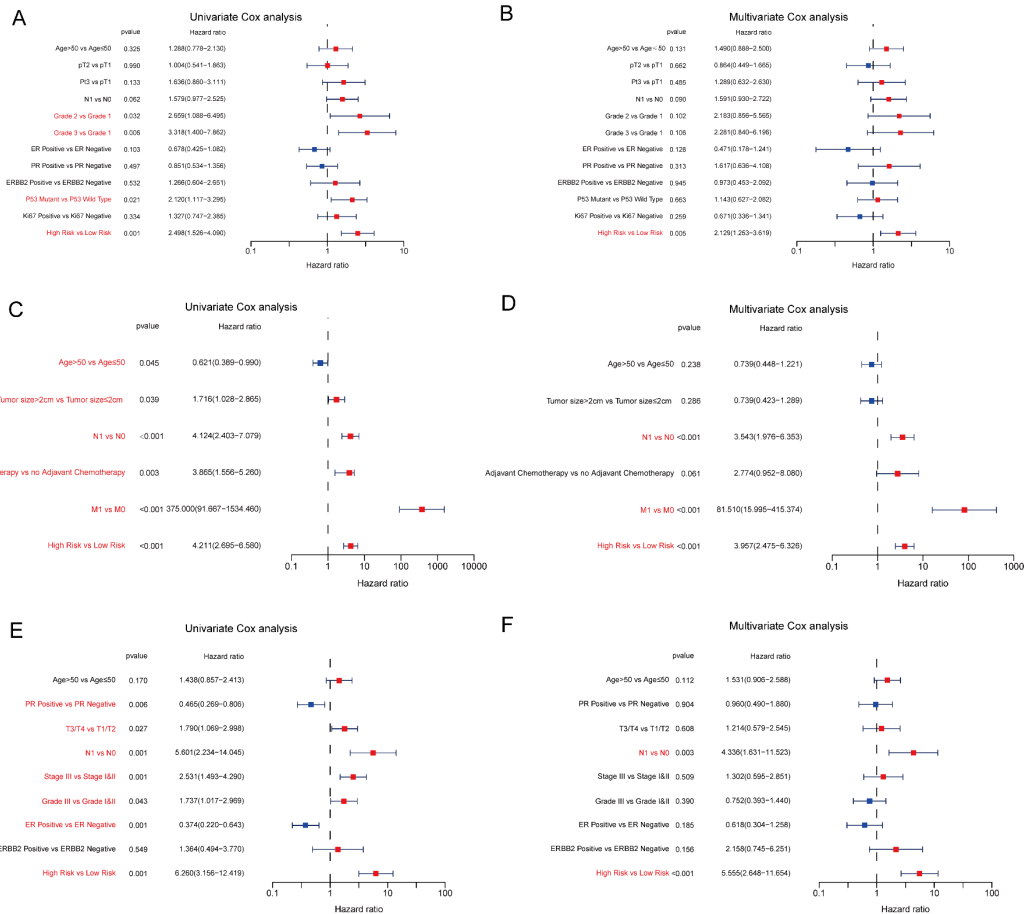
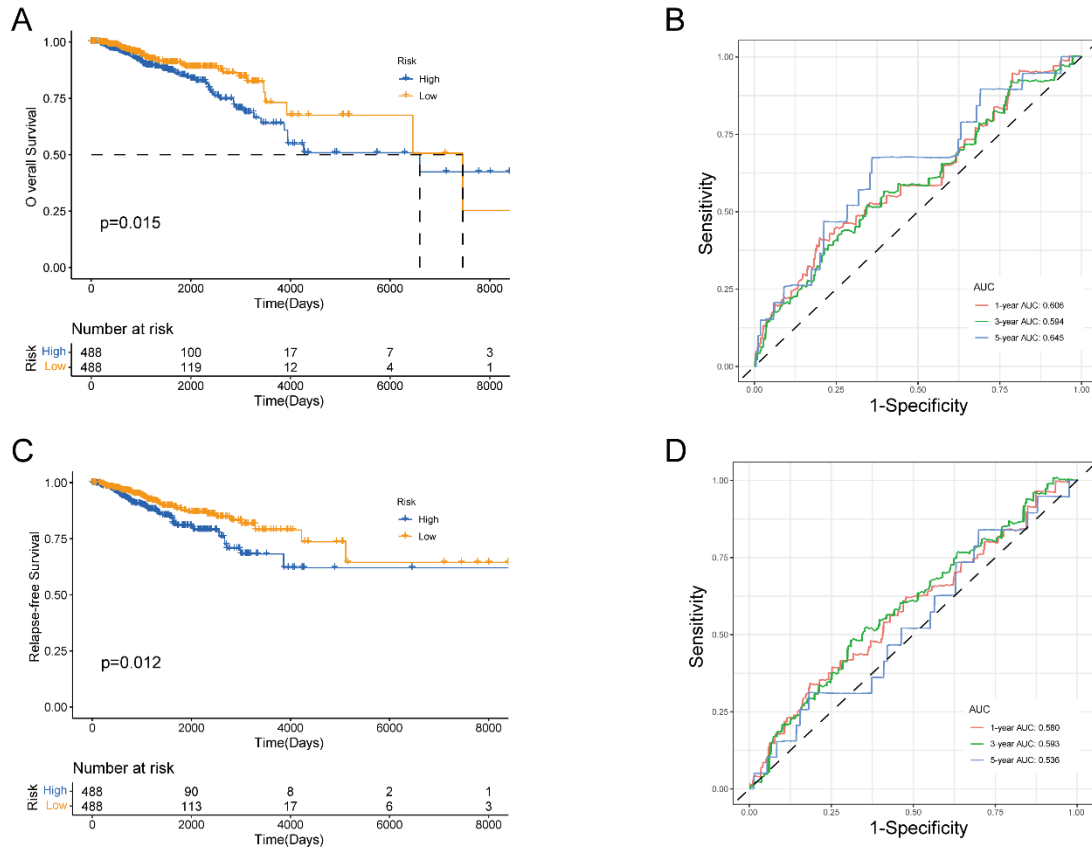


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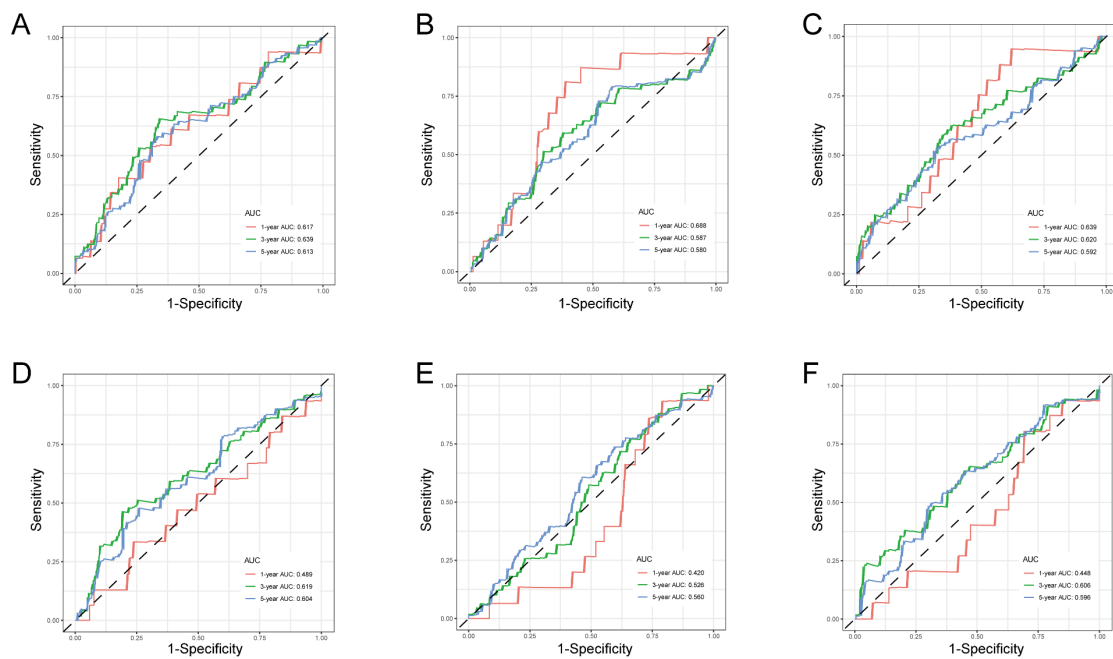
Supplementary Figure S1. Univariate and multivariate Cox analysis of clinicopathological features in training set and validation sets. (A, B) Univariate and multivariate Cox analysis of clinicopathological features of patients in GSE21653, respectively. (C, D) Univariate and multivariate Cox analysis of clinicopathological features of patients in GSE20685. (E, F) Univariate and multivariate Cox analysis of clinicopathological features of patients in GSE25055.



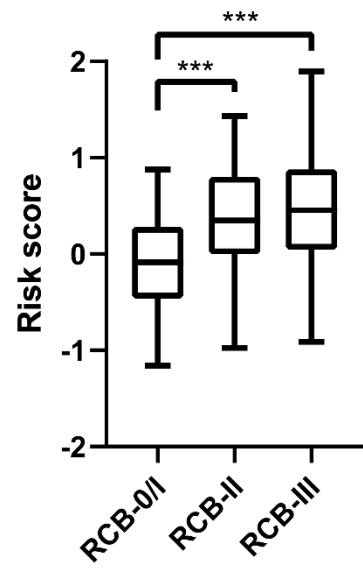
Supplementary Figure S2. Validation of necroptosis-related signature in TCGA - BRCA dataset. (A, B) Kaplan-Meier Survival analysis of overall survival for patients in high/low risk and ROC curve of 1-, 3-, 5-year survival in TCGA-BRCA dataset. (C,D) Kaplan-Meier Survival analysis of relapse-free survival for patients in high/low risk and ROC curve of 1-, 3-, 5-year survival in TCGA-BRCA dataset.



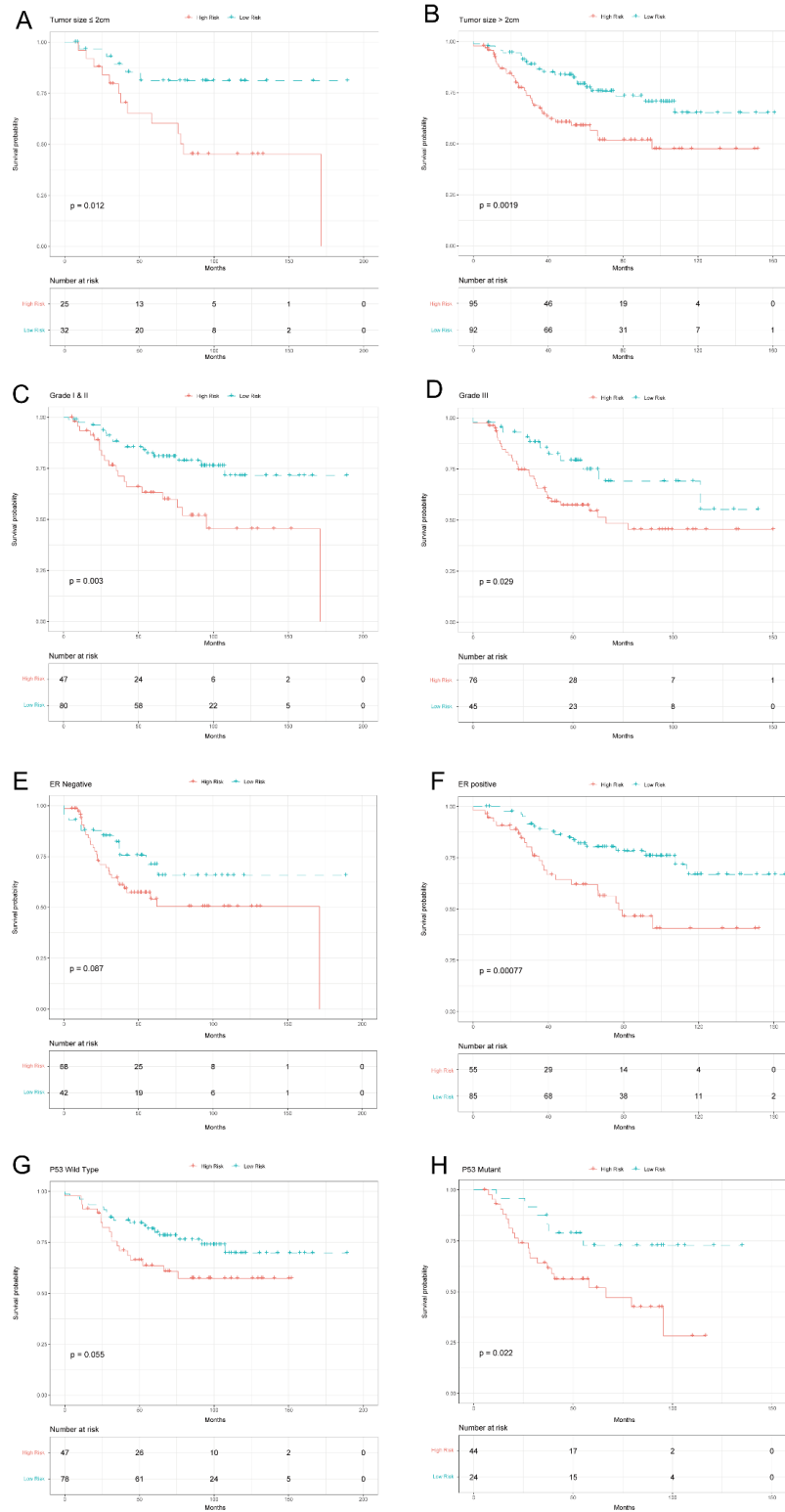
Supplementary Figure S3. ROC curve of other cell death-related prediction models. (A) ROC curve of 1-, 3-, 5-year survival of ferroptosis-related gene model (PMID: 35280394) in GSE21653. (B) ROC curve of 1-, 3-, 5-year survival of ferroptosis-related gene model (PMID: 34499616) in GSE21653. (C) ROC curve of 1-, 3-, 5-year survival of ferroptosis-related gene model (PMID: 34222241) in GSE21653. (D) ROC curve of 1-, 3-, 5-year survival of pyroptosis-related gene model (PMID: 35464869) in GSE21653. (E) ROC curve of 1-, 3-, 5-year survival of pyroptosis-related gene model (PMID: 35957895) in GSE21653. (F) ROC curve of 1-, 3-, 5-year survival of pyroptosis-related gene model (PMID: 35656090) in GSE21653.



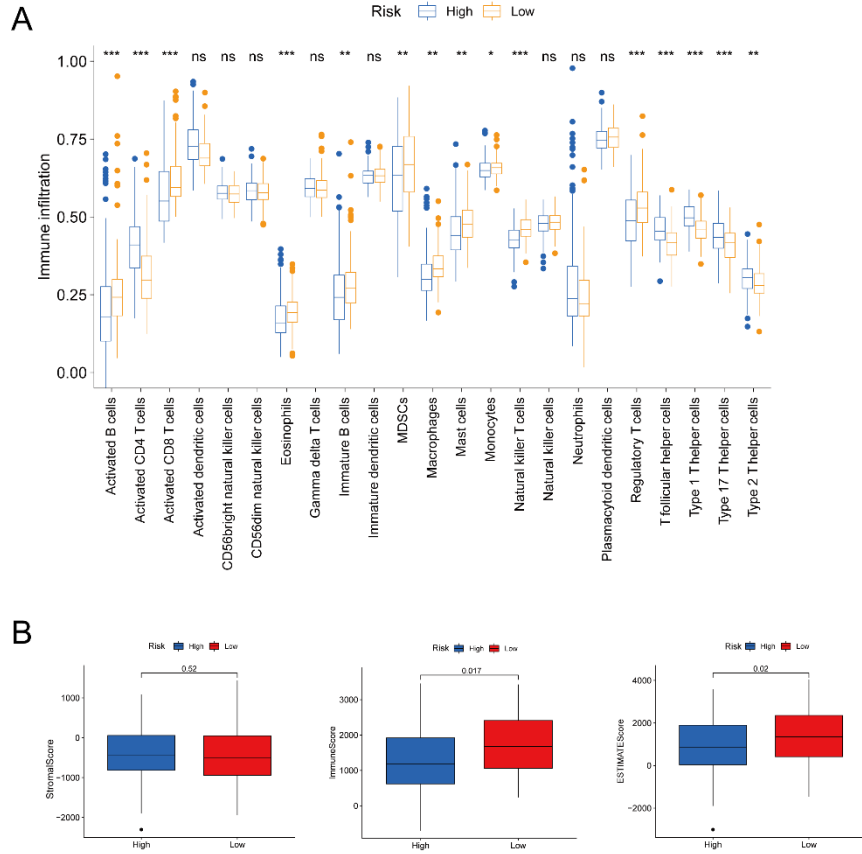
Supplementary Figure S4. Correlation between risk score and RCB assessment after neoadjuvant chemotherapy. (***, $p < 0.001$)



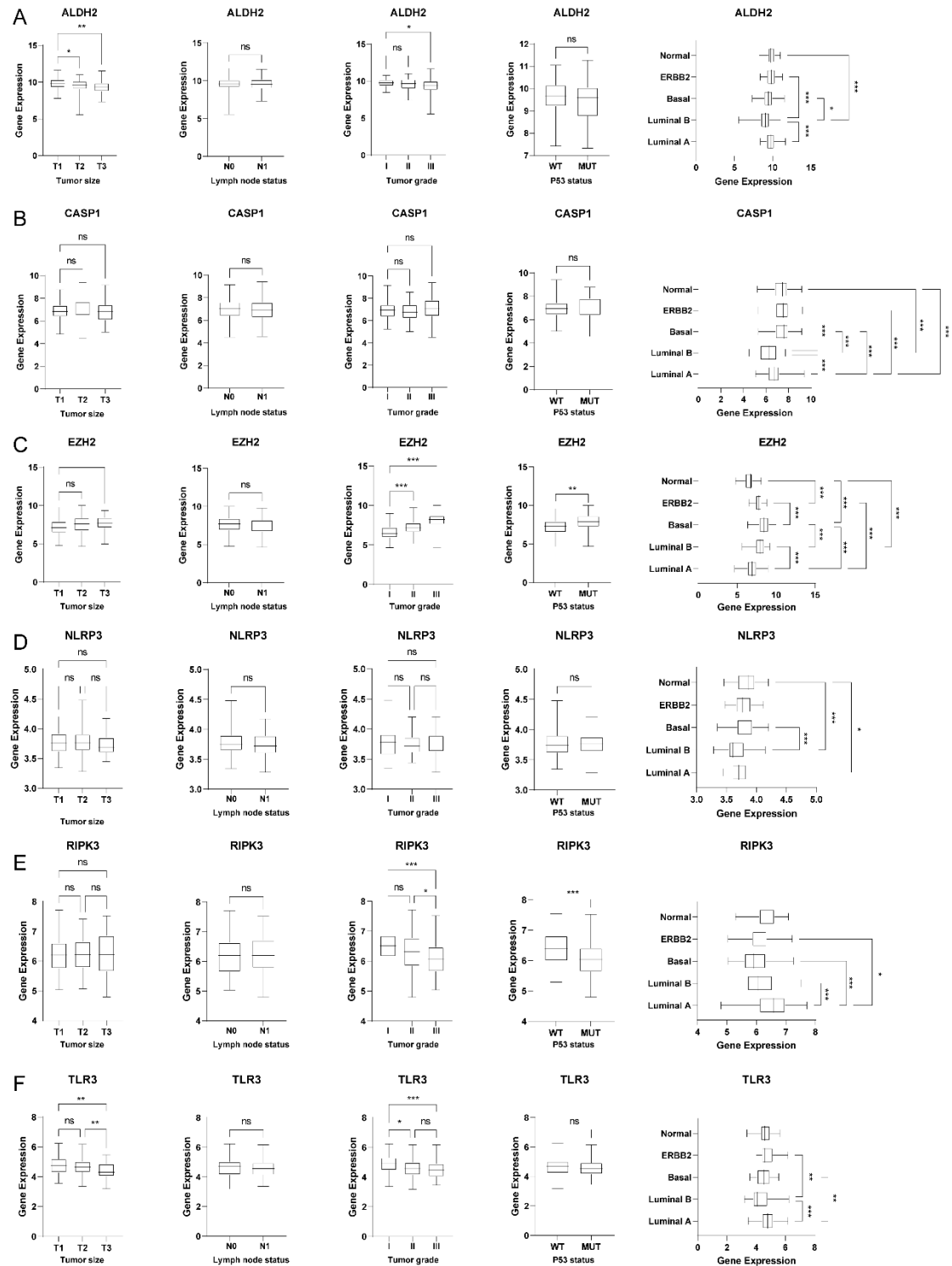
Supplementary Figure S5. Kaplan-Meier analysis for patients in BRCA cohort according to the necroptosis-related signature stratified by clinicopathological risk factors. (A, B) Tumor size. (C, D) Tumor grade. (E, F) ER status. (G, H) TRP53 mutation status.



Supplementary Figure S6. Immune profiles of two prognostic subgroups after prior therapies. (A) Immune cell infiltration analysis between two subgroups. (B) ESTIMATE analysis for the comparisons between cluster A and B were presented in histogram. (ns, not significant; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$)



Supplementary Figure S7. (A-F) Relative mRNA expression of ALDH2, CASP1, EZH2, NLRP3, RIPK3 and TLR3, respectively, in BRCA patients stratified by different clinicopathological risk factors as tumor size, lymph node status, tumor grade, p53 status and molecular subtypes. (ns, not significant; *, $p < 0.05$; **, $p < 0.01$; *, $p < 0.001$)**



Supplementary Table S1. Clinicopathologic characteristics of breast cancer patients in GSE21653 dataset.

Variables	GSE21653
Age at diagnosis (years)	
≤ 50	87
> 50	165
Tumor size	
T1	57
T2	121
T3	66
Unknown	8
Lymph node status	
Negative	116
Positive	133
Grade	
I	43
II	84
III	121
ER status	
Negative	110
Positive	140
PR status	
Negative	124
Positive	126
ERBB2 status	
Negative	207
Positive	26
Unknown	19
P53 status	
Wild Type	125
Mutant	68
Unknown	59
Ki67 status	
Negative	58
Positive	142
Unknown	52
Molecular subtype	
Basal	75
ERBB2	22
Luminal A	85
Luminal B	44
Normal	26
Vital status	
Alive	169
Dead	83
Median follow-up (Months)	52.92

Supplementary Table S2. Expression of necroptosis-related genes between two clusters

Table S2. Expression of necroptosis-related genes between two clusters					
	logFC	AveExpr	t	P.Value	adj.P.Val
AIM2	-0.18214	0.17264	-9.80871	8.19E-22	3.49E-21
ALDH2	-0.22270	0.15471	-15.99494	7.88E-52	6.31E-51
BAK1	-0.71461	0.85340	-19.57524	3.06E-73	3.27E-72
BAX	-0.02288	0.02665	-6.17285	9.48E-10	2.43E-09
CASP1	-1.30528	1.26639	-20.60360	8.79E-80	1.41E-78
CASP3	-0.14188	0.10649	-4.06793	5.09E-05	9.58E-05
CASP4	-0.48085	4.90707	-9.36454	4.32E-20	1.73E-19
CASP5	-0.43703	1.13640	-4.47759	8.35E-06	1.78E-05
CASP6	-0.45136	0.98129	-5.51323	4.41E-08	1.04E-07
CASP8	-0.93030	3.18154	-13.06115	2.68E-36	1.90E-35
CASP9	-1.27296	4.33193	-18.34229	1.31E-65	1.20E-64
CHMP2A	0.09950	5.45071	3.33579	0.00087958	0.00152143
CHMP2B	-0.87881	3.00189	-12.33898	8.18E-33	5.24E-32
CHMP4B	-0.04061	0.85601	-1.11806	0.26378933	0.30147352
CHMP4C	-0.05920	0.19740	-2.10654	0.03538847	0.05147414
CHMP6	-0.00404	0.41249	-0.14127	0.88768415	0.88768415
CHMP7	-0.12812	0.59151	-4.88325	1.20E-06	2.65E-06
CXCL1	-1.64459	3.07007	-23.12505	2.17E-96	4.63E-95
CYCS	0.66268	9.97277	6.41193	2.15E-10	5.72E-10
ELANE	-0.10811	0.18832	-3.56087	0.00038577	0.00068581
EZH2	1.24750	3.30636	7.16043	1.49E-12	4.32E-12
GPX4	-0.95657	5.02496	-11.41589	1.42E-28	7.56E-28
GSDMB	-0.28922	1.24580	-4.26998	2.13E-05	4.25E-05
GSDMC	-0.60895	1.90531	-10.21738	1.87E-23	9.20E-23
GSDMD	-0.04129	0.10134	-6.12049	1.30E-09	3.21E-09
GZMA	-0.03700	0.61218	-0.71244	0.47634628	0.51671461
GZMB	0.00362	0.09670	0.21860	0.82700673	0.84013382
HMGB1	0.06446	0.78165	1.23133	0.21846693	0.25421607
IL18	-0.03680	1.05022	-1.00232	0.31641378	0.34914624
IL1A	-0.19824	2.46816	-3.76666	0.0001744	0.0003189
IL1B	0.03101	0.16291	1.24162	0.21464882	0.25421607
IL6	-0.02238	0.13347	-1.85528	0.06382939	0.0888061
IRF1	-0.04234	0.59717	-1.48187	0.13866612	0.17066599
IRF2	-0.03833	0.29184	-2.60463	0.00932409	0.01530107
MLKL	0.09265	5.28950	2.26377	0.02378662	0.03713033
NDRG2	-0.78826	3.30280	-9.87016	4.68E-22	2.14E-21
NLRC4	0.26250	2.80768	5.05350	5.09E-07	1.16E-06
NLRP1	-0.38399	5.54476	-7.57674	7.61E-14	2.32E-13
NLRP2	-0.63314	1.12635	-11.78433	3.09E-30	1.80E-29
NLRP3	-2.51005	2.85676	-28.23652	9.72E-132	3.11E-130
NLRP6	-0.07857	0.86967	-1.61826	0.10589959	0.13831783
NLRP7	-0.24647	1.15761	-7.10370	2.20E-12	6.13E-12
NOD1	-0.39680	6.59827	-7.67425	3.71E-14	1.19E-13
NOD2	-0.03360	4.78342	-0.59607	0.55125625	0.58800667
NR2C2	0.17166	4.34557	1.63737	0.10184562	0.13579416
PGAM5	-2.51005	2.85676	-28.23652	9.72E-132	3.11E-130
PLCG1	-0.03311	4.19930	-0.37090	0.7107815	0.73370994
PRKACA	0.09819	5.54820	2.74037	0.00623848	0.01050691
PYCARD	-0.03716	0.53842	-1.40926	0.15904695	0.19205669
RIPK1	-0.06647	2.93436	-1.82976	0.06756233	0.09199977
RIPK3	-0.68344	0.88433	-19.96181	1.11E-75	1.42E-74
SCAF11	0.28586	1.45978	4.11260	4.21E-05	8.16E-05
TIRAP	-0.02742	0.21528	-1.99997	0.04575451	0.06507309
TLR2	-0.00709	0.05117	-1.05083	0.29357219	0.32962492
TLR3	-0.35203	6.36992	-7.85580	9.57E-15	3.22E-14
TLR4	-0.02522	0.10477	-1.57117	0.11643596	0.14668582
TNF	-0.48800	6.24250	-8.21231	6.16E-16	2.32E-15
TNFRSF1A	-0.99857	3.10620	-8.19991	6.79E-16	2.41E-15
TP53	-0.01182	0.13833	-0.39800	0.69070612	0.72467527
TP63	-0.01002	0.00801	-2.17249	0.03003643	0.04470538
TRAF2	-0.00973	0.00696	-2.21087	0.02725417	0.04153017
USP22	-0.11095	0.08016	-4.41400	1.12E-05	2.31E-05
ZBP1	-0.02143	0.02403	-2.51481	0.01205448	0.01928716