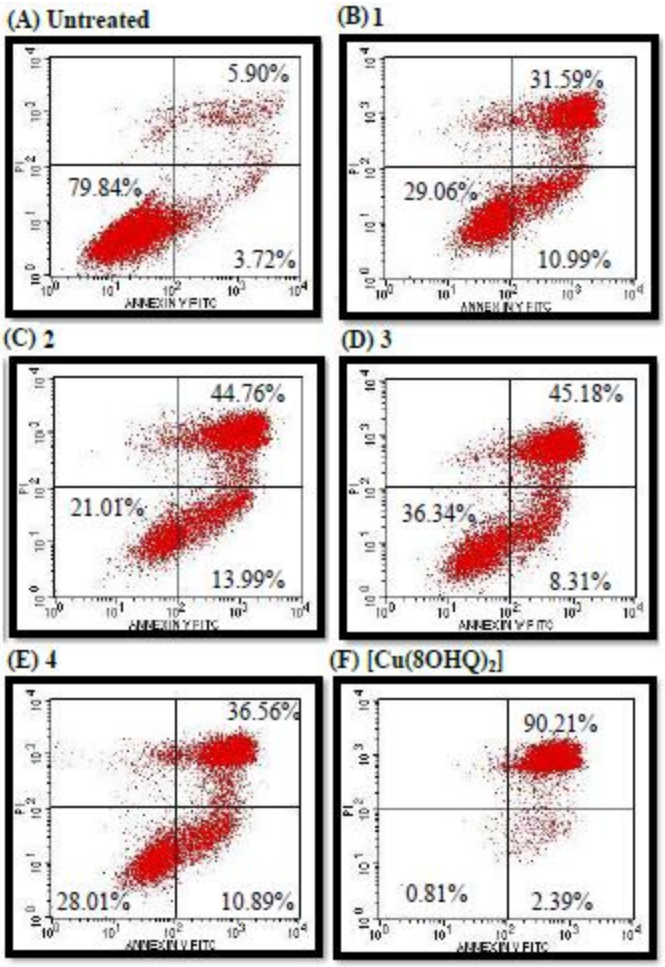
Sup Fig. 1.4B Morphological changes in MCF10A cells treated for 24 h with [Cu(phen)(C-dMg) (H_2O)]NO_3 **4** at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions.



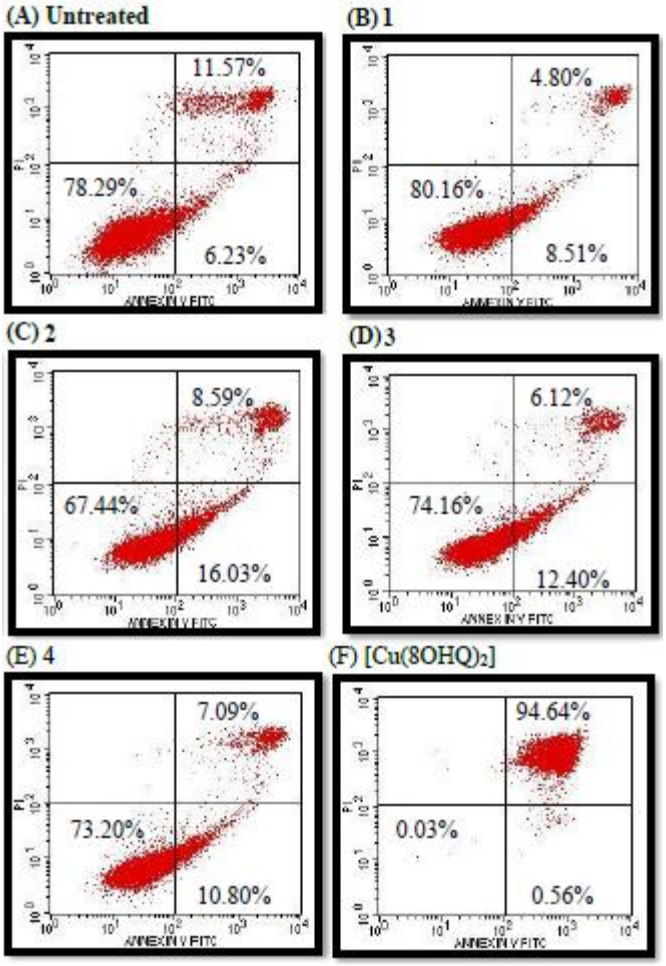
Sup Fig. 1.5A Morphological changes in MDA-MB-231 cells treated for 24 h with [$Cu(8OHQ)_2$] at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions.



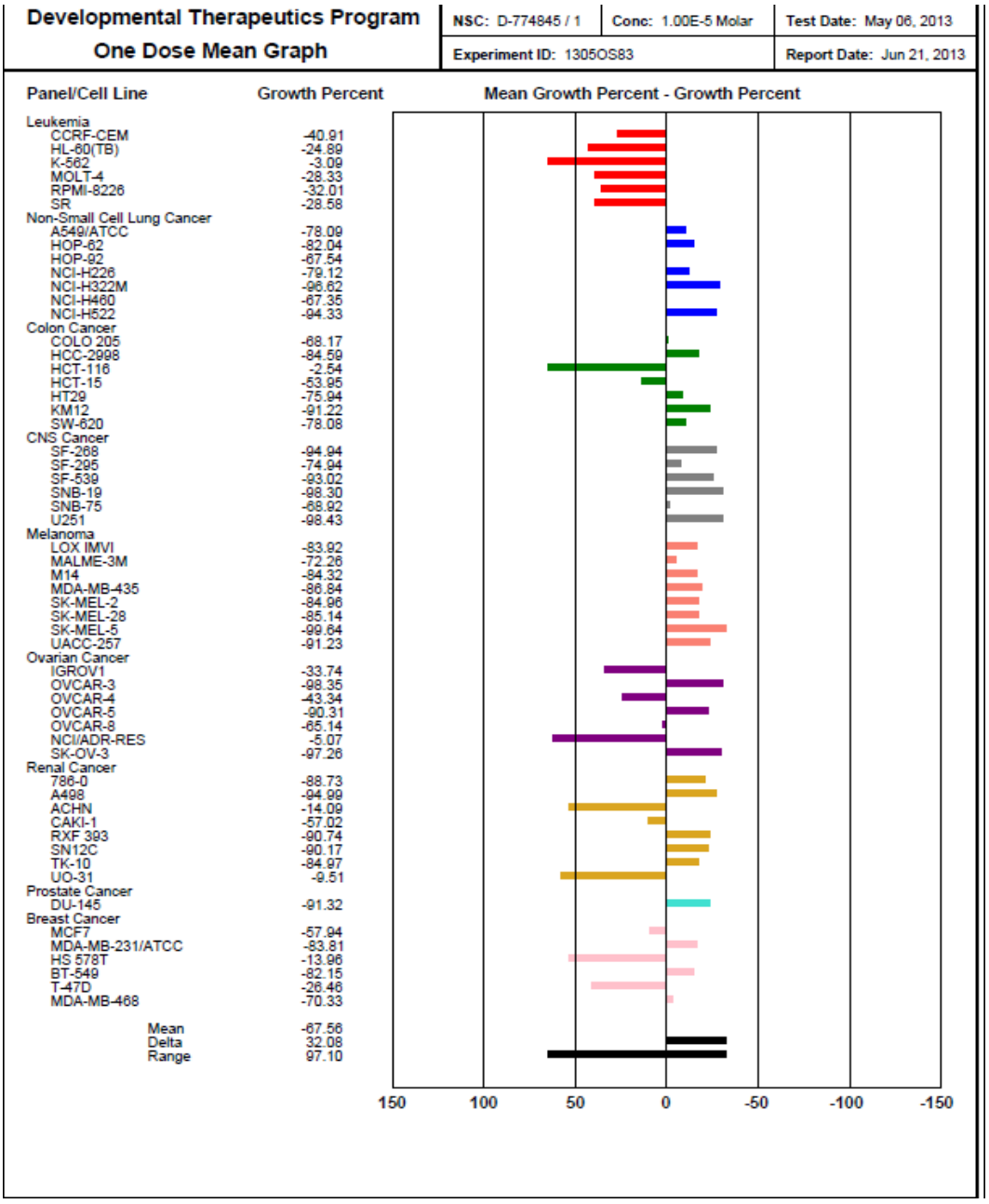
Sup Fig. 1.5B Morphological changes in MCF10A cells treated for 24 h with [$Cu(8OHQ)_2$] at different concentrations as compared to untreated cells. (Microscope magnification 400x). All pictures are typical of three independent experiments each performed under identical conditions.



Sup Fig. 2.1. A comparison between untreated and treated MDA-MB-231 cells in expression of apoptosis after incubation with 5 μM copper(II) complexes at 24 h by flow cytometry analysis. Percentage of total cells is shown for each quadrant. Results are representative of three independent experiments.



Sup. Fig. 2.2 A comparison between untreated and treated MCF10A cells in expression of apoptosis after incubation with 5 μM copper(II) complexes at 24 h by flow cytometry analysis. Percentage of total cells is shown for each quadrant. Results are representative of three independent experiments.

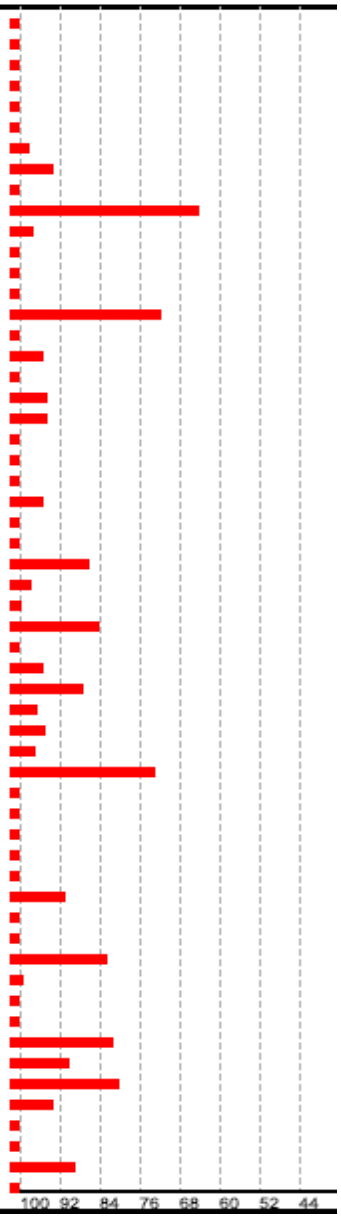


Sup. Fig. 3 One-dose data in the National Cancer Institute anticancer screen showing a mean graph of the percent growth of cancer cells treated with of 10 μM of **4** for 24 h. The number reported for the One-dose assay is growth relative to the no-drug control, and relative to the time zero number of cells. This allows detection of both growth inhibition (values between 0 and 100) and lethality (values less than 0). For example, a value of 100 means no growth inhibition. A value of 40 would mean 60% growth inhibition. A value of 0 means no net growth over the course of the experiment. A value of -40 would mean 40% lethality. A value of -100 means all cells are dead.

One Dose Data Graph for NSC 119875

DTP OneDose/Syn/60 Cell Line

Cell Panel	Cell Line	Growth Percent
Leukemia	CCRF-CEM	109.4
	HL-60(TB)	126.5
	K-562	106.9
	MOLT-4	123.0
	RPMI-8226	109.2
	SR	102.8
Non-Small Cell Lung	A549/ATCC	98.0
	EKVX	93.4
	HOP-62	110.0
	HOP-92	64.2
	NCI-H226	97.5
	NCI-H23	109.7
	NCI-H322M	102.8
	NCI-H460	111.8
	NCI-H522	71.6
Colon	COLO 205	110.3
	HCC-2998	95.3
	HCT-116	113.0
	HCT-15	94.4
	HT29	94.6
	KM12	103.4
	SW-620	109.0
Central Nervous System	SF-268	105.3
	SF-295	95.5
	SF-539	106.9
	SNB-19	102.9
	SNB-75	86.1
	U251	97.6
Melanoma	LOX IMVI	99.8
	MALME-3M	84.2
	M14	115.9
	MDA-MB-435	95.2
	SK-MEL-2	87.4
	SK-MEL-5	96.5
	UACC-257	94.9
	UACC-62	96.8
Ovarian	IGROV1	73.1
	OVCAR-3	101.9
	OVCAR-4	111.6
	OVCAR-5	108.4
	NCI/ADR-RES	108.8
	SK-OV-3	113.0
Renal	786-0	91.1
	A498	100.6
	ACHN	103.7
	CAKI-1	82.6
	RXF 393	99.2
	SN12C	106.1
	TK-10	102.7
	UO-31	81.2
Prostate	PC-3	90.1
	DU-145	80.1
Breast	MCF7	93.5
	MDA-MB-231/ATCC	106.1
	HS 578T	122.8
	BT-549	89.1
	T-47D	104.4



Sup. Fig. 4 One-dose data in the National Cancer Institute anticancer screen showing a mean graph of the percent growth of cancer cells treated with of 10 μM of **cisplatin** for 24 h. The number reported for the One-dose assay is growth relative to the no-drug control, and relative to the time zero number of cells. This allows detection of both growth inhibition (values between 0 and 100) and lethality (values less than 0). For example, a value of 100 means no growth inhibition. A value of 40 would mean 60% growth inhibition. A value of 0 means no net growth over the course of the experiment. A value of -40 would mean 40% lethality. A value of -100 means all cells are dead.

Supplementary Table 1 Statistical analysis of the cell cycle analysis after cells treated with copper(II) complexes **1** - **4** at 24h. * = ($p < 0.05$), ** = ($p < 0.01$), *** = ($p < 0.005$) indicates significantly different from untreated. NS = non-significant.

	MDA-MB-231 cells			MCF10A cells		
	G_0/G_1 phase	S phase	G_2/M phase	G_0/G_1 phase	S phase	G_2/M phase
Untreated vs **1**	NS	NS	***	NS	NS	NS
Untreated vs **2**	**	*	***	NS	**	NS
Untreated vs **3**	NS	NS	***	*	***	NS
Untreated vs **4**	*	NS	***	NS	*	NS