Figure S1. The expression of CK1 $\alpha$  mRNA was downregulated by lentivirus-based approaches. (A) The relative expression level of CK1 $\alpha$  mRNA was determined by RT-qPCR. Results are expressed as mean  $\pm$  SD of at least three independent experiments. (B) The level of CK1 $\alpha$  protein was determined by western blotting. Images shown are representatives of at least three independent experiments. CK1 $\alpha$ , casein kinase 1 $\alpha$ .



Figure S2. Chemotherapy drug Ara-c aggravates apoptosis and autophagy induced by inhibition of CK1 $\alpha$ . HEL cells transfected with shControl or shCSNK1A1 were treated with Ara-c for 48 h, and THP-1 and HEL cells were treated with 40  $\mu$ M D4476 in the presence or absence of 0.2  $\mu$ M Ara-c for 48 h. (A) The levels of LC3-II, PARP cleavage and survivin were determined. (B) The apoptosis was determined by Annexin V-FITC/PI or Annexin V-APC/7AAD. Images representing at least three independent experiments are shown. CK1 $\alpha$ , casein kinase 1 $\alpha$ ; Ara-c, cytosine arabinoside; LC3, LC3, microtubule-associated protein 1A/1B-light chain 3; PARP, PARP, poly(ADP-ribose) polymerase.



Figure S3. Inhibition of CK1 $\alpha$  does not affect cell cycle progression. The cell cycle was analyzed using PI staining by flow cytometry in HL-60 (A and B) or HEL cells (C and D) treated with or without 40  $\mu$ M D4476 for 48 h or transfected with shControl or shCSNK1A1 for 72 h, then screened with puromycin for 7 days. In panels A and C, the abscissa indicates the amount of DNA and the ordinate indicates the number of cells. The red area on the left indicates cells in the G1 phase, and the red area on the right indicates cells in the G2 phase; the grey pattern represents cells in the S phase. In panels B and D, the percentage of cells in each phase is presented in bar charts. Results are expressed as mean ± SD of at least three independent experiments. CK1 $\alpha$ , casein kinase 1 $\alpha$ ; PI, propidium iodide.

![](_page_2_Figure_1.jpeg)

Figure S4. Inhibition of CK1 $\alpha$  by D4476 increases LC3-II and p62 in AML cells. HL-60 or HEL cells were treated with 0, 20, 40  $\mu$ M D4476 for 12, 24 and 48 h, and the levels of LC3-II and SQSTM1/p62 were determined. Images representing at least three independent experiments are shown. CK1 $\alpha$ , casein kinase 1 $\alpha$ ; AML, acute myeloid leukemia; LC3, LC3, microtubule-associated protein 1A/1B-light chain 3; SQSTM1, sequestosome-1.

![](_page_3_Figure_1.jpeg)

Patient no.	Sex	Age (years)	CK1a mRNA expression	FAB subtypes
1	Male	31	0.34	M5
2	Female	81	0.56	M5
3	Male	45	0.46	M5
4	Female	28	20.83	M5
5	Female	69	14.98	M5
6	Male	84	17.98	M5
7	Male	44	7.53	M5
8	Male	60	25.08	M5
9	Female	31	34.82	M5
10	Male	73	14.90	M5
11	Female	64	0.56	M5
12	Male	31	0.01	M5
13	Female	76	0.15	M5
14	Male	46	2.35	M5
15	Female	56	37.92	M5
16	Female	24	71.91	M5
17	Female	64	96.45	M5
18	Male	78	1164.69	M5
19	Male	28	1.34	M5
20	Female	64	499.65	M5
21	Male	81	967.08	M5
22	Male	50	22.00	M5
23	Female	51	6.55	M5
24	Male	75	6.07	M5
25	Male	62	5.79	M5
26	Male	66	13.54	M5
27	Female	60	1.09	M5
28	Male	51	0.97	M5
29	Female	52	1.74	M5
30	Male	87	3.75	M5
31	Male	78	1.04	M5
32	Female	59	1.31	M5
33	Female	41	8.76	M5
34	Female	64	9.77	M4
35	Female	52	0.51	M4
36	Male	23	174.69	M4
37	Male	17	9.82	M4
38	Male	30	16.38	M4
39	Female	65	68.32	M4
40	Female	27	18.37	M4
41	Male	47	1.83	M4
42	Male	32	0.51	M4
43	Female	60	0.39	M4
44	Female	65	437.21	M4
45	Male	74	2234.68	M4
46	Female	23	4.42	M4
47	Female	64	1.18	M4
48	Female	52	1.99	M4
49	Male	54	0.00	M4
50	Male	25	3.38	M4
51	Male	54	1.43	M4
52	Male	80	1.75	M4
53	Male	59	0.49	M4
54	Male	28	1.47	M4
55	Male	77	11.36	M4
56	Male	52	583.73	M4

Table SI. Expression of CK1 $\alpha$  mRNA in 61 AML patients according to FAB types.

Table SI Continued.

Patient no.	Sex	Age (years)	CK1a mRNA expression	FAB subtypes
57	Male	55	0.01	M3
58	Female	56	0.01	M3
59	Female	75	36.34	M2
60	Male	53	18.22	M2
61	Female	27	7.91	M2

 $FAB, French-American-British\ classification;\ AML,\ acute\ myeloid\ leukemia;\ CK1\alpha,\ casein\ kinase\ 1\alpha.$ 

Table SII. Sequences of the primers used for real-time PCR.

Genes	Forward primer (5'-3')	Reverse primer (5'-3')	
CSNK1A1	AATGTTAAAGCAGAAAGCAGCAC	TCCTCAATTCATGCTTAGAAACC	
<i>p</i> 62	CTGGGACTGAGAAGGCTCAC	GCAGCTGATGGTTTGGAAAT	
GAPDH	ATCATCAGCAATGCCTCC	CATCACGCCACAGTTTCC	

CSNK1A1, casein kinase 1  $\alpha$  1; GAPDH, glyceraldehyde 3-phosphate dehydrogenase.

Table SIII. The target sequences and synthetic oligo information for shRNAs targeting CSNK1A1.

No.	TargetSeq
Target sequence A	GGACAATGTTAAAGCAGAA
Synthetic oligo A-1	5'-GATCCGGACAATGTTAAAGCAGAATTCAAGAGATTCTG
	CTTTAACATTGTCCTTTTTTG-3'
Synthetic oligo A-2	5'-AATTCAAAAAAGGACAATGTTAAAGCAGAATCTCTTGA
	A TTCTGCTTTAACATTGTCCG-3'
Target sequence B	GGCTAAAGGCTGCAACAAA
Synthetic oligo B-1	5'-GATCCGGCTAAAGGCTGCAACAAATTCAAGAGATTTGT
	TGCAGCCTTTAGCCTTTTTTG-3'
Synthetic oligo B-2	5'-AATTCAAAAAAGGCTAAAGGCTGCAACAAATCTCTTGA
	ATTTGTTGCAGCCTTTAGCCG-3'
Target sequence C	AAACTATTGTCGTGGGCTA
Synthetic oligo C-1	5'-GATCCGAAACTATTGTCGTGGGCTATTCAAGAGATAGCC
	C ACGACAATAGTTTTTTTTG-3'
Synthetic oligo C-2	5'-AATTCAAAAAAAAAACTATTGTCGTGGGCTATCTCTTGAA
	TAGCCCACGACAATAGTTTCG-3'
Target sequence D	CAAGAAGGTTCACAATGAA
Synthetic oligo D-1	5'-GATCCGCACTTTGACTTCCTGATAGATTCAAGAGATCTA
	T CAGGAAGTCAAAGTGCTTTTTTG-3'
Synthetic oligo D-2	5'-AATTCAAAAAAGCACTTTGACTTCCTGATAGATCTCTTG
	AATCTATCAGGAAGTCAAAGTGCG-3'
$\overline{CSNK1A1}$ , casein kinase 1 $\alpha$ 1.	