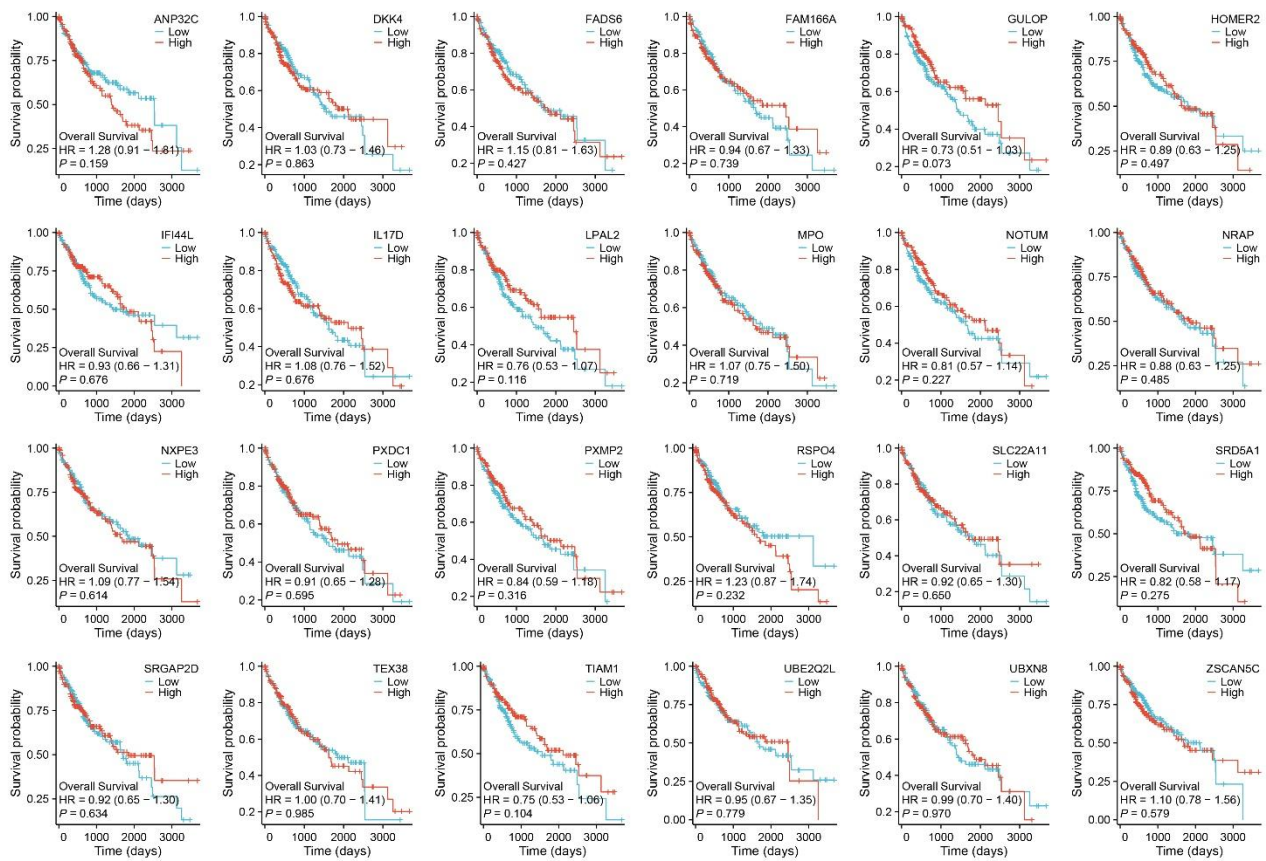
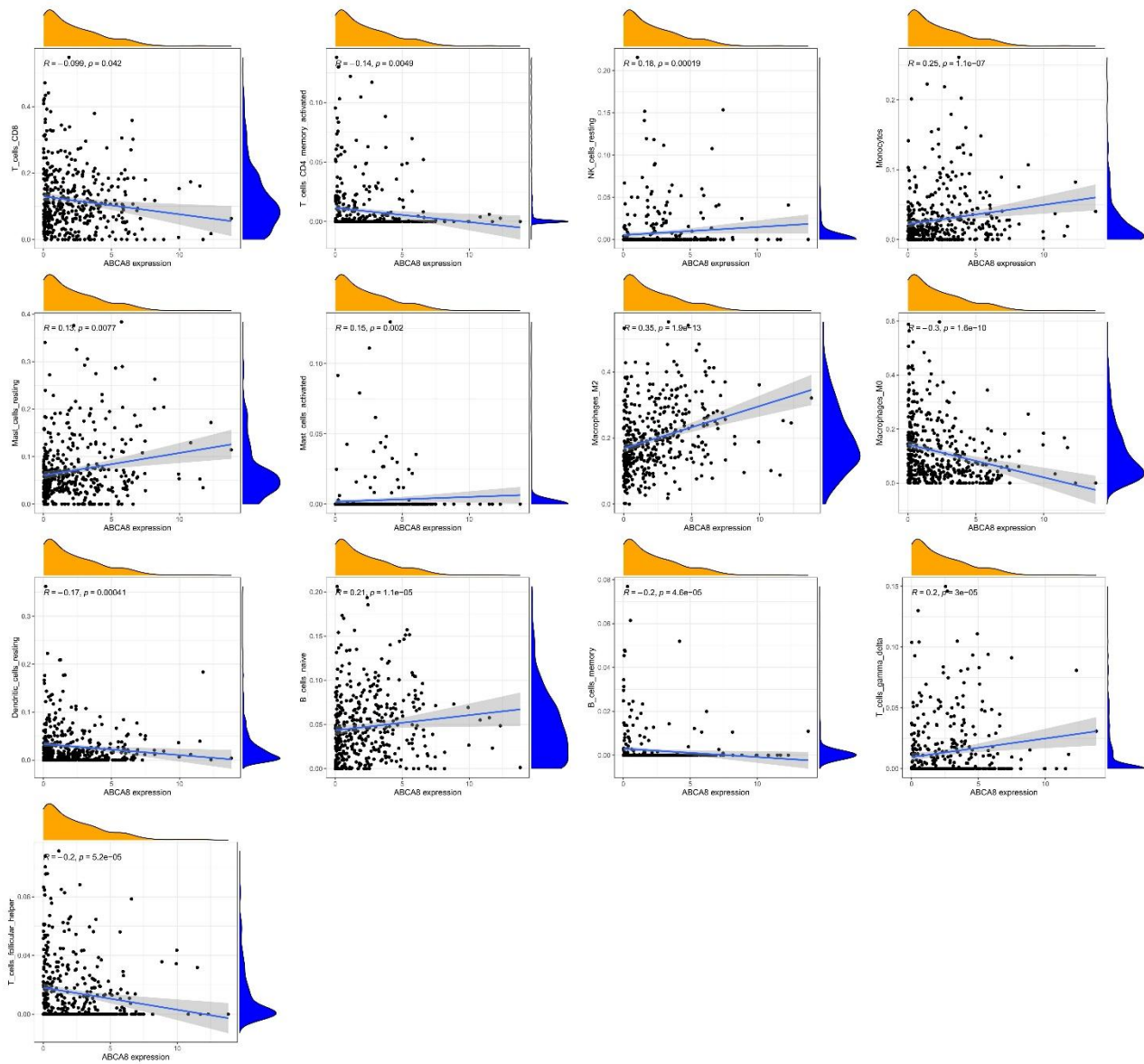


Supplementary Table 1 Univariate COX regression analysis

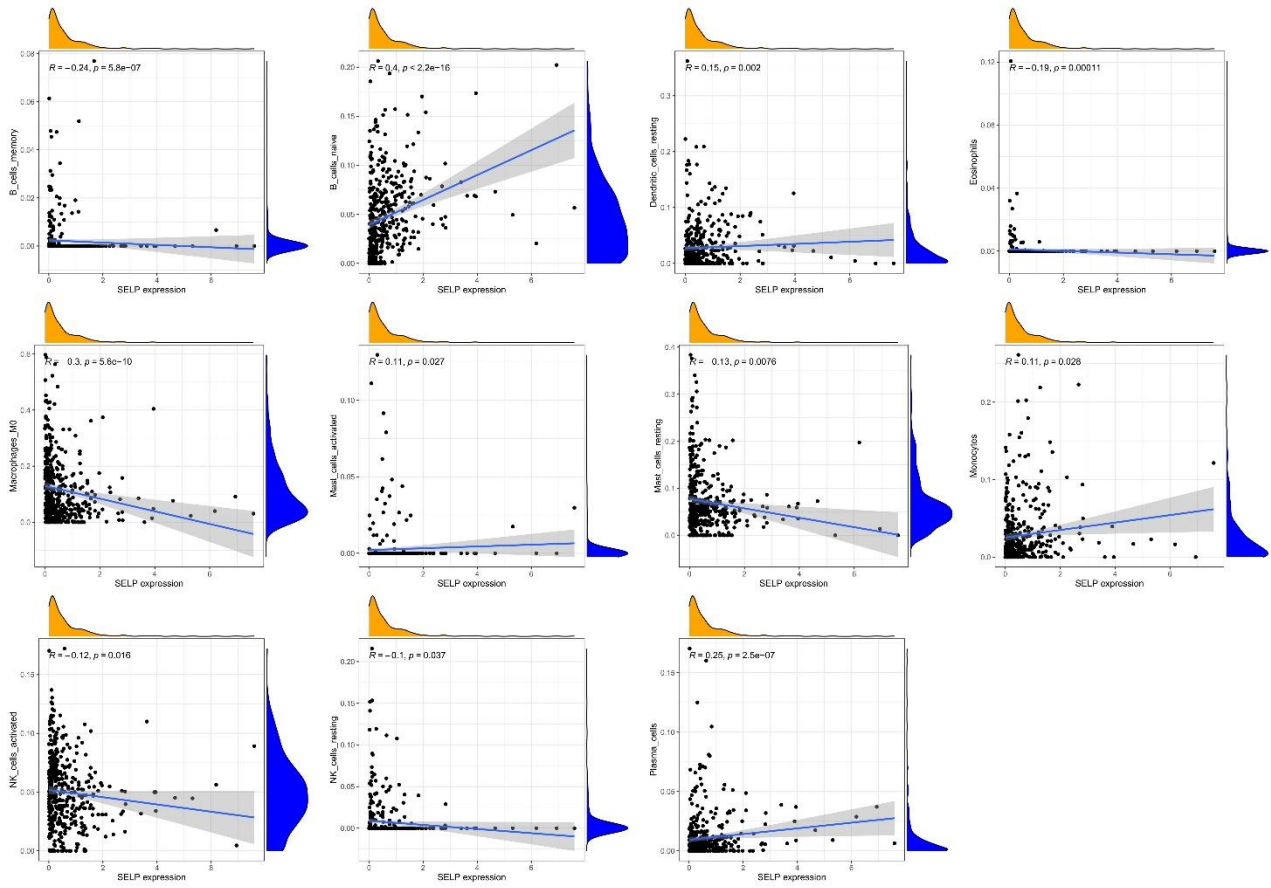
Gene	HR	HR.95L	HR.95H	pvalue	Coefficient
<i>ABCA8</i>	0.916585666	0.846469455	0.992509863	0.031942575	-0.019126792
<i>ANP32C</i>	140.1346445	1.545576675	12705.75502	0.031610871	0.672897359
<i>APCDD1</i>	0.943031735	0.896406334	0.992082295	0.023376289	-0.009962187
<i>CCL25</i>	1.001028683	1.000240918	1.001817068	0.010476897	0.000737809
<i>DKK4</i>	1.004940463	1.000935216	1.008961738	0.015574337	0.003410656
<i>FADS6</i>	1.026219559	1.001608937	1.05143489	0.036638452	0.012511638
<i>FAM166A</i>	1.860467104	1.033351334	3.349623434	0.038516474	0.113394449
<i>GULOP</i>	0.211064575	0.05591262	0.796747768	0.021720864	-0.511650481
<i>HOMER2</i>	0.937190358	0.878901374	0.999345083	0.047707998	-0.048182106
<i>IFI44L</i>	1.057638404	1.019198876	1.097527695	0.003009757	0.014497783
<i>IL17D</i>	1.070577053	1.02371403	1.119585346	0.002824435	0.020629083
<i>LPAL2</i>	1.22878208	1.040382438	1.451298432	0.015259441	0.036756511
<i>MPO</i>	2.254347404	1.144388306	4.440872204	0.018780834	0.527202265
<i>NOTUM</i>	0.99720747	0.994570518	0.999851415	0.038456385	-0.001441598
<i>NRAP</i>	1.224395787	1.009344717	1.485265657	0.039941846	0.073589712
<i>NXPE3</i>	1.245282482	1.021734182	1.517741587	0.029783981	0.0197275
<i>PXDC1</i>	0.990013334	0.980623741	0.999492834	0.038989267	-0.004091673
<i>PXMP2</i>	1.005629954	1.000045343	1.011245751	0.048163566	0.005801581
<i>RSPO4</i>	1.34558615	1.092959155	1.656605444	0.005145306	0.047675305
<i>SELP</i>	1.167606841	1.010835637	1.3486918	0.035163456	0.018652234
<i>SLC22A11</i>	0.969123339	0.939591683	0.999583184	0.046992466	-0.001954104
<i>SOCS2</i>	0.925319654	0.860123635	0.995457428	0.037333432	-0.03405654
<i>SRD5A1</i>	0.953285373	0.912792276	0.995574815	0.030755387	-0.016896324
<i>SRGAP2D</i>	1.568124126	1.093818095	2.248100744	0.014369008	0.382984976
<i>TEX38</i>	53.3599769	3.074956567	925.9601147	0.006305861	1.964022109
<i>TIAM1</i>	1.265125439	1.031208915	1.552102927	0.024159053	0.109065294
<i>UBE2Q2L</i>	3.32418627	1.531012649	7.217585278	0.002391653	0.905185303
<i>UBXN8</i>	0.904380073	0.838563158	0.975362808	0.009132917	-0.032022692
<i>ZSCAN5C</i>	1.12E-05	7.09E-10	0.17560446	0.020735062	-9.002265297



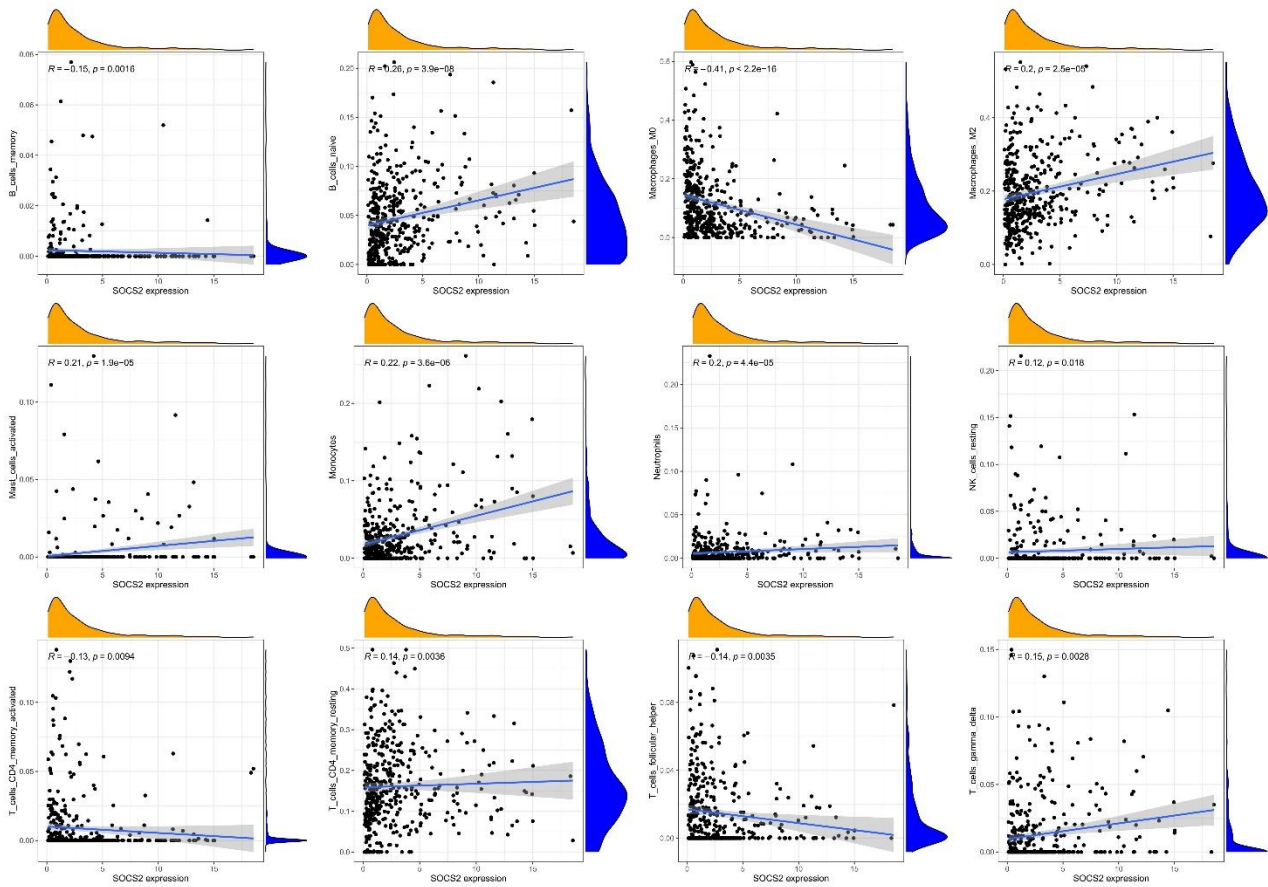
Supplementary Figure 1 Survival Curves of 24 Prognostic DEGs. Survival curve analysis of 25 DEGs related to LIHC prognosis, with no significant results obtained.



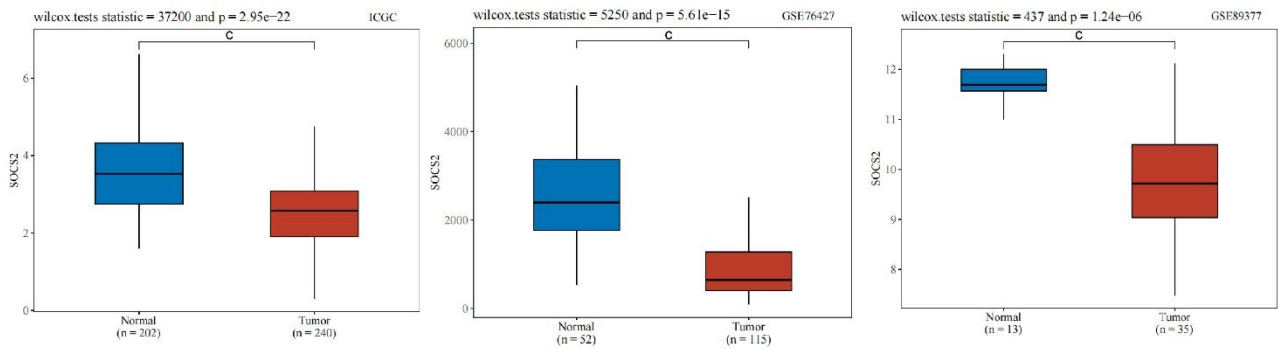
Supplementary Figure 2 Single-Gene Immune Infiltration Analysis of ABCA8. Correlation analysis of ABCA8 with 13 immune cell types.



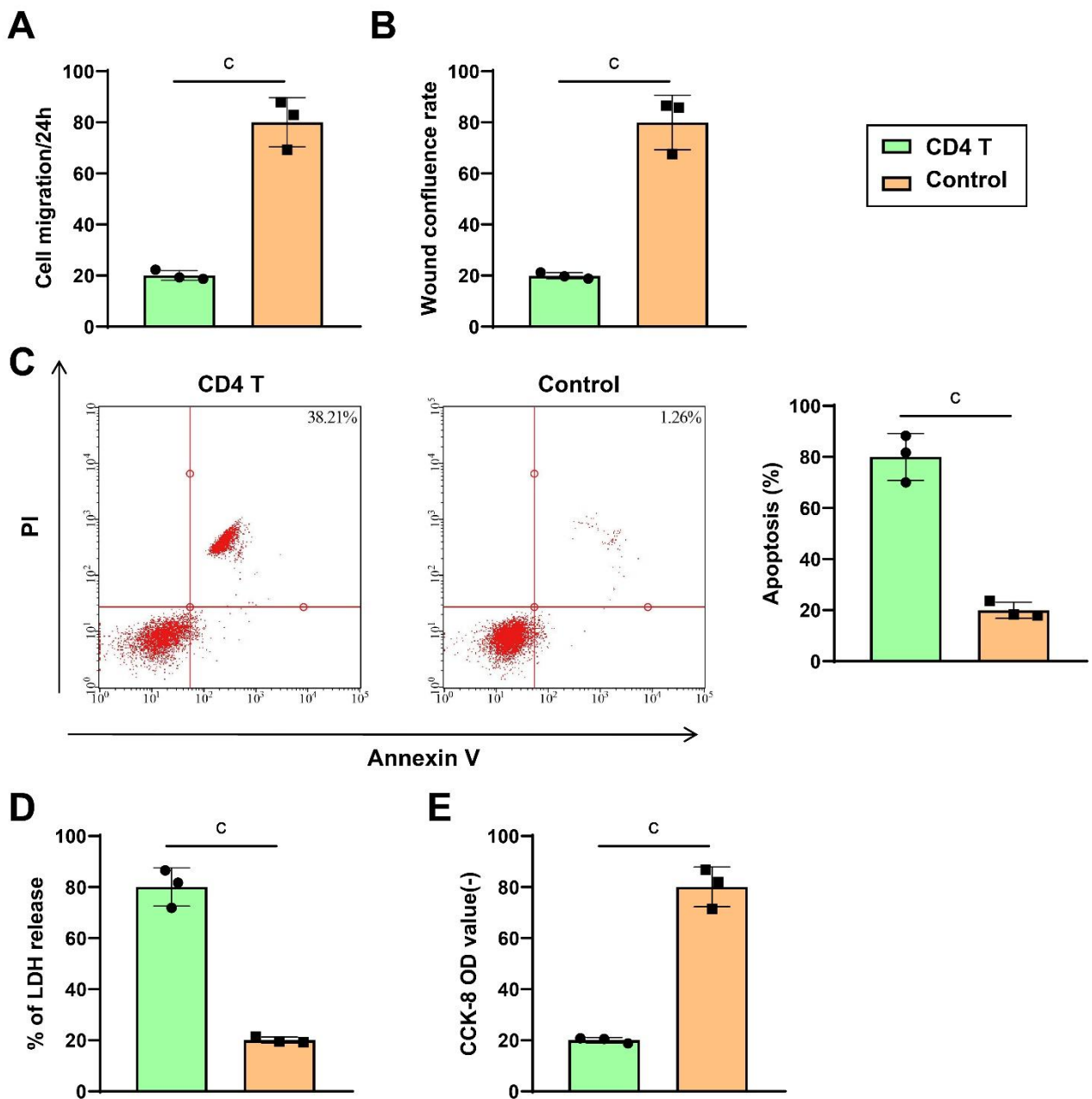
Supplementary Figure 3 Single-Gene Immune Infiltration Analysis of SELP. Correlation analysis of SELP with 11 immune cell types.



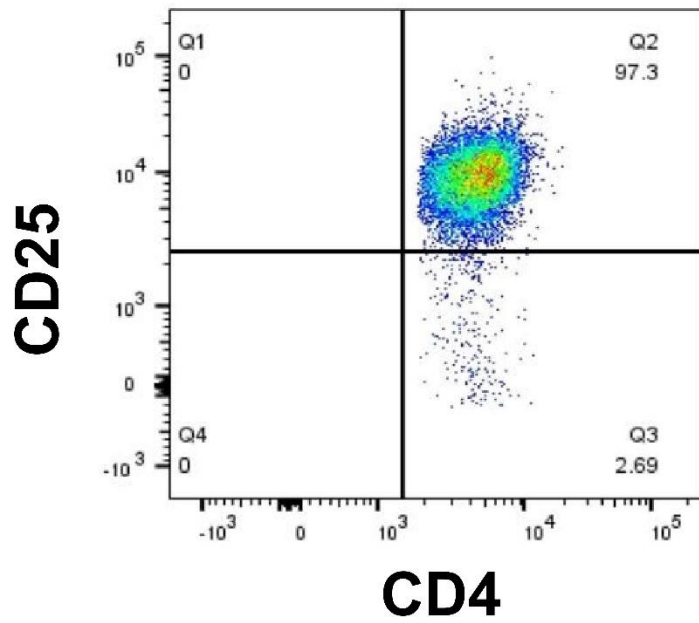
Supplementary Figure 4 Single-Gene Immune Infiltration Analysis of SOCS2. Correlation analysis of SOCS2 with 12 immune cell types.



Supplementary Figure 5. Differential Expression Analysis of SOCS2 in Normal and Tumor Tissues. ICGC dataset: Normal = 202, Tumor = 240; GSE76427 dataset: Normal = 52, Tumor = 115; GSE89377 dataset: Normal = 13, Tumor = 35; **** indicates $P < 0.0001$ for comparisons between normal and tumor groups.



Supplementary Figure 6 CD4 T Cells Inhibit Liver Cancer Cell Growth. (A) Representative images and cell numbers of Huh-7 migration assessed by Transwell assay; (B) Scratch assay to detect representative images of Huh-7 and wound closure rate, where the wound closure rate % = $(a-b) \times 100\%$; (C) Flow cytometry determining apoptosis rate of Huh-7 cells after co-culture; (D) Measurement of LDH release in Huh-7 cells after co-culture treatment; (E) CCK-8 assay to assess the viability of Huh-7 cells after co-culture treatment. Data are presented as mean \pm SD (with cell experiments repeated thrice, *** $p < 0.001$, statistical analysis performed using t-test).



Supplementary Figure 7 Identification of Treg Cell Proportion. Determination of Treg cell proportion using flow cytometry.