Supplementary

Table S1 Ferroptosis-related genes

Symbol	Function	Symbol	Function	Symbol	Function	Symbol	Function
RPL8	Driver	MT1DP	Driver	COX4I2	Driver	GDF15	Suppressor
IREB2	Driver	PEX10	Driver	lncRNA AABR07017145.1	Driver	ABHD12	Suppressor
ATP5MC3	Driver	AGPAT3	Driver	TIMP1	Driver	PPP1R13L	Suppressor
CS	Driver	PEX12	Driver	KDM6B	Driver	TFAM	Suppressor
EMC2	Driver	CHP1	Driver	METTL14	Driver	KDM3B	Suppressor
ACSF2	Driver	GPAT4	Driver	MIB1	Driver	RNF113A	Suppressor
NOX1	Driver	BRPF1	Driver	KDM5C	Driver	AHCY	Suppressor
CYBB	Driver	OSBPL9	Driver	MEG3	Driver	circ-TTBK2	Suppressor
NOX3	Driver	INTS2	Driver	CCDC6	Driver	MIR522	Suppressor
NOX4	Driver	MMD	Driver	CFL1	Driver	IDH2	Suppressor
NOX5	Driver	CYP4F8	Driver	MIR539	Driver	PPARA	Suppressor
DUOX1	Driver	MLLT1	Driver	KMT2D	Driver	NOS2	Suppressor
DUOX2	Driver	TTPA	Driver	PTGS2	Marker	SIAH2	Suppressor
ATF4	Driver, suppressor	GRIA3	Driver	IL6	Driver, suppressor	RELA	Suppressor
PGD	Driver	EPT1	Driver	MIR214	Driver, suppressor	VDR	Suppressor
CHAC1	Driver, marker	POM121L12	Driver	NFE2L2	Marker, suppressor	NEDD4	Suppressor
FLT3	Driver	LIG3	Driver	PIK3CA	Driver, suppressor	PRDX1	Suppressor
SCP2	Driver	AEBP2	Driver	PRKAA2	Driver, suppressor	AR	Suppressor
ACSL4	Driver	AGPS	Driver	AKR1C1	Suppressor	MTF1	Suppressor
LPCAT3	Driver	CDCA3	Driver	AKR1C2	Suppressor	COPZ1	Suppressor
NRAS	Driver	PEX2	Driver	AKR1C3	Suppressor	NUPR1	Suppressor
KRAS	Driver	PEX6	Driver	RB1	Suppressor	USP35	Suppressor
HRAS	Driver	TIMM9	Driver	SIRT1	Driver, suppressor	NEAT1	Suppressor
FADS2	Driver, suppressor	DCAF7	Driver	HSF1	Suppressor	PARP1	Suppressor
TFR2	Driver	LCE2C	Driver	GCLC	Suppressor	PARP2	Suppressor
SLC38A1	Driver	FAR1	Driver	SQSTM1	Suppressor	PARP3	Suppressor
SLC1A5	Driver	PHF21A	Driver	NQO1	Suppressor	PARP4	Suppressor
GLS2	Driver	SMAD7	Driver	SIRT3	Driver, suppressor	PARP6	Suppressor
FTH1	Marker, suppressor	LYRM1	Driver	MUC1	Suppressor	PARP8	Suppressor
CARS1	Driver	AMN	Driver	SLC3A2	Suppressor	PARP9	Suppressor
ALOX5	Driver	PEX3	Driver	MT1G	Suppressor	PARP10	Suppressor
KEAP1	Driver	MTCH1	Driver	SLC40A1	Marker, suppressor	PARP11	Suppressor
ATG5	Driver	ACADSB	Driver	CISD1	Suppressor	PARP12	Suppressor
ATG7	Driver	PVT1	Driver	FANCD2	Suppressor	PARP14	Suppressor
NCOA4	Driver	hsa_circ_0008367	Driver	FTMT	Suppressor	PARP15	Suppressor
ALOX12	Driver	SLC39A14	Driver	HSPA5	Suppressor	PARP16	Suppressor
ALOX12B	Driver	MAP3K11	Driver	SLC7A11	Driver, suppressor	PDSS2	Suppressor
ALOX15	Driver	GSK3B	Driver	HELLS	Suppressor	TXN	Suppressor
ALOX15B	Driver	BRD7	Driver	SCD	Suppressor	SENP1	Suppressor
ALOXE3	Driver	SLC25A28	Driver	SRC	Suppressor	OIP5-AS1	Suppressor
PHKG2	Driver	MFN2	Driver	STAT3	Suppressor	MIR190A	Suppressor
ACO1	Driver	SLC11A2	Driver	PML	Suppressor	FGF21	Suppressor
G6PDX	Driver	ZFAS1	Driver	MTOR	Suppressor	CREB1	Suppressor
ULK1	Driver	TSC1	Driver	NFS1	Suppressor	CREB3	Suppressor
ATG3	Driver	TGFB1	Driver	TP63	Suppressor	CREB5	Suppressor
ATG4D	Driver	SNCA	Driver	CDKN1A	Suppressor	TP53	Driver, suppressor
BECN1	Driver	HIF1A	Driver, suppressor	MIR137	Suppressor	MIR130B	Suppressor
MAP1LC3A	Driver	CGAS	Driver	ENPP2	Suppressor	BEX1	Suppressor
GABARAPL2	Driver	STING1	Driver	SMPD1	Driver, suppressor	ASAH2	Suppressor
GABARAPL1	Driver	HDDC3	Driver	FH	Suppressor	FABP4	Suppressor
ATG16L1	Driver	MIR761	Driver	CISD2	Suppressor	AKT1S1	Suppressor
WIPI1	Driver	MDM2	Driver	MIR9-1	Suppressor	MLST8	Suppressor
WIPI2	Driver	MDM4	Driver	MIR9-2	Suppressor	TYRO3	Suppressor
SNX4	Driver	DLD	Driver	MIR9-3	Suppressor	SIRT6	Suppressor
ATG13	Driver	WWTR1	Driver	CBS	Suppressor	TMSB4X	Suppressor
ULK2	Driver	PRKCA	Driver	ISCU	Suppressor	TMSB4Y	Suppressor
SAT1	Driver	LGMN	Driver	ACSL3	Suppressor	KIF20A	Suppressor
EGFR	Driver	HMOX1	Driver, suppressor	OTUB1	Suppressor	ECH1	Suppressor
MAPK3	Driver	MYCN	Driver	CD44	Suppressor	circRHOT1	Suppressor
MAPK1	Driver	IFNA1	Driver	LINC00336	Suppressor	ETV4	Suppressor
BID	Driver	IFNA2	Driver	BRD4	Suppressor	MEG8	Suppressor
ZEB1	Driver	IFNA4	Driver	PRDX6	Suppressor	VCP	Suppressor
DPP4	Driver	IFNA5	Driver	MIR17	Suppressor	circ_0007142	Suppressor
CDKN2A	Driver	IFNA6	Driver	SESN2	Suppressor	RBMS1	Suppressor
PEBP1	Driver	IFNA7	Driver	NF2	Suppressor	KDM4A	Suppressor
SOCS1	Driver	IFNA8	Driver	ARNTL	Suppressor	MGST1	Suppressor
CDO1	Driver	IFNA10	Driver	JUN	Suppressor	circKIF4A	Suppressor
MYB	Driver	IFNA13	Driver	CA9	Suppressor	miR-7-5p	Suppressor
MAPK8	Driver	IFNA14	Driver	TMBIM4	Suppressor	circ_0067934	Suppressor
MAPK9	Driver	IFNA16	Driver	PLIN2	Suppressor	MPC1	Suppressor
G6PD	Driver, suppressor	IFNA17	Driver	MIR212	Suppressor	CHMP1A	Suppressor
MAPK14	Driver	IFNA21	Driver	Fer1HCH	Suppressor	CAMKK2	Suppressor
LINC00472	Driver	SMG9	Driver	AIFM2	Suppressor	SOX2	Suppressor
PRKAA1	Driver	PPARG	Driver	LAMP2	Suppressor	SRSF9	Suppressor
ELAVL1	Driver	MIR335	Driver	ZFP36	Suppressor	PROK2	Suppressor
BAP1	Driver	SNX5	Driver	PROM2	Suppressor	MIR4443	Suppressor
ABCC1	Driver	PAQR3	Driver	CHMP5	Suppressor	SIRT2	Suppressor
MIR6852	Driver	MICU1	Driver	CHMP6	Suppressor	circRNA1615	Suppressor
ACVR1B	Driver	TOR2A	Driver	CAV1	Suppressor	MIR27A	Suppressor
TGFBR1	Driver	MIR375	Driver	GCH1	Suppressor	MIR670	Suppressor
EPAS1	Driver	MAP3K14	Driver	TF	Driver, marker, suppressor	MEF2C	Suppressor
HILPDA	Driver	CircKDM4C	Driver	DAZAP1	Suppressor	EZH2	Suppressor
GOT1	Driver, suppressor	MIR324	Driver	PIR	Suppressor	PEDS1	Suppressor
IFNG	Driver	QSOX1	Driver	FTL	Suppressor	USP11	Driver, suppressor
ANO6	Driver	MIB2	Driver	HCAR1	Suppressor	ADAMTS13	Suppressor
LPIN1	Driver	CLTRN	Driver	SLC16A1	Suppressor	CDC25A	Suppressor
HMGB1	Driver	KLF2	Driver	RRM2	Suppressor	CircFNDC3B	Suppressor
TNFAIP3	Driver	MIR5096	Driver	NR4A1	Suppressor	PPARD	Suppressor
TLR4	Driver	HOTAIR	Driver	RPTOR	Suppressor	ENO3	Suppressor
ATF3	Driver	H19	Driver	SREBF1	Suppressor	LCN2	Suppressor
ATM	Driver	FOXO4	Driver	SREBF2	Suppressor	MARCHF5	Suppressor
YY1AP1	Driver	YTHDC2	Driver	FZD7	Suppressor	TRIB2	Suppressor
EGLN2	Driver	DDR2	Driver	P4HB	Suppressor	DHODH	Suppressor
MIOX	Driver	SLC39A7	Driver	NT5DC2	Suppressor	MIR545	Suppressor
TAFAZZIN	Driver	TRIM46	Driver	BCAT2	Suppressor	PDK4	Suppressor
MTDH	Driver	ACSL1	Driver	PLA2G6	Suppressor	CircPVT1	Suppressor
IDH1	Driver	KDM5A	Driver	MIR424	Suppressor	MIR9-3HG	Suppressor
FBXW7	Driver	TRIM21	Driver	PARK7	Suppressor	ADIPOQ	Suppressor
PANX1	Driver	DPEP1	Driver	FXN	Suppressor	circDTL	Suppressor
DNAJB6	Driver	CYGB	Driver	SUV39H1	Suppressor	mmu_circRNA_0000309	Suppressor
BACH1	Driver	IDO1	Driver	ATF2	Suppressor	VDAC2	Driver, suppressor
LONP1	Driver	GSTZ1	Driver	ACOT1	Suppressor	PTPN18	Suppressor
CD82	Driver	GJA1	Driver	ALDH3A2	Suppressor	ABCC5	Suppressor
IL1B	Driver	PGRMC1	Driver	STK11	Suppressor	CISD3	Suppressor
CTSB	Driver	CIRBP	Driver	FNDC5	Suppressor	MS4A15	Suppressor
POR	Driver	circPSEN1	Driver	CircIL4R	Suppressor	FURIN	Suppressor
CYB5R1	Driver	HSPB1	Marker, suppressor	CDH1	Suppressor	circRHBG	Suppressor
ELOVL5	Driver	YAP1	Driver	NEDD4L	Suppressor	GALNT14	Suppressor
FADS1	Driver	MIR135B	Driver	TFRC	Driver, marker, suppressor	KLHDC3	Suppressor
PTEN	Driver	TRIM26	Driver	BRD2	Suppressor	LINC01833	Suppressor
NR1D1	Driver	NDRG1	Driver	BRD3	Suppressor	circGFRA1	Suppressor
NR1D2	Driver	MIR302A	Driver	BRDT	Suppressor	MAPKAP1	Suppressor
TBK1	Driver	ASMTL-AS1	Driver	DECR1	Suppressor	PRR5	Suppressor
GPX4	Marker, suppressor	PIEZO1	Driver	GLRX5	Suppressor	RICTOR	Suppressor
USP7	Driver	LIFR	Driver	NCOA3	Suppressor	GSTM1	Suppressor
miR-182-5p	Driver	PTPN6	Driver	NR5A2	Suppressor	TERT	Suppressor
miR-378a-3p	Driver	MIR15A	Driver	PANX2	Suppressor	circ0097009	Suppressor
AQP3	Driver	EGR1	Driver	RHEBP1	Suppressor	TMEM161B-DT	Suppressor
AQP5	Driver	ADAM23	Driver	TFAP2A	Suppressor	circEPSTI1	Suppressor
AQP8	Driver	ARHGEF26-AS1	Driver	CP	Suppressor	MIR18A	Suppressor
LINC00618	Driver	CPEB1	Driver	ARF6	Suppressor	RARRES2	Suppressor

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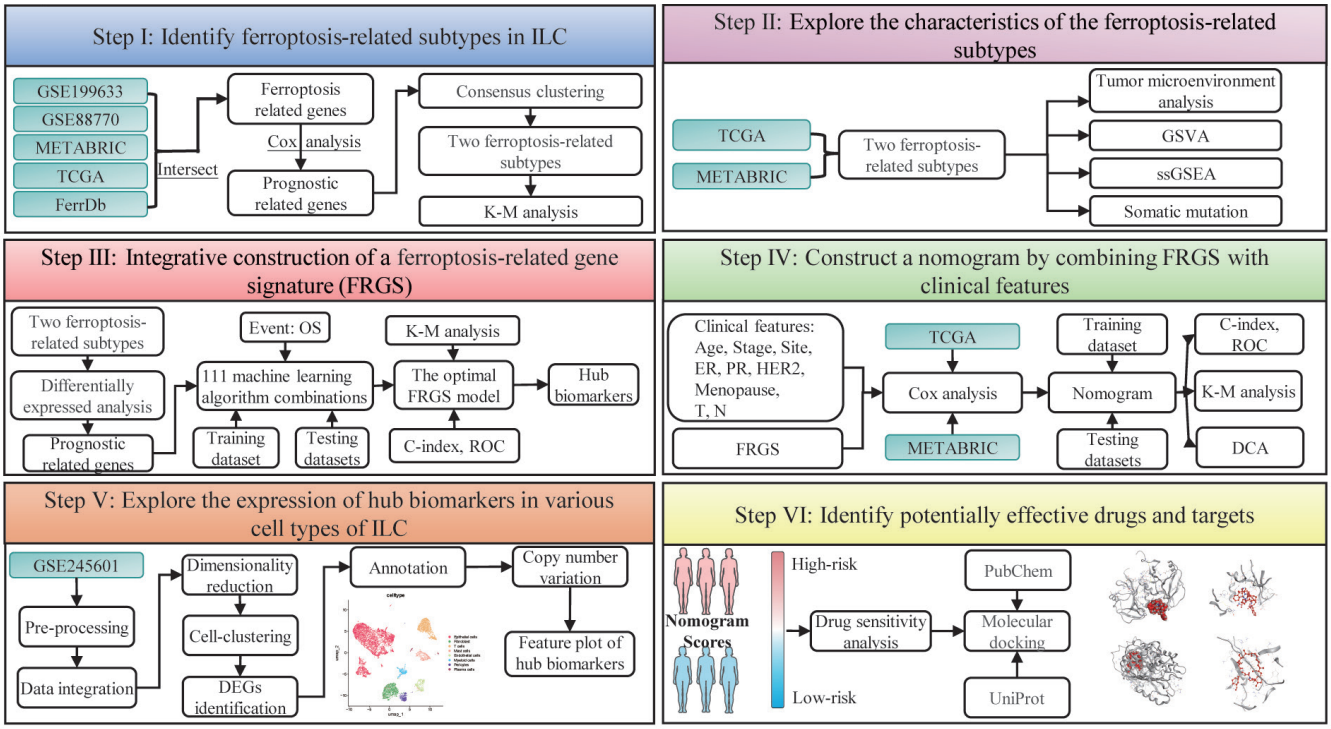

Figure S1 Overall design of this study.

https://dx.doi.org/ 10.21037/tcr-2025-aw-2457

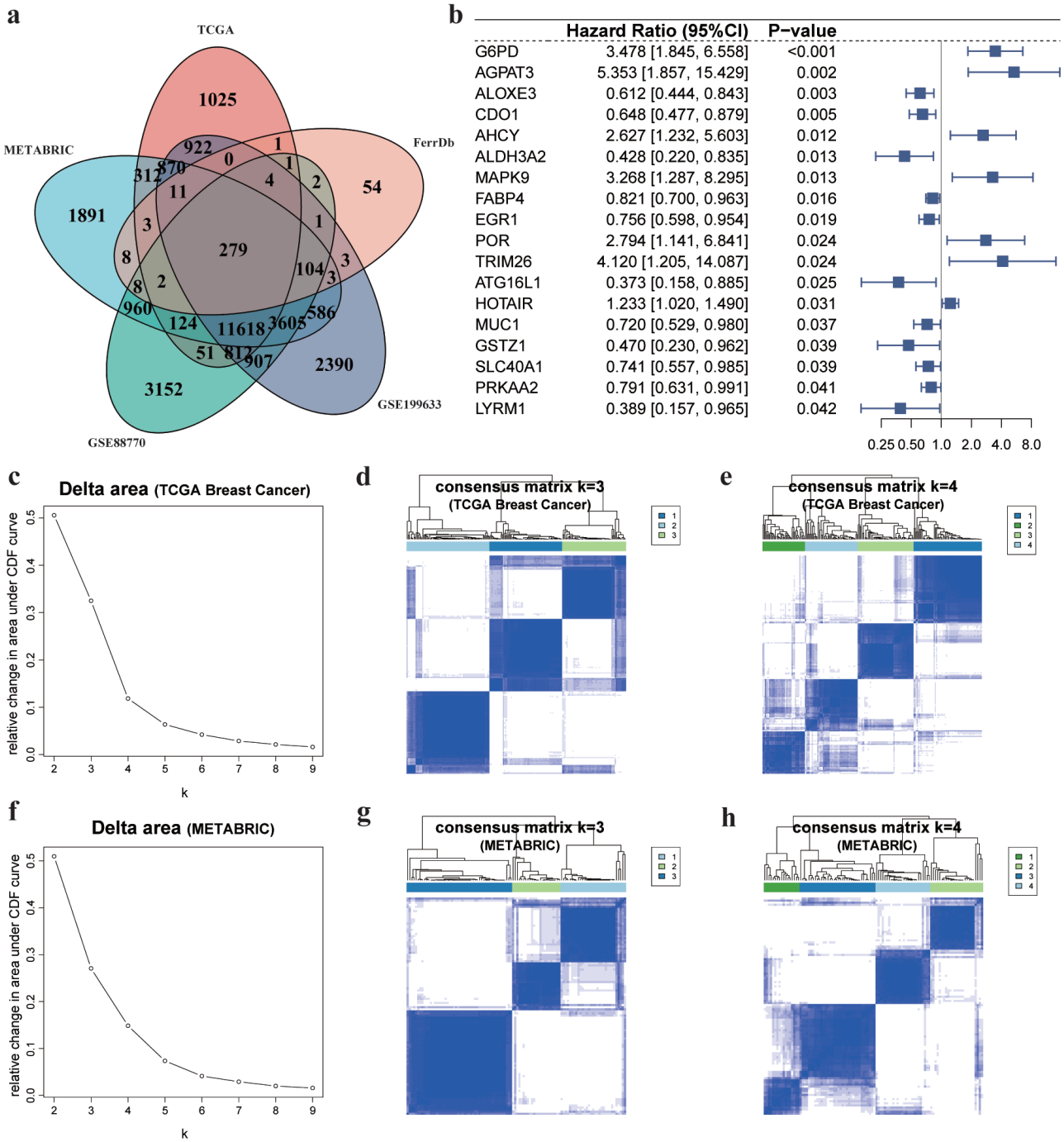

Figure S2 Consensus clustering.

https://dx.doi.org/ 10.21037/tcr-2025-aw-2457

Table S2 The results of univariate Cox regression analysis of 279 ferroptosis-related genes

Variants	HR (95% CI)	P value	FDR
G6PD	3.478 (1.845, 6.558)	<0.001	0.033
AGPAT3	5.353 (1.857, 15.429)	0.002	0.251
ALOXE3	0.612 (0.444, 0.843)	0.003	0.251
CDO1	0.648 (0.477, 0.879)	0.005	0.376
AHCY	2.627 (1.232, 5.603)	0.012	0.510
ALDH3A2	0.428 (0.220, 0.835)	0.013	0.510
MAPK9	3.268 (1.287, 8.295)	0.013	0.510
FABP4	0.821 (0.700, 0.963)	0.016	0.547
EGR1	0.756 (0.598, 0.954)	0.019	0.576
POR	2.794 (1.141, 6.841)	0.024	0.588
TRIM26	4.120 (1.205, 14.087)	0.024	0.588
ATG16L1	0.373 (0.158, 0.885)	0.025	0.588
HOTAIR	1.233 (1.020, 1.490)	0.031	0.644
MUC1	0.720 (0.529, 0.980)	0.037	0.644
GSTZ1	0.470 (0.230, 0.962)	0.039	0.644
SLC40A1	0.741 (0.557, 0.985)	0.039	0.644
PRKAA2	0.791 (0.631, 0.991)	0.041	0.644
LYRM1	0.389 (0.157, 0.965)	0.042	0.644
KIF20A	1.335 (1.000, 1.783)	0.05	0.666
PARP16	0.267 (0.071, 1.000)	0.05	0.666
ACVR1B	2.877 (0.982, 8.427)	0.054	0.666
AKR1C1	0.771 (0.589, 1.008)	0.057	0.666
RPTOR	2.700 (0.970, 7.515)	0.057	0.666
ACADSB	0.662 (0.431, 1.016)	0.059	0.666
PDSS2	2.221 (0.960, 5.137)	0.062	0.666
ISCU	0.321 (0.096, 1.075)	0.065	0.666
GABARAPL2	0.308 (0.088, 1.074)	0.065	0.666
ADIPOQ	0.885 (0.777, 1.009)	0.068	0.666
FH	2.252 (0.927, 5.475)	0.073	0.666
CREB3	0.464 (0.200, 1.078)	0.074	0.666
GDF15	1.214 (0.977, 1.509)	0.08	0.666
VCP	2.663 (0.882, 8.036)	0.082	0.666
BRD7	3.068 (0.854, 11.022)	0.086	0.666
TIMM9	0.346 (0.103, 1.163)	0.086	0.666
CHAC1	1.285 (0.963, 1.714)	0.089	0.666
NRAS	0.571 (0.299, 1.092)	0.09	0.666
ALOX12B	0.646 (0.389, 1.073)	0.091	0.666
LIG3	1.654 (0.915, 2.992)	0.096	0.666
PLIN2	0.626 (0.360, 1.088)	0.097	0.666
ZFP36	0.768 (0.559, 1.054)	0.102	0.666
OSBPL9	0.539 (0.255, 1.138)	0.105	0.666
PRDX6	2.270 (0.838, 6.145)	0.107	0.666
NR4A1	0.821 (0.644, 1.046)	0.11	0.666
PLA2G6	0.640 (0.368, 1.111)	0.113	0.666
NCOA3	1.767 (0.869, 3.594)	0.116	0.666
NFS1	2.203 (0.820, 5.917)	0.117	0.666
PEX2	2.326 (0.809, 6.688)	0.117	0.666
PTGS2	0.831 (0.657, 1.051)	0.122	0.666
NCOA4	1.933 (0.823, 4.543)	0.131	0.666
SQSTM1	1.940 (0.822, 4.580)	0.131	0.666
SRC	1.805 (0.835, 3.902)	0.134	0.666
RBMS1	0.659 (0.382, 1.137)	0.134	0.666
ALOX5	0.722 (0.472, 1.106)	0.134	0.666
IL6	0.861 (0.707, 1.048)	0.136	0.666
YAP1	0.664 (0.385, 1.143)	0.139	0.666
MLLT1	2.505 (0.737, 8.517)	0.141	0.666
CDCA3	1.272 (0.922, 1.756)	0.143	0.666
LAMP2	2.095 (0.779, 5.635)	0.143	0.666
MEG3	0.815 (0.620, 1.072)	0.144	0.666
TRIM21	0.557 (0.252, 1.229)	0.147	0.666
TF	0.869 (0.718, 1.052)	0.149	0.666
JUN	0.779 (0.553, 1.098)	0.154	0.666
GRIA3	0.803 (0.594, 1.085)	0.154	0.666
MAPKAP1	3.117 (0.650, 14.949)	0.155	0.666
MYB	0.706 (0.435, 1.144)	0.157	0.666
TXN	1.728 (0.805, 3.707)	0.16	0.666
FANCD2	1.376 (0.870, 2.174)	0.172	0.666
SIRT3	0.588 (0.273, 1.266)	0.175	0.666
IL1B	0.819 (0.614, 1.093)	0.175	0.666
SLC39A7	1.762 (0.776, 4.001)	0.176	0.666
PPP1R13L	0.606 (0.291, 1.263)	0.181	0.666
MAP1LC3A	0.739 (0.473, 1.154)	0.183	0.666
AKR1C3	0.776 (0.534, 1.128)	0.183	0.666
CA9	1.143 (0.939, 1.391)	0.184	0.666
HSF1	1.654 (0.780, 3.506)	0.189	0.666
RRM2	1.236 (0.901, 1.695)	0.189	0.666
PEX10	0.582 (0.260, 1.304)	0.189	0.666
CAV1	0.787 (0.549, 1.127)	0.191	0.666
PRDX1	1.759 (0.752, 4.109)	0.192	0.666
IFNA21	0.159 (0.010, 2.531)	0.193	0.666
PGRMC1	1.939 (0.715, 5.261)	0.193	0.666
NT5DC2	1.416 (0.835, 2.400)	0.197	0.670
TFRC	1.339 (0.848, 2.114)	0.211	0.709
PANX1	1.758 (0.719, 4.297)	0.216	0.712
HELLS	1.301 (0.857, 1.977)	0.217	0.712
PARP8	1.321 (0.845, 2.065)	0.221	0.718
PEX6	1.468 (0.787, 2.738)	0.228	0.731
CREB5	0.785 (0.522, 1.182)	0.246	0.776
PDK4	0.848 (0.641, 1.121)	0.248	0.776
IFNG	0.821 (0.584, 1.154)	0.256	0.793
HIF1A	1.278 (0.833, 1.960)	0.261	0.800
ABHD12	1.511 (0.727, 3.140)	0.268	0.802
ELAVL1	2.257 (0.533, 9.561)	0.269	0.802
BEX1	0.892 (0.727, 1.094)	0.272	0.802
MT1G	0.894 (0.731, 1.094)	0.276	0.802
FNDC5	0.787 (0.511, 1.213)	0.278	0.802
ADAMTS13	0.790 (0.515, 1.212)	0.28	0.802
MGST1	1.247 (0.833, 1.866)	0.284	0.802
KDM4A	0.596 (0.231, 1.539)	0.285	0.802
CISD1	1.615 (0.661, 3.947)	0.293	0.802
AR	1.154 (0.880, 1.512)	0.3	0.802
SIRT2	0.586 (0.213, 1.611)	0.3	0.802
DAZAP1	1.580 (0.665, 3.754)	0.3	0.802
TFR2	0.877 (0.682, 1.126)	0.302	0.802
SIAH2	0.797 (0.515, 1.233)	0.307	0.802
FZD7	0.846 (0.614, 1.166)	0.308	0.802
MFN2	0.570 (0.193, 1.687)	0.31	0.802
RARRES2	0.836 (0.589, 1.186)	0.315	0.802
BID	1.587 (0.645, 3.905)	0.315	0.802
GSK3B	1.543 (0.658, 3.616)	0.318	0.802
PTEN	0.717 (0.372, 1.384)	0.322	0.802
MAPK3	0.582 (0.199, 1.700)	0.322	0.802
HSPA5	1.647 (0.604, 4.493)	0.33	0.803
ALOX15B	0.923 (0.784, 1.085)	0.33	0.803
TP63	0.909 (0.749, 1.102)	0.331	0.803
PHKG2	0.697 (0.335, 1.453)	0.336	0.808
PARP12	0.702 (0.335, 1.471)	0.348	0.821
AGPS	0.829 (0.559, 1.228)	0.349	0.821
PML	0.660 (0.277, 1.577)	0.35	0.821
ATF3	0.884 (0.679, 1.152)	0.362	0.835
NEDD4L	0.762 (0.426, 1.366)	0.362	0.835
ATF2	1.274 (0.747, 2.173)	0.373	0.851
CDC25A	1.156 (0.838, 1.595)	0.376	0.851
PROM2	1.394 (0.666, 2.920)	0.378	0.851
MAPK1	1.439 (0.623, 3.327)	0.394	0.871
YTHDC2	1.433 (0.625, 3.283)	0.395	0.871
ENO3	0.842 (0.565, 1.255)	0.399	0.871
TOR2A	1.310 (0.699, 2.457)	0.4	0.871
FOXO4	1.415 (0.624, 3.210)	0.406	0.873
TTPA	1.125 (0.851, 1.487)	0.407	0.873
FURIN	0.753 (0.382, 1.484)	0.413	0.874
NDRG1	1.276 (0.711, 2.290)	0.414	0.874
CP	1.071 (0.907, 1.265)	0.417	0.874
SCP2	0.686 (0.273, 1.727)	0.424	0.878
PEX12	0.730 (0.336, 1.584)	0.426	0.878
PARP10	1.205 (0.760, 1.910)	0.429	0.878
FXN	0.634 (0.201, 2.000)	0.437	0.878
BRD2	1.718 (0.436, 6.775)	0.44	0.878
CYP4F8	0.958 (0.857, 1.070)	0.443	0.878
CAMKK2	0.616 (0.172, 2.198)	0.455	0.878
DLD	1.479 (0.523, 4.182)	0.46	0.878
RELA	0.620 (0.174, 2.211)	0.461	0.878
VDR	1.211 (0.726, 2.020)	0.462	0.878
HMGB1	0.690 (0.253, 1.883)	0.468	0.878
MDM2	0.728 (0.308, 1.720)	0.469	0.878
CDKN1A	1.212 (0.709, 2.073)	0.482	0.878
WIPI1	0.792 (0.410, 1.532)	0.488	0.878
MIOX	0.804 (0.433, 1.490)	0.488	0.878
CHMP1A	1.396 (0.539, 3.620)	0.492	0.878
FBXW7	0.728 (0.293, 1.810)	0.494	0.878
PEBP1	1.412 (0.524, 3.803)	0.495	0.878
BAP1	0.641 (0.179, 2.301)	0.496	0.878
PROK2	1.200 (0.708, 2.032)	0.499	0.878
CREB1	0.715 (0.270, 1.897)	0.501	0.878
MMD	0.856 (0.542, 1.353)	0.506	0.878
MTCH1	1.540 (0.430, 5.517)	0.507	0.878
GABARAPL1	1.223 (0.674, 2.218)	0.508	0.878
CD82	1.163 (0.744, 1.819)	0.508	0.878
TMBIM4	1.302 (0.591, 2.867)	0.512	0.878
SLC3A2	1.281 (0.610, 2.687)	0.513	0.878
BECN1	0.679 (0.213, 2.162)	0.513	0.878
FTL	0.845 (0.509, 1.404)	0.516	0.878
PARP14	0.822 (0.453, 1.493)	0.52	0.878
TGFBR1	1.212 (0.674, 2.177)	0.521	0.878
TIMP1	0.852 (0.519, 1.397)	0.525	0.878
USP11	1.379 (0.511, 3.722)	0.526	0.878
CISD2	1.438 (0.466, 4.436)	0.528	0.878
PTPN6	1.242 (0.631, 2.447)	0.531	0.878
PRKCA	0.877 (0.581, 1.324)	0.533	0.878
SIRT1	0.783 (0.361, 1.699)	0.536	0.878
STAT3	0.731 (0.265, 2.014)	0.544	0.878
CHMP5	0.735 (0.272, 1.991)	0.545	0.878
TERT	1.111 (0.789, 1.564)	0.547	0.878
MIB2	0.876 (0.568, 1.350)	0.549	0.878
SREBF1	1.132 (0.754, 1.699)	0.551	0.878
ADAM23	1.118 (0.769, 1.625)	0.56	0.882
PRR5	1.178 (0.678, 2.048)	0.561	0.882
SLC16A1	0.862 (0.520, 1.427)	0.563	0.882
SIRT6	1.187 (0.658, 2.144)	0.569	0.883
TFAM	1.334 (0.489, 3.644)	0.574	0.883
FAR1	0.779 (0.326, 1.864)	0.575	0.883
PAQR3	1.175 (0.668, 2.067)	0.576	0.883
PEX3	1.322 (0.488, 3.583)	0.583	0.885
SMAD7	0.753 (0.270, 2.098)	0.587	0.885
SOCS1	0.908 (0.640, 1.288)	0.587	0.885
BRD4	1.333 (0.465, 3.827)	0.593	0.885
ATG7	0.693 (0.178, 2.697)	0.597	0.885
QSOX1	0.887 (0.565, 1.391)	0.601	0.885
ATF4	1.247 (0.542, 2.872)	0.604	0.885
ATM	0.873 (0.519, 1.468)	0.608	0.885
CPEB1	1.084 (0.794, 1.481)	0.612	0.885
MDM4	0.805 (0.348, 1.861)	0.612	0.885
TRIM46	0.914 (0.645, 1.296)	0.615	0.885
DCAF7	1.231 (0.546, 2.778)	0.617	0.885
MYCN	1.075 (0.808, 1.429)	0.621	0.885
NR1D2	1.159 (0.644, 2.088)	0.622	0.885
NF2	0.803 (0.324, 1.986)	0.634	0.894
BRDT	0.934 (0.705, 1.238)	0.635	0.894
TFAP2A	1.119 (0.700, 1.790)	0.638	0.894
IREB2	0.838 (0.398, 1.764)	0.641	0.894
AIFM2	0.874 (0.482, 1.584)	0.657	0.908
LIFR	0.932 (0.681, 1.276)	0.66	0.908
DHODH	1.243 (0.470, 3.286)	0.661	0.908
MAPK8	1.118 (0.675, 1.852)	0.665	0.910
BRD3	1.225 (0.483, 3.106)	0.669	0.910
AQP5	0.962 (0.802, 1.153)	0.674	0.913
MIB1	0.885 (0.490, 1.599)	0.687	0.925
CCDC6	1.187 (0.485, 2.901)	0.707	0.949
CTSB	0.870 (0.414, 1.827)	0.713	0.949
KDM3B	1.189 (0.458, 3.087)	0.722	0.949
BCAT2	1.113 (0.616, 2.013)	0.723	0.949
MAPK14	1.257 (0.339, 4.669)	0.732	0.949
TLR4	0.923 (0.582, 1.463)	0.734	0.949
TBK1	1.247 (0.343, 4.537)	0.737	0.949
DDR2	1.051 (0.785, 1.405)	0.739	0.949
CDKN2A	1.063 (0.736, 1.536)	0.744	0.949
PARK7	0.866 (0.361, 2.075)	0.746	0.949
CD44	0.926 (0.580, 1.478)	0.748	0.949
COPZ1	1.229 (0.331, 4.560)	0.758	0.949
LPCAT3	1.168 (0.433, 3.148)	0.759	0.949
WWTR1	1.070 (0.695, 1.647)	0.759	0.949
SESN2	0.913 (0.507, 1.642)	0.76	0.949
SLC39A14	1.102 (0.590, 2.059)	0.761	0.949
WIPI2	0.806 (0.195, 3.323)	0.765	0.949
PARP15	0.957 (0.718, 1.276)	0.766	0.949
COX4I2	1.058 (0.728, 1.537)	0.769	0.949
NOS2	1.061 (0.712, 1.581)	0.772	0.949
TGFB1	0.932 (0.570, 1.524)	0.779	0.950
KDM6B	1.115 (0.520, 2.391)	0.78	0.950
FADS2	1.042 (0.779, 1.392)	0.783	0.950
DNAJB6	0.876 (0.312, 2.457)	0.801	0.964
IDO1	0.970 (0.759, 1.239)	0.805	0.964
ACSL3	0.925 (0.481, 1.780)	0.816	0.964
NR5A2	0.953 (0.634, 1.433)	0.817	0.964
USP35	0.937 (0.541, 1.623)	0.818	0.964
HRAS	0.945 (0.581, 1.536)	0.819	0.964
PANX2	0.964 (0.698, 1.331)	0.824	0.964
PIK3CA	0.939 (0.541, 1.631)	0.824	0.964
CHMP6	1.075 (0.561, 2.062)	0.827	0.964
ATG4D	0.929 (0.476, 1.814)	0.829	0.964
SAT1	1.072 (0.541, 2.123)	0.843	0.971
AMN	1.045 (0.675, 1.618)	0.843	0.971
SCD	0.972 (0.729, 1.297)	0.847	0.971
NUPR1	1.040 (0.690, 1.569)	0.851	0.971
VDAC2	1.104 (0.379, 3.218)	0.856	0.971
CYBB	1.036 (0.695, 1.544)	0.862	0.971
SLC25A28	1.075 (0.478, 2.419)	0.862	0.971
PARP1	1.063 (0.530, 2.134)	0.863	0.971
PARP4	0.952 (0.532, 1.704)	0.868	0.972
MS4A15	1.013 (0.863, 1.190)	0.871	0.972
LGMN	1.051 (0.555, 1.990)	0.878	0.973
ATG5	1.077 (0.416, 2.789)	0.879	0.973
NEDD4	1.047 (0.568, 1.927)	0.884	0.975
NQO1	0.960 (0.540, 1.706)	0.889	0.977
SNX4	0.926 (0.280, 3.056)	0.899	0.981
PGD	1.060 (0.425, 2.641)	0.901	0.981
DPEP1	1.015 (0.793, 1.299)	0.907	0.981
ATG3	0.927 (0.259, 3.312)	0.907	0.981
SMPD1	1.041 (0.468, 2.313)	0.922	0.984
HMOX1	1.021 (0.663, 1.572)	0.926	0.984
STK11	1.032 (0.528, 2.017)	0.927	0.984
PARP11	1.040 (0.436, 2.483)	0.93	0.984
KLHDC3	0.962 (0.403, 2.300)	0.931	0.984
MTOR	1.038 (0.414, 2.606)	0.936	0.984
TNFAIP3	1.016 (0.669, 1.543)	0.942	0.984
GALNT14	1.009 (0.795, 1.280)	0.942	0.984
AEBP2	1.038 (0.372, 2.896)	0.943	0.984
BACH1	1.020 (0.568, 1.831)	0.947	0.984
RICTOR	0.979 (0.514, 1.866)	0.949	0.984
HDDC3	1.022 (0.482, 2.168)	0.955	0.987
SREBF2	1.017 (0.539, 1.917)	0.959	0.988
MEF2C	0.993 (0.581, 1.698)	0.981	0.998
PRKAA1	1.004 (0.606, 1.662)	0.989	0.998
GJA1	1.002 (0.716, 1.402)	0.989	0.998
ULK1	1.006 (0.393, 2.578)	0.989	0.998
HSPB1	1.001 (0.712, 1.406)	0.997	0.998
POM121L12	0.000 (0.000, Inf)	0.998	0.998
IFNA10	0.000 (0.000, Inf)	0.998	0.998
TMSB4Y	0.000 (0.000, Inf)	0.998	0.998

https://dx.doi.org/ 10.21037/tcr-2025-aw-2457

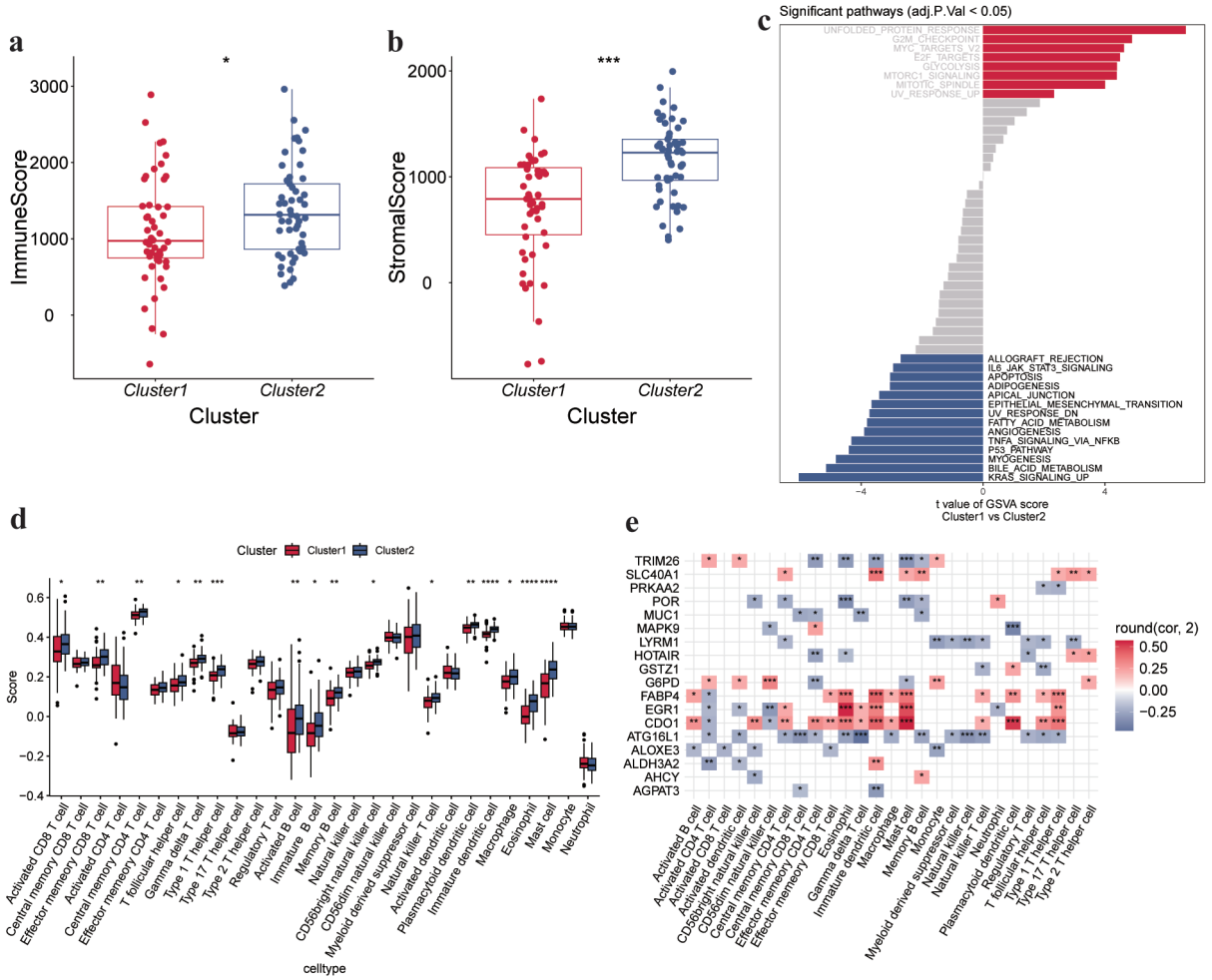

Figure S3 Verify the characteristics of the ferroptosis-related subtypes.

https://dx.doi.org/ 10.21037/tcr-2025-aw-2457

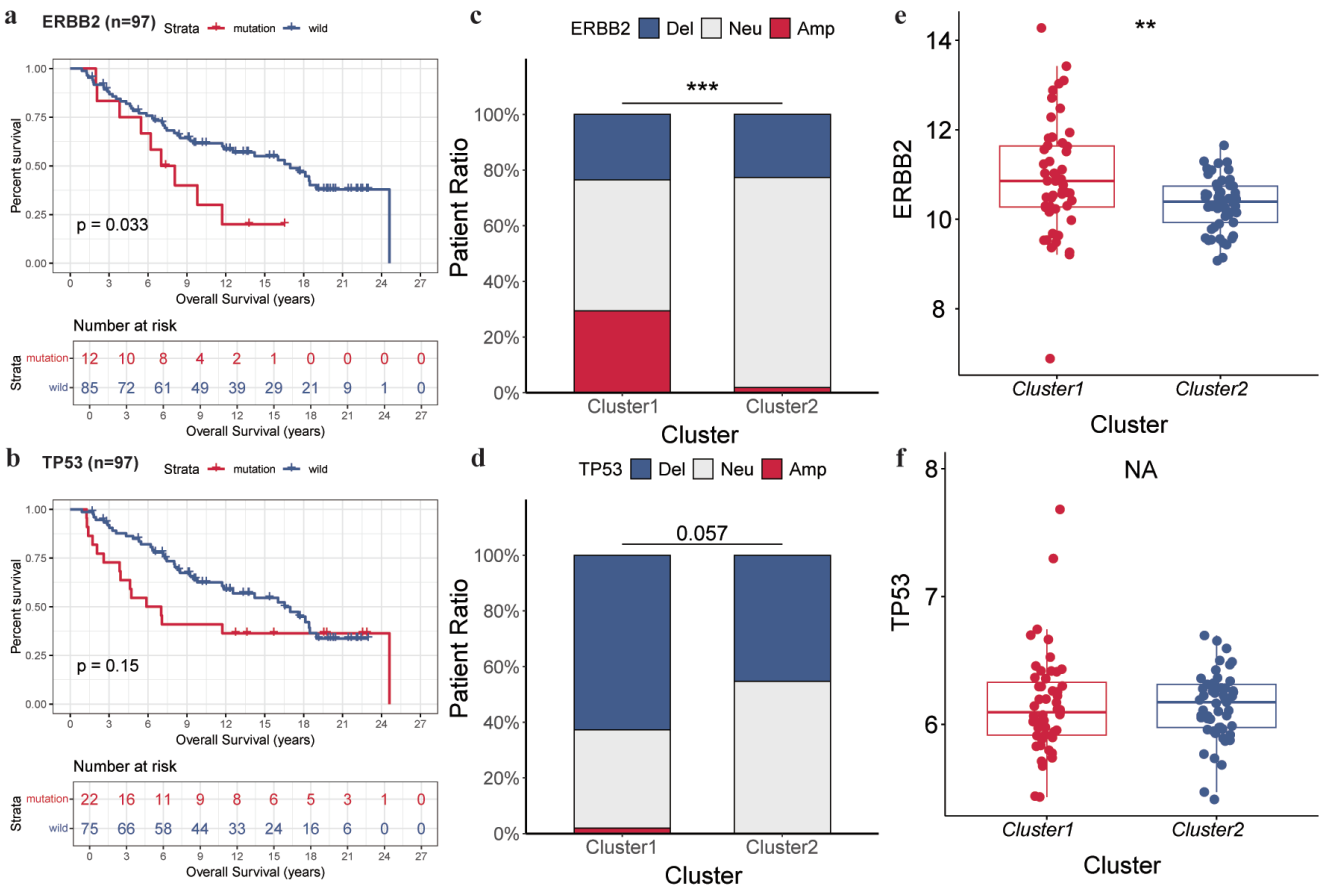

Figure S4 Differences in TP53 and ERBB2 between two ferroptosis-related subtypes.

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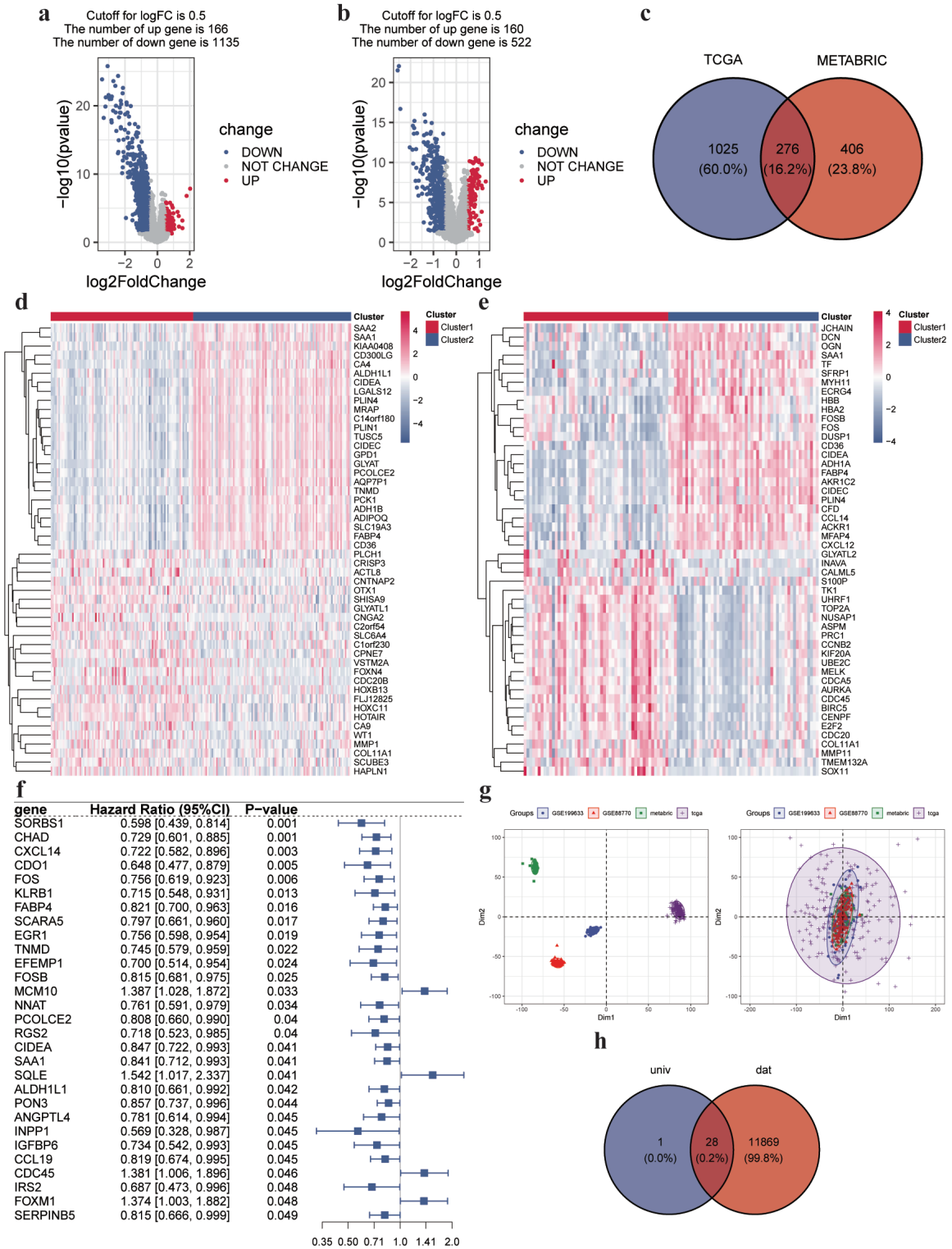

Figure S5 Identification of DEGs associated with prognosis in ferroptosis-related subtypes.

https://dx.doi.org/ 10.21037/tcr-2025-aw-2457

Table S3 The raw P values and the FDR-adjusted P values of the 276 differentially expressed genes in TCGA

Symbol	logFC	AveExpr	t	P.Value	FDR	B	Change
FABP4	-3.080233104	9.703522959	-12.42496908	1.62E-26	2.60E-22	49.3588344	DOWN
AQP7P1	-2.429776762	3.096491837	-11.95121303	4.42E-25	3.54E-21	46.14459738	DOWN
CIDEC	-3.421548888	6.915065306	-11.78588543	1.39E-24	7.45E-21	45.02667274	DOWN
CD300LG	-2.721731402	5.614434184	-11.70166085	2.50E-24	1.00E-20	44.45803939	DOWN
LPL	-2.128140035	9.393096939	-11.36986581	2.48E-23	6.64E-20	42.22450984	DOWN
MRAP	-3.019074736	3.263214796	-11.01913722	2.77E-22	5.56E-19	39.87667792	DOWN
PLIN1	-2.81938836	9.032987245	-10.9483463	4.51E-22	7.23E-19	39.40465952	DOWN
CIDEA	-3.191049963	5.360334694	-10.90572211	6.03E-22	8.79E-19	39.12077672	DOWN
RDH5	-1.905314887	5.904029082	-10.65459118	3.35E-21	3.58E-18	37.45347512	DOWN
PCOLCE2	-2.562913363	5.82209949	-10.49078107	1.02E-20	9.07E-18	36.37110451	DOWN
CDO1	-1.645783871	6.586792347	-10.47581386	1.13E-20	9.51E-18	36.27242641	DOWN
TNMD	-2.331453837	3.324038265	-10.4065986	1.80E-20	1.37E-17	35.81658339	DOWN
PLIN4	-2.734933229	9.950203061	-10.24527059	5.35E-20	3.90E-17	34.75732997	DOWN
SLC19A3	-2.579302996	6.125709184	-10.15770581	9.63E-20	6.51E-17	34.18436979	DOWN
CD36	-2.314672492	10.30701735	-10.14805105	1.03E-19	6.51E-17	34.12128404	DOWN
NNAT	-1.989787598	4.993621429	-10.0635235	1.81E-19	1.08E-16	33.56973137	DOWN
HSPB6	-1.758798048	8.714496429	-9.952175772	3.81E-19	2.18E-16	32.84532072	DOWN
ALDH1L1	-2.373318781	5.283339796	-9.91328143	4.94E-19	2.73E-16	32.59287245	DOWN
ADH1B	-2.842329711	9.518887245	-9.76418136	1.33E-18	6.89E-16	31.62806607	DOWN
LIPE	-1.72780308	8.878096429	-9.578142496	4.56E-18	2.22E-15	30.43108068	DOWN
CAV1	-1.185243324	10.92481122	-9.415104412	1.33E-17	6.10E-15	29.38870034	DOWN
G0S2	-2.258606483	7.75802398	-9.410713807	1.37E-17	6.11E-15	29.36071799	DOWN
ADH1A	-2.012140359	3.048304592	-9.276530445	3.30E-17	1.39E-14	28.50785917	DOWN
TMEM37	-1.266051477	7.632062755	-8.904045958	3.67E-16	1.34E-13	26.16527396	DOWN
GPIHBP1	-1.535714344	6.692165816	-8.800939054	7.09E-16	2.47E-13	25.52371141	DOWN
SAA1	-2.392883547	9.182434184	-8.727685699	1.13E-15	3.78E-13	25.06982141	DOWN
CCL14	-1.573515617	8.703657653	-8.624362456	2.18E-15	6.99E-13	24.43239121	DOWN
CALB2	-1.82793089	6.304908163	-8.373360734	1.06E-14	3.20E-12	22.89799071	DOWN
EBF1	-1.07865296	7.913607653	-8.23833364	2.45E-14	6.90E-12	22.08119982	DOWN
CAV2	-0.926898058	9.253894388	-8.03664614	8.51E-14	2.28E-11	20.87304257	DOWN
FAM162B	-1.047248241	4.019312755	-8.008672849	1.01E-13	2.61E-11	20.7066346	DOWN
AKR1C2	-1.824093047	6.782131122	-7.972709068	1.26E-13	3.11E-11	20.49311697	DOWN
PDK4	-1.539513216	10.21681378	-7.900583166	1.95E-13	4.48E-11	20.06635931	DOWN
MYOM1	-1.170070456	5.698888265	-7.893038513	2.05E-13	4.60E-11	20.02183207	DOWN
GNG11	-0.786947625	9.359498469	-7.884926972	2.15E-13	4.72E-11	19.97398326	DOWN
ACACB	-1.108375582	9.530684184	-7.859891054	2.50E-13	5.42E-11	19.82645809	DOWN
C6	-2.052774194	4.821479592	-7.83777843	2.86E-13	6.12E-11	19.69635808	DOWN
TF	-1.907795041	7.005666837	-7.758731878	4.62E-13	9.37E-11	19.23283263	DOWN
GPAM	-1.03769025	9.201537245	-7.699286672	6.60E-13	1.30E-10	18.8858617	DOWN
MEOX1	-1.464156854	7.099463776	-7.692933162	6.86E-13	1.32E-10	18.84886029	DOWN
FOSB	-2.138477378	9.948034694	-7.620727598	1.06E-12	2.02E-10	18.42948856	DOWN
TSPAN7	-1.155521391	8.499647959	-7.60773312	1.14E-12	2.15E-10	18.35423989	DOWN
EBF3	-1.035670968	6.556084694	-7.502492096	2.14E-12	3.94E-10	17.74735943	DOWN
AKR1C3	-0.98162873	8.3976	-7.491014771	2.29E-12	4.12E-10	17.68145204	DOWN
PPP1R1A	-1.833955924	7.193576531	-7.479296487	2.45E-12	4.32E-10	17.61421784	DOWN
EGR2	-1.426946174	8.802609184	-7.386775882	4.23E-12	6.92E-10	17.08541266	DOWN
CD34	-0.721801263	10.65897092	-7.338101872	5.63E-12	8.85E-10	16.80868259	DOWN
ANGPTL4	-1.646300512	7.937572449	-7.336284361	5.69E-12	8.85E-10	16.79836918	DOWN
TMEM100	-1.339427696	5.483407653	-7.326300145	6.03E-12	9.30E-10	16.7417396	DOWN
FAM89A	-1.005484069	6.511136224	-7.283394215	7.75E-12	1.18E-09	16.49887546	DOWN
NMB	-0.883483036	6.384204082	-7.23633625	1.02E-11	1.53E-09	16.2334386	DOWN
SCARA5	-2.141788819	5.394977041	-7.231661843	1.05E-11	1.55E-09	16.20712544	DOWN
CCDC3	-0.942547343	8.575080612	-7.229455744	1.06E-11	1.56E-09	16.19471024	DOWN
FAM107A	-1.296277701	7.237316837	-7.219251249	1.13E-11	1.61E-09	16.13731086	DOWN
TXNIP	-0.774514135	13.78674949	-6.948408043	5.34E-11	6.85E-09	14.63112171	DOWN
IRS2	-0.99445249	9.213214286	-6.939545968	5.61E-11	7.14E-09	14.58241348	DOWN
PECAM1	-0.692211264	10.46307806	-6.935857844	5.73E-11	7.24E-09	14.56215356	DOWN
GYPC	-0.75735297	8.891831122	-6.933946497	5.79E-11	7.26E-09	14.55165652	DOWN
THRSP	-1.822321391	6.847858163	-6.922440468	6.18E-11	7.69E-09	14.48850249	DOWN
PI16	-2.178667658	7.000485204	-6.891392982	7.37E-11	8.89E-09	14.31840409	DOWN
MAOA	-1.395952584	8.489635714	-6.891388576	7.37E-11	8.89E-09	14.31837998	DOWN
MT1M	-1.360531392	5.126739796	-6.865373069	8.54E-11	1.00E-08	14.17620503	DOWN
FOS	-1.665612914	12.29885357	-6.855593722	9.03E-11	1.03E-08	14.12284491	DOWN
S1PR1	-0.905197536	9.394995918	-6.854976006	9.06E-11	1.03E-08	14.11947595	DOWN
IL33	-1.394690625	8.174360714	-6.83063108	1.04E-10	1.17E-08	13.98684775	DOWN
C7	-1.650709437	9.017947449	-6.798949099	1.24E-10	1.38E-08	13.81467841	DOWN
CLDN5	-1.182214636	8.373955102	-6.754215422	1.60E-10	1.76E-08	13.57241668	DOWN
EGR1	-1.403032081	12.54968724	-6.738780876	1.74E-10	1.91E-08	13.48905679	DOWN
PLAC9	-1.289654275	6.965797449	-6.692359441	2.25E-10	2.44E-08	13.23905157	DOWN
SORBS1	-1.002036444	10.232175	-6.691133083	2.27E-10	2.44E-08	13.23246148	DOWN
IL6	-1.811005783	5.156422449	-6.646867778	2.90E-10	3.04E-08	12.99509615	DOWN
JAM2	-0.778333626	7.716845918	-6.552924559	4.87E-10	4.76E-08	12.49461993	DOWN
DNASE1L3	-1.271599384	4.703214796	-6.544958174	5.09E-10	4.91E-08	12.45238659	DOWN
INMT	-1.12393444	6.980514286	-6.526963042	5.62E-10	5.37E-08	12.35710652	DOWN
ZFP36	-1.133945798	11.89061837	-6.495297814	6.68E-10	6.19E-08	12.18985228	DOWN
GEM	-1.043249692	9.656726531	-6.481203363	7.21E-10	6.57E-08	12.11557321	DOWN
CLEC14A	-0.670082357	9.164216837	-6.391880463	1.17E-09	1.02E-07	11.64724887	DOWN
CLEC3B	-0.983178025	8.144646429	-6.320288887	1.72E-09	1.45E-07	11.27493808	DOWN
ADH1C	-1.335579476	4.536352041	-6.303761184	1.88E-09	1.56E-07	11.18937576	DOWN
CYYR1	-0.73791947	8.657533673	-6.290667059	2.02E-09	1.66E-07	11.12169322	DOWN
ETS2	-0.691503382	10.24303724	-6.243274264	2.60E-09	2.09E-07	10.87749937	DOWN
DPT	-1.224319344	9.763903061	-6.198580304	3.30E-09	2.56E-07	10.64833295	DOWN
HSPB2	-0.90588029	6.347892347	-6.177039611	3.70E-09	2.80E-07	10.53827555	DOWN
SPRY2	-0.911917872	8.009478061	-6.17286656	3.79E-09	2.85E-07	10.51698385	DOWN
INPP1	-0.528959975	7.803806122	-5.968759731	1.10E-08	7.69E-07	9.487482193	DOWN
VWF	-0.755193517	12.16405867	-5.968754956	1.10E-08	7.69E-07	9.487458386	DOWN
ICAM2	-0.663709009	8.384203061	-5.960135605	1.15E-08	7.94E-07	9.44450271	DOWN
IGF1	-1.147467512	9.22370051	-5.949973212	1.22E-08	8.30E-07	9.393911924	DOWN
SRPX	-0.950902819	8.391680102	-5.936420143	1.30E-08	8.86E-07	9.326534096	DOWN
PTGS2	-1.414506535	5.554490306	-5.925258858	1.38E-08	9.35E-07	9.271126382	DOWN
LYVE1	-1.283013446	5.545858163	-5.915904741	1.45E-08	9.69E-07	9.224745435	DOWN
PRG4	-1.358614062	6.531210714	-5.898007497	1.59E-08	1.05E-06	9.136146042	DOWN
TGFBR3	-1.058792776	9.848240816	-5.890695615	1.65E-08	1.09E-06	9.100002471	DOWN
SVEP1	-1.056098632	9.203634694	-5.837941217	2.16E-08	1.38E-06	8.840155151	DOWN
RGS2	-0.968759975	9.00132551	-5.747606659	3.42E-08	2.04E-06	8.399007696	DOWN
RASD1	-1.215990949	8.940618878	-5.6676081	5.12E-08	2.93E-06	8.012400029	DOWN
CBX7	-0.603317246	9.878311735	-5.648907802	5.62E-08	3.15E-06	7.922583981	DOWN
NDN	-0.604826976	8.556744898	-5.632938618	6.09E-08	3.37E-06	7.846053316	DOWN
CES1	-1.238064694	7.686639286	-5.630458718	6.17E-08	3.40E-06	7.834182568	DOWN
ALPL	-0.933567314	8.307865816	-5.628842785	6.22E-08	3.41E-06	7.82644946	DOWN
CFD	-1.292203048	9.36687449	-5.615070179	6.66E-08	3.61E-06	7.760604743	DOWN
NTRK2	-1.231683119	9.533145918	-5.604048415	7.03E-08	3.77E-06	7.707994818	DOWN
SPRY1	-0.769585072	9.869578571	-5.58938621	7.57E-08	4.02E-06	7.638123298	DOWN
JUN	-0.85610997	12.41484184	-5.56109399	8.71E-08	4.55E-06	7.503672087	DOWN
ALDH1A2	-1.05039049	5.715818878	-5.556652689	8.90E-08	4.63E-06	7.482610734	DOWN
FABP5	-0.921762846	6.083348469	-5.551877999	9.11E-08	4.71E-06	7.459981968	DOWN
HSPA12B	-0.715448304	8.204267857	-5.533435032	9.98E-08	5.11E-06	7.372707191	DOWN
ANXA1	-0.670080583	11.28623418	-5.513825271	1.10E-07	5.54E-06	7.280142033	DOWN
FBLN5	-0.666030556	10.14538112	-5.473039579	1.34E-07	6.59E-06	7.088384942	DOWN
GPC3	-1.221988892	8.134102041	-5.472925756	1.34E-07	6.59E-06	7.087851244	DOWN
PROS1	-0.761257845	8.986922959	-5.470486128	1.36E-07	6.65E-06	7.076414233	DOWN
GIMAP8	-0.679372659	8.308468878	-5.449285684	1.51E-07	7.33E-06	6.977183212	DOWN
PGM5	-0.874078996	7.645013776	-5.442807228	1.56E-07	7.54E-06	6.946916345	DOWN
THBS4	-1.324245662	10.40261429	-5.420485083	1.74E-07	8.20E-06	6.842831209	DOWN
SHE	-0.710226913	7.775014286	-5.360831094	2.32E-07	1.07E-05	6.566218834	DOWN
OAF	-0.540738042	9.546751531	-5.342461918	2.53E-07	1.16E-05	6.481497568	DOWN
PHLDA1	-0.734974883	9.82197551	-5.268641975	3.61E-07	1.59E-05	6.143210815	DOWN
PPP1R14A	-1.087892567	5.370635204	-5.24400199	4.05E-07	1.77E-05	6.031078336	DOWN
GIMAP5	-0.713454317	8.564778061	-5.238958994	4.15E-07	1.81E-05	6.008177049	DOWN
IGFBP6	-0.886044316	7.779218878	-5.234362463	4.24E-07	1.83E-05	5.987317653	DOWN
TGFBR2	-0.753384873	11.25993724	-5.218484794	4.58E-07	1.96E-05	5.915369397	DOWN
TUBB6	-0.514610126	10.25172857	-5.212582453	4.71E-07	2.00E-05	5.888665345	DOWN
VIM	-0.515474632	14.42874847	-5.185126876	5.36E-07	2.25E-05	5.764746861	DOWN
SPARCL1	-0.708808174	12.83871173	-5.181915693	5.44E-07	2.28E-05	5.750285686	DOWN
FZD4	-0.550649233	10.26478469	-5.175153852	5.62E-07	2.33E-05	5.719856669	DOWN
A2M	-0.567395876	13.7978648	-5.150712588	6.30E-07	2.58E-05	5.610118896	DOWN
RGS5	-0.682484215	11.495375	-5.07865724	8.82E-07	3.48E-05	5.288897592	DOWN
FBLN7	-0.639942708	7.996226531	-5.073952744	9.02E-07	3.54E-05	5.268044962	DOWN
PDGFD	-0.677962272	9.088584694	-5.068793835	9.24E-07	3.62E-05	5.245195124	DOWN
CDKN1C	-0.703548345	8.167893878	-5.056757677	9.77E-07	3.77E-05	5.191953667	DOWN
TEK	-0.740660695	8.222079592	-5.043561123	1.04E-06	3.99E-05	5.133690594	DOWN
PID1	-0.804447876	6.448172449	-5.03210634	1.09E-06	4.18E-05	5.083212075	DOWN
MATN2	-0.866689498	9.396642347	-5.024989453	1.13E-06	4.31E-05	5.051893993	DOWN
COX7A1	-0.734336935	7.211281122	-5.007864901	1.22E-06	4.62E-05	4.97667642	DOWN
TFPI	-0.709465372	8.486197959	-4.982726034	1.37E-06	5.15E-05	4.866614987	DOWN
FCER1A	-0.997249087	6.08039898	-4.927149674	1.77E-06	6.45E-05	4.624813333	DOWN
ABI3BP	-0.998306807	8.914990306	-4.925849232	1.78E-06	6.45E-05	4.619180525	DOWN
ATF3	-1.166142604	9.63455102	-4.909805773	1.92E-06	6.87E-05	4.549783955	DOWN
PAMR1	-1.007352876	6.936379592	-4.907812519	1.93E-06	6.92E-05	4.541174346	DOWN
SQLE	0.568694394	9.863277551	4.90704258	1.94E-06	6.93E-05	4.537849421	UP
TESC	-0.920191826	5.614844388	-4.905207705	1.96E-06	6.97E-05	4.529927278	DOWN
PPP1R15A	-0.556531997	10.39088367	-4.844895822	2.57E-06	8.96E-05	4.270814595	DOWN
OSR1	-1.201785667	6.765688265	-4.837243645	2.66E-06	9.23E-05	4.238118289	DOWN
GIMAP7	-0.69602636	8.138847449	-4.832343011	2.72E-06	9.41E-05	4.217200067	DOWN
EMP1	-0.590300438	11.73734439	-4.812650331	2.97E-06	1.01E-04	4.133310021	DOWN
MFAP4	-0.968193152	10.70234592	-4.763266892	3.70E-06	1.22E-04	3.924123461	DOWN
GIMAP6	-0.581236966	8.982935204	-4.714567357	4.59E-06	1.46E-04	3.719502661	DOWN
CCL2	-0.862327811	8.520855612	-4.697881299	4.94E-06	1.54E-04	3.649776147	DOWN
KCTD12	-0.540623541	11.13231071	-4.695253625	5.00E-06	1.56E-04	3.638813695	DOWN
CXCL12	-0.641477774	11.46520204	-4.683227844	5.27E-06	1.63E-04	3.588705276	DOWN
ID1	-0.701321234	8.172112755	-4.680148985	5.34E-06	1.64E-04	3.575892869	DOWN
NR4A2	-0.907142959	8.782620408	-4.666539133	5.67E-06	1.72E-04	3.519336992	DOWN
PELI2	-0.627438407	7.302959694	-4.606103427	7.38E-06	2.17E-04	3.269784671	DOWN
GPR183	-0.82595606	7.703170918	-4.582632759	8.16E-06	2.37E-04	3.173571559	DOWN
MME	-0.913272335	8.899218878	-4.556927664	9.12E-06	2.59E-04	3.068652069	DOWN
PDE1A	-0.647758754	6.332458673	-4.530651936	1.02E-05	2.84E-04	2.961894845	DOWN
MMD	-0.526950256	8.311380102	-4.487665026	1.23E-05	3.33E-04	2.788316667	DOWN
RAMP3	-0.642083871	8.943437755	-4.479735251	1.27E-05	3.40E-04	2.756443198	DOWN
SOX18	-0.652329638	7.829630612	-4.433048858	1.55E-05	4.05E-04	2.569717595	DOWN
FOLR2	-0.803378087	7.601079082	-4.413316558	1.68E-05	4.35E-04	2.491275837	DOWN
ECM2	-0.68591306	8.856289796	-4.408990052	1.71E-05	4.40E-04	2.474114857	DOWN
OGN	-1.134216828	8.791909184	-4.355434247	2.14E-05	5.29E-04	2.262827602	DOWN
CPE	-0.544335995	10.82354337	-4.349184343	2.20E-05	5.43E-04	2.238308531	DOWN
SFRP1	-1.249785239	10.46634694	-4.309767531	2.59E-05	6.22E-04	2.084339069	DOWN
SRGN	-0.562535359	10.13054388	-4.305205877	2.63E-05	6.32E-04	2.066594907	DOWN
CDCA8	0.569562407	7.657571939	4.290012153	2.80E-05	6.65E-04	2.007605337	UP
EFEMP1	-0.729343783	10.59310663	-4.283467827	2.88E-05	6.80E-04	1.982250058	DOWN
CPXM2	-0.590980457	9.377527551	-4.267384218	3.08E-05	7.17E-04	1.920071773	DOWN
PCDH18	-0.684645996	8.780934694	-4.258129971	3.20E-05	7.43E-04	1.884383085	DOWN
CH25H	-0.824417883	6.029965816	-4.255908934	3.23E-05	7.47E-04	1.875827272	DOWN
TMEM119	-0.659852302	10.24102041	-4.246507338	3.35E-05	7.71E-04	1.83965168	DOWN
CCNE2	0.673737937	6.950854592	4.239072637	3.46E-05	7.89E-04	1.811091282	UP
ANGPTL2	-0.593628917	10.4859602	-4.229003737	3.60E-05	8.14E-04	1.772477783	DOWN
H19	-0.67978433	11.720625	-4.200248996	4.05E-05	0.000897343	1.662625468	DOWN
TTK	0.687024293	6.881421939	4.196269206	4.11E-05	0.000907288	1.647470501	UP
RGL1	-0.552351623	8.869984694	-4.195892642	4.12E-05	0.000907288	1.64603717	DOWN
CD209	-0.873135891	5.759332143	-4.185757999	4.29E-05	0.000941102	1.607501537	DOWN
OXTR	-1.151379131	7.427046429	-4.162780142	4.71E-05	0.001012373	1.520419073	DOWN
ANKRD35	-0.699616474	5.939845918	-4.120463089	5.58E-05	0.001156825	1.361092547	DOWN
NEK2	0.791261927	8.052681633	4.098656794	6.08E-05	0.001240973	1.279522927	UP
SYNPO2	-0.676536246	9.815793367	-4.09798843	6.10E-05	0.001242695	1.277028549	DOWN
COL14A1	-0.83587529	11.48072551	-4.0881751	6.34E-05	0.001287194	1.240443918	DOWN
PAQR4	0.635463817	9.856904592	4.05905365	7.12E-05	0.001405341	1.132311849	UP
MMRN1	-0.948727289	7.209164796	-4.047435083	7.45E-05	0.00145866	1.08935215	DOWN
SLIT3	-0.624699614	9.6395	-4.035514274	7.81E-05	0.001510278	1.04538285	DOWN
ANLN	0.702512945	8.322555612	4.01742472	8.38E-05	0.001600155	0.978869627	UP
CTSG	-0.988268619	5.559148469	-3.989898093	9.33E-05	0.001742455	0.878142354	DOWN
LEPR	-0.724642917	8.102135204	-3.982664114	9.60E-05	0.00178394	0.851768626	DOWN
PRNP	-0.511960476	10.44612755	-3.933683719	1.16E-04	0.002106529	0.674264706	DOWN
KIF20A	0.742841226	7.91562398	3.87937472	1.43E-04	0.002498732	0.479638435	UP
MT1E	-0.731838303	8.66122398	-3.862977681	1.52E-04	0.002612503	0.421331091	DOWN
BUB1	0.6496893	7.675221429	3.858944173	1.55E-04	0.002644382	0.407020467	UP
CX3CL1	-0.736373546	10.12506429	-3.832048271	1.71E-04	0.002852103	0.3119232	DOWN
CD69	-0.741567742	7.056133673	-3.824451396	1.76E-04	0.002907406	0.285165894	DOWN
PCSK5	-0.6600981	6.746067857	-3.796046228	1.96E-04	0.003171494	0.185523137	DOWN
TPX2	0.637679653	9.270313265	3.795291604	1.97E-04	0.003176571	0.182884698	UP
LAMA2	-0.727948011	9.834379592	-3.782350775	2.06E-04	0.003301169	0.137709179	DOWN
C3	-0.59569193	13.33811531	-3.768559291	2.17E-04	0.003448291	0.089710476	DOWN
RBMS3	-0.680968233	5.373872959	-3.720162583	2.60E-04	0.003977798	-0.077526742	DOWN
EPDR1	-0.536445642	7.352977551	-3.679075111	3.02E-04	0.004511073	-0.218036592	DOWN
SCRG1	-0.860336079	2.780363776	-3.622399982	3.72E-04	0.005371027	-0.409625276	DOWN
HBB	-0.789587285	7.258107143	-3.617483492	3.78E-04	0.005447859	-0.426123129	DOWN
CDC20	0.622648272	8.181909184	3.601608996	4.01E-04	0.005687731	-0.479258269	UP
CDK1	0.574760434	8.81035	3.58931368	4.19E-04	0.005877664	-0.520272827	UP
TMEM47	-0.525084936	8.864582653	-3.563143957	4.60E-04	0.006312578	-0.607160745	DOWN
DLK1	-1.080280207	1.959882143	-3.557025453	4.70E-04	0.006430172	-0.627394874	DOWN
CCL21	-1.029714093	7.659980102	-3.535049728	5.09E-04	0.006854717	-0.699817867	DOWN
CILP	-0.835166019	11.71538827	-3.522645892	5.32E-04	0.00708009	-0.740521813	DOWN
UBE2T	0.565425128	7.862232143	3.497013873	5.82E-04	0.007609438	-0.82423613	UP
AURKA	0.502684028	7.690369898	3.456574306	6.71E-04	0.008470109	-0.955216195	UP
CCL19	-1.058747531	8.178203061	-3.45050988	6.85E-04	0.008608822	-0.974742359	DOWN
CNN1	-0.764623301	8.787817347	-3.448432913	6.90E-04	0.008639551	-0.981422788	DOWN
CDCA5	0.543330473	8.018758163	3.447773744	6.92E-04	0.008652687	-0.983542216	UP
KCNMB1	-0.604319605	6.911734184	-3.444018821	7.01E-04	0.00872589	-0.995608617	DOWN
MYH11	-0.830132905	10.64504439	-3.438842092	7.14E-04	0.008857172	-1.012224915	DOWN
PTTG1	0.607726318	7.847034694	3.427612397	7.42E-04	0.00913715	-1.048194054	UP
RGS1	-0.703579695	10.10269745	-3.414199785	7.77E-04	0.00947961	-1.091018668	DOWN
APOD	-0.819157104	12.18398724	-3.395523435	8.29E-04	0.009908093	-1.150401802	DOWN
ZBTB16	-1.036442238	5.390545918	-3.380546409	8.73E-04	0.01029423	-1.197813804	DOWN
FOXM1	0.578244879	8.681558673	3.360875991	9.34E-04	0.010845032	-1.259800579	UP
ZNF296	0.523257365	6.943863776	3.359032903	9.40E-04	0.010905721	-1.265592168	UP
HJURP	0.583172241	7.070081122	3.357338033	0.000945388	0.010955939	-1.270915511	UP
DST	-0.521282211	11.82294235	-3.357251692	0.000945667	0.010955939	-1.271186634	DOWN
BTG2	-0.528247562	13.02882959	-3.356632768	9.48E-04	0.010955939	-1.273129945	DOWN
TUBB2B	-0.803303894	5.434114286	-3.35259416	0.000960836	0.011076205	-1.285802635	DOWN
FBLN2	-0.53606247	11.62114286	-3.352292004	0.000961828	0.011079674	-1.286750219	DOWN
CCNB2	0.545937248	7.631528061	3.350341834	0.000968252	0.011129695	-1.29286428	UP
KIF15	0.568239921	6.650615306	3.331350206	0.001032946	0.011736231	-1.352240074	UP
TSHZ2	-0.711693026	6.630813776	-3.313933745	0.001095797	0.012296083	-1.406426786	DOWN
ASPM	0.669411473	8.054905612	3.306513441	0.001123642	0.012494869	-1.429436123	UP
HBA2	-0.736089915	7.164606633	-3.304558818	0.001131086	0.012551531	-1.435489481	DOWN
BIRC5	0.644542531	7.260344388	3.280833103	0.001225179	0.013278425	-1.508711665	UP
KLRB1	-0.692329492	5.430172449	-3.266849672	0.001283997	0.013799522	-1.551646277	DOWN
E2F2	0.510639879	6.445964286	3.214106167	0.001530298	0.015756844	-1.712110144	UP
PDZK1	-1.309043637	7.775166327	-3.213301416	0.001534375	0.01577058	-1.714540319	DOWN
CD79B	-0.675837196	6.627086224	-3.204177972	0.001581305	0.016119662	-1.742052913	DOWN
UBE2C	0.620061416	8.06387398	3.170184409	0.001768139	0.017468955	-1.843944009	UP
MMP23B	-0.636460205	6.652636224	-3.140295741	0.001949098	0.01887306	-1.932722103	DOWN
PPEF1	0.532068755	4.787080612	3.104091453	0.002191201	0.020499362	-2.039242123	UP
CDC45	0.573488433	6.345866837	3.101475046	0.002209731	0.020612589	-2.046896821	UP
TOP2A	0.638674225	10.25863469	3.077767114	0.002384358	0.021922695	-2.115991547	UP
PDGFRA	-0.531163451	10.16073827	-3.06682642	0.002469163	0.022534449	-2.147715223	DOWN
MCM10	0.56749478	6.277321939	3.046330383	0.002635562	0.023553321	-2.206869722	UP
POLQ	0.505636194	6.068865816	3.046323431	0.00263562	0.023553321	-2.206889725	UP
HOXA5	-0.531088809	5.087967857	-2.964710007	0.003405843	0.028488621	-2.438856449	DOWN
CHAD	-0.901274079	8.551685714	-2.96200649	0.003434578	0.028654246	-2.44644229	DOWN
RARRES2	-0.509317987	9.701676531	-2.951903423	0.003543942	0.029352848	-2.474734692	DOWN
CKAP2L	0.540474517	6.128182653	2.936730964	0.003714189	0.030420508	-2.517057379	UP
DCN	-0.515932686	13.60276122	-2.932871654	0.003758673	0.030606764	-2.527790887	DOWN
PON3	-1.13006175	5.152872959	-2.895656735	0.004213347	0.033232181	-2.630629889	DOWN
FGFR4	0.840144441	7.337463265	2.891247449	0.004270426	0.033447374	-2.642734701	UP
AOX1	-0.609734273	7.391178571	-2.850344621	0.004834586	0.036563775	-2.754218144	DOWN
SOCS2	-0.521535139	8.861330102	-2.769326134	0.006157065	0.04380148	-2.9707222	DOWN
RAB26	0.522852469	7.299256122	2.702189969	0.007492936	0.050250618	-3.145757749	UP
COL17A1	-0.950098121	8.929905612	-2.70122038	0.007514014	0.050307817	-3.148256493	DOWN
HMGCS2	-1.239891805	8.525610204	-2.695319475	0.007643457	0.05097193	-3.163445882	DOWN
BBOX1	-0.877359954	5.344554082	-2.679602824	0.007998102	0.052777602	-3.203751428	DOWN
OMD	-0.61587648	7.700181633	-2.643116534	0.008879301	0.056815482	-3.296476797	DOWN
CD52	-0.542548314	8.509877041	-2.641352972	0.008924028	0.05696117	-3.300928128	DOWN
KIT	-0.584070206	9.160661735	-2.636897943	0.009037919	0.057486329	-3.312162683	DOWN
PKMYT1	0.559072419	7.798257653	2.630119199	0.009213725	0.05839608	-3.329222345	UP
COL11A1	1.043488798	9.545230612	2.590676953	0.010299026	0.063352437	-3.427672785	UP
CXCL14	-0.755959077	11.88508571	-2.588422274	0.010364398	0.063611835	-3.433258709	DOWN
SOX11	0.54385558	5.014390816	2.581160798	0.010577472	0.064246122	-3.451218033	UP
GZMK	-0.607048784	7.117917857	-2.510706091	0.012857706	0.073045132	-3.623020074	DOWN
KLK5	-0.924134899	5.895292857	-2.447074183	0.01528357	0.082222746	-3.774354827	DOWN
STC2	-0.683004165	12.79901276	-2.409853819	0.016883601	0.088070443	-3.861182984	DOWN
IL7R	-0.758677545	6.187054082	-2.394479539	0.017586622	0.09026936	-3.89668267	DOWN
SERPINB5	-0.707161144	6.797380612	-2.298286769	0.022601018	0.106807001	-4.113924183	DOWN
KRT5	-0.91162232	10.19739694	-2.253649268	0.025325906	0.115372071	-4.211869694	DOWN
MMP11	0.53931711	12.17492959	2.201624133	0.028859464	0.126403035	-4.323724156	UP
KRT17	-0.815249201	9.995825	-2.123670513	0.034952278	0.14423444	-4.486669798	DOWN
PIP	-0.886740641	9.939482653	-2.06610165	0.040134507	0.157928052	-4.603405845	DOWN
TCN1	-0.899884998	6.074263265	-2.061560796	0.040569866	0.15907876	-4.612483105	DOWN
CALML3	-0.747860048	6.826529592	-2.012339805	0.045553526	0.171750832	-4.709649368	DOWN
KRT14	-0.838774455	10.17545765	-1.998974589	0.046993302	0.175772709	-4.73564483	DOWN

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Table S4 The raw P values and the FDR-adjusted P values of the 276 differentially expressed genes in METABRIC

Symbol	logFC	AveExpr	t	P.Value	FDR	B	Change
FABP4	-2.507634485	8.465805035	-12.64794052	8.99E-23	1.83E-18	40.69702331	DOWN
ADH1A	-2.562173701	8.232932176	-12.40457788	3.06E-22	3.12E-18	39.53349355	DOWN
CIDEC	-2.44459508	7.854020644	-10.23068587	2.03E-17	1.38E-13	28.93100197	DOWN
CIDEA	-1.827454496	7.255981633	-9.561434174	6.36E-16	2.59E-12	25.62694173	DOWN
CAV1	-1.351265347	9.342449008	-9.517310861	7.98E-16	2.71E-12	25.40914868	DOWN
ADH1B	-1.070836028	6.405763147	-9.44255342	1.17E-15	3.41E-12	25.04022371	DOWN
CD36	-1.894183602	8.406917626	-9.288006257	2.59E-15	6.61E-12	24.27795077	DOWN
AKR1C2	-1.839142731	7.68994886	-9.160930372	4.98E-15	1.13E-11	23.65172273	DOWN
CD300LG	-1.107029926	6.95320935	-8.941748586	1.53E-14	3.12E-11	22.57317357	DOWN
HSPB6	-1.293089181	7.027422142	-8.841421613	2.56E-14	3.56E-11	22.08031192	DOWN
CCL14	-1.852634038	8.331939727	-8.843227709	2.53E-14	3.56E-11	22.08917921	DOWN
GNG11	-1.129963317	8.82765531	-8.836438273	2.62E-14	3.56E-11	22.05584651	DOWN
TMEM100	-0.566497636	6.033556609	-8.839133358	2.59E-14	3.56E-11	22.06907768	DOWN
CFD	-1.713963736	9.841837581	-8.870036456	2.21E-14	3.56E-11	22.220824	DOWN
PLIN1	-1.410173584	6.648254768	-8.754597904	3.99E-14	5.08E-11	21.6542822	DOWN
JAM2	-0.849632199	7.119881717	-8.519862149	1.32E-13	1.41E-10	20.50516607	DOWN
PLAC9	-1.419086119	8.592517233	-8.364088846	2.91E-13	2.84E-10	19.74513709	DOWN
PGM5	-1.237499901	7.540504338	-8.363141694	2.92E-13	2.84E-10	19.74052281	DOWN
AKR1C3	-1.266986121	8.692072867	-8.200358418	6.66E-13	5.66E-10	18.94884752	DOWN
IL33	-1.058959825	7.064010087	-8.17913155	7.42E-13	6.05E-10	18.84582289	DOWN
LPL	-1.233294871	7.127882256	-8.13710609	9.17E-13	6.92E-10	18.6420032	DOWN
PCOLCE2	-1.14479893	6.704801562	-8.137876634	9.13E-13	6.92E-10	18.64573844	DOWN
GPAM	-0.899932957	6.95470236	-8.103923754	1.08E-12	7.89E-10	18.48121694	DOWN
PLIN4	-2.032848257	8.094726161	-8.0671499	1.30E-12	8.68E-10	18.3031815	DOWN
G0S2	-1.133619656	6.36284158	-7.955405586	2.29E-12	1.41E-09	17.76322176	DOWN
SAA1	-1.911641075	7.999617038	-7.93547945	2.53E-12	1.52E-09	17.66710668	DOWN
GYPC	-1.090519352	8.266505998	-7.759773393	6.10E-12	3.27E-09	16.82196072	DOWN
EBF1	-0.842396352	7.53400195	-7.655615921	1.02E-11	5.36E-09	16.32311805	DOWN
PDK4	-1.193804561	7.702965127	-7.593668364	1.39E-11	6.93E-09	16.02724693	DOWN
EGR1	-1.403938728	9.740495093	-7.539663253	1.82E-11	8.64E-09	15.76982801	DOWN
CDKN1C	-0.798002965	6.951638863	-7.503184386	2.18E-11	1.01E-08	15.59623012	DOWN
CDO1	-0.858907096	6.427250372	-7.482384217	2.42E-11	1.07E-08	15.49734857	DOWN
FCER1A	-1.421036412	7.677880041	-7.404138062	3.57E-11	1.48E-08	15.12606656	DOWN
SLC19A3	-0.960230393	6.345814215	-7.391146773	3.80E-11	1.55E-08	15.06453009	DOWN
SRPX	-1.302129794	8.465535375	-7.350275613	4.65E-11	1.79E-08	14.87113886	DOWN
CDC45	0.983756123	6.880008083	7.320626465	5.38E-11	2.03E-08	14.73104493	UP
AQP7P1	-0.871619472	6.196969145	-7.232046824	8.31E-11	2.73E-08	14.3135198	DOWN
PROS1	-1.059507277	8.223113226	-7.232577189	8.29E-11	2.73E-08	14.31601507	DOWN
FBLN5	-0.964022694	8.013470999	-7.221364958	8.76E-11	2.83E-08	14.26327569	DOWN
MEOX1	-0.908377809	6.775410753	-7.210174572	9.25E-11	2.86E-08	14.21066448	DOWN
CXCL12	-1.431256388	9.701064239	-7.182153069	1.06E-10	3.18E-08	14.07903468	DOWN
PKMYT1	0.746175793	6.316850612	7.147973839	1.25E-10	3.65E-08	13.91869927	UP
MME	-0.953250994	6.717813379	-7.144120902	1.28E-10	3.67E-08	13.9006404	DOWN
RDH5	-0.887382971	6.799656789	-7.137531982	1.32E-10	3.74E-08	13.86976513	DOWN
C6	-0.800035472	6.249179605	-7.126842342	1.39E-10	3.83E-08	13.81969368	DOWN
FOS	-1.88067506	10.50056455	-7.127319318	1.39E-10	3.83E-08	13.82192737	DOWN
CDCA5	1.116317051	7.908131277	7.077866727	1.77E-10	4.80E-08	13.59059906	UP
OGN	-1.425064723	7.059585745	-7.063169494	1.91E-10	5.13E-08	13.51534647	DOWN
TNMD	-0.765378944	6.085964957	-7.04296477	2.09E-10	5.54E-08	13.4276552	DOWN
CD34	-0.860188976	9.323835685	-7.019268705	2.35E-10	6.13E-08	13.31718084	DOWN
TGFBR2	-0.98717846	9.472154515	-7.015630878	2.39E-10	6.16E-08	13.30023189	DOWN
MRAP	-0.956454473	6.184898808	-7.000883075	2.57E-10	6.54E-08	13.23155106	DOWN
TF	-1.487210026	7.408181554	-6.983714176	2.79E-10	6.85E-08	13.15165707	DOWN
INMT	-0.965151073	6.768191269	-6.977553601	2.87E-10	6.97E-08	13.12300572	DOWN
DNASE1L3	-0.658486609	6.114796932	-6.904563172	4.09E-10	9.58E-08	12.7842118	DOWN
TXNIP	-0.851632901	10.47244106	-6.886082942	4.47E-10	1.02E-07	12.69863176	DOWN
DPT	-1.267014451	8.088772403	-6.882141568	4.56E-10	1.03E-07	12.68039017	DOWN
MYH11	-1.745518014	9.465004853	-6.872757703	4.77E-10	1.07E-07	12.63697444	DOWN
CAV2	-0.884954811	7.19533594	-6.842359118	5.52E-10	1.21E-07	12.49647681	DOWN
CLEC14A	-0.649185737	7.876134941	-6.820575749	6.13E-10	1.32E-07	12.3959355	DOWN
SVEP1	-1.226360985	8.560569658	-6.821140824	6.12E-10	1.32E-07	12.39854214	DOWN
ASPM	0.928517152	7.075520788	6.783990808	7.31E-10	1.55E-07	12.2273404	UP
FOXM1	0.741081081	6.137003815	6.753093975	8.48E-10	1.73E-07	12.08521814	UP
ECM2	-0.979177323	8.187115296	-6.739791801	9.04E-10	1.81E-07	12.02410378	DOWN
GEM	-1.058208559	7.53845611	-6.71131761	1.04E-09	2.01E-07	11.89343629	DOWN
EFEMP1	-1.287359032	8.916392563	-6.709677847	1.04E-09	2.01E-07	11.8859178	DOWN
PCDH18	-1.036291803	8.325053854	-6.701522122	1.09E-09	2.07E-07	11.84853323	DOWN
MCM10	0.756919679	6.44195545	6.656116677	1.35E-09	2.48E-07	11.64071857	UP
MFAP4	-1.571878966	9.289685189	-6.639952515	1.46E-09	2.65E-07	11.56686834	DOWN
HJURP	0.73383523	6.455543615	6.632313244	1.51E-09	2.72E-07	11.53199048	UP
ETS2	-0.653798497	7.84521066	-6.627221369	1.55E-09	2.77E-07	11.50875168	DOWN
ADH1C	-0.600852206	5.854889554	-6.616267746	1.63E-09	2.86E-07	11.45878397	DOWN
SCARA5	-0.820423918	6.100171614	-6.585198147	1.89E-09	3.22E-07	11.31722824	DOWN
PDGFD	-0.749205715	6.944476202	-6.57862017	1.95E-09	3.28E-07	11.28729203	DOWN
ICAM2	-0.550867678	8.266559753	-6.567921789	2.05E-09	3.43E-07	11.23862925	DOWN
KIF20A	0.876796429	6.864349961	6.540750557	2.33E-09	3.80E-07	11.11517942	UP
CKAP2L	0.710257201	6.361636744	6.514096209	2.65E-09	4.25E-07	10.99427716	UP
ID1	-0.831578205	7.952379069	-6.469378185	3.27E-09	5.09E-07	10.79188855	DOWN
EGR2	-1.082150765	7.668328631	-6.467130624	3.30E-09	5.10E-07	10.78173135	DOWN
AURKA	0.854971786	7.102074102	6.441819803	3.72E-09	5.58E-07	10.66744669	UP
C7	-0.950538551	6.291782607	-6.434771575	3.85E-09	5.68E-07	10.6356551	DOWN
TSHZ2	-0.965314834	8.012649668	-6.402513163	4.48E-09	6.48E-07	10.49033553	DOWN
NDN	-0.913626657	8.944532987	-6.347259934	5.80E-09	8.22E-07	10.24214055	DOWN
BIRC5	0.85437449	6.602248958	6.33995815	6.01E-09	8.44E-07	10.20940948	UP
CH25H	-0.904773026	6.795109126	-6.333977786	6.18E-09	8.62E-07	10.1826138	DOWN
SPRY1	-1.010792699	9.472836114	-6.312979058	6.81E-09	9.45E-07	10.08861246	DOWN
ANXA1	-0.951905555	10.86958933	-6.31059793	6.89E-09	9.49E-07	10.07796174	DOWN
SPARCL1	-1.089795737	11.13260346	-6.30257613	7.15E-09	9.79E-07	10.0420932	DOWN
POLQ	0.631588352	6.398798601	6.280961413	7.91E-09	1.06E-06	9.945543685	UP
TPX2	0.801139325	6.562303009	6.257188202	8.84E-09	1.16E-06	9.839519082	UP
S1PR1	-0.520989984	6.728321104	-6.251847257	9.06E-09	1.18E-06	9.815723509	DOWN
VIM	-0.694708595	12.35668231	-6.249133948	9.18E-09	1.18E-06	9.803638284	DOWN
E2F2	0.918199463	7.00219606	6.249375541	9.17E-09	1.18E-06	9.804714259	UP
CLEC3B	-0.681771904	6.648740937	-6.24532424	9.34E-09	1.20E-06	9.786673519	DOWN
GPIHBP1	-0.76848527	6.60615827	-6.238090617	9.66E-09	1.22E-06	9.75447445	DOWN
PTGS2	-1.067812441	6.900663215	-6.230034927	1.00E-08	1.25E-06	9.718635437	DOWN
OSR1	-1.264927482	7.195587692	-6.228987403	1.01E-08	1.25E-06	9.713976602	DOWN
MATN2	-1.149191648	8.00817549	-6.208727717	1.11E-08	1.35E-06	9.623940312	DOWN
TSPAN7	-1.131297247	7.679523034	-6.199060773	1.16E-08	1.41E-06	9.581025201	DOWN
TGFBR3	-1.153335905	9.246482962	-6.176371783	1.29E-08	1.53E-06	9.480417609	DOWN
SHE	-0.512356761	6.322034779	-6.156611653	1.41E-08	1.64E-06	9.392931942	DOWN
ZFP36	-1.109030424	9.992417919	-6.097100459	1.86E-08	2.07E-06	9.130220952	DOWN
HBB	-1.639599748	9.4824461	-6.091798834	1.90E-08	2.11E-06	9.106873562	DOWN
TMEM37	-0.623064773	6.297274569	-6.085281945	1.96E-08	2.16E-06	9.07818716	DOWN
SFRP1	-1.775244981	8.716102057	-6.080367678	2.00E-08	2.20E-06	9.056564615	DOWN
EBF3	-0.522773692	6.482382063	-6.063020393	2.17E-08	2.33E-06	8.980301835	DOWN
UBE2C	1.290610285	8.53760901	6.039275343	2.42E-08	2.57E-06	8.876076808	UP
COL14A1	-0.818419354	7.115920191	-5.94921432	3.65E-08	3.67E-06	8.482517884	DOWN
CYYR1	-0.607455558	7.163292095	-5.922900707	4.12E-08	4.10E-06	8.368061345	DOWN
RGS2	-1.018931668	8.778063576	-5.893385285	4.71E-08	4.64E-06	8.23996908	DOWN
FAM162B	-0.567524182	6.960105018	-5.856060828	5.58E-08	5.34E-06	8.078432681	DOWN
TEK	-0.541195536	7.268264639	-5.851640915	5.69E-08	5.42E-06	8.059337011	DOWN
SOX11	0.994561462	6.079609445	5.835841625	6.11E-08	5.77E-06	7.991136157	UP
LEPR	-1.123633961	6.976649032	-5.818809963	6.60E-08	6.20E-06	7.917717448	DOWN
CCDC3	-0.781184475	7.30770462	-5.78336391	7.74E-08	7.01E-06	7.765261266	DOWN
CDC20	1.108042207	8.280642855	5.783755815	7.73E-08	7.01E-06	7.766944343	UP
INPP1	-0.570452298	7.846251972	-5.777179812	7.96E-08	7.15E-06	7.738710624	DOWN
RBMS3	-0.56470148	6.542103427	-5.772719704	8.12E-08	7.26E-06	7.719570545	DOWN
SPRY2	-0.87827949	7.202886317	-5.760847465	8.57E-08	7.59E-06	7.668658254	DOWN
HSPA12B	-0.568772209	7.270524461	-5.736510694	9.56E-08	8.25E-06	7.564458848	DOWN
SORBS1	-0.900308814	7.660328143	-5.726546776	9.99E-08	8.59E-06	7.521862103	DOWN
ACACB	-0.960248679	8.314810554	-5.725188415	1.01E-07	8.61E-06	7.516057881	DOWN
MMRN1	-0.775938257	6.382370801	-5.719074565	1.03E-07	8.81E-06	7.489942314	DOWN
HBA2	-1.475902043	9.759351821	-5.699374486	1.13E-07	9.49E-06	7.405889299	DOWN
KIF15	0.521419814	6.187027353	5.690771499	1.17E-07	9.76E-06	7.369229989	UP
CLDN5	-0.925182742	7.710482028	-5.682049799	1.22E-07	1.01E-05	7.332093783	DOWN
FOSB	-1.720187333	9.050067678	-5.648223728	1.42E-07	1.16E-05	7.188342991	DOWN
MAOA	-1.254650502	8.05281888	-5.642291045	1.46E-07	1.18E-05	7.163176577	DOWN
HSPB2	-0.615725339	6.715946006	-5.642562407	1.45E-07	1.18E-05	7.164327396	DOWN
CPXM2	-0.858697872	8.240500281	-5.62266302	1.59E-07	1.27E-05	7.080012534	DOWN
CCNB2	0.906788011	7.542489164	5.614223959	1.65E-07	1.31E-05	7.044302605	UP
PELI2	-0.500524279	6.442171483	-5.610717785	1.67E-07	1.32E-05	7.02947445	DOWN
TOP2A	1.146330502	8.33773754	5.605815286	1.71E-07	1.35E-05	7.008749136	UP
KIT	-1.006647815	7.535864432	-5.585320173	1.87E-07	1.44E-05	6.922208955	DOWN
ANLN	0.590306464	6.148706104	5.574617428	1.96E-07	1.47E-05	6.877083114	UP
CTSG	-1.376494507	7.689542332	-5.57255896	1.98E-07	1.48E-05	6.868409252	DOWN
RGL1	-0.655473382	8.856537585	-5.56109056	2.09E-07	1.54E-05	6.820115328	DOWN
LYVE1	-0.776119374	6.143298242	-5.553210673	2.16E-07	1.58E-05	6.786963314	DOWN
GPC3	-0.857222149	6.678262532	-5.544432577	2.24E-07	1.62E-05	6.750061753	DOWN
LAMA2	-0.775842523	7.088993707	-5.511131323	2.60E-07	1.82E-05	6.610352178	DOWN
LIPE	-0.540381982	6.043237666	-5.480282401	2.98E-07	2.04E-05	6.481333831	DOWN
IGFBP6	-0.947541975	7.928878871	-5.420887001	3.86E-07	2.52E-05	6.234032678	DOWN
FBLN7	-0.585143953	6.859238595	-5.411382068	4.02E-07	2.59E-05	6.194594154	DOWN
UBE2T	0.71106212	7.279304523	5.409743884	4.05E-07	2.59E-05	6.187800727	UP
GIMAP6	-0.65452945	7.928888508	-5.403262586	4.17E-07	2.63E-05	6.160934343	DOWN
GIMAP7	-0.828554887	8.620429248	-5.389069379	4.43E-07	2.77E-05	6.102162364	DOWN
HOXA5	-0.884600375	7.67592124	-5.378699382	4.64E-07	2.85E-05	6.059275686	DOWN
CDCA8	0.598240305	6.539028824	5.313112317	6.16E-07	3.60E-05	5.789095854	UP
ABI3BP	-0.700300213	7.398646274	-5.285437351	6.94E-07	4.00E-05	5.675649407	DOWN
PECAM1	-0.565586328	8.379907303	-5.279698337	7.11E-07	4.06E-05	5.652165679	DOWN
MYOM1	-0.554599672	6.65702925	-5.26897206	7.45E-07	4.17E-05	5.608313102	DOWN
COL17A1	-1.198772945	6.943488189	-5.262859346	7.65E-07	4.27E-05	5.583344945	DOWN
PI16	-1.123848446	6.849336709	-5.254301199	7.94E-07	4.37E-05	5.548415799	DOWN
PPP1R14A	-0.670152785	7.180377152	-5.254768707	7.92E-07	4.37E-05	5.550323047	DOWN
IGF1	-0.64029406	6.112451298	-5.251618571	8.03E-07	4.40E-05	5.537473607	DOWN
IL6	-0.692881953	6.219120699	-5.245894733	8.23E-07	4.46E-05	5.514137251	DOWN
DCN	-1.493992187	9.679907283	-5.245165775	8.25E-07	4.46E-05	5.511166296	DOWN
CPE	-0.857247984	8.255231516	-5.240868568	8.41E-07	4.51E-05	5.493657316	DOWN
ALDH1L1	-0.573114111	5.821551522	-5.203802195	9.85E-07	5.12E-05	5.342971834	DOWN
TMEM119	-0.980525918	9.539764281	-5.190193529	1.04E-06	5.39E-05	5.287803183	DOWN
VWF	-0.75764028	10.84036474	-5.18266218	1.08E-06	5.49E-05	5.257307463	DOWN
GIMAP8	-0.574560594	7.697566461	-5.18311843	1.08E-06	5.49E-05	5.259154167	DOWN
BUB1	0.616545731	6.323480074	5.183295665	1.08E-06	5.49E-05	5.259871567	UP
KCTD12	-0.573871897	8.518310782	-5.174389631	1.12E-06	5.63E-05	5.223840051	DOWN
MMP23B	-0.87400012	7.76825905	-5.174980971	1.11E-06	5.63E-05	5.226231347	DOWN
TESC	-0.56720212	6.428817982	-5.150861999	1.23E-06	6.17E-05	5.1288265	DOWN
CBX7	-0.530190835	7.742139505	-5.10480691	1.50E-06	7.25E-05	4.943571563	DOWN
PTTG1	0.851043957	8.639479484	5.084095601	1.64E-06	7.76E-05	4.860580283	UP
PID1	-0.574268319	6.349030285	-5.055622527	1.85E-06	8.61E-05	4.746813586	DOWN
ALDH1A2	-0.609184655	6.414103231	-5.037921408	1.99E-06	9.05E-05	4.676278948	DOWN
COX7A1	-0.785313353	9.036104716	-5.025818964	2.09E-06	9.37E-05	4.628138771	DOWN
PDGFRA	-0.777491848	8.091388418	-5.025188196	2.10E-06	9.38E-05	4.625631651	DOWN
SOX18	-0.665571058	9.096400674	-5.011427917	2.22E-06	9.87E-05	4.570985525	DOWN
PPP1R15A	-0.532845459	8.988900781	-5.002568903	2.31E-06	0.000101509	4.535851427	DOWN
PCSK5	-0.610296268	7.33818244	-4.992067405	2.41E-06	0.000105378	4.494251892	DOWN
ANKRD35	-0.706499413	7.244464392	-4.971371689	2.63E-06	0.000111297	4.4124247	DOWN
IRS2	-0.742700252	7.52317857	-4.96711683	2.67E-06	0.000112353	4.395627262	DOWN
TTK	0.701809695	6.555361795	4.957945498	2.78E-06	0.000116008	4.359450146	UP
PAMR1	-0.727934877	6.694176273	-4.918989519	3.26E-06	0.000131521	4.206239361	DOWN
H19	-0.986350028	9.277784023	-4.89754697	3.57E-06	0.000142039	4.122223556	DOWN
CNN1	-0.744910218	6.541023353	-4.895437984	3.60E-06	0.000142725	4.113972358	DOWN
TFPI	-0.722293097	7.919170729	-4.881121133	3.82E-06	0.000149955	4.058017056	DOWN
CD209	-0.515342516	6.241276702	-4.870353974	3.99E-06	0.000154675	4.016001919	DOWN
CCNE2	0.541106011	6.450972854	4.866604762	4.05E-06	0.000156784	4.001385392	UP
TUBB6	-0.524988134	6.93459715	-4.863999617	4.10E-06	0.000158175	3.991233183	DOWN
NMB	-0.518024409	6.941258946	-4.848518305	4.37E-06	0.000166529	3.93097238	DOWN
OAF	-0.644890692	9.237504094	-4.848283263	4.37E-06	0.000166529	3.930058401	DOWN
SYNPO2	-0.546488333	6.646918198	-4.846180408	4.41E-06	0.000167661	3.921882526	DOWN
PPEF1	0.544755661	6.280314969	4.844532216	4.44E-06	0.000168485	3.915475915	UP
PAQR4	0.826748643	8.680776301	4.840367585	4.52E-06	0.000170965	3.899293817	UP
CCL21	-0.909920077	7.082644729	-4.824530225	4.82E-06	0.000178897	3.837835431	DOWN
NEK2	0.696073335	6.55423021	4.812127714	5.07E-06	0.000186518	3.789794228	UP
GPR183	-0.770581859	7.518963052	-4.748815283	6.56E-06	0.000232625	3.5457669	DOWN
A2M	-0.735967862	9.327650493	-4.729442851	7.10E-06	0.000249188	3.471508234	DOWN
KLRB1	-0.750488942	7.167362135	-4.721137652	7.34E-06	0.000255631	3.439731854	DOWN
DST	-0.510258004	5.838449059	-4.711043661	7.65E-06	0.000262426	3.401159413	DOWN
PDE1A	-0.546246302	6.995842329	-4.673073896	8.91E-06	0.000296375	3.256538726	DOWN
MMD	-0.541161485	7.816046713	-4.640349506	1.02E-05	0.000326287	3.132502391	DOWN
FABP5	-0.676577983	8.120603398	-4.600380119	1.19E-05	0.000375574	2.981773315	DOWN
RGS5	-0.636135254	7.782938415	-4.568849504	1.35E-05	0.000414412	2.863469463	DOWN
CDK1	0.646539256	6.994640677	4.532933826	1.56E-05	0.000464513	2.729365415	UP
FOLR2	-0.643651137	6.888227516	-4.494959479	1.81E-05	0.000522729	2.588337689	DOWN
SLIT3	-0.553060605	6.964549418	-4.490147182	1.85E-05	0.000528225	2.570522346	DOWN
THRSP	-1.011031393	7.126383079	-4.463269262	2.05E-05	0.000570936	2.471253715	DOWN
FAM107A	-0.871675779	7.070239224	-4.459736817	2.08E-05	0.0005742	2.458236966	DOWN
AOX1	-0.730856255	6.56934657	-4.442286287	2.23E-05	0.000600605	2.394034923	DOWN
PRNP	-0.653390747	8.189046516	-4.350142483	3.18E-05	0.00080987	2.05785939	DOWN
CCL2	-0.753489621	9.120775971	-4.348426545	3.20E-05	0.000814229	2.051644557	DOWN
C3	-0.783247247	8.552687144	-4.347119724	3.22E-05	0.000817323	2.046921601	DOWN
BBOX1	-0.563859975	6.083402941	-4.3328242	3.40E-05	0.00084878	1.995212683	DOWN
CES1	-0.72066721	6.433865144	-4.332069921	3.41E-05	0.000850205	1.992488071	DOWN
OMD	-0.746465669	7.061820078	-4.322004532	3.55E-05	0.000873071	1.956161011	DOWN
NTRK2	-0.649378634	6.417712496	-4.319319617	3.58E-05	0.000878936	1.94648069	DOWN
CD69	-0.761896158	6.99918694	-4.293338022	3.96E-05	0.000944813	1.853019759	DOWN
RAMP3	-0.530328969	7.328048463	-4.275933809	4.23E-05	0.00099809	1.790631538	DOWN
THBS4	-1.209012171	9.315505726	-4.204950243	5.54E-05	0.00121929	1.538009433	DOWN
KCNMB1	-0.690693191	7.511790551	-4.196729233	5.71E-05	0.001248281	1.508943265	DOWN
OXTR	-0.800857308	6.774967296	-4.156728562	6.64E-05	0.001402821	1.368089663	DOWN
FAM89A	-0.557706207	6.839148547	-4.131335974	7.30E-05	0.001511351	1.279171088	DOWN
PHLDA1	-0.700545	7.894126028	-4.101166547	8.17E-05	0.001659503	1.174029626	DOWN
RARRES2	-0.689304679	9.374570545	-4.07318268	9.07E-05	0.001783135	1.076997873	DOWN
KRT5	-0.885629842	6.471638365	-4.064351188	9.37E-05	0.00182201	1.046474415	DOWN
NNAT	-0.574943838	6.115263099	-4.033490134	0.000104968	0.002009069	0.940187266	DOWN
CCL19	-1.18178085	8.602224471	-4.012085306	0.000113553	0.002135307	0.866812016	DOWN
PRG4	-0.628543102	6.659707652	-3.961550011	0.00013657	0.002448561	0.694705501	DOWN
ANGPTL4	-0.634602373	7.169815679	-3.938376714	0.000148557	0.002611007	0.616318433	DOWN
MMP11	1.113908276	9.435713141	3.937931211	0.000148797	0.002612463	0.61481476	UP
BTG2	-0.746441308	9.792147665	-3.924607676	0.000156148	0.002697391	0.569902594	DOWN
KRT14	-1.107742411	7.181011351	-3.898646518	0.00017148	0.002900792	0.482712642	DOWN
CILP	-1.071065018	9.858476532	-3.83857886	0.000212649	0.00345004	0.282621798	DOWN
MT1M	-0.590265154	6.541784338	-3.834643602	0.000215651	0.003479039	0.269593813	DOWN
ANGPTL2	-0.573708459	8.493345887	-3.785883212	0.000256368	0.004010603	0.10899903	DOWN
RASD1	-0.828561868	8.17995119	-3.784445921	0.000257673	0.004027922	0.104288648	DOWN
GIMAP5	-0.528428282	7.653662088	-3.712762342	0.000331378	0.004901887	-0.128921468	DOWN
JUN	-0.64245244	9.870958404	-3.680295786	0.000370982	0.005367003	-0.233430416	DOWN
ATF3	-0.820803145	7.764070893	-3.655840212	0.000403736	0.005735026	-0.311688818	DOWN
SQLE	0.59619357	8.300357507	3.643941889	0.000420646	0.005954474	-0.349619028	UP
CXCL14	-1.122606948	8.834761642	-3.608731148	0.000474702	0.006498544	-0.461308306	DOWN
EMP1	-0.558609498	10.22618314	-3.587934986	0.000509651	0.006879946	-0.526880751	DOWN
EPDR1	-0.516746412	7.80857745	-3.580622616	0.000522507	0.00701171	-0.549867668	DOWN
TMEM47	-0.506787708	7.777503562	-3.574735137	0.000533081	0.007102169	-0.568348915	DOWN
TUBB2B	-0.895603157	7.327640006	-3.570171786	0.000541415	0.007169576	-0.582657386	DOWN
FBLN2	-0.77004166	9.320601462	-3.564209082	0.000552491	0.007289302	-0.601332153	DOWN
CD52	-0.86636983	8.678037533	-3.552082645	0.000575679	0.007507771	-0.639236401	DOWN
ZNF296	0.514378491	7.732323724	3.550719783	0.000578342	0.007532859	-0.643490089	UP
APOD	-1.092748943	11.95915681	-3.503843982	0.000677339	0.008439415	-0.789019799	DOWN
SRGN	-0.674843623	9.458505854	-3.502227842	0.000681022	0.008474941	-0.794010241	DOWN
RAB26	0.566099297	7.658664053	3.475522109	0.000744681	0.009062428	-0.87621238	UP
KRT17	-1.049698538	7.824338899	-3.470714232	0.000756721	0.009146761	-0.890958791	DOWN
FZD4	-0.510922707	9.028018503	-3.385388817	0.001003392	0.011287608	-1.14997387	DOWN
CALML3	-0.522345396	6.123839682	-3.368867076	0.001059153	0.011778387	-1.199534884	DOWN
DLK1	-0.549952016	5.785184061	-3.312017719	0.001274038	0.013647636	-1.368584158	DOWN
ZBTB16	-0.633105366	7.164844239	-3.217189893	0.001725533	0.017157686	-1.645393708	DOWN
SOCS2	-0.714485134	8.698251394	-3.214773914	0.001738783	0.017274502	-1.652360793	DOWN
COL11A1	0.98693041	7.853064149	3.214340771	0.001741169	0.017279446	-1.653609422	UP
PPP1R1A	-0.607650411	6.704439307	-3.178003809	0.001952527	0.01876488	-1.757868925	DOWN
CD79B	-0.614270319	7.578083449	-3.124390107	0.002308341	0.021204696	-1.909922995	DOWN
NR4A2	-0.622582968	7.863445628	-3.123781274	0.002312707	0.021231194	-1.911637479	DOWN
PIP	-1.419637961	11.05723691	-3.01983198	0.003181457	0.02670956	-2.200296186	DOWN
GZMK	-0.699967162	7.91537539	-2.908036926	0.004445803	0.033567523	-2.501606617	DOWN
ALPL	-0.535736514	7.787967482	-2.841575121	0.005401769	0.038798327	-2.676174184	DOWN
SERPINB5	-0.593618091	6.508387381	-2.834248819	0.005517939	0.039424351	-2.695207064	DOWN
IL7R	-0.574650892	7.554525244	-2.826744882	0.005639294	0.04005274	-2.714657941	DOWN
CHAD	-0.54600396	6.576528826	-2.757609573	0.006877771	0.046435515	-2.891783194	DOWN
SCRG1	-0.505519209	6.169041686	-2.752118688	0.006986055	0.046996039	-2.905689342	DOWN
MT1E	-0.53076738	10.03140774	-2.608593882	0.010428162	0.062628128	-3.260648527	DOWN
FGFR4	0.513455928	6.510613152	2.450351502	0.015938296	0.084671936	-3.632659304	UP
CX3CL1	-0.51434508	7.825225185	-2.444687015	0.016176619	0.085625603	-3.645593957	DOWN
CALB2	-0.522891115	7.448367722	-2.391198005	0.018588477	0.094443548	-3.766418951	DOWN
RGS1	-0.566946571	8.66349739	-2.380746229	0.019095417	0.095919413	-3.789749501	DOWN
PON3	-0.597930935	6.944256787	-2.347989574	0.02076452	0.101947367	-3.86227629	DOWN
TCN1	-0.995298137	7.697663761	-2.217474282	0.028763723	0.128001254	-4.142253838	DOWN
HMGCS2	-0.96581864	8.764042224	-2.137520802	0.034896046	0.146055507	-4.306585933	DOWN
PDZK1	-0.667412074	6.983346771	-2.120387143	0.03634857	0.150433456	-4.341084659	DOWN
STC2	-0.763955821	10.008857	-2.035758553	0.044313793	0.170143596	-4.507745455	DOWN
KLK5	-0.514705505	6.409815176	-2.024954465	0.045431092	0.172992451	-4.528572429	DOWN

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Table S5 The results of univariate Cox regression analysis of 276 differentially expressed genes

Variants	HR (95% CI)	P value	FDR
SORBS1	0.598 (0.439, 0.814)	0.001	0.138
CHAD	0.729 (0.601, 0.885)	0.001	0.138
CXCL14	0.722 (0.582, 0.896)	0.003	0.276
CDO1	0.648 (0.477, 0.879)	0.005	0.331
FOS	0.756 (0.619, 0.923)	0.006	0.331
KLRB1	0.715 (0.548, 0.931)	0.013	0.381
FABP4	0.821 (0.700, 0.963)	0.016	0.381
SCARA5	0.797 (0.661, 0.960)	0.017	0.381
EGR1	0.756 (0.598, 0.954)	0.019	0.381
TNMD	0.745 (0.579, 0.959)	0.022	0.381
EFEMP1	0.700 (0.514, 0.954)	0.024	0.381
FOSB	0.815 (0.681, 0.975)	0.025	0.381
MCM10	1.387 (1.028, 1.872)	0.033	0.381
NNAT	0.761 (0.591, 0.979)	0.034	0.381
PCOLCE2	0.808 (0.660, 0.990)	0.04	0.381
RGS2	0.718 (0.523, 0.985)	0.04	0.381
CIDEA	0.847 (0.722, 0.993)	0.041	0.381
SAA1	0.841 (0.712, 0.993)	0.041	0.381
SQLE	1.542 (1.017, 2.337)	0.041	0.381
ALDH1L1	0.810 (0.661, 0.992)	0.042	0.381
PON3	0.857 (0.737, 0.996)	0.044	0.381
ANGPTL4	0.781 (0.614, 0.994)	0.045	0.381
INPP1	0.569 (0.328, 0.987)	0.045	0.381
IGFBP6	0.734 (0.542, 0.993)	0.045	0.381
CCL19	0.819 (0.674, 0.995)	0.045	0.381
CDC45	1.381 (1.006, 1.896)	0.046	0.381
IRS2	0.687 (0.473, 0.996)	0.048	0.381
FOXM1	1.374 (1.003, 1.882)	0.048	0.381
SERPINB5	0.815 (0.666, 0.999)	0.049	0.381
KIF20A	1.335 (1.000, 1.783)	0.05	0.381
ANLN	1.343 (0.997, 1.808)	0.052	0.381
PTTG1	1.396 (0.997, 1.954)	0.052	0.381
CKAP2L	1.372 (0.997, 1.890)	0.052	0.381
CCNE2	1.298 (0.994, 1.694)	0.055	0.381
TTK	1.340 (0.992, 1.811)	0.056	0.381
CD300LG	0.827 (0.680, 1.006)	0.057	0.381
KIT	0.772 (0.591, 1.008)	0.057	0.381
TCN1	0.882 (0.775, 1.004)	0.057	0.381
CIDEC	0.870 (0.752, 1.006)	0.06	0.381
UBE2T	1.390 (0.986, 1.960)	0.06	0.381
CCNB2	1.381 (0.985, 1.936)	0.061	0.381
CBX7	0.630 (0.387, 1.024)	0.062	0.381
DPT	0.774 (0.591, 1.014)	0.063	0.381
PI16	0.857 (0.728, 1.009)	0.064	0.381
BUB1	1.400 (0.981, 1.998)	0.064	0.381
BTG2	0.706 (0.488, 1.021)	0.064	0.381
IL33	0.801 (0.633, 1.014)	0.066	0.381
ALDH1A2	0.775 (0.590, 1.018)	0.067	0.381
PKMYT1	1.283 (0.981, 1.678)	0.068	0.381
UBE2C	1.309 (0.979, 1.750)	0.069	0.381
MRAP	0.850 (0.711, 1.016)	0.074	0.400
SLC19A3	0.845 (0.699, 1.021)	0.081	0.416
BIRC5	1.298 (0.966, 1.742)	0.083	0.416
ADH1B	0.879 (0.760, 1.017)	0.084	0.416
MT1M	0.794 (0.611, 1.033)	0.085	0.416
CDCA8	1.393 (0.955, 2.032)	0.085	0.416
DST	0.713 (0.485, 1.049)	0.086	0.416
TPX2	1.312 (0.958, 1.796)	0.09	0.421
PPP1R15A	0.644 (0.386, 1.075)	0.092	0.421
ANKRD35	0.778 (0.580, 1.042)	0.093	0.421
PDGFRA	0.757 (0.548, 1.047)	0.093	0.421
FGFR4	1.165 (0.973, 1.394)	0.096	0.422
CD36	0.849 (0.700, 1.030)	0.097	0.422
RDH5	0.807 (0.625, 1.042)	0.1	0.422
ZFP36	0.768 (0.559, 1.054)	0.102	0.422
PRG4	0.817 (0.642, 1.041)	0.102	0.422
KRT14	0.896 (0.785, 1.022)	0.103	0.422
NTRK2	0.832 (0.666, 1.039)	0.104	0.422
AURKA	1.322 (0.943, 1.853)	0.106	0.424
TOP2A	1.238 (0.954, 1.606)	0.108	0.426
MT1E	0.774 (0.566, 1.060)	0.11	0.428
PLIN4	0.880 (0.751, 1.032)	0.116	0.430
STC2	0.842 (0.679, 1.043)	0.116	0.430
NMB	0.694 (0.439, 1.098)	0.119	0.430
G0S2	0.852 (0.696, 1.044)	0.122	0.430
MAOA	0.837 (0.667, 1.049)	0.122	0.430
PTGS2	0.831 (0.657, 1.051)	0.122	0.430
TGFBR3	0.816 (0.631, 1.056)	0.123	0.430
CALML3	0.896 (0.779, 1.030)	0.123	0.430
TESC	0.801 (0.602, 1.067)	0.129	0.442
GNG11	0.688 (0.423, 1.119)	0.132	0.442
IL6	0.861 (0.707, 1.048)	0.136	0.442
ANXA1	0.725 (0.475, 1.106)	0.136	0.442
FABP5	0.767 (0.540, 1.088)	0.137	0.442
CALB2	0.860 (0.705, 1.050)	0.138	0.442
PLIN1	0.879 (0.740, 1.043)	0.139	0.442
ASPM	1.226 (0.935, 1.608)	0.141	0.442
FCER1A	0.825 (0.638, 1.067)	0.142	0.442
DNASE1L3	0.815 (0.620, 1.072)	0.143	0.442
PHLDA1	0.723 (0.468, 1.117)	0.144	0.442
TXNIP	0.701 (0.433, 1.134)	0.148	0.442
TF	0.869 (0.718, 1.052)	0.149	0.442
KRT5	0.900 (0.781, 1.038)	0.149	0.442
SOX11	1.230 (0.926, 1.633)	0.153	0.445
JUN	0.779 (0.553, 1.098)	0.154	0.445
HJURP	1.258 (0.914, 1.733)	0.159	0.445
CAV2	0.750 (0.503, 1.120)	0.16	0.445
PELI2	0.763 (0.522, 1.114)	0.161	0.445
CDK1	1.287 (0.904, 1.832)	0.161	0.445
MYOM1	0.778 (0.548, 1.106)	0.162	0.445
CDCA5	1.271 (0.907, 1.781)	0.163	0.445
CCL14	0.845 (0.665, 1.072)	0.165	0.446
EGR2	0.827 (0.631, 1.083)	0.168	0.450
SFRP1	0.883 (0.738, 1.057)	0.176	0.467
PDZK1	0.899 (0.769, 1.051)	0.182	0.476
AKR1C3	0.776 (0.534, 1.128)	0.183	0.476
CDKN1C	0.803 (0.578, 1.115)	0.19	0.481
CAV1	0.787 (0.549, 1.127)	0.191	0.481
TMEM100	0.830 (0.628, 1.097)	0.191	0.481
OXTR	0.860 (0.686, 1.079)	0.193	0.481
HSPB6	0.854 (0.674, 1.083)	0.194	0.481
KIF15	1.205 (0.909, 1.598)	0.195	0.481
LPL	0.851 (0.665, 1.090)	0.201	0.491
NR4A2	0.842 (0.645, 1.100)	0.207	0.501
NDN	0.747 (0.467, 1.193)	0.222	0.522
OSR1	0.878 (0.712, 1.082)	0.222	0.522
ABI3BP	0.852 (0.659, 1.103)	0.224	0.522
PLAC9	0.863 (0.680, 1.096)	0.227	0.522
PROS1	0.796 (0.549, 1.153)	0.228	0.522
THBS4	0.880 (0.715, 1.084)	0.229	0.522
RGS5	1.293 (0.851, 1.964)	0.229	0.522
AQP7P1	0.870 (0.692, 1.095)	0.235	0.532
CDC20	1.207 (0.883, 1.650)	0.239	0.536
POLQ	1.217 (0.876, 1.689)	0.241	0.536
CTSG	0.876 (0.702, 1.094)	0.244	0.539
PDK4	0.848 (0.641, 1.121)	0.248	0.543
TUBB6	0.721 (0.413, 1.260)	0.251	0.543
CD52	0.838 (0.619, 1.134)	0.252	0.543
RASD1	0.858 (0.658, 1.117)	0.254	0.543
HSPB2	0.835 (0.611, 1.141)	0.258	0.548
SRPX	0.832 (0.603, 1.148)	0.263	0.550
NEK2	1.170 (0.889, 1.540)	0.263	0.550
AOX1	1.190 (0.874, 1.620)	0.269	0.550
OAF	0.773 (0.488, 1.222)	0.27	0.550
TFPI	0.801 (0.538, 1.192)	0.274	0.550
ADH1A	0.877 (0.694, 1.110)	0.275	0.550
MFAP4	0.888 (0.717, 1.099)	0.275	0.550
TMEM37	0.822 (0.576, 1.172)	0.279	0.550
IGF1	0.861 (0.656, 1.129)	0.28	0.550
EBF1	0.812 (0.556, 1.186)	0.281	0.550
COL17A1	0.926 (0.806, 1.065)	0.282	0.550
PGM5	0.847 (0.625, 1.147)	0.283	0.550
AKR1C2	0.884 (0.705, 1.109)	0.286	0.552
DCN	0.844 (0.613, 1.161)	0.297	0.569
TSPAN7	0.854 (0.633, 1.151)	0.3	0.569
LAMA2	0.868 (0.664, 1.135)	0.301	0.569
ALPL	0.833 (0.588, 1.182)	0.306	0.569
CH25H	0.860 (0.644, 1.149)	0.307	0.569
SPRY2	0.833 (0.586, 1.184)	0.308	0.569
GZMK	0.876 (0.678, 1.131)	0.309	0.569
RARRES2	0.836 (0.589, 1.186)	0.315	0.576
PCDH18	0.837 (0.589, 1.189)	0.319	0.579
JAM2	0.814 (0.540, 1.227)	0.326	0.588
FBLN5	0.810 (0.529, 1.242)	0.334	0.598
VIM	0.776 (0.463, 1.300)	0.336	0.598
ICAM2	0.799 (0.502, 1.273)	0.345	0.610
SVEP1	0.878 (0.668, 1.153)	0.349	0.614
PECAM1	0.792 (0.484, 1.298)	0.355	0.620
ID1	0.851 (0.604, 1.199)	0.357	0.620
ATF3	0.884 (0.679, 1.152)	0.362	0.620
APOD	0.905 (0.728, 1.123)	0.364	0.620
MEOX1	0.888 (0.688, 1.147)	0.365	0.620
FAM107A	0.880 (0.667, 1.161)	0.366	0.620
CD79B	0.877 (0.657, 1.171)	0.373	0.628
LIPE	0.901 (0.713, 1.138)	0.38	0.633
CLDN5	0.880 (0.661, 1.171)	0.381	0.633
SYNPO2	0.854 (0.596, 1.223)	0.388	0.636
SCRG1	0.908 (0.728, 1.132)	0.389	0.636
E2F2	1.168 (0.820, 1.664)	0.39	0.636
RGS1	0.891 (0.684, 1.161)	0.392	0.636
CD69	0.888 (0.674, 1.168)	0.395	0.637
CES1	0.907 (0.724, 1.137)	0.397	0.637
SOCS2	0.878 (0.646, 1.193)	0.405	0.645
ANGPTL2	0.849 (0.577, 1.250)	0.407	0.645
TUBB2B	0.907 (0.721, 1.143)	0.409	0.645
HMGCS2	0.948 (0.835, 1.077)	0.413	0.645
CCL21	0.933 (0.791, 1.102)	0.416	0.645
C6	0.918 (0.746, 1.129)	0.418	0.645
LEPR	0.869 (0.619, 1.221)	0.418	0.645
GPR183	0.876 (0.633, 1.212)	0.424	0.650
GYPC	0.835 (0.534, 1.304)	0.427	0.651
GIMAP7	0.852 (0.573, 1.268)	0.43	0.652
GPAM	0.849 (0.562, 1.283)	0.437	0.657
BBOX1	0.936 (0.792, 1.106)	0.438	0.657
CCL2	0.892 (0.664, 1.199)	0.449	0.670
DLK1	0.925 (0.755, 1.134)	0.452	0.671
CFD	0.910 (0.709, 1.168)	0.457	0.672
FAM162B	1.158 (0.786, 1.705)	0.458	0.672
ETS2	1.204 (0.733, 1.979)	0.463	0.676
PPEF1	1.147 (0.792, 1.663)	0.468	0.678
PID1	0.886 (0.638, 1.230)	0.469	0.678
SOX18	0.876 (0.606, 1.268)	0.483	0.694
CD209	0.910 (0.697, 1.188)	0.488	0.695
EMP1	0.854 (0.546, 1.336)	0.49	0.695
ACACB	0.879 (0.609, 1.269)	0.491	0.695
RBMS3	0.896 (0.649, 1.236)	0.503	0.707
MMD	0.856 (0.542, 1.353)	0.506	0.707
HOXA5	0.899 (0.657, 1.231)	0.507	0.707
SLIT3	1.138 (0.774, 1.674)	0.511	0.708
KCNMB1	0.905 (0.671, 1.220)	0.513	0.708
KLK5	0.956 (0.833, 1.097)	0.518	0.711
PAMR1	0.918 (0.706, 1.194)	0.522	0.713
SRGN	0.868 (0.561, 1.343)	0.525	0.714
KRT17	0.956 (0.830, 1.101)	0.529	0.716
LYVE1	0.920 (0.706, 1.199)	0.538	0.724
KCTD12	0.855 (0.515, 1.419)	0.545	0.730
FZD4	0.857 (0.518, 1.417)	0.548	0.731
GPIHBP1	0.922 (0.707, 1.204)	0.551	0.731
EBF3	0.899 (0.628, 1.287)	0.561	0.741
GEM	0.906 (0.646, 1.272)	0.57	0.741
ADH1C	1.077 (0.833, 1.391)	0.571	0.741
MMRN1	0.938 (0.751, 1.172)	0.572	0.741
PIP	1.040 (0.907, 1.193)	0.572	0.741
C7	0.945 (0.773, 1.155)	0.578	0.745
CPE	0.889 (0.582, 1.359)	0.588	0.755
FAM89A	1.109 (0.757, 1.624)	0.595	0.760
CYYR1	0.895 (0.591, 1.354)	0.6	0.763
OGN	0.942 (0.753, 1.180)	0.605	0.766
IL7R	0.950 (0.778, 1.160)	0.615	0.771
INMT	0.929 (0.695, 1.242)	0.619	0.771
CNN1	0.941 (0.742, 1.194)	0.619	0.771
PDE1A	0.909 (0.622, 1.328)	0.62	0.771
PPP1R1A	0.955 (0.788, 1.157)	0.64	0.792
TMEM47	0.913 (0.617, 1.352)	0.651	0.795
C3	0.921 (0.643, 1.320)	0.654	0.795
MYH11	0.951 (0.765, 1.183)	0.654	0.795
MMP23B	0.941 (0.720, 1.229)	0.654	0.795
GPC3	1.058 (0.823, 1.360)	0.662	0.801
CILP	0.945 (0.730, 1.223)	0.666	0.801
HSPA12B	1.098 (0.717, 1.681)	0.669	0.801
CXCL12	0.913 (0.600, 1.388)	0.67	0.801
HBB	0.949 (0.743, 1.213)	0.677	0.805
MATN2	0.933 (0.661, 1.317)	0.693	0.813
PCSK5	1.075 (0.750, 1.540)	0.695	0.813
CLEC14A	1.098 (0.686, 1.757)	0.697	0.813
OMD	0.949 (0.727, 1.238)	0.699	0.813
PPP1R14A	0.950 (0.732, 1.233)	0.7	0.813
EPDR1	0.923 (0.613, 1.389)	0.701	0.813
SHE	1.081 (0.718, 1.629)	0.709	0.819
FOLR2	0.950 (0.723, 1.248)	0.713	0.820
TSHZ2	0.954 (0.729, 1.249)	0.732	0.838
PAQR4	1.061 (0.745, 1.511)	0.743	0.844
MMP11	0.961 (0.754, 1.224)	0.746	0.844
RGL1	0.928 (0.588, 1.464)	0.747	0.844
ECM2	0.941 (0.648, 1.366)	0.749	0.844
COL11A1	1.022 (0.886, 1.178)	0.766	0.859
SPARCL1	0.944 (0.643, 1.387)	0.769	0.859
FBLN7	0.940 (0.607, 1.455)	0.78	0.868
CPXM2	1.061 (0.696, 1.616)	0.784	0.869
GIMAP5	0.947 (0.630, 1.423)	0.792	0.874
CCDC3	0.957 (0.677, 1.354)	0.805	0.884
VWF	1.052 (0.697, 1.589)	0.809	0.884
PRNP	0.950 (0.623, 1.448)	0.811	0.884
A2M	0.949 (0.602, 1.495)	0.82	0.884
CLEC3B	0.962 (0.688, 1.346)	0.822	0.884
HBA2	0.973 (0.764, 1.239)	0.822	0.884
SPRY1	0.956 (0.648, 1.412)	0.823	0.884
CX3CL1	0.972 (0.747, 1.266)	0.834	0.890
RAMP3	0.962 (0.670, 1.383)	0.835	0.890
MME	0.974 (0.743, 1.278)	0.849	0.901
GIMAP6	1.041 (0.645, 1.679)	0.87	0.920
S1PR1	0.969 (0.645, 1.457)	0.882	0.929
ZBTB16	1.013 (0.846, 1.213)	0.89	0.934
TGFBR2	0.975 (0.656, 1.450)	0.902	0.943
H19	1.019 (0.708, 1.467)	0.919	0.957
FBLN2	1.014 (0.702, 1.465)	0.94	0.974
GIMAP8	0.983 (0.624, 1.548)	0.942	0.974
THRSP	1.005 (0.847, 1.192)	0.953	0.975
RAB26	0.990 (0.714, 1.373)	0.953	0.975
CD34	1.015 (0.622, 1.656)	0.954	0.975
ZNF296	0.989 (0.653, 1.498)	0.959	0.976
COL14A1	0.994 (0.759, 1.301)	0.964	0.976
TEK	1.009 (0.672, 1.515)	0.965	0.976
PDGFD	0.996 (0.653, 1.519)	0.985	0.992
COX7A1	0.999 (0.696, 1.435)	0.996	1.000
TMEM119	1.000 (0.705, 1.418)	1	1.000

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Table S6 Reporting the sample size and number of events for two models

Cohorts	FRGS		Nomogram	
	Total	Event	Total	Event
TCGA	196	23	124	19
METABRIC	104	58	104	58
GSE199633	73	12	73	12
GSE88770	117	19		

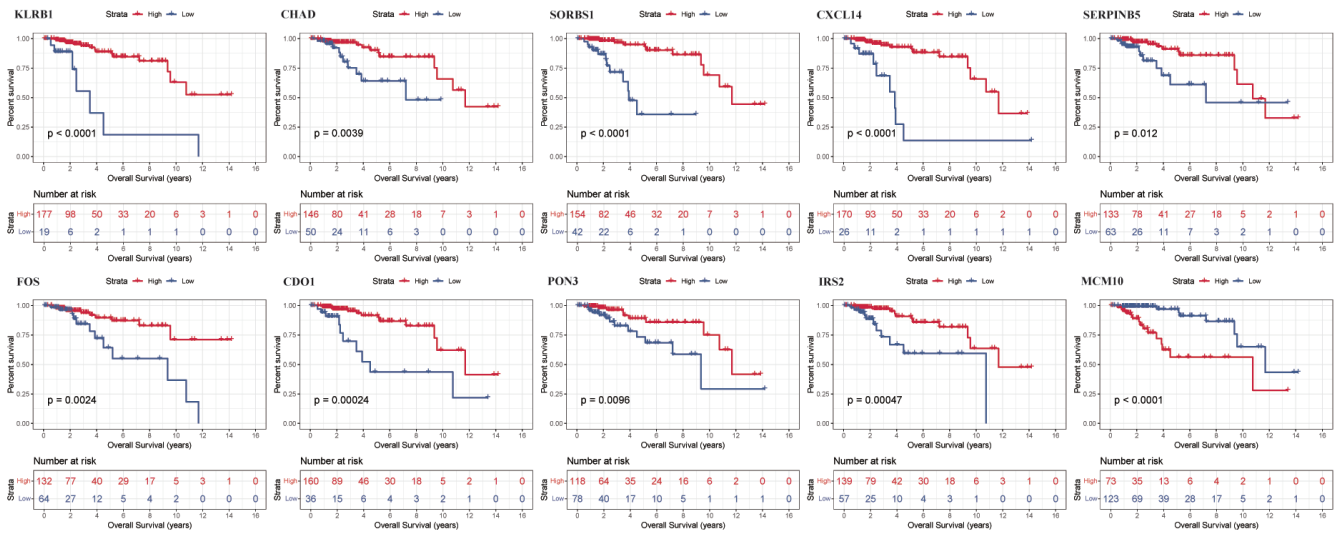

Figure S6 Survival analysis of 10 hub biomarkers in TCGA.

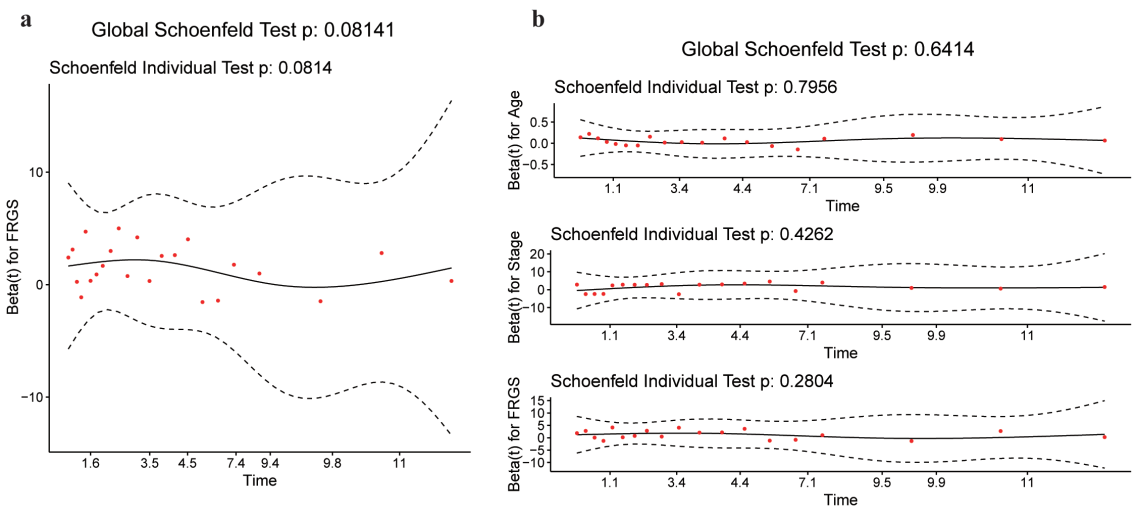

Figure S7 The proportional hazards assumption for the FRGS (A) and nomogram (B).

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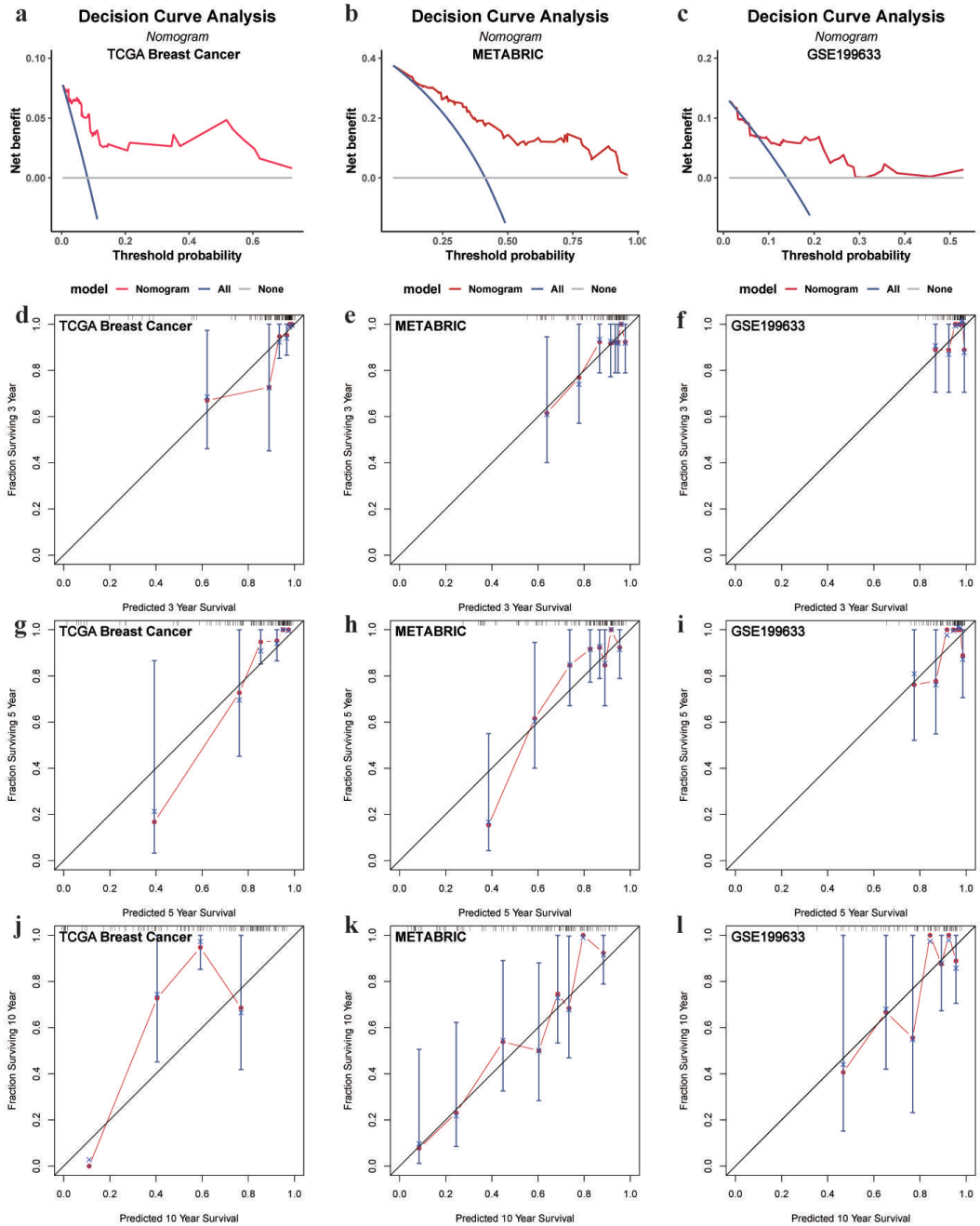

Figure S8 Evaluation of nomogram performance.

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Table S7 Details of the molecular docking results

Gene	Entry	Protein	Drug	CID	S	rmsd_refine
KLRB1	Q12918	5MGR	Rapamycin	5284616	-8.1781	2.1306
CDO1	Q16878	6BPU	Lapatinib	208908	-7.8553	2.6123
SORBS1	Q9BX66	2O9S	AZD5582	49847690	-7.549	2.3923
CDO1	Q16878	6BPU	ML323	60167849	-7.2875	2.5416
SERPINB5	P36952	1XQG	Daporinad	6914657	-7.0459	1.0893
CDO1	Q16878	6BPU	AZD1332	49831044	-6.9937	2.4373
CDO1	Q16878	6BPU	Dihydrorotenone	243725	-6.8654	1.6598
SORBS1	Q9BX66	2O9S	Lapatinib	208908	-6.7808	2.4976
CDO1	Q16878	6BPU	BMS-754807	24785538	-6.7063	2.1902
SERPINB5	P36952	1XQG	BMS-754807	24785538	-6.6029	2.8826
SERPINB5	P36952	1XQG	AZD1332	49831044	-6.5631	1.2708
CXCL14	O95715	2HDL	ML323	60167849	-6.4992	1.8621
CHAD	O15335	5LFN	Daporinad	6914657	-6.3869	2.0208
KLRB1	Q12918	5MGR	AZD1332	49831044	-6.2713	4.3213
CDO1	Q16878	6BPU	OSI-027	135398516	-6.1837	1.4293
KLRB1	Q12918	5MGR	BMS-754807	24785538	-6.0549	2.3512
SORBS1	Q9BX66	2O9S	BMS-754807	24785538	-5.9601	1.9132
SORBS1	Q9BX66	2O9S	OSI-027	135398516	-5.7489	1.4878
SORBS1	Q9BX66	2O9S	Dihydrorotenone	243725	-5.7414	1.3234
SORBS1	Q9BX66	2O9S	AZD1332	49831044	-5.6877	2.6731
SORBS1	Q9BX66	2O9S	LCL161	24737642	-5.4914	1.5541
CDO1	Q16878	6BPU	Sinularin	5477029	-5.4598	2.3878
SORBS1	Q9BX66	2O9S	ML323	60167849	-5.3979	2.794
CXCL14	O95715	2HDL	P22077	46931953	-4.5552	3.1919

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