

Supporting file

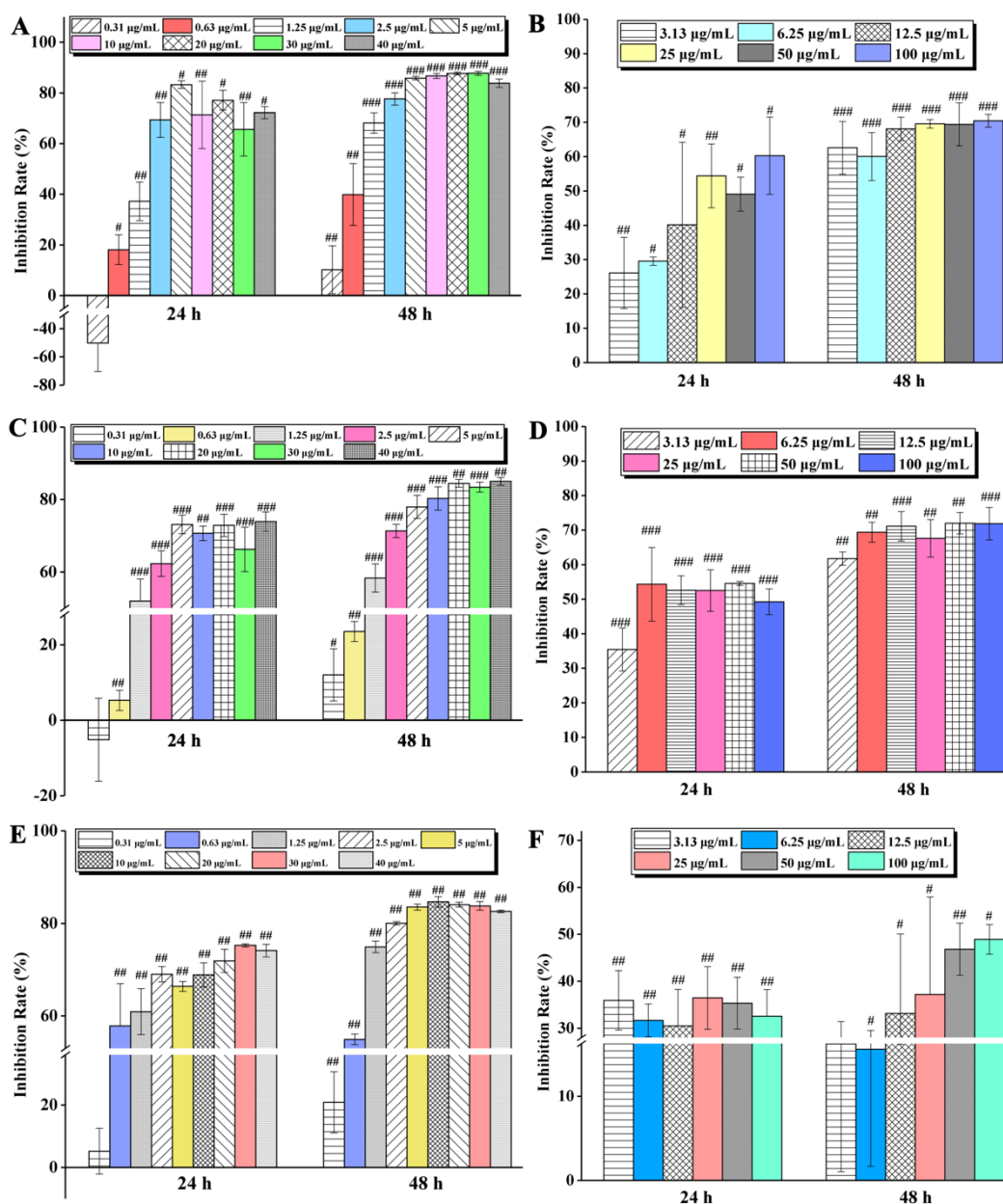


Fig. S1 Inhibition rates of Na_2SeO_3 and 5-FU against A549 cells (A-B), HepG2 cells (C-D), and H1975 cells (E-F) after 24 and 48 h treatment *in vitro*. The inhibition rates were presented as mean values ($n = 3$). # $p < 0.05$ compared with the control.

Table S1 Correlation coefficients (R^2) between Se equivalent and inhibition rates of SeASPs
against three tumor cells *in vitro*.

Samples	Se content ($\mu\text{g/g}$)	A549 cell ($\mu\text{g/mL}$)		HepG2 cell ($\mu\text{g/mL}$)		H1975 cell ($\mu\text{g/mL}$)	
		24h	48h	24h	48h	24h	48h
SeASP ₁	4702	0.8604	0.6576	0.5337	- ^a	-	0.4666
SeASP ₂	9705	0.0793	0.0005	-	-	0.8944	0.8398
SeASP ₃	13030	-	-	-	-	0.6973	-
SeASP ₄	4344	0.7564	0.2507	0.8501	0.9857	-	0.8770
SeASP ₅	4575	0.4433	0.7987	-	0.4889	-	-
SeASP ₆	7089	0.7020	0.0479	0.6396	0.6069	-	-

^a Not detected.

Table S2 Cell cycle arrest effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against A549 cells.

Group	24 h			48 h		
	G0/G1 (%)	S (%)	G2/M (%)	G0/G1 (%)	S (%)	G2/M (%)
Control	39.32 ± 0.75	55.52 ± 0.74	5.16 ± 0.05	37.13 ± 0.92	49.01 ± 0.95	13.87 ± 0.88
L-ASP	42.02 ± 1.27	53.13 ± 0.97	4.56 ± 0.31	38.59 ± 1.18	46.93 ± 0.66	14.48 ± 0.81
M-ASP	43.48 ± 1.61	49.83 ± 1.15	6.36 ± 0.54	36.19 ± 0.76	53.19 ± 0.53	10.29 ± 0.53
H-ASP	38.48 ± 1.44	54.88 ± 1.33	6.67 ± 0.58	39.17 ± 5.57	50.08 ± 6.77	10.74 ± 1.28
L-5-FU	66.40 ± 0.00	33.26 ± 1.77	0.00 ± 0.00	74.99 ± 1.82	25.01 ± 1.82	0.00 ± 0.00
M-5-FU	70.68 ± 2.64	29.31 ± 2.64	0.00 ± 0.00	64.14 ± 1.21	35.90 ± 1.14	0.00 ± 0.00
H-5-FU	66.90 ± 0.32	33.10 ± 0.32	0.00 ± 0.00	64.87 ± 1.69	35.13 ± 1.69	0.00 ± 0.00
L-Na ₂ SeO ₃	54.28 ± 7.14	39.81 ± 7.94	6.58 ± 1.24	41.48 ± 0.80	46.57 ± 1.39	11.98 ± 1.07
M-Na ₂ SeO ₃	46.06 ± 1.34	44.19 ± 1.53	9.42 ± 0.42	39.56 ± 1.63	52.99 ± 3.01	7.45 ± 1.46
H-Na ₂ SeO ₃	48.80 ± 0.33	44.56 ± 1.37	6.64 ± 1.40	44.02 ± 1.38	45.26 ± 1.54	10.73 ± 0.67
L-SeASP ₃	51.67 ± 1.63	36.28 ± 1.01	12.06 ± 0.62	42.91 ± 0.82	39.44 ± 0.82	17.65 ± 0.02
M-SeASP ₃	44.52 ± 0.78	43.10 ± 0.43	12.65 ± 0.80	41.18 ± 0.41	37.07 ± 1.02	21.75 ± 0.64
H-SeASP ₃	39.01 ± 0.95	50.71 ± 0.46	10.28 ± 0.57	37.35 ± 0.76	42.86 ± 1.56	19.80 ± 0.80
L-SeASP ₆	30.28 ± 0.77	49.30 ± 0.94	20.42 ± 0.28	30.11 ± 0.23	49.61 ± 0.46	20.28 ± 0.25
M-SeASP ₆	27.13 ± 0.78	51.00 ± 0.95	21.87 ± 0.62	30.50 ± 0.42	49.84 ± 0.70	19.66 ± 0.30
H-SeASP ₆	28.83 ± 0.40	50.87 ± 0.24	20.30 ± 0.20	29.21 ± 0.71	52.51 ± 0.69	19.28 ± 0.23

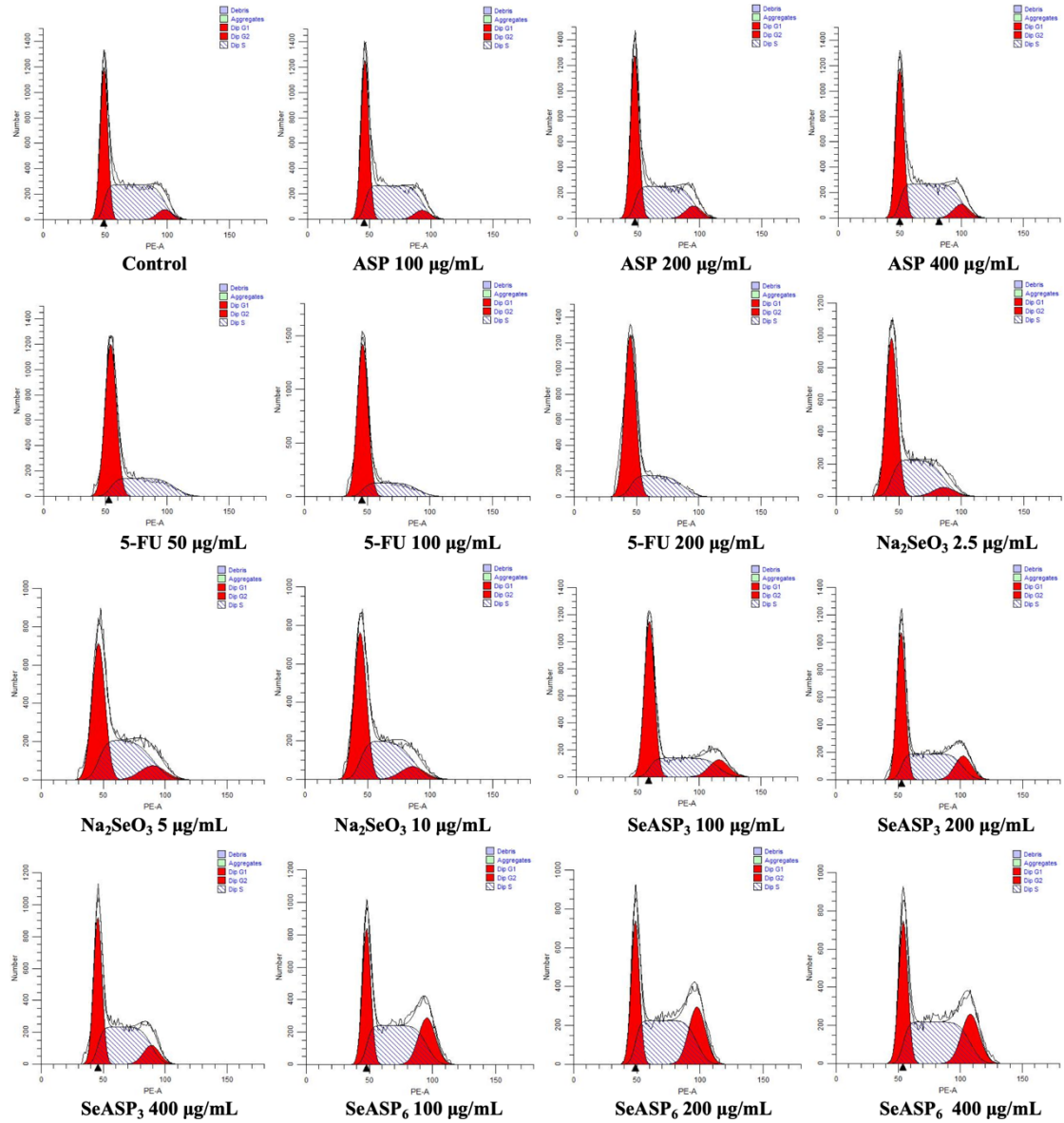


Fig. S2 Cell cycle arrest of A549 cells treated with Na_2SeO_3 , 5-FU, ASP, and SeASPs for 24 h.

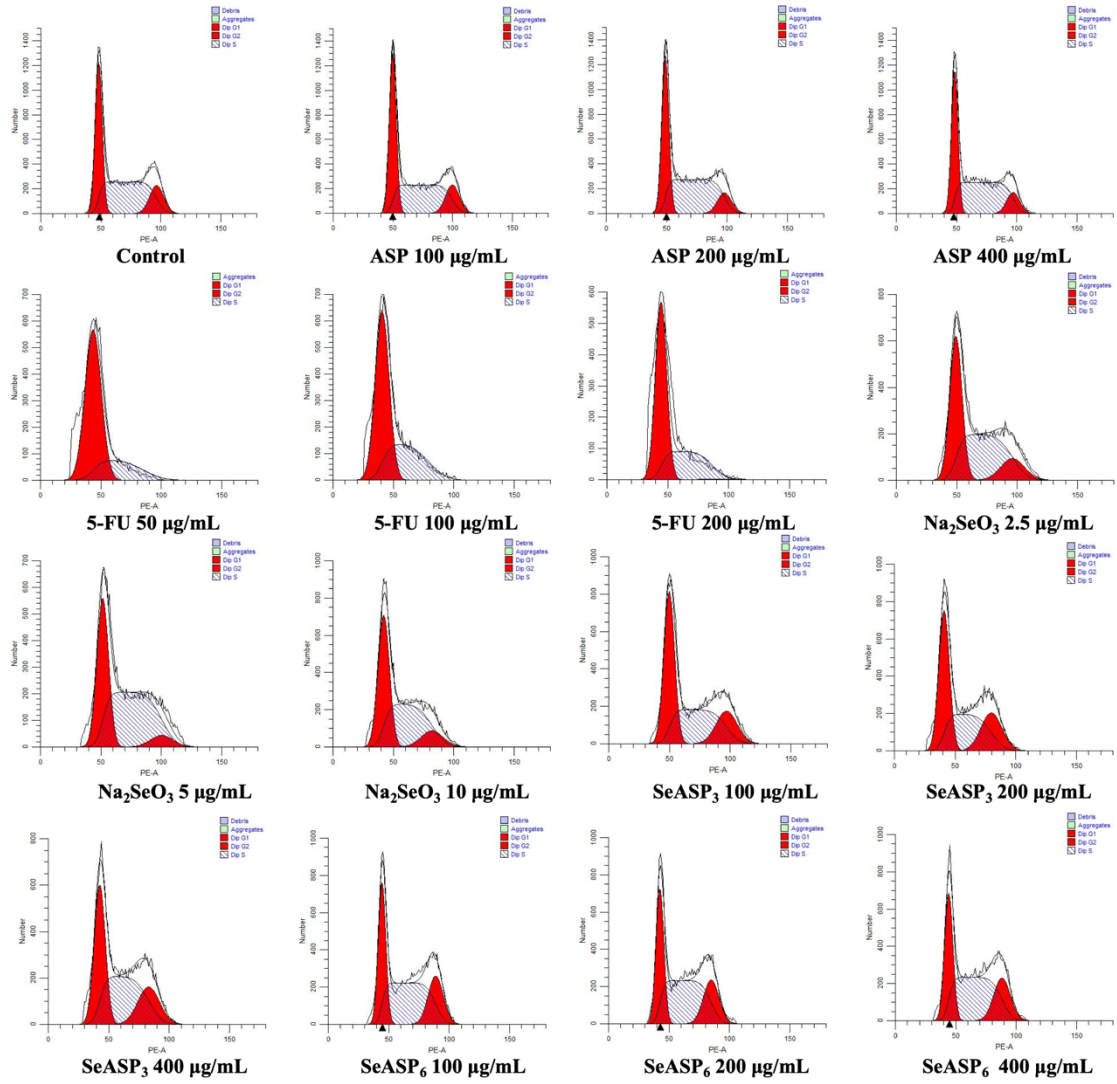


Fig. S3 Cell cycle arrest of A549 cells treated with Na₂SeO₃, 5-FU, ASP, and SeASPs for 48 h.

Table S3 Cell cycle arrest effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against HepG2 cells.

Group	24 h			48 h		
	G0/G1 (%)	S (%)	G2/M (%)	G0/G1 (%)	S (%)	G2/M (%)
Control	62.38 ± 0.74	28.87 ± 0.99	10.75 ± 0.33	71.46 ± 0.81	22.02 ± 0.41	6.51 ± 0.41
L-ASP	65.39 ± 0.40	24.50 ± 0.34	10.12 ± 0.08	71.24 ± 0.46	21.25 ± 0.29	7.51 ± 0.28
M-ASP	55.44 ± 1.33	32.40 ± 0.77	12.16 ± 0.58	71.58 ± 0.12	23.59 ± 0.08	4.83 ± 0.17
H-ASP	60.83 ± 0.36	26.66 ± 0.35	12.51 ± 0.44	66.12 ± 0.49	27.31 ± 0.81	6.57 ± 0.42
L-5-FU	67.02 ± 0.18	31.61 ± 0.38	1.37 ± 0.36	76.33 ± 0.35	23.23 ± 0.32	0.44 ± 0.40
M-5-FU	67.17 ± 0.25	30.26 ± 0.49	2.57 ± 0.25	76.11 ± 0.25	22.94 ± 0.32	1.07 ± 0.11
H-5-FU	67.04 ± 0.48	29.63 ± 0.53	3.33 ± 0.05	75.91 ± 0.19	23.14 ± 0.24	0.96 ± 0.09
L-Na ₂ SeO ₃	40.64 ± 0.53	42.22 ± 0.63	17.15 ± 0.27	48.54 ± 0.63	33.30 ± 0.50	18.16 ± 0.48
M-Na ₂ SeO ₃	44.81 ± 0.84	37.94 ± 0.65	17.24 ± 0.21	48.18 ± 0.50	31.10 ± 0.24	20.72 ± 0.30
H-Na ₂ SeO ₃	46.12 ± 0.58	40.64 ± 0.87	13.24 ± 0.30	49.28 ± 0.77	31.31 ± 0.59	19.41 ± 0.82
L-SeASP ₃	63.51 ± 0.44	23.11 ± 0.91	13.37 ± 0.48	61.69 ± 0.69	25.54 ± 0.95	12.78 ± 0.73
M-SeASP ₃	64.76 ± 0.44	22.12 ± 0.31	13.12 ± 0.13	69.42 ± 2.46	21.80 ± 1.06	8.78 ± 1.81
H-SeASP ₃	67.59 ± 0.31	18.85 ± 0.14	13.56 ± 0.27	69.67 ± 0.63	18.26 ± 2.05	12.07 ± 1.41
L-SeASP ₆	28.68 ± 0.44	60.94 ± 0.38	10.38 ± 0.14	21.61 ± 0.21	65.62 ± 0.21	12.87 ± 0.44
M-SeASP ₆	31.82 ± 0.21	57.13 ± 0.36	11.05 ± 0.46	25.88 ± 0.10	65.14 ± 0.49	8.98 ± 0.42
H-SeASP ₆	36.82 ± 0.25	51.22 ± 0.12	11.91 ± 0.17	44.42 ± 1.40	47.92 ± 1.19	7.66 ± 1.19

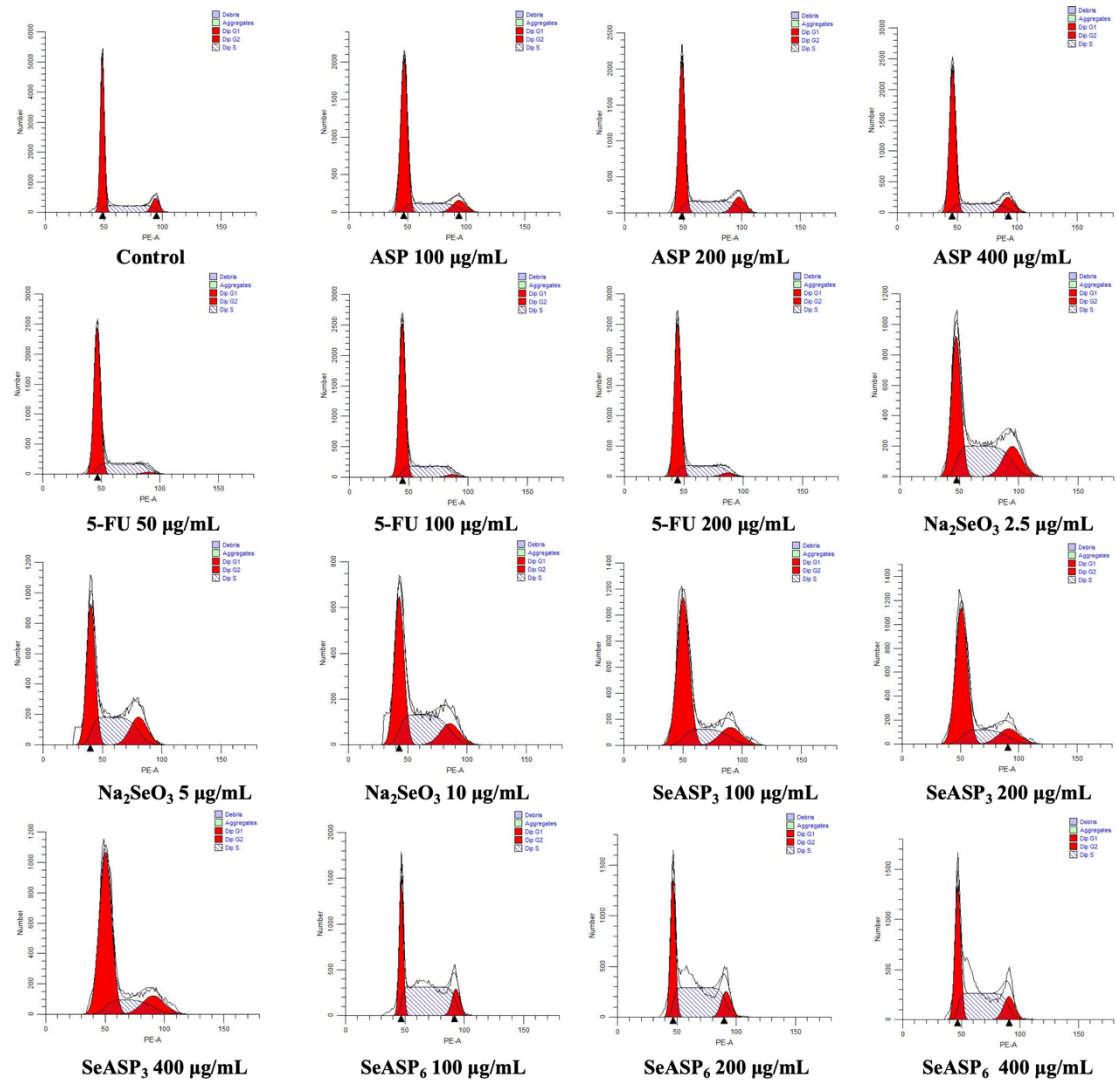


Fig. S4 Cell cycle arrest of HepG2 cells treated with Na₂SeO₃, 5-FU, ASP, and SeASPs for 24 h.

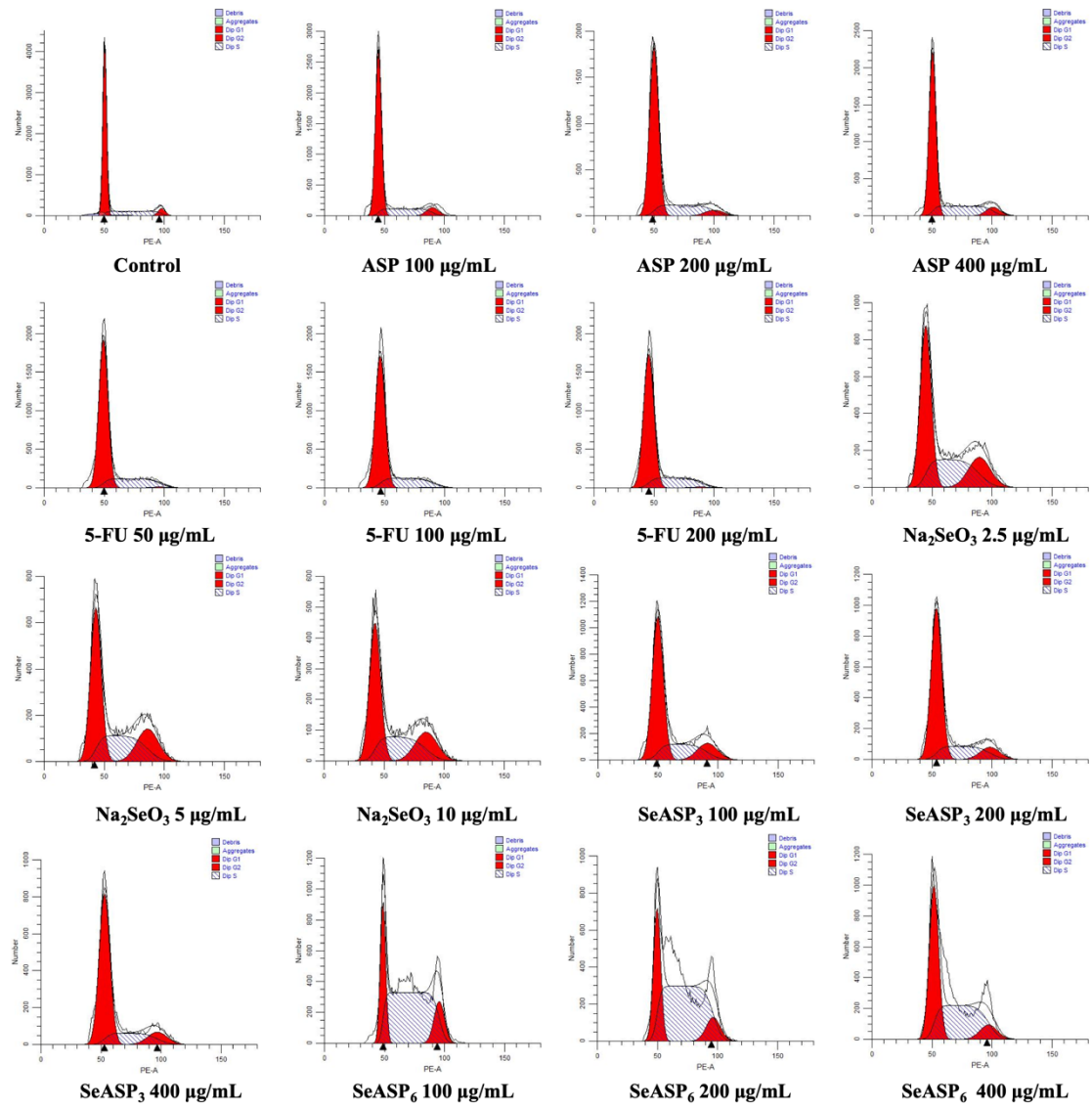


Fig. S5 Cell cycle arrest of HepG2 cells treated with Na₂SeO₃, 5-FU, ASP, and SeASPs for 48 h.

Table S4 Cell cycle arrest effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against H1975 cells.

Group	24 h			48 h		
	G0/G1 (%)	S (%)	G2/M (%)	G0/G1 (%)	S (%)	G2/M (%)
Control	56.12 ± 1.11	38.55 ± 0.77	4.65 ± 0.50	58.17 ± 1.42	39.34 ± 1.82	2.49 ± 0.61
L-ASP	59.30 ± 0.59	34.28 ± 0.47	6.42 ± 0.17	56.69 ± 0.59	40.62 ± 0.15	3.22 ± 0.49
M-ASP	63.96 ± 1.05	26.68 ± 0.12	9.43 ± 1.08	66.72 ± 0.83	27.93 ± 0.71	5.36 ± 0.43
H-ASP	66.97 ± 1.07	26.15 ± 1.04	6.90 ± 0.10	62.02 ± 1.13	26.83 ± 1.24	11.15 ± 0.39
L-5-FU	82.88 ± 0.97	17.12 ± 0.72	0.00 ± 0.00	79.83 ± 0.36	20.17 ± 0.36	0.00 ± 0.00
M-5-FU	83.12 ± 0.60	16.88 ± 0.60	0.00 ± 0.00	80.46 ± 0.26	19.54 ± 0.26	0.00 ± 0.00
H-5-FU	83.44 ± 1.30	16.56 ± 1.30	0.00 ± 0.00	77.07 ± 0.45	22.93 ± 0.45	0.00 ± 0.00
L-Na ₂ SeO ₃	41.91 ± 0.10	46.90 ± 0.61	11.19 ± 0.51	47.10 ± 2.55	41.59 ± 3.15	11.31 ± 0.71
M-Na ₂ SeO ₃	42.26 ± 0.72	49.16 ± 0.05	8.58 ± 0.76	57.58 ± 3.92	40.75 ± 4.79	11.68 ± 0.94
H-Na ₂ SeO ₃	44.22 ± 0.64	48.20 ± 0.76	7.62 ± 0.37	49.62 ± 3.50	45.38 ± 9.24	5.04 ± 5.79
L-SeASP ₃	20.05 ± 0.95	62.19 ± 0.77	17.76 ± 1.24	34.32 ± 4.68	58.98 ± 7.10	6.70 ± 2.43
M-SeASP ₃	21.57 ± 0.19	59.93 ± 0.84	18.50 ± 0.65	41.03 ± 0.22	55.05 ± 0.45	3.92 ± 0.66
H-SeASP ₃	45.49 ± 0.30	46.42 ± 0.45	8.10 ± 0.37	44.58 ± 1.86	55.08 ± 2.18	0.01 ± 1.41
L-SeASP ₆	10.14 ± 1.54	76.08 ± 3.42	13.78 ± 4.92	26.92 ± 0.87	57.85 ± 2.73	15.23 ± 2.84
M-SeASP ₆	7.21 ± 0.99	86.98 ± 0.47	5.81 ± 1.45	34.44 ± 1.88	43.11 ± 3.13	22.44 ± 1.41
H-SeASP ₆	7.77 ± 0.95	92.23 ± 0.95	0.00 ± 0.00	37.27 ± 0.83	45.80 ± 1.81	16.93 ± 0.99

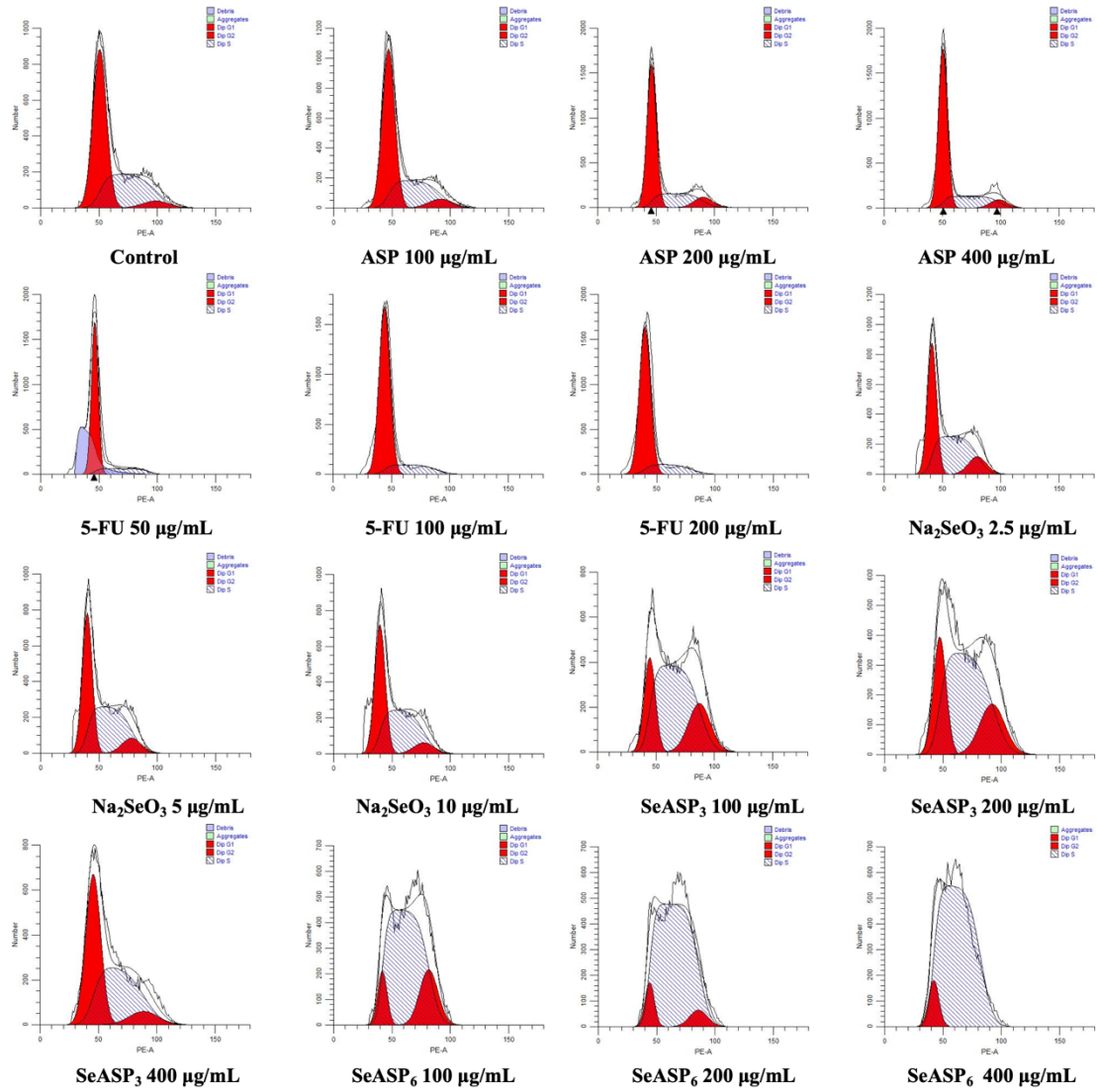


Fig. S6 Cell cycle arrest of H1975 cells treated with Na_2SeO_3 , 5-FU, ASP, and SeASPs for 24 h.

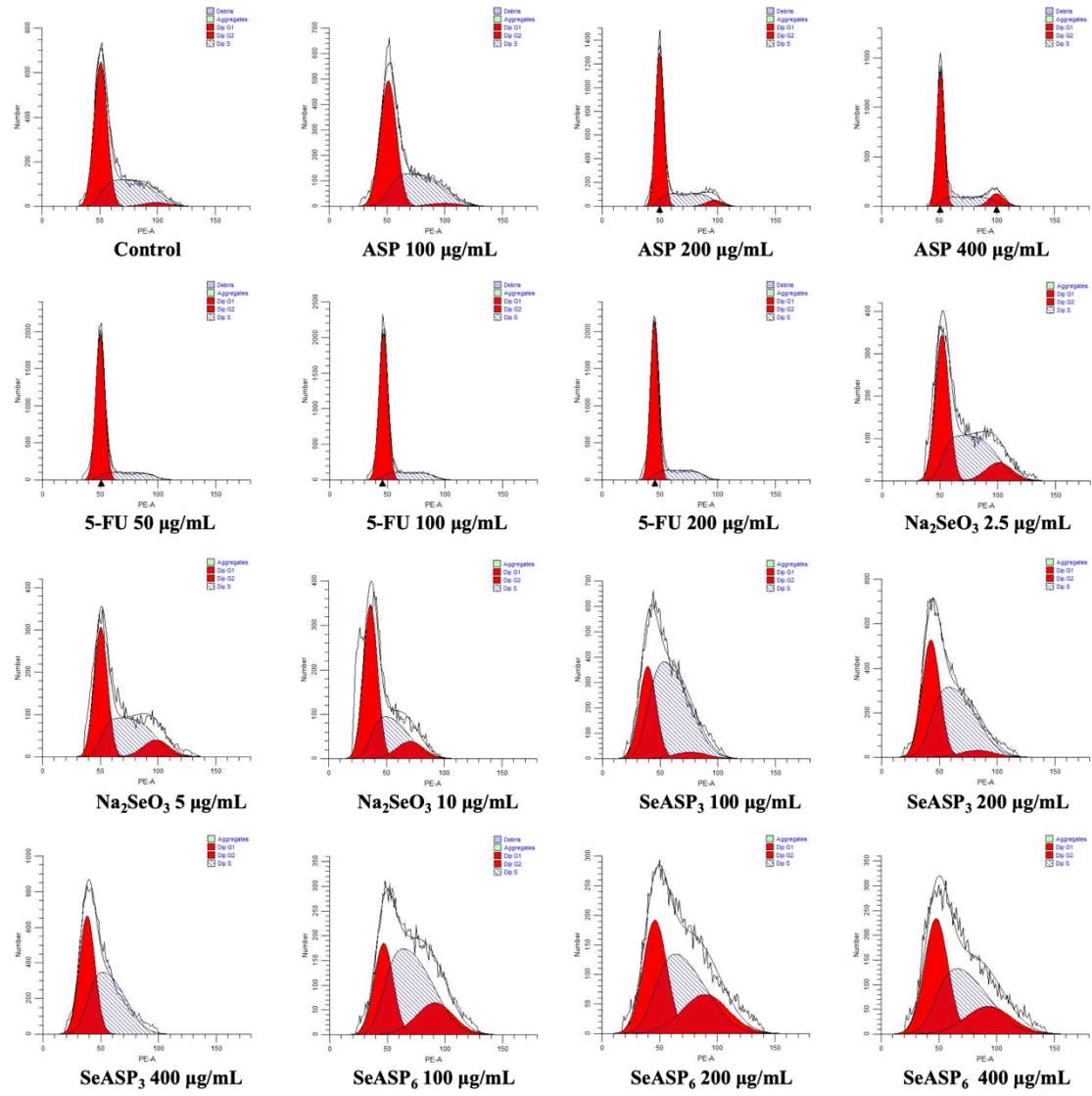


Fig. S7 Cell cycle arrest of H1975 cells treated with Na₂SeO₃, 5-FU, ASP, and SeASPs for 48 h.

Table S5 Pro-apoptosis effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against A549 cells, HepG2 cells, and H1975 cells.

Group	A549 cells (%)		HepG2 cells (%)		H1975 cells (%)	
	24 h	48 h	24 h	48 h	24 h	48 h
Control	6.86 ± 0.94	6.57 ± 0.75	2.49 ± 0.03	3.52 ± 0.06	12.68 ± 0.66	7.57 ± 0.35
L-ASP	6.91 ± 1.73	3.97 ± 0.14	6.73 ± 0.48	7.79 ± 0.57	8.88 ± 0.59	10.02 ± 0.13
M-ASP	5.93 ± 0.32	4.66 ± 0.69	5.80 ± 0.28	7.04 ± 0.40	10.41 ± 1.20	7.87 ± 0.25
H-ASP	7.18 ± 1.80	4.65 ± 0.65	5.89 ± 0.32	7.07 ± 0.35	6.71 ± 0.38	7.15 ± 0.29
L-5-FU	7.30 ± 0.83	12.90 ± 0.70	10.74 ± 1.17	17.33 ± 0.62	25.23 ± 0.68	19.86 ± 1.13
M-5-FU	8.39 ± 0.14	28.33 ± 0.69	11.70 ± 1.89	13.84 ± 0.48	30.16 ± 0.19	28.52 ± 0.38
H-5-FU	9.24 ± 0.21	25.67 ± 1.69	10.88 ± 0.44	16.17 ± 0.34	18.99 ± 0.33	38.23 ± 1.39
L-Na ₂ SeO ₃	21.03 ± 0.24	19.32 ± 0.65	54.82 ± 0.96	42.04 ± 0.40	91.23 ± 0.19	89.35 ± 0.26
M-Na ₂ SeO ₃	39.16 ± 0.25	19.75 ± 0.72	63.14 ± 0.30	51.09 ± 0.47	90.47 ± 0.19	96.98 ± 0.14
H-Na ₂ SeO ₃	23.14 ± 0.72	18.12 ± 0.65	63.08 ± 0.47	54.38 ± 0.14	91.47 ± 0.20	96.94 ± 0.12
L-SeASP ₃	9.84 ± 0.91	16.64 ± 0.16	18.66 ± 0.96	37.77 ± 2.55	49.90 ± 0.46	74.52 ± 0.58
M-SeASP ₃	15.20 ± 1.26	16.67 ± 1.12	20.25 ± 0.39	43.03 ± 0.84	50.49 ± 1.15	73.73 ± 0.28
H-SeASP ₃	16.81 ± 1.19	24.20 ± 1.20	25.22 ± 0.35	35.09 ± 0.65	53.82 ± 1.36	86.43 ± 0.47
L-SeASP ₆	12.12 ± 2.55	13.80 ± 0.41	5.31 ± 2.06	13.88 ± 1.58	23.42 ± 0.43	87.87 ± 0.27
M-SeASP ₆	13.57 ± 0.19	14.32 ± 0.23	7.71 ± 0.54	14.68 ± 1.91	41.30 ± 0.81	75.80 ± 0.41
H-SeASP ₆	11.11 ± 0.21	14.65 ± 0.94	7.53 ± 0.23	15.79 ± 0.51	38.60 ± 0.79	87.76 ± 0.23

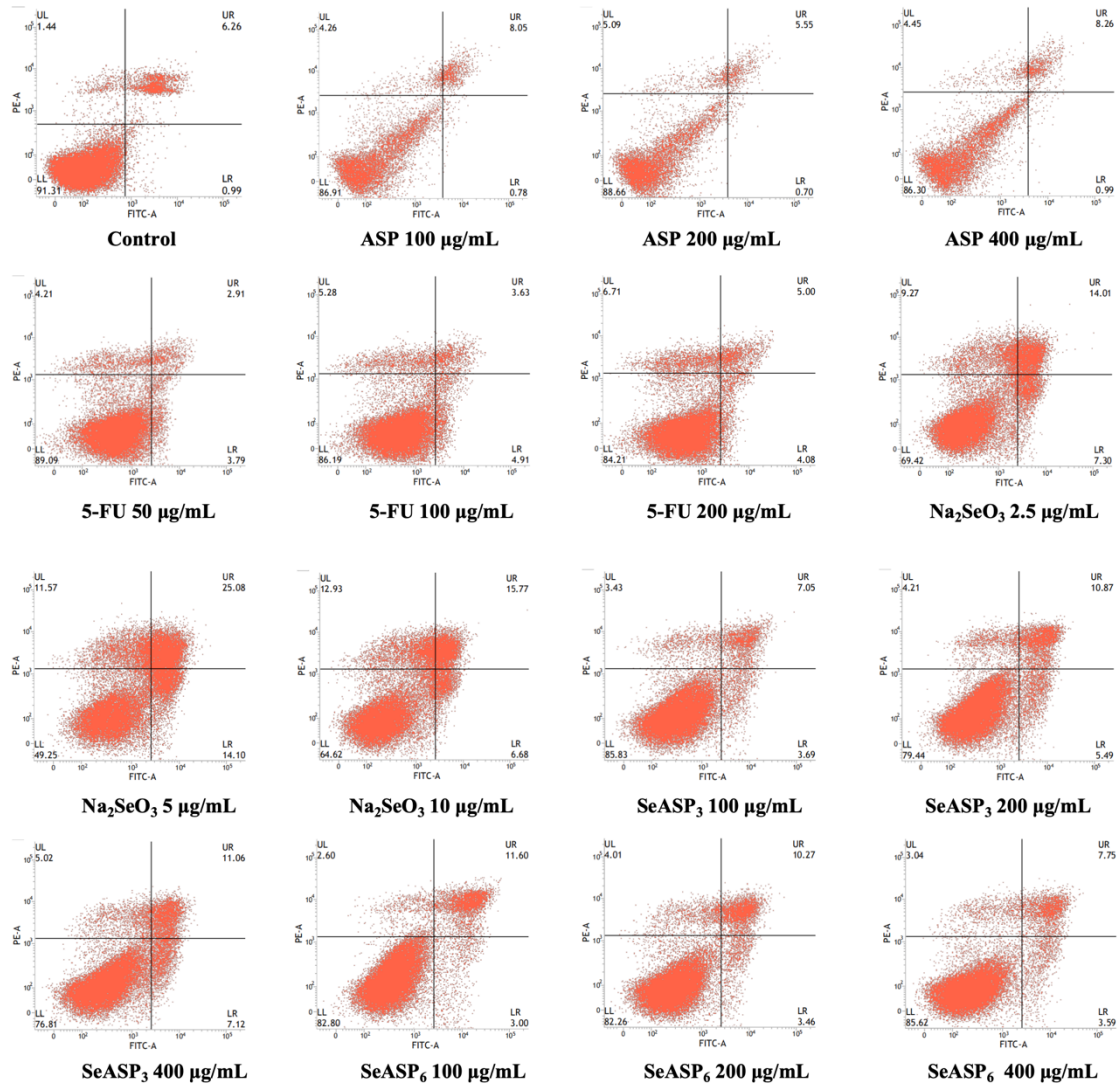


Fig. S8 Pro-apoptosis effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against A549 cells after 24 h treatment.

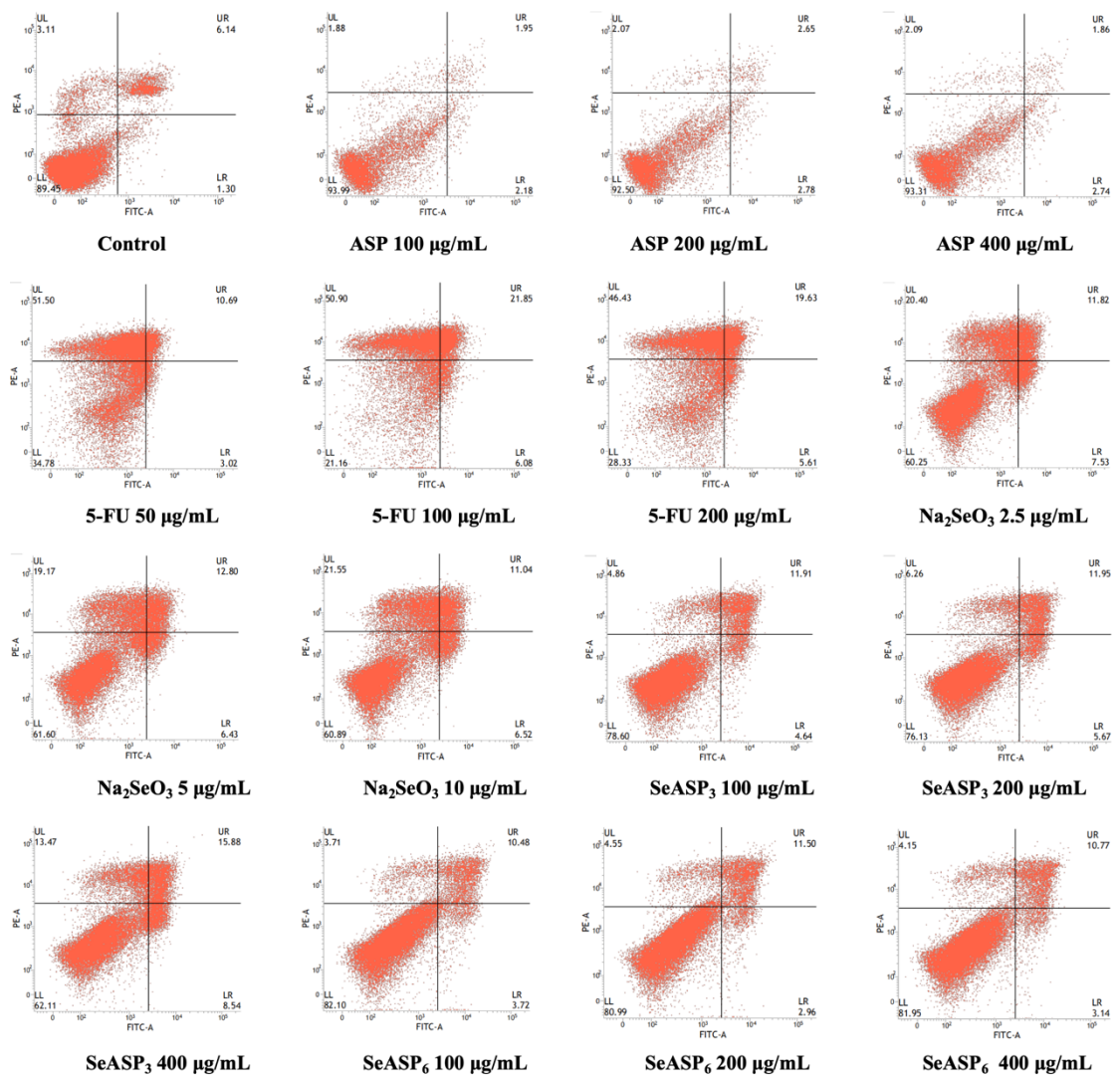


Fig. S9 Pro-apoptosis effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against A549 cells after 48 h treatment.

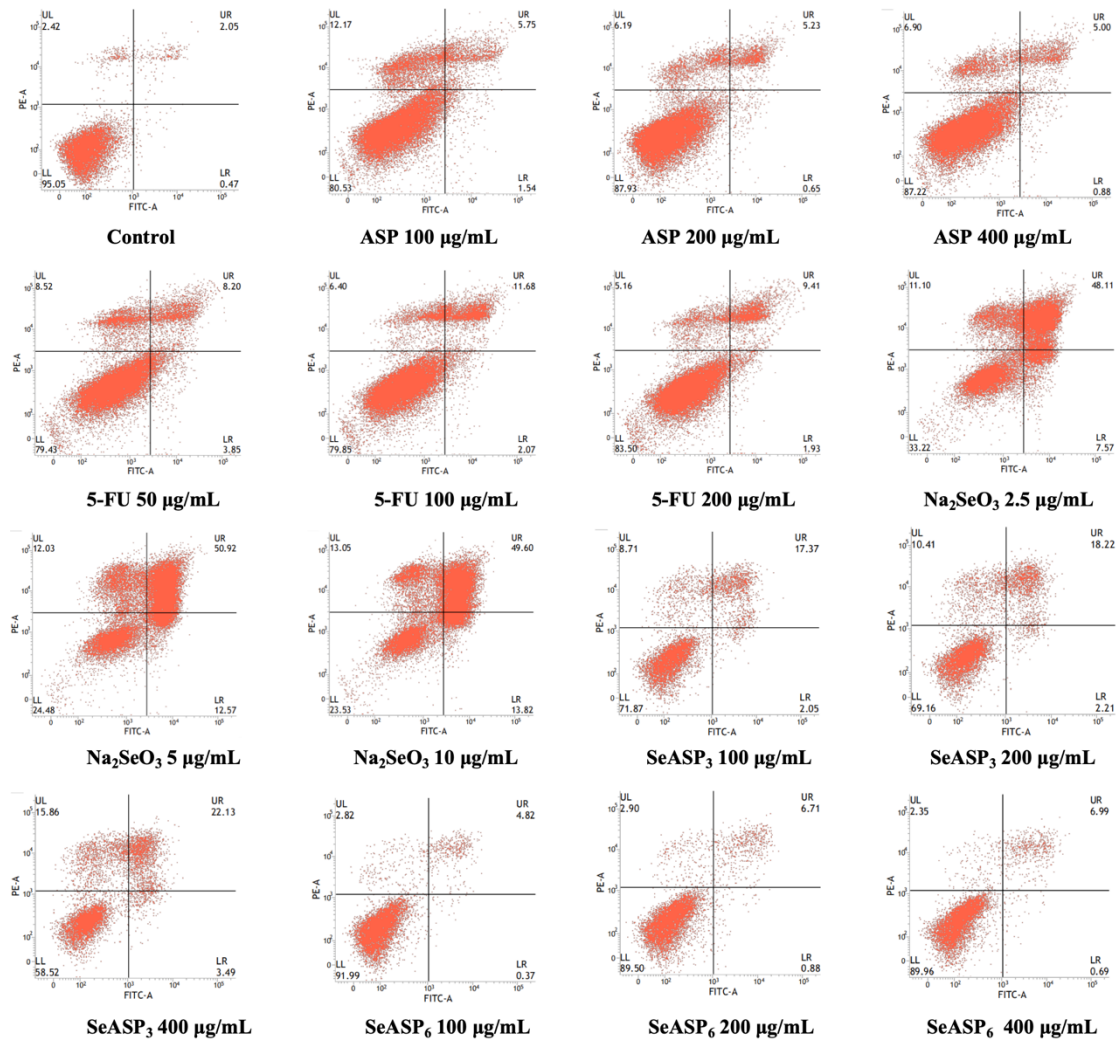


Fig. S10 Pro-apoptosis effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against HepG2 cells after 24 h treatment.

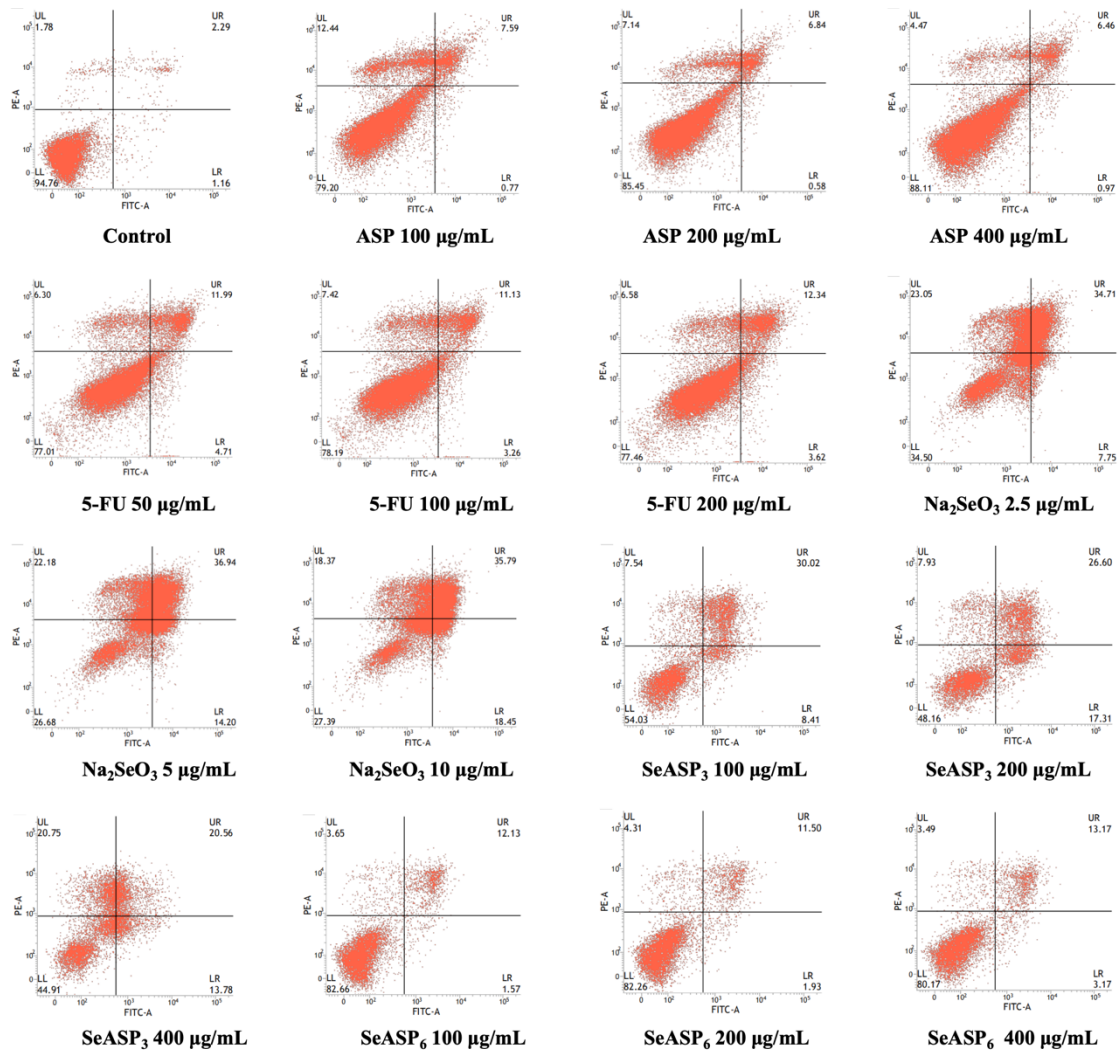


Fig. S11 Pro-apoptosis effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against HepG2 cells after 48 h treatment.

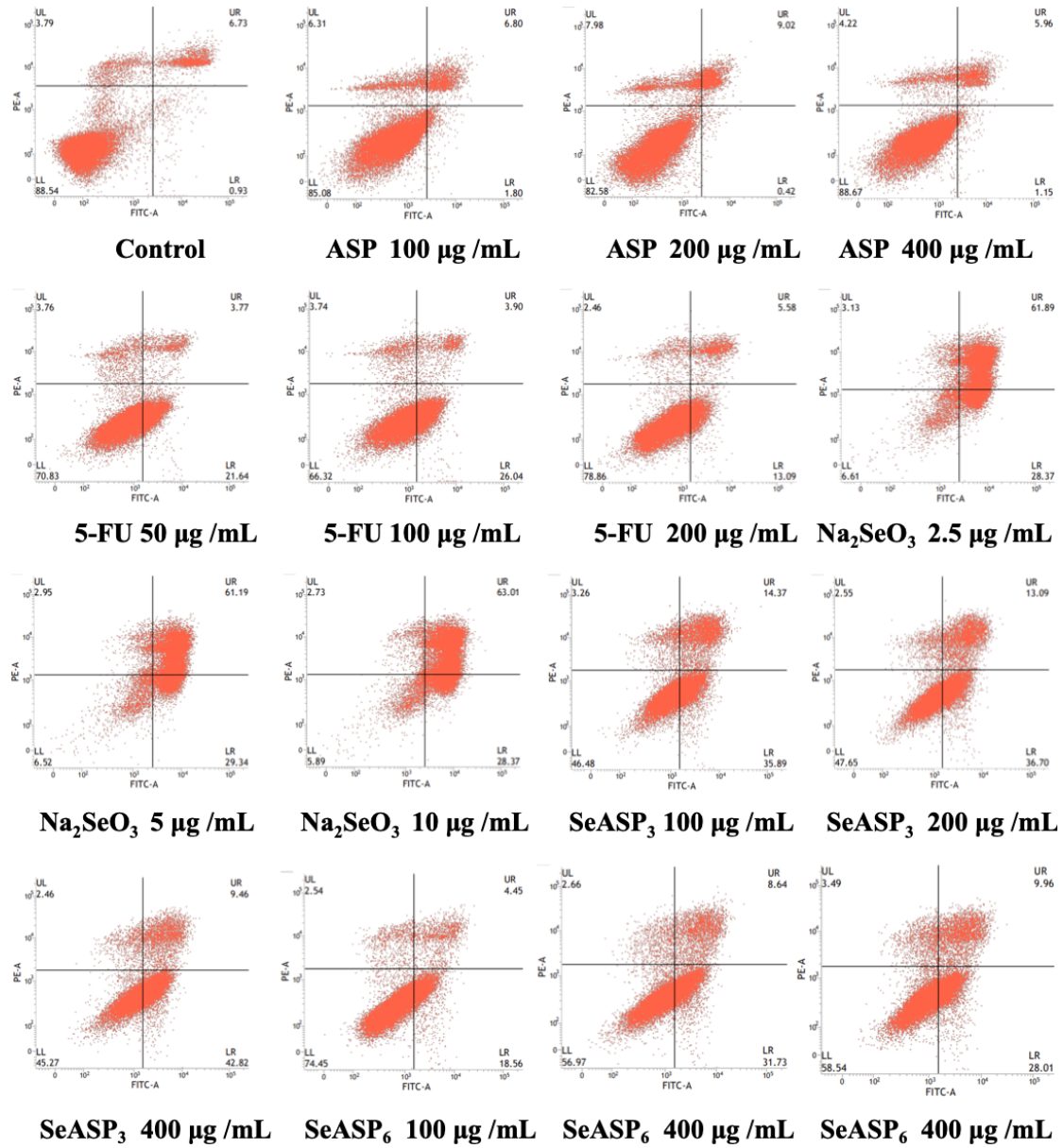


Fig. S12 Pro-apoptosis effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against H1975 cells after 24 h treatment.

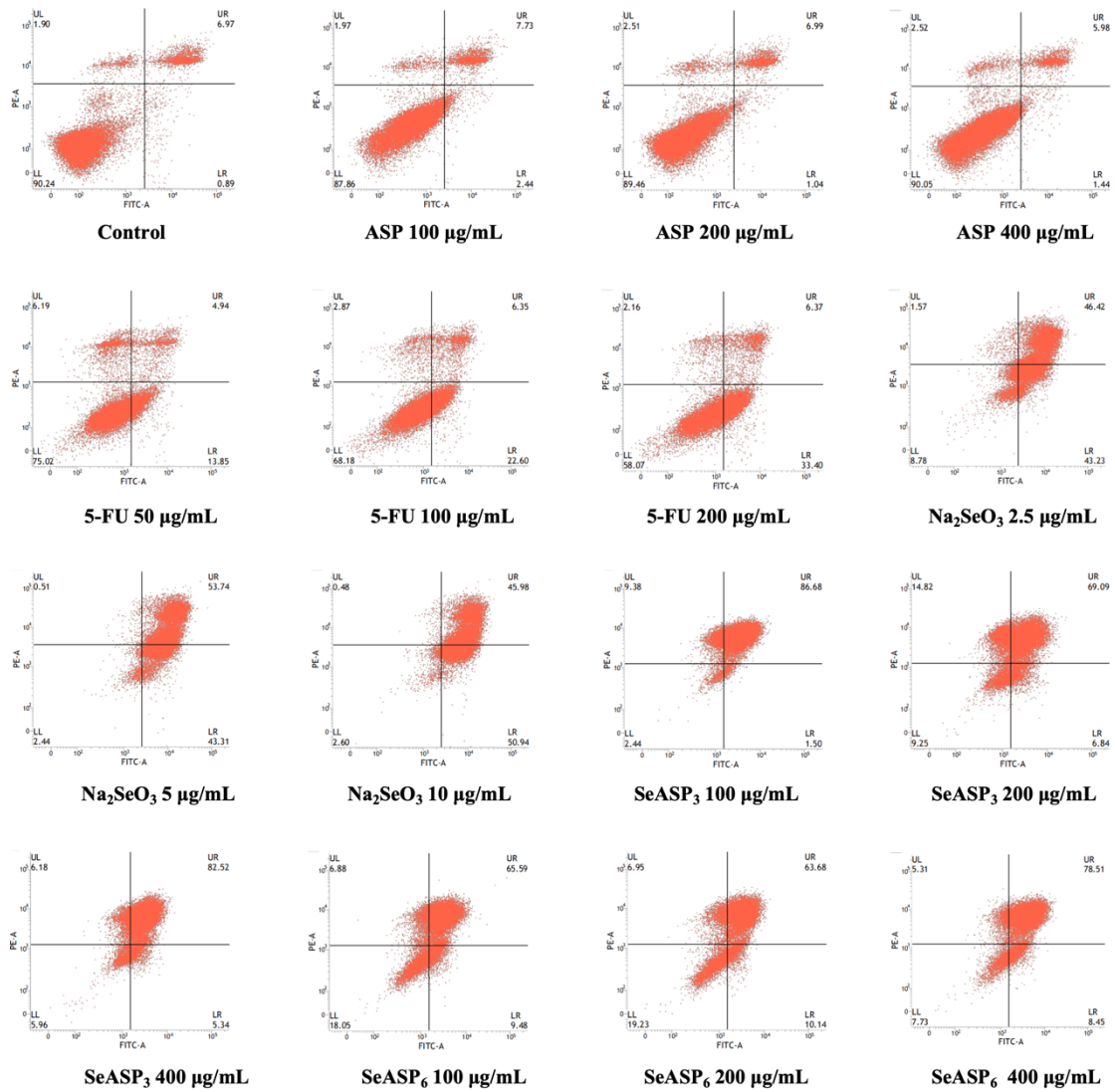


Fig. S13 Pro-apoptosis effects of Na₂SeO₃, 5-FU, ASP, and SeASPs against H1975 cells after 48 h treatment.