Supplementary Material (ESI) for Molecular BioSystems

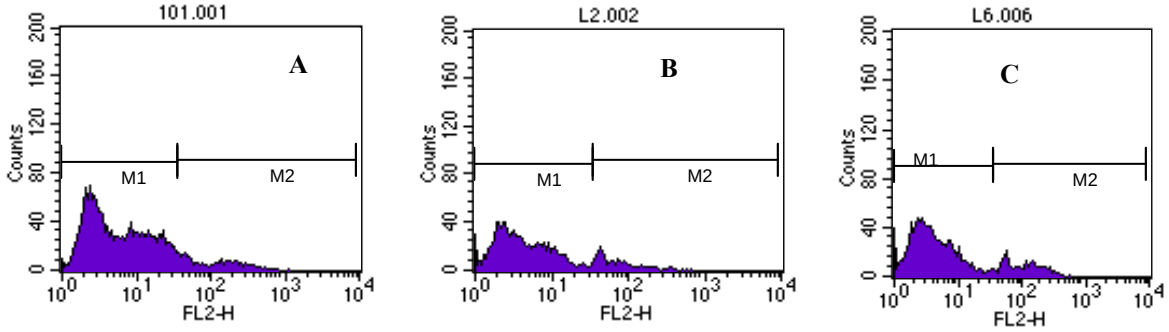
Supporting Information

Carbon Nanotubes as a Protein Toxin Transporter for Selective HER2-Positive Breast Cancer Cell Destruction

Xuexiang Weng, [a,c] Meiyan Wang, [a] Jing Ge, [b] Shaoning Yu, [a] Baohong Liu, [a] Jiang Zhong [b] and Jilie Kong*[a]

[a] *Department of Chemistry and Institutes of Biomedical Sciences, Fudan University, Shanghai, 200433, P. R. China*
[b] *Department of Microbiology and Microbial Engineering, School of Life Sciences, Fudan University, Shanghai, 200433, P. R. China*
[c] *College of Chemistry and Life Science, Zhejiang Normal University, Jinhua, P. R. China*

E-mail: jlkong@fudan.edu.cn



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M2	9.96

File: L2.002

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M2	13.88

File: L6.006

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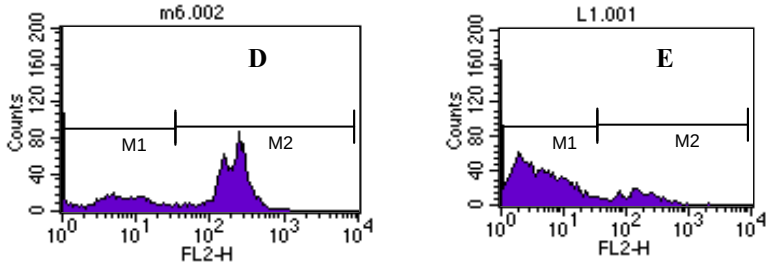

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File: L1.001

Marker	% Gated
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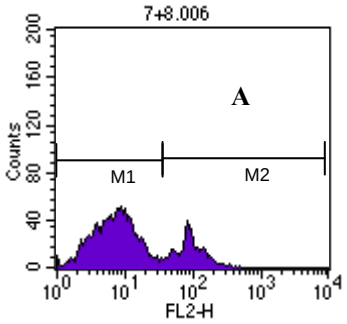
M1	85.46
M2	14.57

Figure S1: The original cell cytometry data of cells death corresponding to the bars of Figure 4e in the manuscript, respectively. (A)untreated cells, and cells incubated with (B) MWNT alone, (C) RTA alone, (D) MWNT-RTA conjugates and (E) denatured RTA. All the cells are plated at a cell density of 3-4×105 cells/well and returned to a CO_2 incubator at 37°C and 5% CO_2 for 22 h and stained by PI (excitation λ = 488 nm, emission detected at λ = 620 nm).



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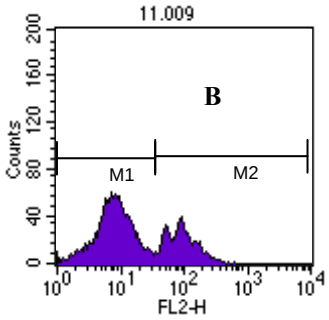

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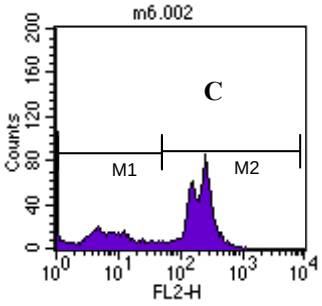

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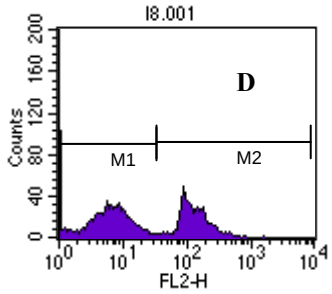

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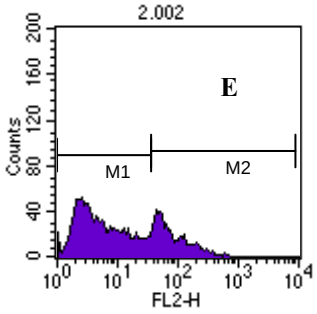

File: 2.002

Marker	% Gated
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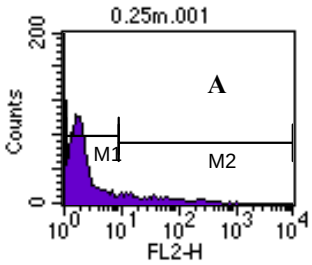
M1	70.85
M2	29.35

Figure S2: The original cell cytometry data of cell death vs.concentrations of RTA corresponding to Figure 5a in the manuscript. (A) 0.05 µM RTA, (B) 0.1 µM RTA, (C) 0.2 µM RTA, (D) 0.6 µM RTA and (E) 1.0 µM RTA.



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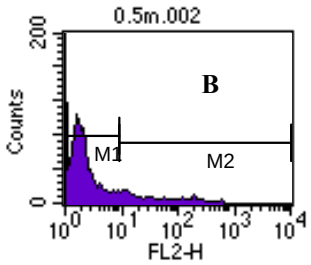

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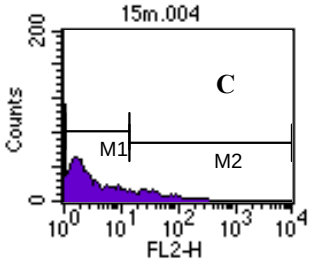

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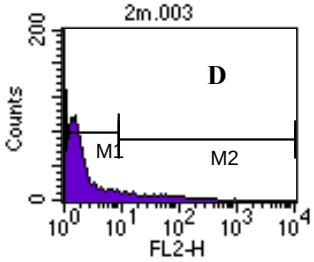

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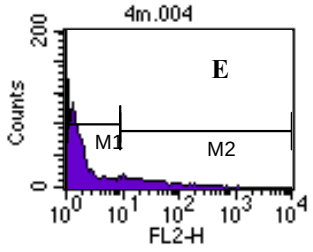

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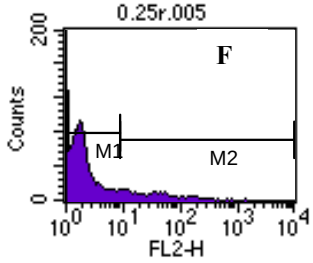

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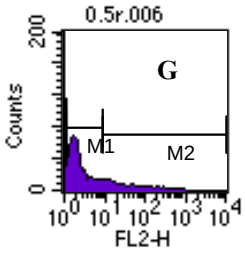

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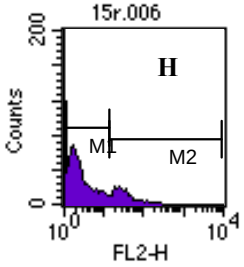

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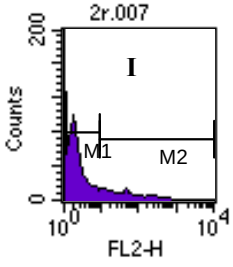

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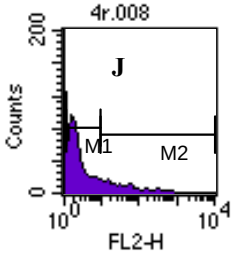

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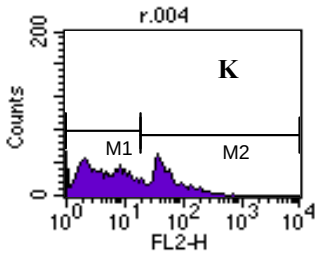

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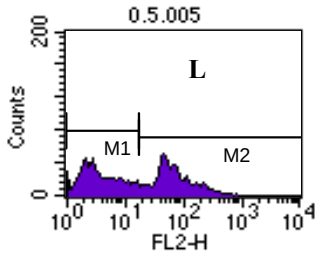

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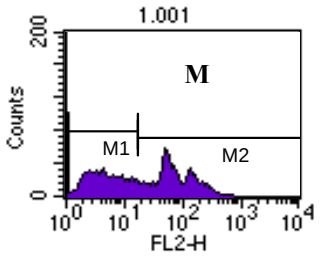

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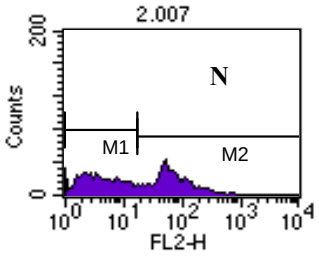

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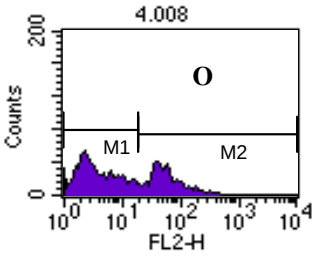

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Marker	% Gated
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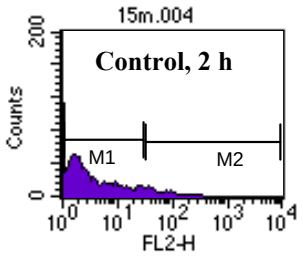
M2	37.90

Figure S3: Cell cytometry data of cell death vs. different volumes of MWNT (A-E), RTA (F-J) and MWNT-RTA conjugates (K-O) corresponding to Figure 5b (black, red and green line, respectively) in the manuscript. (A,F,K) 37.5 µL, (B,G,L)75 µL,(C,H,M) 150 µL, (D,I,N) 300 µL and (E,J,O) 600 µL.



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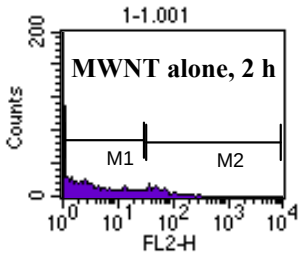

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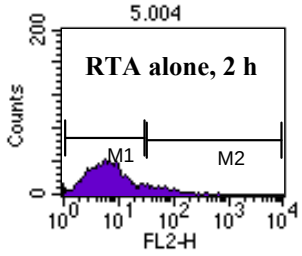

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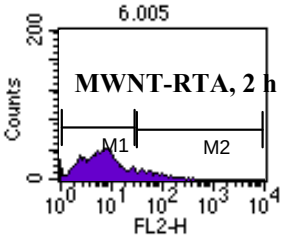

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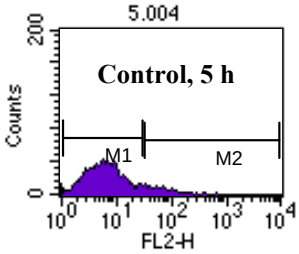

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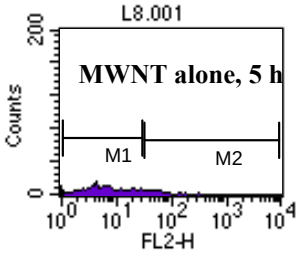
M2	8.66



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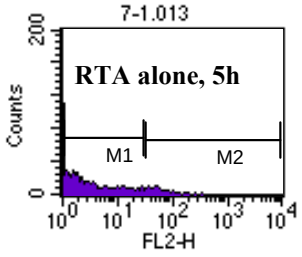

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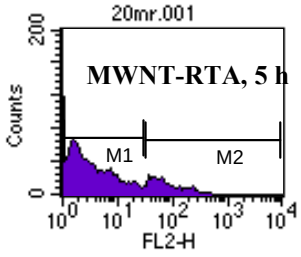

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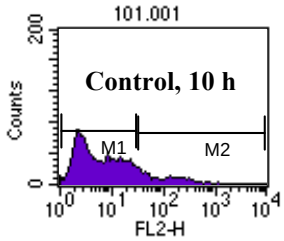

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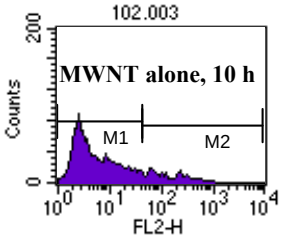

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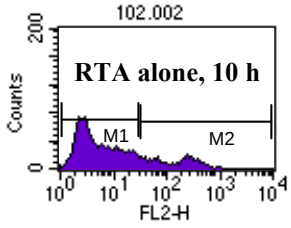

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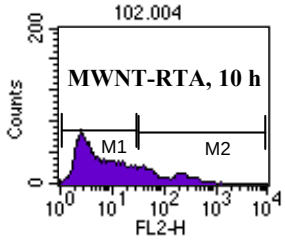

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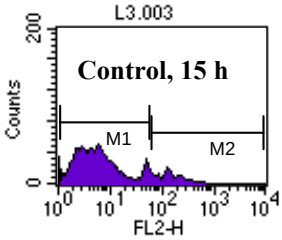

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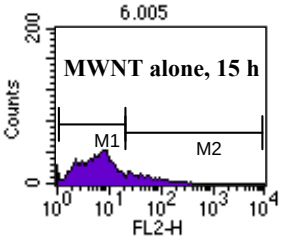

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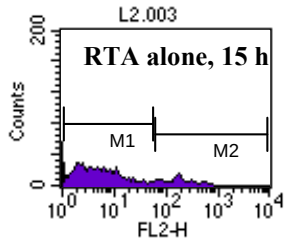

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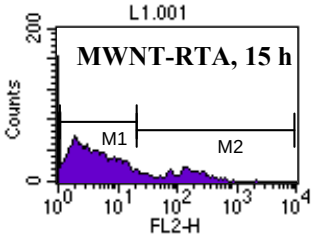

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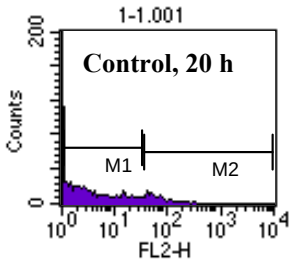

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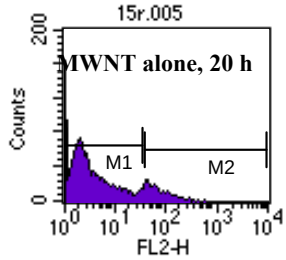

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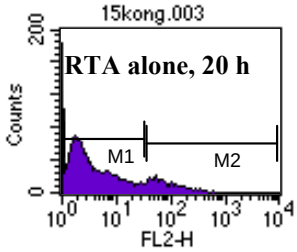

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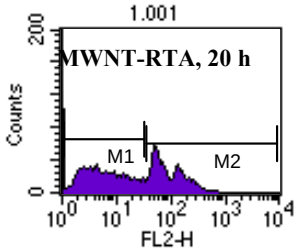

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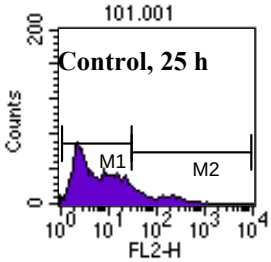

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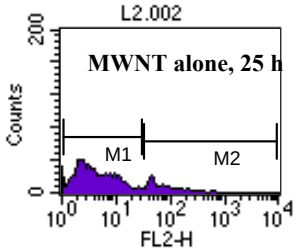

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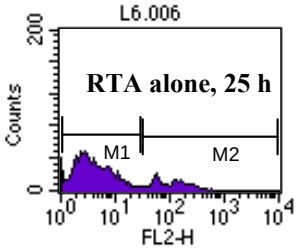

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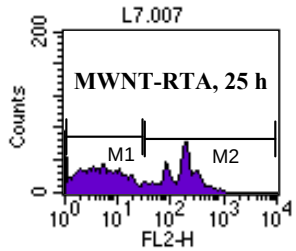

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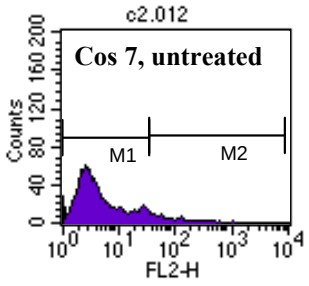
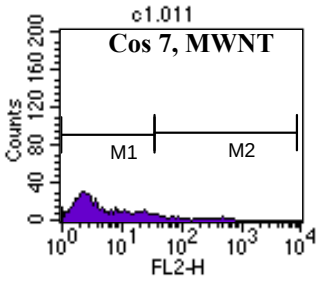
M1	57.26
M2	41.06

Figure S4. Flow cytometry data of cell death vs time of incubation in solutions with MWNT alone, RTA alone, MWNT–RTA conjugates and for cells without any treatment (labelled as "control"). The data presented herein are corresponding to the data showed in Figure 6 in the manuscript.



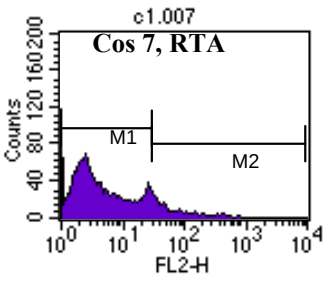
File: c2.012

Marker	% Gated
All	100.00
M1	94.53
M2	5.58



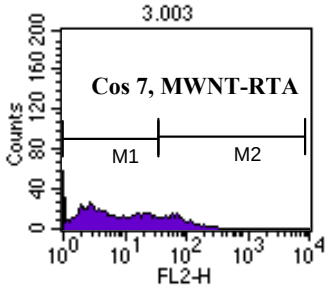
File: c1.011

Marker	% Gated
All	100.00
M1	93.79
M2	6.33



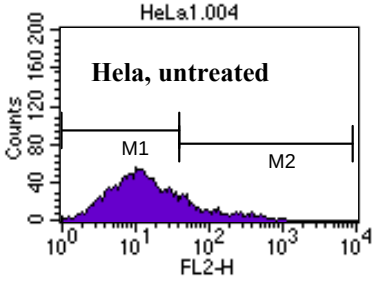
File: c1.007

Marker	% Gated
All	100.00
M1	91.07
M2	9.11



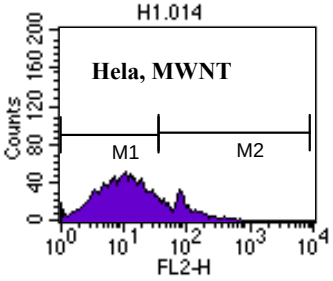
File: 3.003

Marker	% Gated
All	100.00
M1	80.06
M2	20.14



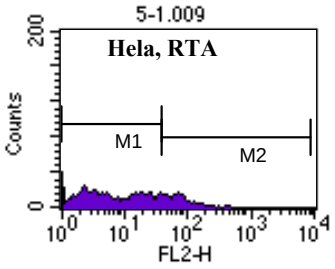
File: HeLa1.004

Marker	% Gated
All	100.00
M1	85.33
M2	14.86



File: H1.014

Marker	% Gated
All	100.00
M1	82.72
M2	17.37

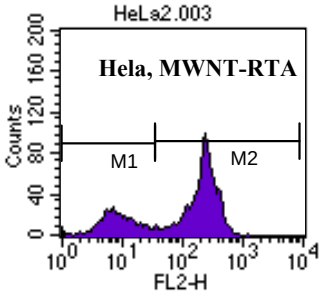


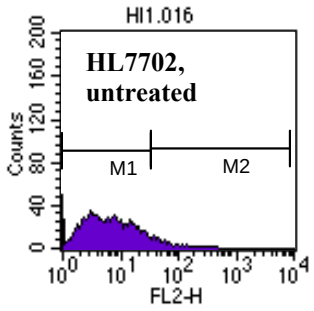
File: 5-1.009

Marker	% Gated
All	100.00
M1	80.17
M2	20.01

File: HeLa2.003

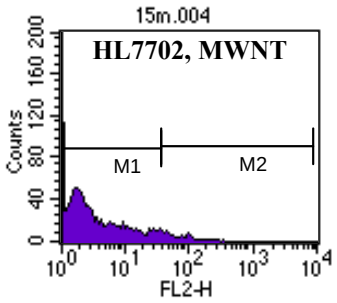
Marker	% Gated
All	100.00
M1	25.99
M2	74.04





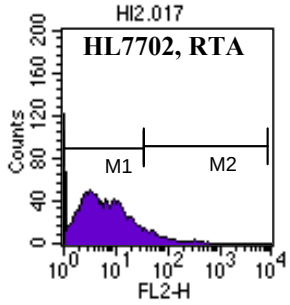
File: HI1.016

Marker	% Gated
All	100.00
M1	93.94
M2	6.16



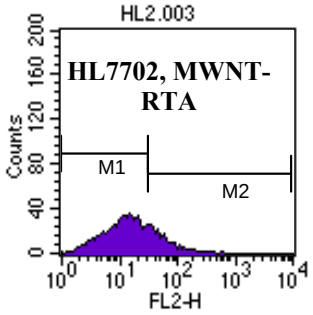
File: 15m.004

Marker	% Gated
All	100.00
M1	94.01
M2	6.08



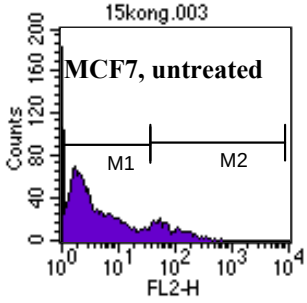
File: HI2.017

Marker	% Gated
All	100.00
M1	93.80
M2	6.29



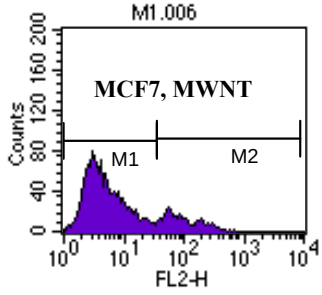
File: HL2.003

Marker	% Gated
All	100.00
M1	79.37
M2	21.04



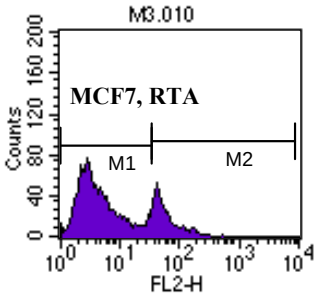
File: 15kong.003

Marker	% Gated
All	100.00
M1	85.96
M2	14.11



File: M1.006

Marker	% Gated
All	100.00
M1	83.81
M2	16.24



File: M3.010

Marker	% Gated
All	100.00
M1	81.12
M2	19.22

File: M2.007

Marker	% Gated
All	100.00
M1	58.12
M2	41.89

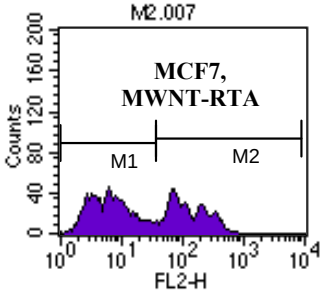
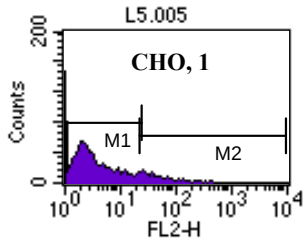
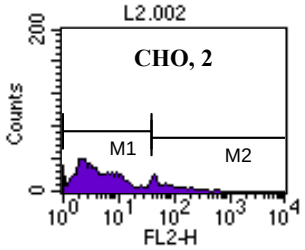


Figure S5. Flow cytometry data of cell death of different cell lines for untreated cells and cells incubated in MWNT alone, RTA alone, MWNT–RTA conjugates. The data presented herein are corresponding to the data showed in Figure 7 in the manuscript.



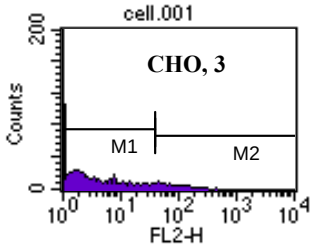
File: L5.005

Marker	% Gated
All	100.00
M1	92.25
M2	9.30



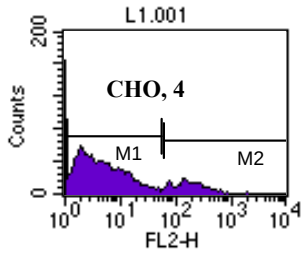
File: L2.002

Marker	% Gated
All	100.00
M1	89.15
M2	10.98



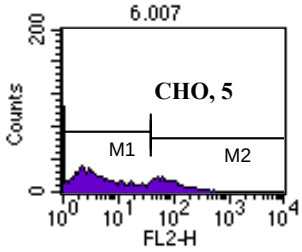
File: cell.001

Marker	% Gated
All	100.00
M1	88.92
M2	11.31



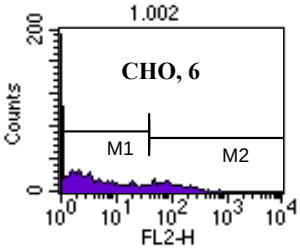
File: L1.001

Marker	% Gated
All	100.00
M1	86.74
M2	12.85



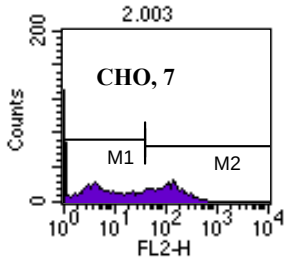
File: 6.007

Marker	% Gated
All	100.00
M1	79.07
M2	21.05



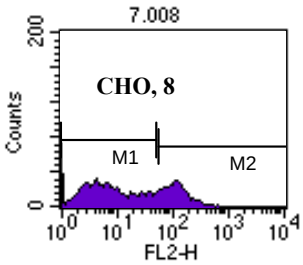
File: 1.002

Marker	% Gated
All	100.00
M1	79.67
M2	20.45



File: 2.003

Marker	% Gated
All	100.00
M1	56.60
M2	43.59



File: 7.008

Marker	% Gated
All	100.00
M1	69.40
M2	28.94

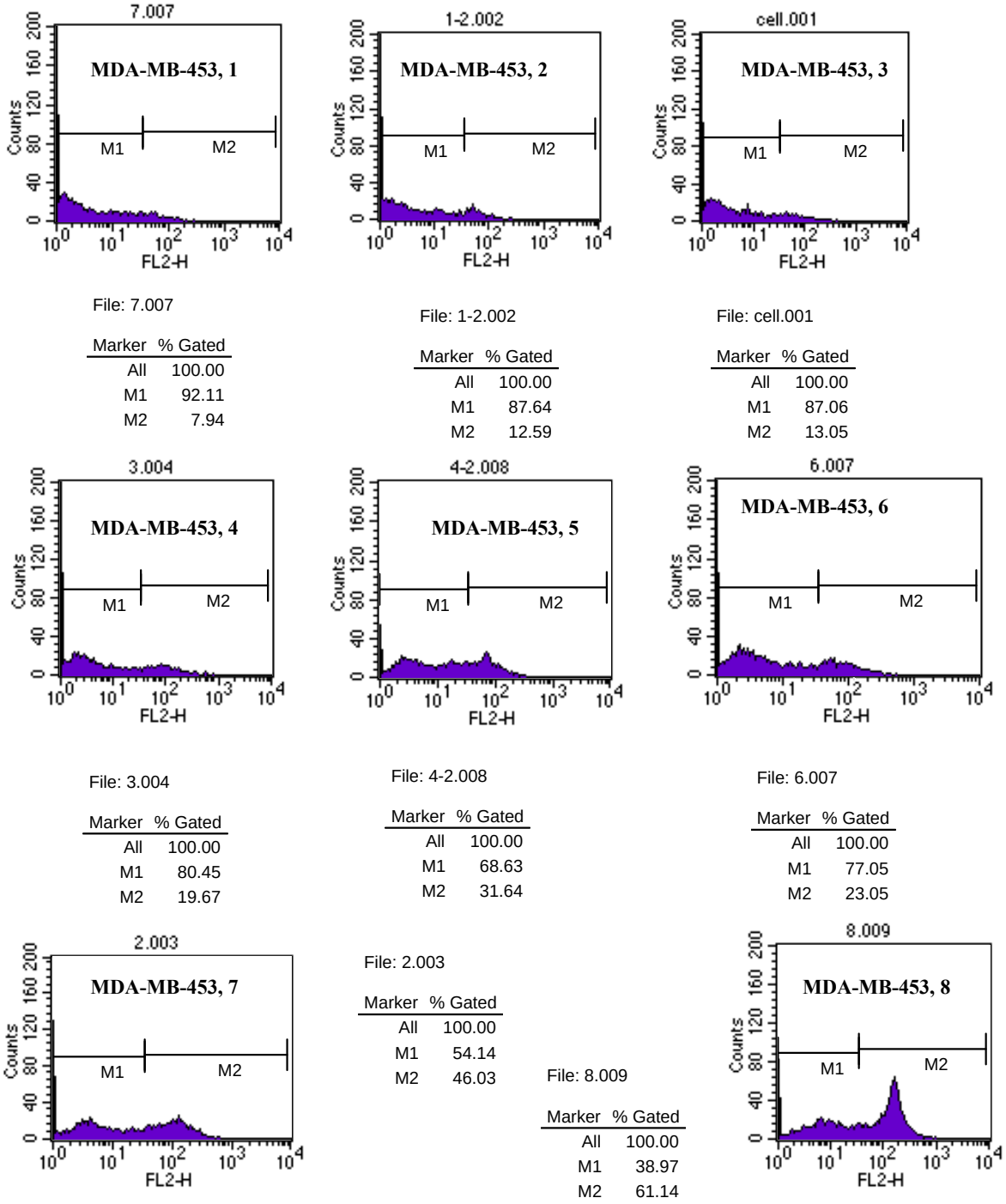
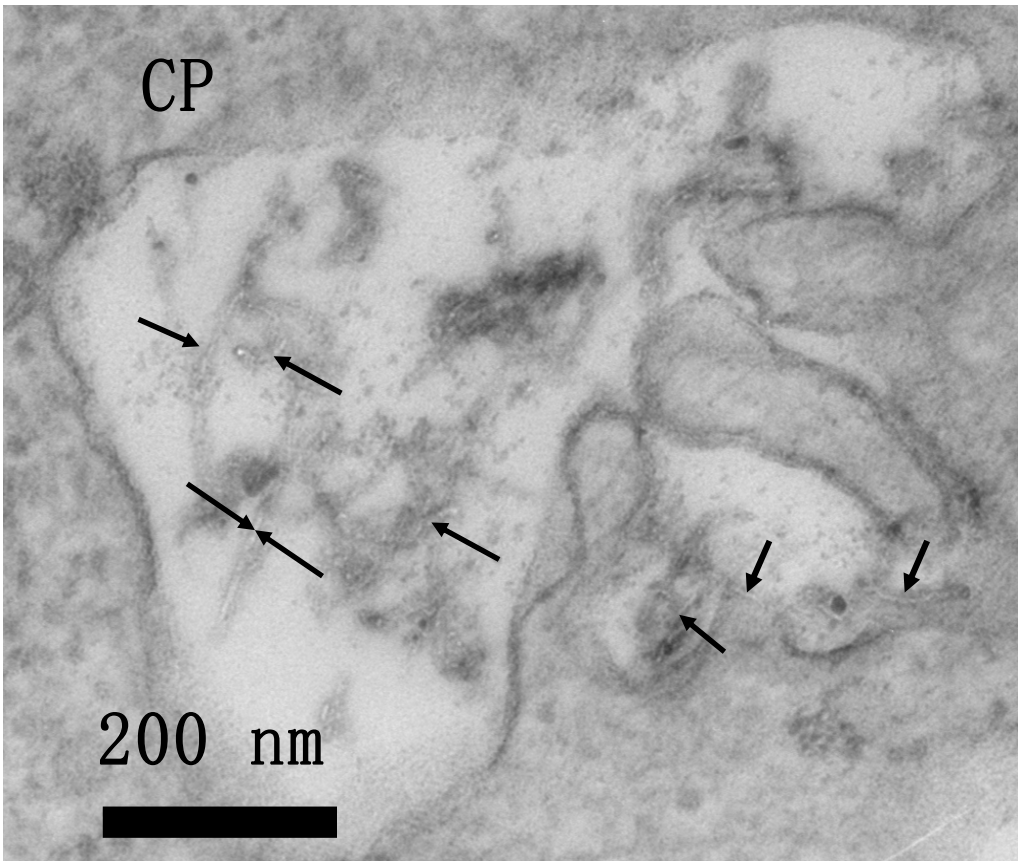
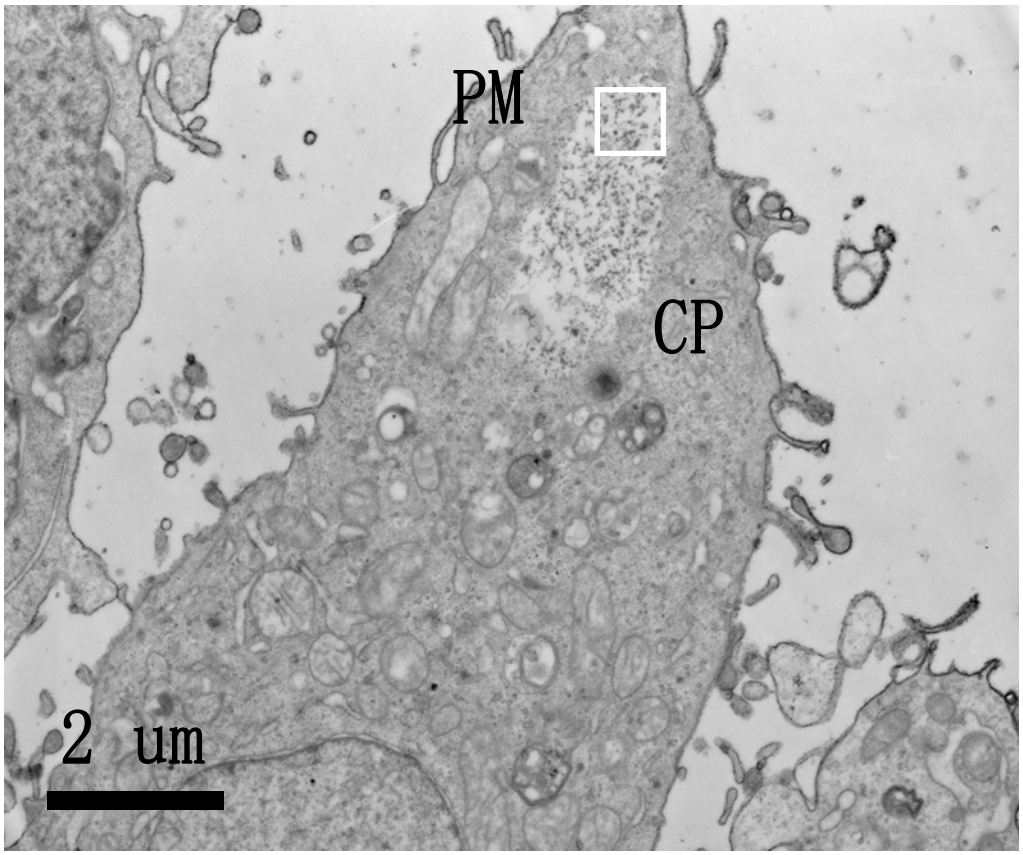


Figure S6. Flow cytometry data of cell death for normal cell CHO and cancer cell MDA-MB-453 caused by exposure of the cells to various treatments: (1) Untreated cells and cells incubated with (2) MWNT alone, (3) RTA alone, (4) HER2 alone, (5) RTA-HER2 alone, (6) MWNT-HER2 conjugates, (7) MWNT-RTA conjugates and (8) MWNT-RTA-HER2. The data presented herein are corresponding to the data showed in Figure 8 in the manuscript.

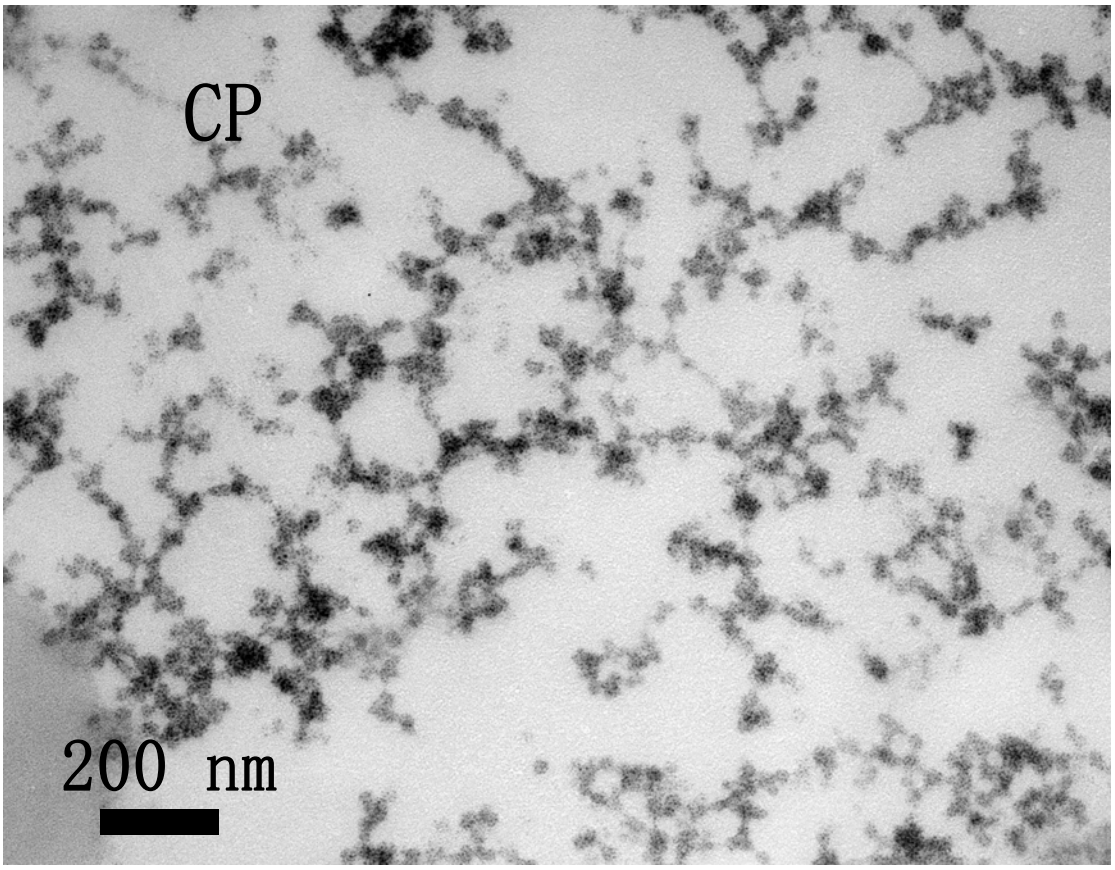
d



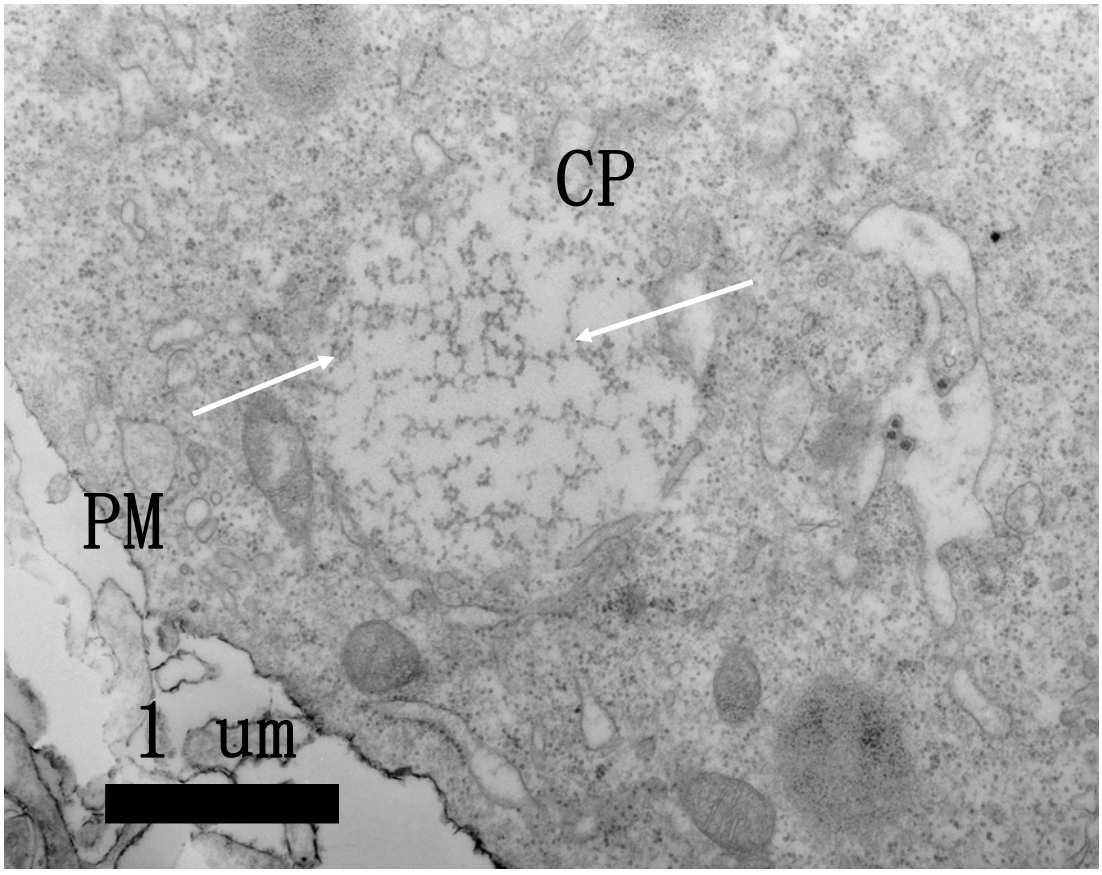
e



f



g



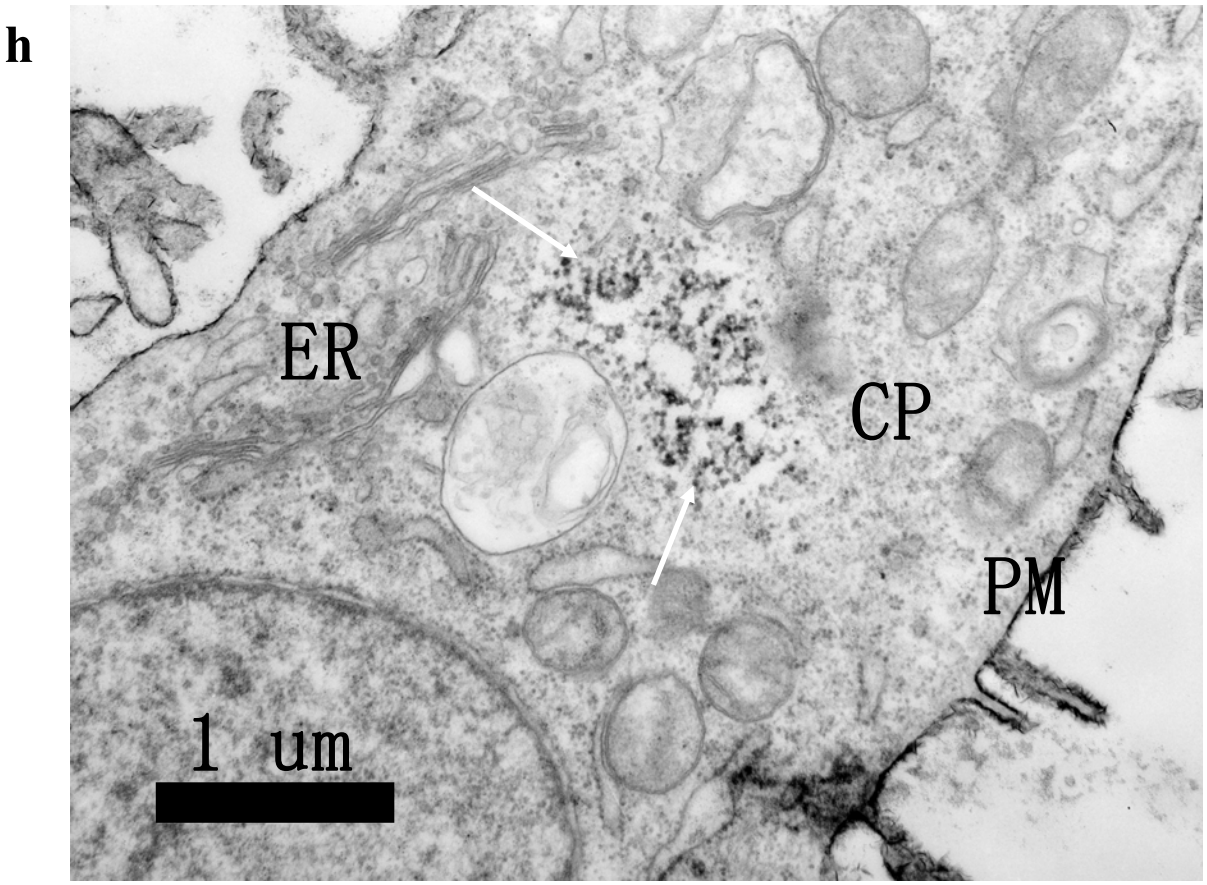


Figure S7. Ultrathin transverse section of HeLa cells treated without and with MWNT-RTA conjugates for 22h. (d) Subsequent magnifications of white boxed area in figure 3c. (e) MWNTs translocated across the plasma membrane barrier into the neighbouring cytoplasm, (f) A magnification of white boxed area in figure 3e. (g) MWNT bundles located within cytoplasm, (h) MWNT bundles localized nearby endoplasmic reticulum. [MWNTs] = 0.025 mg·mL^{-1}, [RTA] = 0.2 μM. Labels: PM (plasma membrane), CP (cytoplasm), NM (nuclear membrane), N (nucleus), GC(Golgi complex) and ER(endoplasmic reticulum).