

Supplementary Material

Supplementary Figures

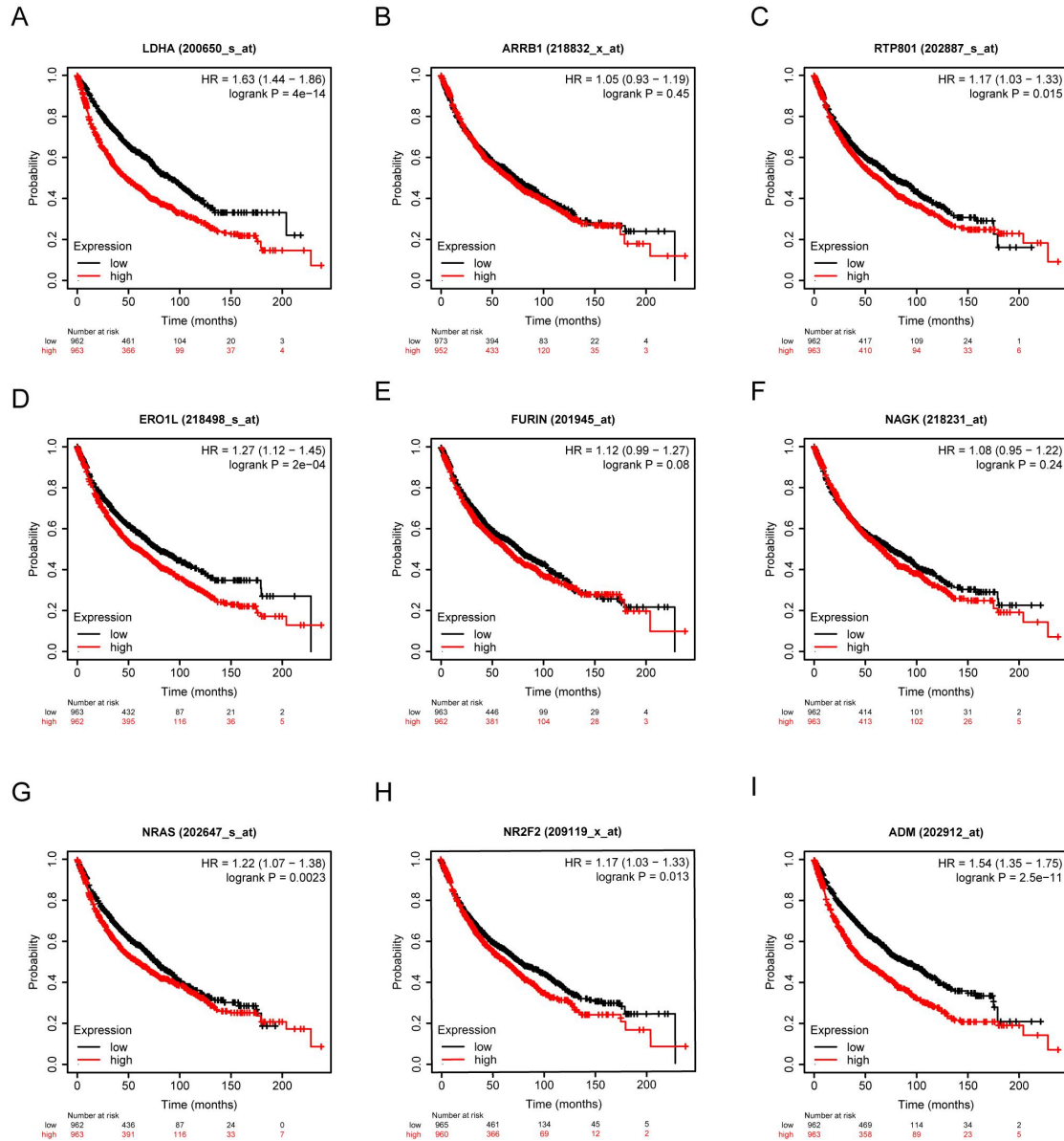


Figure S1. Kaplan-Meier analysis of 9 genes involved in model construction (LDHA, ARRB1, DDIT4, ERO1L, FURIN, NAGK, NRAS, NR2F2, and ADM).

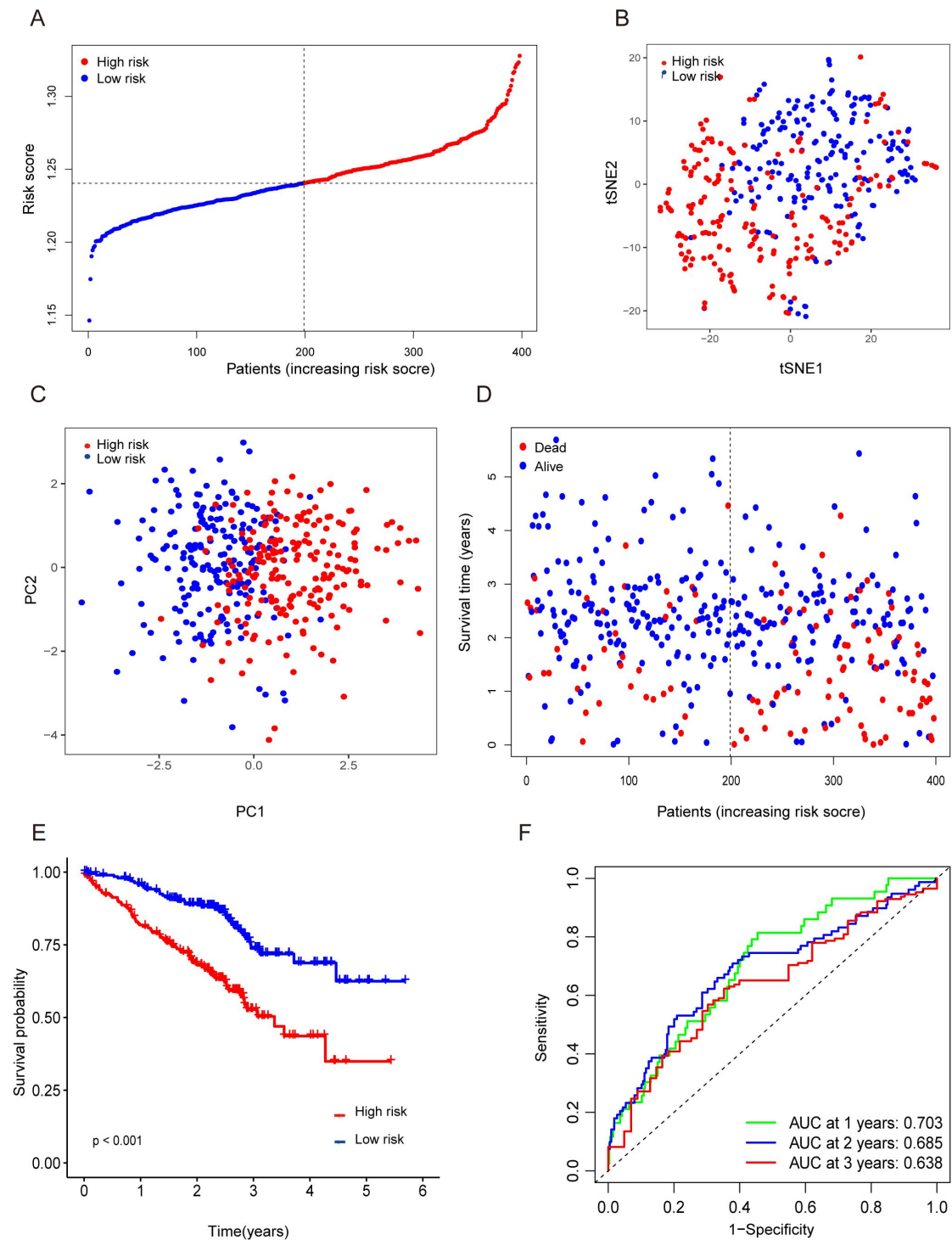


Figure S2. Validation of the nine-genes signature in the GSE72094 cohort. (A) The distributions of the risk score. **(B, C)** t-SNE and PCA analysis showed significant differences between groups of patients. **(D, E)** The distributions of OS status and OS of patients between high-risk and low-risk groups, patients in the high-risk group had higher score values and mortality. **(F)** Time-independent ROC analysis of the risk score for prediction of the OS, the area under the curve for 1, 2, and 3 years reached 0.703, 0.685, and 0.638, respectively.

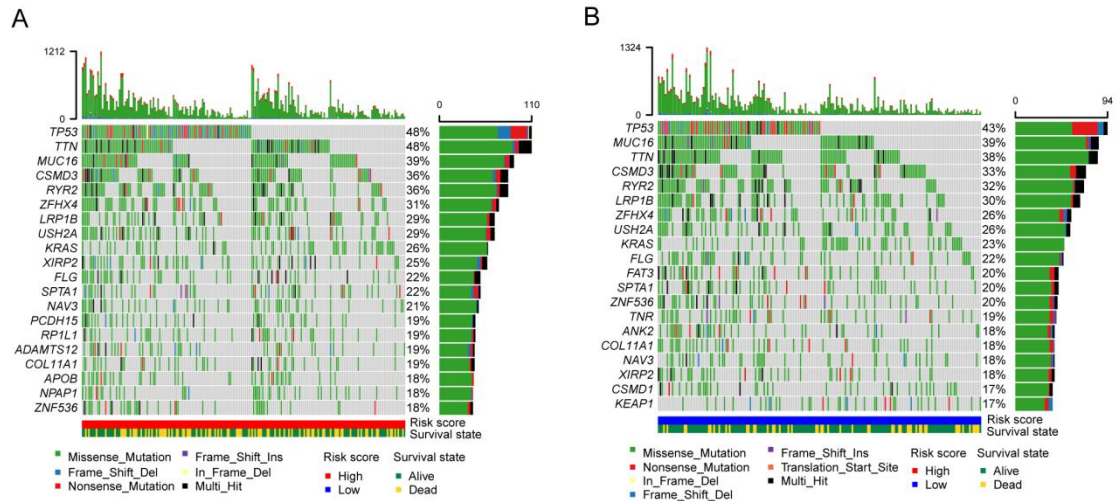


Figure S3. Somatic mutation in the risk score stratified groups. (A, B) Oncoplots of the mutated genes in the (A) high-risk and (B) low-risk subgroups of the TCGA cohort.

Supplementary Tables

Table S1. The clinical characteristics of the TCGA, GSE31210 and GSE72094 cohorts.

Clinical characteristic		TCGA cohort	GSE31210 cohort	GSE72094 cohort
Age	<65	215	164	107
	≥65	254	62	291
Gender	Male	213	105	176
	Female	256	121	222
Stage	I - II	367	226	321

III-IV	102	0	72
Unknown			5

Table S2. Summary of hypoxia-related genes.

Hypoxia-related genes				
ACKR3	CSRP2	HDLBP	NDRG1	NDRG1
ADM	CXCR4	HEXA	NDST1	NDST1
ADORA2B	DCN	HK1	NDST2	NDST2
AK4	DDIT3	HK2	NEDD4L	NEDD4L
AKAP12	DDIT4	HMOX1	NFIL3	NFIL3
ALDOA	DPYSL4	HOXB9	NOCT	NOCT
ALDOB	DTNA	HS3ST1	NR3C1	NR3C1
ALDOC	DUSP1	HSPA5	P4HA1	P4HA1
AMPD3	EDN2	IDS	P4HA2	P4HA2
ANGPTL4	EFNA1	IER3	PAM	PAM
ANKZF1	EFNA3	IGFBP1	PCK1	PCK1
ANXA2	EGFR	IGFBP3	PDGFB	PDGFB
ATF3	ENO1	IL6	PDK1	PDK1
ATP7A	ENO2	ILVBL	PDK3	PDK3
B3GALT6	ENO3	INHA	PFKFB3	PFKFB3
B4GALNT2	ERO1A	IRS2	PFKL	PFKL
BCAN	ERRF1	ISG20	PFKP	PFKP
BCL2	ETS1	JMJD6	PGAM2	PGAM2
BGN	EXT1	JUN	PGF	PGF
BHLHE40	F3	KDELR3	PGK1	PGK1
BNIP3L	FAM162A	KDM3A	PGM1	PGM1
BRS3	FBP1	KIF5A	PGM2	PGM2
BTG1	FOS	KLF6	PHKG1	PHKG1
CA12	FOSL2	KLF7	PIM1	PIM1
CASP6	FOXO3	KLHL24	PKLR	PKLR
CAV1	GAA	LALBA	PKP1	PKP1
CAVIN1	GALK1	LARGE1	PLAC8	PLAC8
CAVIN3	GAPDH	LDHA	PLAUR	PLAUR

CCN1	GAPDHS	LDHC	PLIN2	PLIN2
CCN2	GBE1	LOX	PNRC1	PNRC1
CCN5	GCK	LXN	PPARGC1A	PPARGC1A
CCNG2	GCNT2	MAFF	PPFIA4	PPFIA4
CDKN1A	GLRX	MAP3K1	PPP1R15A	PPP1R15A
CDKN1B	GPC1	MIF	PPP1R3C	PPP1R3C
CDKN1C	GPC3	MT1E	PRDX5	PRDX5
CHST2	GPC4	MT2A	PRKCA	PRKCA
CHST3	GPI	MXI1	PYGM	PYGM
CITED2	GRHPR	MYH9	RBPJ	RBPJ
COL5A1	GYS1	NAGK	RORA	RORA
CP	HAS1	NCAN	RRAGD	RRAGD

Table S3. Summary of immune-related genes.

Immune-related genes				
AZGP1	PRTN3	IGHD4-11	FGF4	NR1I3
B2M	MAPK1	IGHD4-17	FGF5	NR2C1
CALR	PML	IGHD4-23	FGF6	NR2C2
CANX	AEN	IGHD4-4	FGF7	NR2E1
CD1A	CYBB	IGHD5-12	FGF8	NR2E3
CD1B	BPIFA2	IGHD5-18	FGF9	NR2F1
CD1C	ISG20	IGHD5-24	VEGFD	NR2F2
CD1D	BCL3	IGHD5-5	FIGNL2	NR2F6
CD1E	ISG20L2	IGHD6-13	FLT3LG	NR3C1
CD4	NOX5	IGHD6-19	FSHB	NR3C2
CD8A	NOX3	IGHD6-25	GAL	NR4A1
CD8B	DUOX2	IGHD6-6	GALP	NR4A2
CD74	TLR3	IGHD7-27	GAST	NR4A3
CREB1	TFRC	IGHE	GCG	NR5A1
CTSB	IFIH1	IGHG1	GDF1	NR5A2
CTSE	LRP1	IGHG2	GDF10	NR6A1
CTSL	TRIM5	IGHG3	GDF11	NRP1
CTSS	IDO1	IGHG4	GDF2	NRP2
FCER1G	GDF15	IGHJ1	GDF3	OGFR
FCGRT	NEDD4	IGHJ2	GDF5	OPRD1
PDIA3	ADIPOQ	IGHJ3	GDF6	OPRK1
HFE	STAT3	IGHJ4	GDF7	OPRL1
HLA-A	STAT1	IGHJ5	GDF9	OPRM1
HLA-B	IFNL2	IGHJ6	GDNF	OSMR
HLA-C	SOCS3	IGHM	GH1	OXTR
HLA-DMA	SEMG1	IGHV1-18	GH2	PGR

HLA-DMB	TNFSF10	IGHV1-2	GHRH	PGRMC2
HLA-DOA	CCL20	IGHV1-24	GHRL	PPARA
HLA-DOB	SOCS1	IGHV1-3	GIP	PPARD
HLA-DPA1	RNASEL	IGHV1-45	GKN1	PRLHR
HLA-DPB1	IRF1	IGHV1-46	GMFB	PRLR
HLA-DQA1	IL15	IGHV1-58	GMFG	PTGER1
HLA-DQA2	APOBEC3F	IGHV1-69	GNRH1	PTGER2
HLA-DQB1	PLAAT4	IGHV1-8	GNRH2	PTGER3
HLA-DRA	CHIT1	IGHV1-38-4	GPHA2	PTGER4
HLA-DRB1	CD40	IGHV1-69-2	GPHB5	PTGFR
HLA-DRB3	TLR7	IGHV2-26	GPI	PTH1R
HLA-DRB4	PPIA	IGHV2-5	GREM1	PTH2R
HLA-DRB5	ZYX	IGHV2-70	GREM2	RARA
HLA-E	NLRX1	IGHV3-11	GRP	RARB
HLA-F	PGC	IGHV3-13	GUCA2A	RARG
HLA-G	VEGFA	IGHV3-15	HBEGF	RORA
HLA-H	IKBKE	IGHV3-16	HDGF	RORB
MR1	ISG15	IGHV3-20	HDGFL3	RORC
HSPA1A	DHX58	IGHV3-21	IAPP	RXFP1
HSPA1B	TNFAIP3	IGHV3-23	IFNE	RXFP2
HSPA1L	TFR2	IGHV3-30	IFNK	RXRA
HSPA2	FCN2	IGHV3-30-3	IFNW1	RXRB
HSPA4	MUC4	IGHV3-30-5	IGF1	RXRG
HSPA5	F2R	IGHV3-33	IGF2	S1PR1
HSPA6	ELN	IGHV3-35	IL11	S1PR2
HSPA8	IL27	IGHV3-38	IL12A	SCTR
HSP90AA1	MAPT	IGHV3-43	IL16	SDC1
HSP90AB1	LYZ	IGHV3-48	IL17B	SDC2
ICAM1	CCL5	IGHV3-49	IL17C	SDC3
IFNA1	LEP	IGHV3-53	IL17D	SDC4
IFNA2	CYLD	IGHV3-64	IL17F	SORT1
IFNA4	KLKB1	IGHV3-66	IL19	SSTR1
IFNA5	CST4	IGHV3-7	IL1F10	SSTR2
IFNA6	CSRP1	IGHV3-72	IL36RN	SSTR5
IFNA7	MAPK14	IGHV3-73	IL36A	ST2
IFNA8	JUN	IGHV3-74	IL37	TACR1
IFNA10	ITGAV	IGHV3-9	IL36B	TEK
IFNA13	IRF5	IGHV3-38-3	IL36G	TGFBR1
IFNA14	CCR6	IGHV3-69-1	IL1RN	TGFBR2
IFNA16	IL12B	IGHV4-28	IL20	TGFBR3
IFNA17	TLR8	IGHV4-30-1	IL21	THRA
IFNA21	GNLY	IGHV4-30-2	IL23A	THRB
IFNG	CD81	IGHV4-30-4	IL24	TIE1
KIR2DL1	EIF2AK2	IGHV4-31	IL25	TNFRSF10C

KIR2DL2	APOM	IGHV4-34	IL26	TNFRSF10D
KIR2DL3	CACYBP	IGHV4-39	IFNL3	TNFRSF11A
KIR2DL4	NOD1	IGHV4-4	IL3	TNFRSF12A
KIR2DS1	MAPK8	IGHV4-59	IL31	TNFRSF13B
KIR2DS3	MAPK3	IGHV4-61	IL32	TNFRSF13C
KIR2DS4	BST2	IGHV4-38-2	IL33	TNFRSF14
KIR2DS5	BPHL	IGHV5-51	IL34	TNFRSF17
KIR3DL1	PLA2G2A	IGHV5-10-1	IL5	TNFRSF18
KIR3DL2	GRN	IGHV6-1	IL6ST	TNFRSF19
KLRC1	NEWENTRY	IGHV7-4-1	IL7	TNFRSF1A
KLRC2	PDGFRA	IGHV7-81	IL9	TNFRSF1B
KLRC3	GNAI1	IGK	INHA	TNFRSF21
KLRD1	WNT5A	IGKC	INHBA	TNFRSF25
LTA	FURIN	IGKDEL	INHBB	TNFRSF4
CIITA	ADAR	IGKJ	INHBC	TNFRSF6B
MICA	TYK2	IGKJ1	INHBE	TNFRSF8
MICB	NOS2	IGKJ2	INS	TNFRSF9
NFYA	TRAF3	IGKJ3	INS-IGF2	TRHR
NFYB	TPT1	IGKJ4	INSL3	TSHR
NFYC	TPM2	IGKJ5	INSL4	TUBB3
LGMN	NEO1	IGKV@	INSL5	VIPR1
PSMB8	AHNAK	IGKV1-12	INSL6	VIPR2
PSMC1	TLR1	IGKV1-13	JAG1	PTPN11
PSMC2	TK2	IGKV1-16	JAG2	ICAM2
PSMC3	PRDX2	IGKV1-17	FGF7P6	ITGAL
PSMC4	MX2	IGKV1-27	FGF7P3	ITGB2
PSMC5	FGF2	IGKV1-33	KITLG	PAK1
PSMC6	FGA	IGKV1-37	KL	NCR2
PSMD1	TCF7L2	IGKV1-39	LACRT	TYROBP
PSMD2	F2RL1	IGKV1-5	LEFTY1	LCK
PSMD3	TKFC	IGKV1-6	LEFTY2	FCGR3A
PSMD4	MSR1	IGKV1-8	LHB	FCGR3B
PSMD5	NFKBIZ	IGKV1-9	LIF	NCR1
PSMD7	LMBR1	IGKV1D-12	LRSAM1	NCR3
PSMD8	EPPIN	IGKV1D-13	LTB	CD247
PSMD10	SRC	IGKV1D-16	LTBP2	ZAP70
PSMD11	MPO	IGKV1D-17	LTBP3	LCP2
PSMD13	ELAVL1	IGKV1D-33	LTBP4	LAT
PSME1	ROBO3	IGKV1D-37	MDK	PLCG1
PSME2	SP1	IGKV1D-39	MIA	SH3BP2
RELB	SOD1	IGKV1D-42	MLN	FYN
RFX5	PDF	IGKV1D-43	MSTN	SHC2
RFXAP	DLL4	IGKV1D-8	NAMPT	SHC4
SLC10A2	ECD	IGKV2-24	NDP	SHC3

TAP1	SLC11A1	IGKV2-28	NENF	SHC1
TAP2	DMBT1	IGKV2-30	NGF	GRB2
TAPBP	STING1	IGKV2-40	NMB	SOS1
THBS1	SKIV2L	IGKV2D-24	NODAL	SOS2
SEM1	SEMG2	IGKV2D-28	CCN3	ARAF
KLRC4	DES	IGKV2D-29	NPFF	BRAF
AP3B1	DCK	IGKV2D-30	NPPA	RAF1
RFXANK	DAXX	IGKV2D-40	NPPB	HCST
PSMD6	TNFRSF10A	IGKV3-11	NPPC	CD48
PSME3	TNFRSF10B	IGKV3-15	NPY	CD244
PSMD14	EED	IGKV3-20	NRG1	PRKCA
CLEC4M	CCL4	IGKV3-7	NRG2	PRKCG
IFI30	LIMS1	IGKV3D-11	NRG3	SH2D1B
PROCR	LALBA	IGKV3D-15	NRG4	SH2D1A
ADRM1	APOBEC3H	IGKV3D-20	NRTN	FAS
ECPAS	TMPRSS6	IGKV3D-7	NTF3	GZMB
TRPC4AP	SPINK5	IGKV4-1	NTF4	PRF1
CD209	MARCO	IGKV5-2	NTS	CASP3
UBXN1	BECN1	IGKV6-21	NUDT6	BID
ERAP1	TNFSF11	IGKV6D-21	OGN	CD3D
TAPBPL	KNG1	IGKV6D-41	OSGIN1	CD3E
KIR2DL5A	CSK	IGL	OSM	CD3G
ERAP2	KLRK1	IGLC1	OSTN	PTPRC
ULBP3	KCNH2	IGLC2	OXT	ITK
ULBP2	JUND	IGLC3	ENDOU	TEC
ULBP1	JAK1	IGLC6	PDGFA	NCK1
KIR3DL3	CLDN4	IGLC7	PDGFB	NCK2
RAET1E	CCL28	IGLJ	PDGFC	GRAP2
RAET1L	RNASE3	IGLJ1	PDGFD	PAK2
UBR1	RN7SL1	IGLJ2	PDGFRL	PAK3
RAET1G	IRF7	IGLJ3	PGF	PAK4
PDIA2	IREB2	IGLJ4	PMCH	PAK6
HAMP	ILK	IGLJ5	PNOC	PAK5
PI3	IL18	IGLJ6	POMC	RHOA
CAMP	IL17A	IGLJ7	PPBPP2	CDC42
DEFB4A	LTB4R	IGLV@	PPY	CD28
PPBP	APOBEC3A	IGLV1-36	PRL	ICOS
REG3G	MASP2	IGLV1-40	PRLH	MAP3K8
CXCL14	TRIM27	IGLV1-44	PROK1	MAP3K14
CXCL16	RELA	IGLV1-47	PSPN	CTLA4
SLPI	IL7R	IGLV1-50	PTH	CBLC
CXCL8	IL1A	IGLV1-51	PTH2	CBL
CXCL10	PTX3	IGLV10-54	PTHLH	CBLB
CXCL9	IFNAR2	IGLV11-55	PTN	CDK4

CXCL5	IFN1@	IGLV2-11	PYY	RASGRP1
CXCL11	SYTL1	IGLV2-14	QRFP	PDK1
CXCL6	APOBEC3C	IGLV2-18	RABEP1	PRKCQ
CXCL1	DDX17	IGLV2-23	RABEP2	TRAC
CXCL12	PTGS2	IGLV2-33	REG1A	TRAJ1
CXCL13	HTR1A	IGLV2-8	RETN	TRAJ2
CXCL2	SEPTIN7	IGLV3-1	RETNLB	TRAJ3
PF4	CD40LG	IGLV3-10	RLN1	TRAJ4
XCL1	CD14	IGLV3-12	RLN2	TRAJ5
CXCL3	MASP1	IGLV3-16	RLN3	TRAJ6
DEFB103B	PROC	IGLV3-19	SCG2	TRAJ7
CCL13	MAP2K2	IGLV3-21	SCGB3A1	TRAJ8
CCL1	MAP2K1	IGLV3-22	SCT	TRAJ9
DEFB1	HRG	IGLV3-25	AIMP1	TRAJ10
CCL8	NDRG1	IGLV3-27	SECTM1	TRAJ11
ELANE	IRF9	IGLV3-32	SLURP1	TRAJ12
DEFB103A	TRIM22	IGLV3-9	SPP1	TRAJ13
DEFA3	LANCL1	IGLV4-3	SST	TRAJ14
DEFA1	PPP4C	IGLV4-60	STC1	TRAJ15
TMSB10	HMOX1	IGLV4-69	STC2	TRAJ16
DEFA6	HMGB1	IGLV5-37	TAC1	TRAJ17
DEFA5	RNASE7	IGLV5-39	TDGF1	TRAJ18
DEFA4	ABCC4	IGLV5-45	TDGF1P3	TRAJ19
LCN2	HGF	IGLV5-48	TG	TRAJ20
LCN1	HDAC1	IGLV5-52	TGFA	TRAJ21
COLEC10	IFNLR1	IGLV6-57	TGFB2	TRAJ22
BPI	PLSCR1	IGLV7-43	TGFB3	TRAJ23
S100A9	BACH2	IGLV7-46	THPO	TRAJ24
S100A8	TANK	IGLV8-61	TNFRSF11B	TRAJ25
DCD	PIK3CG	IGLV9-49	TNFSF12	TRAJ26
LCN6	ARRB1	C3	TNFSF13	TRAJ27
S100A12	RSAD2	C5	TNFSF13B	TRAJ28
HTN3	STAB2	CCL3P1	TNFSF14	TRAJ29
LCN8	TBK1	CKLF	TNFSF15	TRAJ30
DEFA1B	PDYN	CMA1	TNFSF18	TRAJ31
CCR10	PDGFRB	CX3CL1	TNFSF8	TRAJ32
CELA1	PDCD1	CXCL17	TNFSF9	TRAJ33
DEFB106A	PCSK2	CCN1	TOR2A	TRAJ34
PENK	PCSK1	EDN1	TRH	TRAJ35
BPIFC	ARG2	EDN2	TSHB	TRAJ36
MMP12	AQP9	EDN3	TSLP	TRAJ37
BPIFB6	FASLG	FGF10	TXLNA	TRAJ38
LEAP2	APOH	LECT2	UCN	TRAJ39
SFTPD	BIRC5	PPBPP1	UCN2	TRAJ40

LCN9	ANXA6	PROK2	UCN3	TRAJ41
BPIFB2	IL22	SAA1	UTS2	TRAJ42
PTGDS	VTN	SAA2	UTS2B	TRAJ43
TMSB4X	VIM	SBDS	VEGFB	TRAJ44
PGLYRP1	VCAM1	SEMA3A	VEGFC	TRAJ45
ZC3HAV1	PRDX1	SEMA3B	VEGF	TRAJ46
TMSB15A	GFAP	SEMA3C	VIP	TRAJ47
S100B	GBP2	SEMA3D	ACVR1B	TRAJ48
S100A13	ALB	SEMA3E	ACVR1C	TRAJ49
S100A6	SLC29A3	SEMA3F	ACVR2A	TRAJ50
DEFB119	OAS1	SEMA3G	ACVR2B	TRAJ52
DEFB107A	AGER	SEMA4A	ACVRL1	TRAJ53
DEFB105A	UNC93B1	SEMA4B	ADCYAP1R 1	TRAJ54
SERPIND1	TNFSF4	SEMA4C	ADIPOR1	TRAJ56
DEFB129	NOS1	SEMA4D	ADIPOR2	TRAJ57
DEFB127	ACTG1	SEMA4F	ADRB1	TRAJ58
S100P	ACTA1	SEMA4G	ADRB2	TRAJ59
S100A7	ACO1	SEMA5A	AGTR1	TRAJ61
DEFB104A	SERPINA3	SEMA5B	AGTR2	TRAV1-1
DEFB126	CXCR1	SEMA6A	AMHR2	TRAV1-2
DEFB106B	CCL15	SEMA6B	ANGPT1	TRAV2
DEFB104B	CCL14	SEMA6C	ANGPT4	TRAV3
DEFB107B	CCL16	SEMA6D	ANGPTL1	TRAV4
PGLYRP3	CCL19	SEMA7A	ANGPTL2	TRAV5
PGLYRP2	CCL18	SLIT1	ANGPTL3	TRAV7
S100A10	CCL17	SLIT2	ANGPTL4	TRAV8-1
S100A2	CCL26	TNC	ANGPTL6	TRAV8-2
DEFB125	CCL22	TYMP	APLNR	TRAV8-3
DEFB123	CCR3	C5AR1	AR	TRAV8-4
DEFB105B	CCL4L1	CCR9	AVPR1A	TRAV8-6
DEFB132	ACKR2	CCRL2	AVPR1B	TRAV8-7
BPIFB3	CCR7	CMKLR1	AVPR2	TRAV9-1
LCN12	CCL27	CX3CR1	BMPR1A	TRAV9-2
PGLYRP4	CCR8	CXCR3	BMPR1B	TRAV10
S100A11	ACKR4	CXCR5	BMPR2	TRAV12-1
S100A5	CCL2	ACKR3	BRD8	TRAV12-2
S100A3	CCL21	CYSLTR1	C3AR1	TRAV12-3
S100A1	CCL7	CYSLTR2	CALCR	TRAV13-1
DEFB128	CCL3	ACKR1	CALCRL	TRAV13-2
DEFB108B	CCL11	EDNRA	CNTFR	TRAV14DV4
HTN1	CCR5	EDNRB	CRHR1	TRAV16
LMBR1L	CCL23	FPR1	CRHR2	TRAV17
S100A7A	CCL25	FPR2	CRIM1	TRAV18

DEFB118	CCL3L3	GPR17	CRLF1	TRAV19
COLEC12	CCL4L2	GPR32	CRLF2	TRAV20
TMSB4Y	CCL3L1	GPR33	CRLF3	TRAV21
DEFB131A	CCR1	PTGDR2	CSF1R	TRAV22
DEFB134	CCL24	C5AR2	CSF2RA	TRAV23DV6
DEFB130A	XCL2	CXCR2	CSF2RB	TRAV24
DEFB124	CXCR4	LTB4R2	CSF3R	TRAV25
DEFB121	CXCR6	PLAUR	EGFR	TRAV26-1
DEFB116	CCR4	PLXNA1	ENG	TRAV26-2
DEFB115	TAFA5	PLXNA2	EPOR	TRAV27
DEFB114	TAFA3	PLXNA3	ESR1	TRAV29DV5
DEFB113	TAFA4	PLXNA4	ESR2	TRAV30
DEFB112	TAFA1	PLXNB1	ESRRA	TRAV34
DEFB110	TAFA2	PLXNB2	ESRRB	TRAV35
TMSB15B	CCL15-CCL 14	PLXNB3	ESRRG	TRAV36DV7
DEFB133	PTK2B	PLXNC1	FGFR1	TRAV38-1
S100Z	IL4	PLXND1	FGFR2	TRAV38-2D V8
MAVS	CDH1	PTAFR	FGFR3	TRAV39
TMSB4XP8	LTBP1	ROBO1	FGFR4	TRAV40
S100A14	IL13	ROBO2	FGFRL1	TRAV41
LCN10	IL10	RXFP3	FLT1	TRBC1
S100A16	IL2	XCR1	FLT3	TRBC2
DEFB136	PPARG	ADM	FLT4	TRBD1
DEFB135	FGR	ADM2	FSHR	TRBD2
DEFB117	MIF	AGRP	GALR2	TRBJ1-1
ZC3HAV1L	CRP	AGT	GALR3	TRBJ1-2
S100A7L2	JAK2	AMBN	GCGR	TRBJ1-3
MBL3P	PTK2	AMELX	GHR	TRBJ1-4
DEFB4B	PTGDR	AMH	GHRHR	TRBJ1-5
BPIFB4	CD86	ANGPTL5	GHSR	TRBJ1-6
IFNAR1	HCK	ANGPTL7	GIPR	TRBJ2-1
AZU1	VDR	APLN	GLP1R	TRBJ2-2
DEFB131B	OLR1	AREG	GLP2R	TRBJ2-3
DEFA1A3	GRK2	MANF	GNRHR	TRBJ2-4
LCN1P1	TXK	CDNF	GP1R	TRBJ2-5
S100G	RNASE2	ARTN	HNF4A	TRBJ2-6
DEFA7P	CD79A	AVP	HNF4G	TRBJ2-7
DEFB130B	CD79B	BDNF	HTR3A	TRBV2
DEFB108F	LYN	BMP1	HTR3B	TRBV3-1
DEFB131C	SYK	BMP10	HTR3C	TRBV4-1
TCHHL1	BTK	BMP15	HTR3D	TRBV4-2
TINAGL1	BLNK	BMP2	HTR3E	TRBV4-3

IFNGR1	VAV3	BMP3	IFNGR2	TRBV5-1
SLC22A17	VAV1	BMP4	IGF1R	TRBV5-4
WFIKKN1	VAV2	BMP5	IGF2R	TRBV5-5
WFDC2	RAC1	BMP6	IL10RA	TRBV5-6
IL6	RAC2	BMP7	IL10RB	TRBV5-7
UMODL1	RAC3	BMP8A	IL11RA	TRBV5-8
TGFB1	PPP3CA	BMP8B	IL12RB1	TRBV6-1
PF4V1	PPP3CB	BTC	IL12RB2	TRBV6-2
MMP9	PPP3CC	MYDGF	IL13RA1	TRBV6-3
ANOS1	CHP1	CALCA	IL13RA2	TRBV6-4
TLR4	PPP3R1	CALCB	IL15RA	TRBV6-5
SPAG11B	PPP3R2	CAT	IL2RB	TRBV6-6
A2M	CHP2	CCK	IL17RA	TRBV6-7
NFKB1	NFAT5	CD320	IL17RB	TRBV6-8
APOBEC3G	NFATC1	CD70	IL17RC	TRBV6-9
FABP6	NFATC2	ADA2	IL17RD	TRBV7-2
NOD2	NFATC3	CER1	IL17RE	TRBV7-3
MBL2	NFATC4	CGA	IL18R1	TRBV7-4
SFTPA1	HRAS	CGB3	IL18RAP	TRBV7-6
RBP1	KRAS	CGB1	IL1R1	TRBV7-7
TLR2	NRAS	CGB2	IL1R2	TRBV7-8
SLC40A1	FOS	CGB5	IL1RAP	TRBV7-9
PLAU	CARD11	CGB7	IL1RL1	TRBV9
IL1B	BCL10	CGB8	IL1RL2	TRBV10-1
PAEP	MALT1	CHGA	IL20RA	TRBV10-2
HJV	CHUK	CHGB	IL20RB	TRBV10-3
MUC5AC	IKBKB	CLCF1	IL21R	TRBV11-1
OBP2A	IKBKG	CLEC11A	IL22RA1	TRBV11-2
PLTP	NFKBIA	CMTM1	IL22RA2	TRBV11-3
MX1	NFKBIB	CMTM2	IL23R	TRBV12-3
DDX58	NFKBIE	CMTM3	IL27RA	TRBV12-4
IFNL1	CD19	CMTM4	IL2RA	TRBV12-5
IRF3	CR2	CMTM5	IL2RG	TRBV13
SFTPA2	PIK3R5	CMTM6	IL31RA	TRBV14
LPA	PIK3R1	CMTM7	IL3RA	TRBV15
LBP	PIK3R2	CMTM8	IL4R	TRBV16
RBP4	PIK3R3	CNTF	IL5RA	TRBV17
NOX4	PIK3CA	CORT	IL6R	TRBV18
LTF	PIK3CB	CRH	IL9R	TRBV19
IFNB1	PIK3CD	CSF1	INSR	TRBV20-1
RBP5	AKT3	CSF2	KDR	TRBV24-1
FABP7	AKT1	CSF3	LEPR	TRBV25-1
FABP5	AKT2	CSH1	LGR4	TRBV27
FABP3	GSK3B	CSH2	LGR5	TRBV28

FABP2	INPP5D	CSHL1	LGR6	TRBV29-1
FABP4	CD22	CSPG5	LHCGR	TRBV30
R3HDML	CD72	CTF1	LIFR	TRDC
BPIFA3	PTPN6	CCN2	LTBR	TRDD1
BPIFB1	LILRB3	DKK1	MC1R	TRDD2
OASL	FCGR2B	EBI3	MC2R	TRDD3
CRABP2	RASGRP3	EGF	MC3R	TRDJ1
CRABP1	PLCG2	EPGN	MC4R	TRDJ2
RBP7	PRKCB	EPO	MCHR1	TRDJ3
DUOX1	IFITM1	EREG	MCHR2	TRDJ4
OBP2B	IGH	ESM1	MET	TRDV1
RBP2	IGHA1	FAM3B	MLNR	TRDV2
LCN15	IGHA2	FAM3C	MPL	TRDV3
CETP	IGHD	FAM3D	MTNR1A	TRGV9
FABP12	IGHD1-1	FGF1	MTNR1B	TRGV8
FABP9	IGHD1-14	FGF11	NGFR	TRGV5
BPIFA1	IGHD1-20	FGF12	NMBR	TRGV4
LCNL1	IGHD1-26	FGF13	NPR1	TRGV3
C8G	IGHD1-7	FGF14	NPR3	TRGV2
SPAG11A	IGHD2-15	FGF16	NR0B1	TRGJP2
PI15	IGHD2-2	FGF17	NR0B2	TRGJP1
NOX1	IGHD2-21	FGF18	NR1D1	TRGJP
PMP2	IGHD2-8	FGF19	NR1D2	TRGJ2
APOD	IGHD3-10	FGF20	NR1H2	TRGJ1
ORM2	IGHD3-16	FGF21	NR1H3	TRGC2
ORM1	IGHD3-22	FGF22	NR1H4	TRGC1
TNF	IGHD3-3	FGF23	NR1I2	TRAV6
CTSG	IGHD3-9	FGF3		

Table S4. Primers used in this study.

Gene	Forward primer	Reverse primer
LDHA	ATGGCAACTCTAAAGGATCAGC	CCAACCCCAACAACCTGTAATCT
DDIT4	TGAGGATGAACACTTGTGTGC	CCAAGTGGCTAGGCATCAGC
ADM	ATGAAGCTGGTTTCCGTCG	GACATCCGCAGTTCCTCTT
ARRB1	AAAGGGACCCGAGTGTCAAG	CGTCACATAGACTCTCCGCT
ERO1A	GGCTGGGGATTCTTGTGG	AGTAACCACTAACCTGGCAGA
NAGK	CACGATCCGAGGTCCTTTTAGT	GATCAGCCAGTGGTTTGTGC
NRAS	ATGACTGAGTACAACTGGTGGT	CATGTATTGGTCTCTCATGGCAC
NR2F2	TCATGGGTATCGAGAACATTTGC	TTCAACACAAACAGCTCGCTC

FURIN	CCTGGTTGCTATGGGTGGTAG	AAGTGGTAATAGTCCCCGAAGA
β -ACTIN	CATGTACGTTGCTATCCAGGC	CTCCTTAATGTCACGCACGAT

Table S5. The normalized expression levels of 9 genes.

ID	ADM	ARRB1	DDIT4	ER01A	FURIN	LDHA	NAGK	NR2F2	NRAS
P1	0.152	0.207	0.530	0.007	0.005	0.063	0.016	0.010	0.549
P2	0.033	0.187	0.153	0.005	0.007	0.090	0.005	0.015	0.397
P3	0.664	0.306	0.053	0.016	0.017	0.136	0.017	0.018	0.187
P4	0.028	0.123	0.037	0.012	0.007	0.104	0.016	0.025	0.088
P5	0.147	0.169	0.059	0.051	0.082	0.008	0.047	0.056	0.102
P6	0.010	0.052	0.030	0.023	0.016	0.126	0.013	0.038	0.077
P7	0.026	0.071	0.082	0.016	0.018	0.150	0.014	0.043	0.199
P8	0.019	0.047	0.054	0.012	0.010	0.142	0.029	0.042	0.262
P9	0.030	0.176	0.140	0.006	0.007	0.094	0.011	0.049	0.061
P10	0.015	0.083	0.009	0.024	0.017	0.371	0.028	0.030	0.108