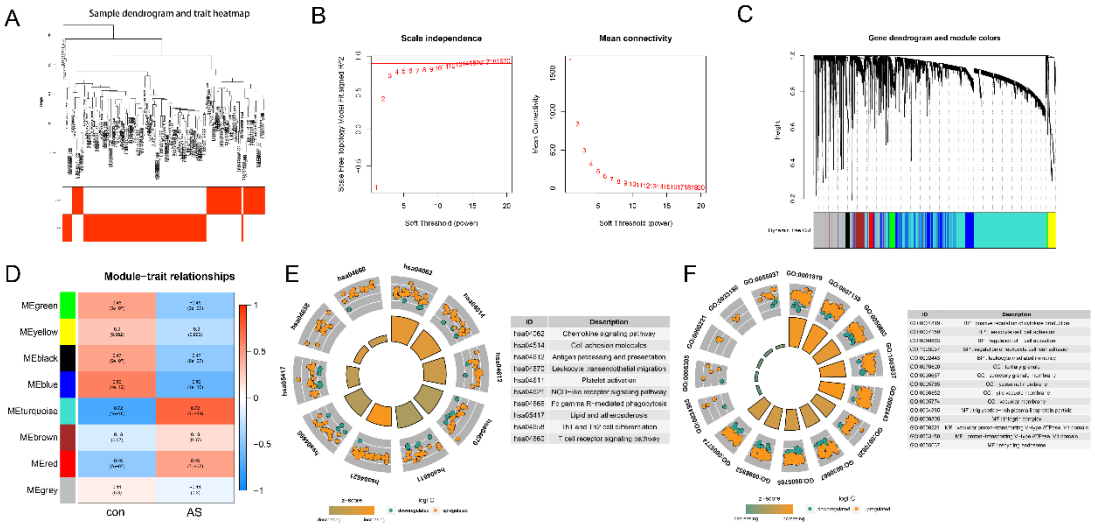
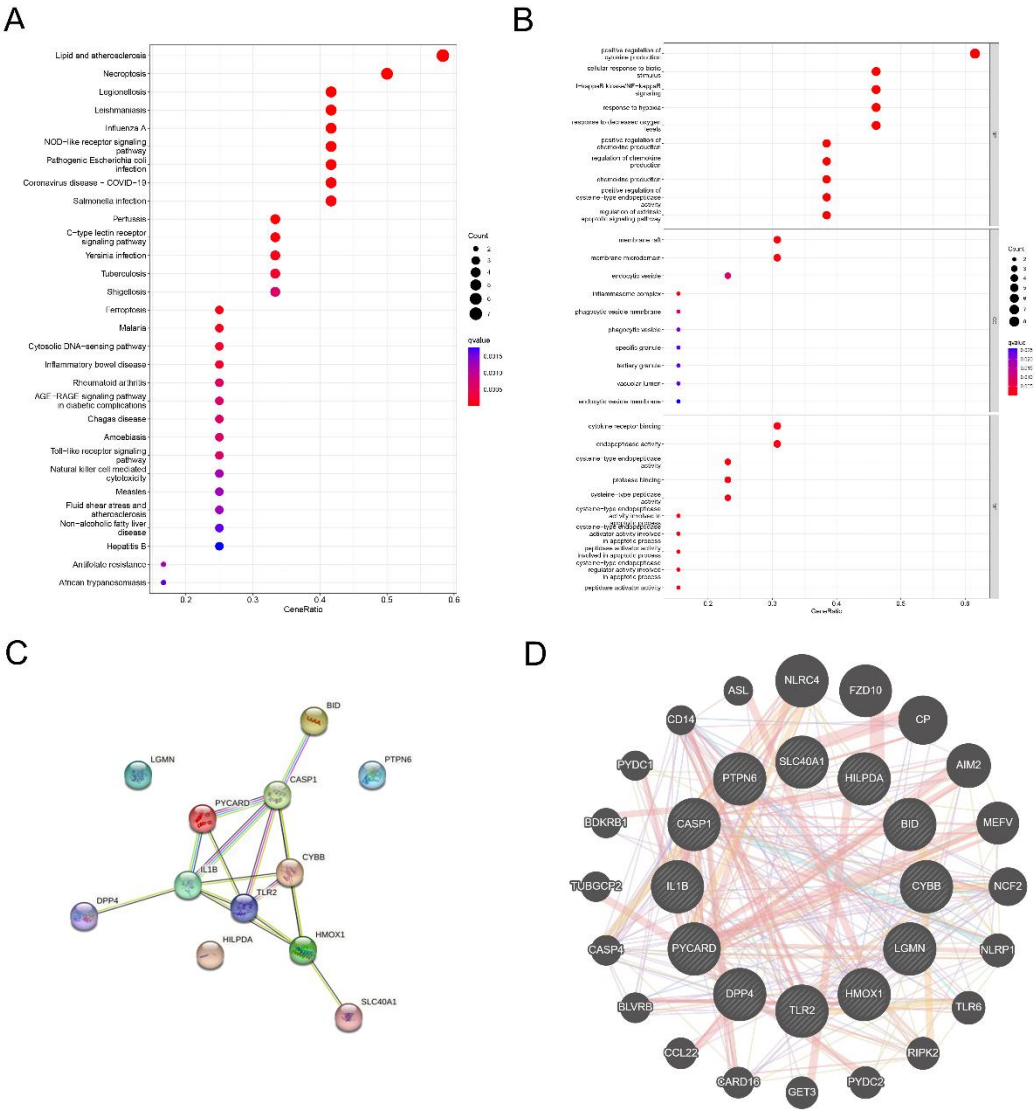
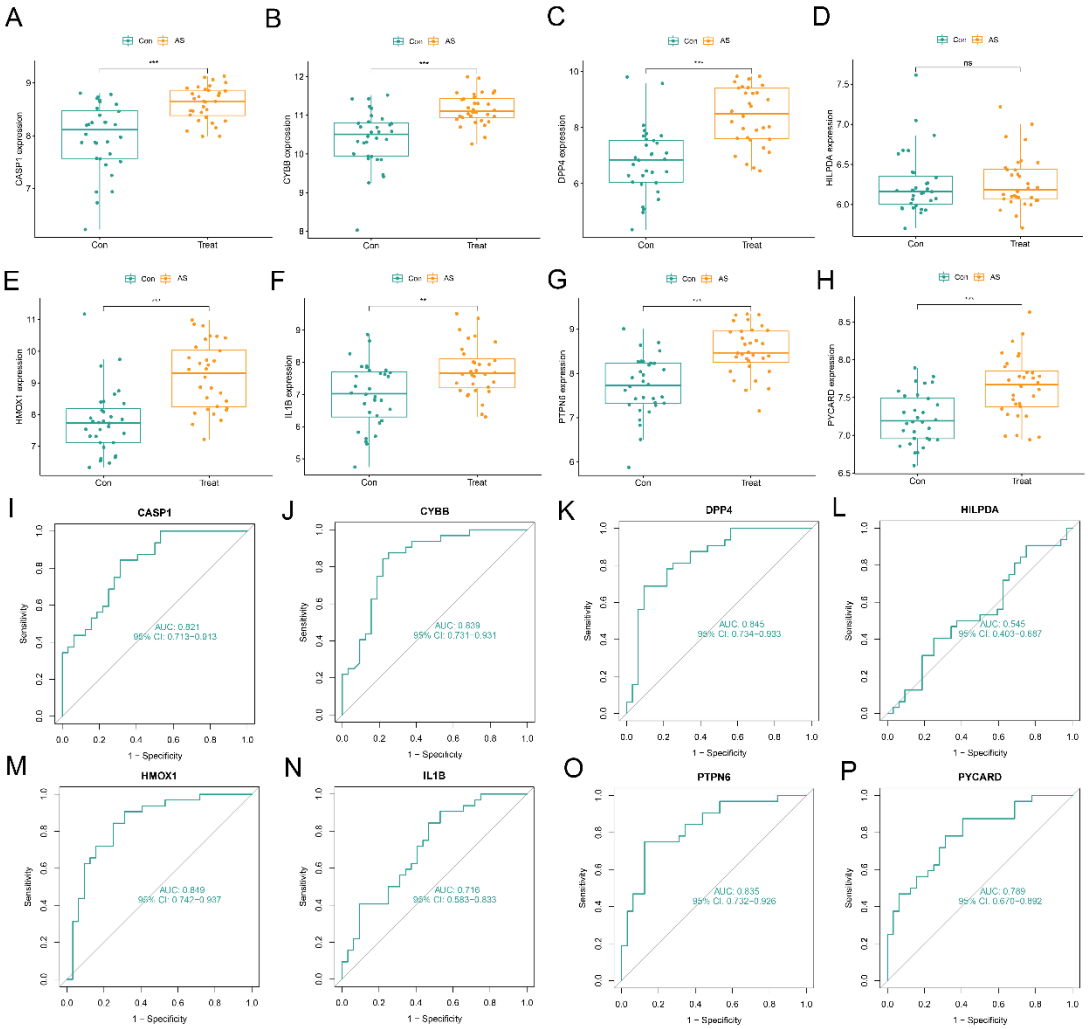
Supplementary Figure 1. Construction of WGCNA modules. (A) Sample dendrogram showing normal control and AS classification. (B) Scale independence and mean connectivity under various soft-thresholding powers. (C) Co-expression modules assigned diverse colors for each gene in the hierarchical clustering tree. Dynamic tree cut represents the original modules, while merged dynamic corresponds to the finally identified merged modules. (D) Heatmap illustrating relationships between co-expression modules and clinical traits. Numbers indicate correlation coefficients, with p-values in parentheses. (E) KEGG enrichment analysis of genes in the turquoise module. (F) GO enrichment analysis of genes in the turquoise module.



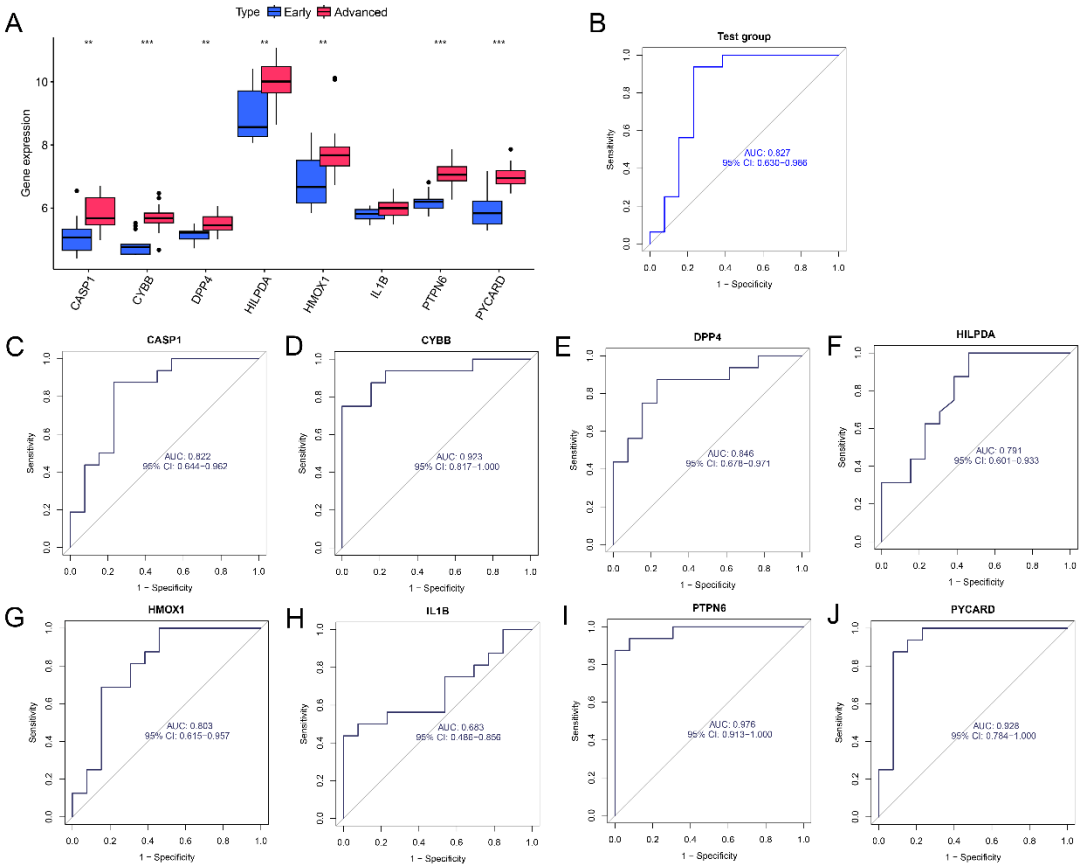
Supplementary Figure 2. Functional enrichment analysis and protein network interaction of LCDEGs. (A, B) Sankey-bubble diagram showing the GO and KEGG enrichment analysis of LCDEGs. (C) Network interaction among LCDEGs. (D) Association of LCDEGs with predicted related genes.



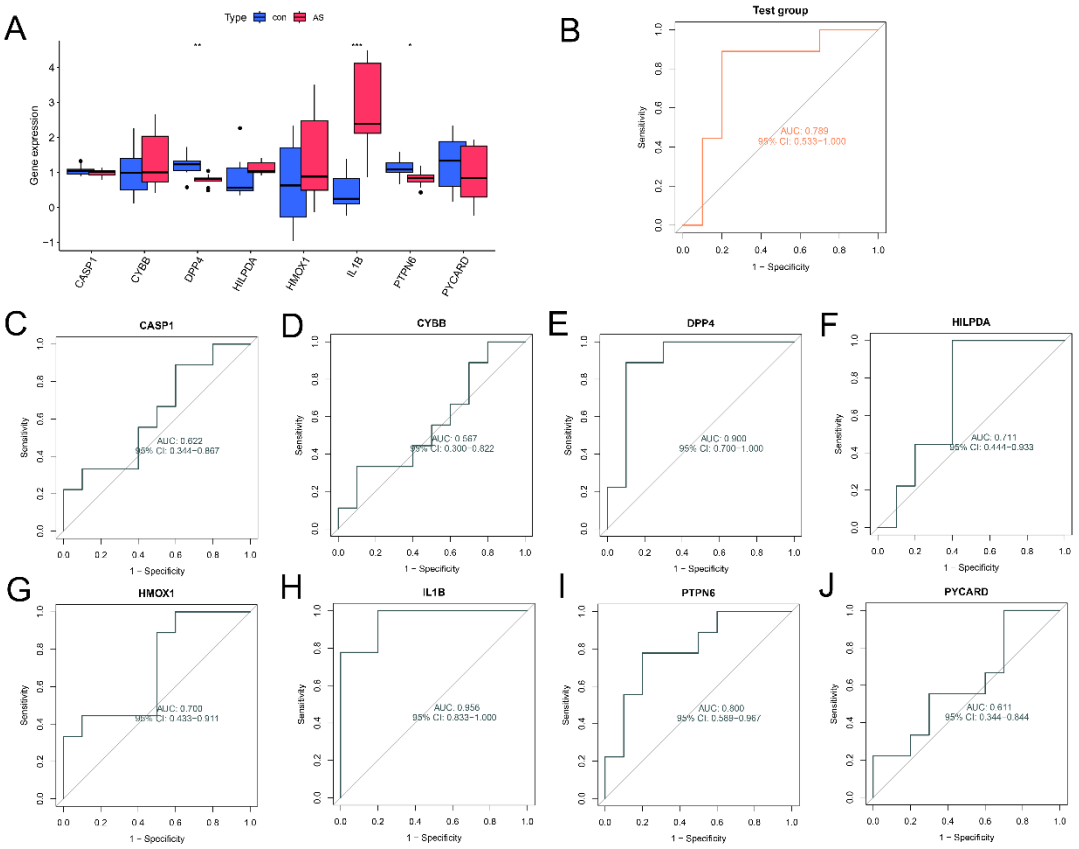
Supplementary Figure 3. External validation (GSE43292) to further test the diagnostic performance of AS signature genes. (A-H) Differences in the expression of AS signature genes between different groups. (I-P) The ROC curves of the AS signature genes. * indicates P < 0.05 compared to cluster A, ** indicates P < 0.01 compared to cluster A, and *** indicates P < 0.001 compared to cluster A.



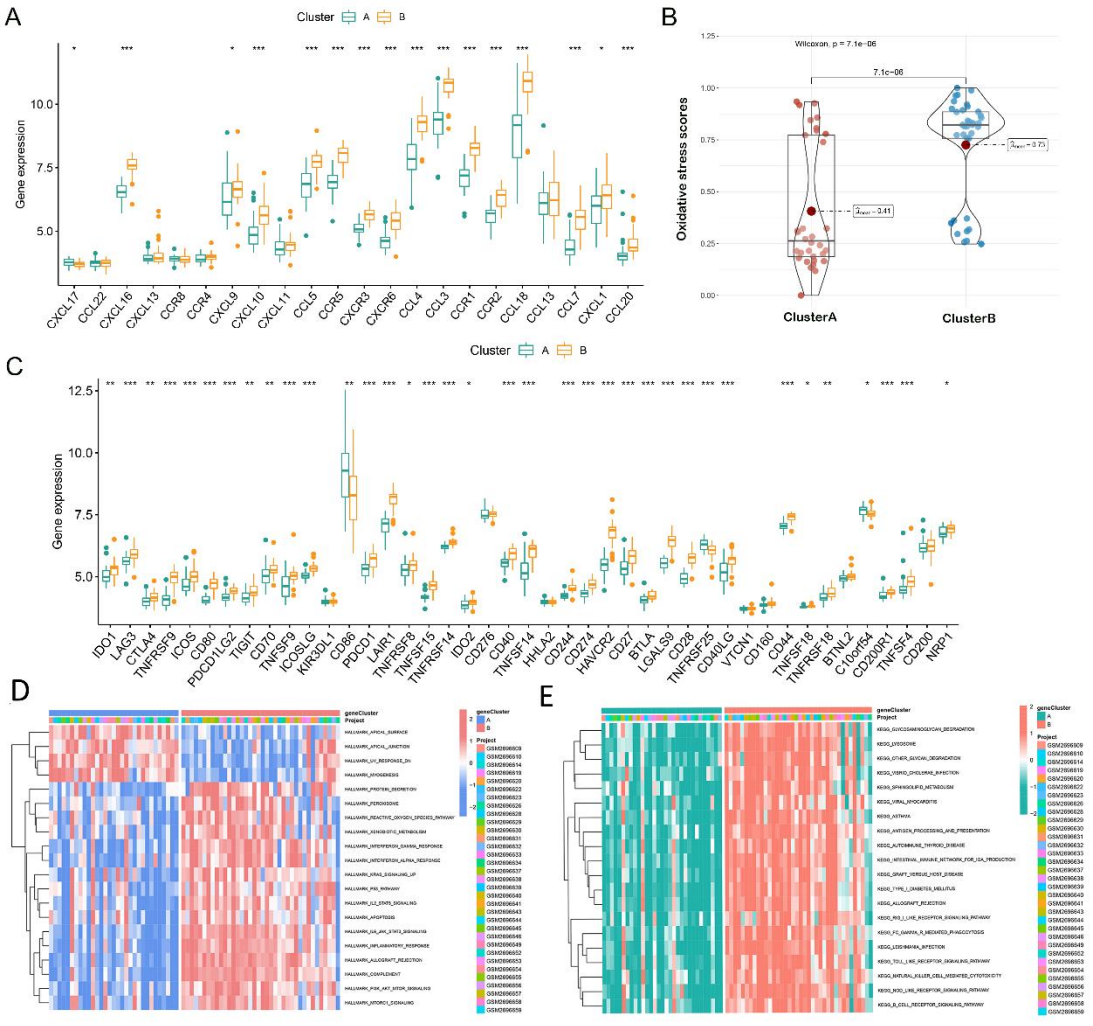
Supplementary Figure 4. External validation (GSE28829) to further test the diagnostic performance of ANN model and AS signature genes. (A) Differences in the expression of AS signature genes between different groups. (B) The ROC curves of the ANN model. (C-J) The ROC curves of the AS signature genes. * indicates P < 0.05 compared to cluster A, ** indicates P < 0.01 compared to cluster A, and *** indicates P < 0.001 compared to cluster A.



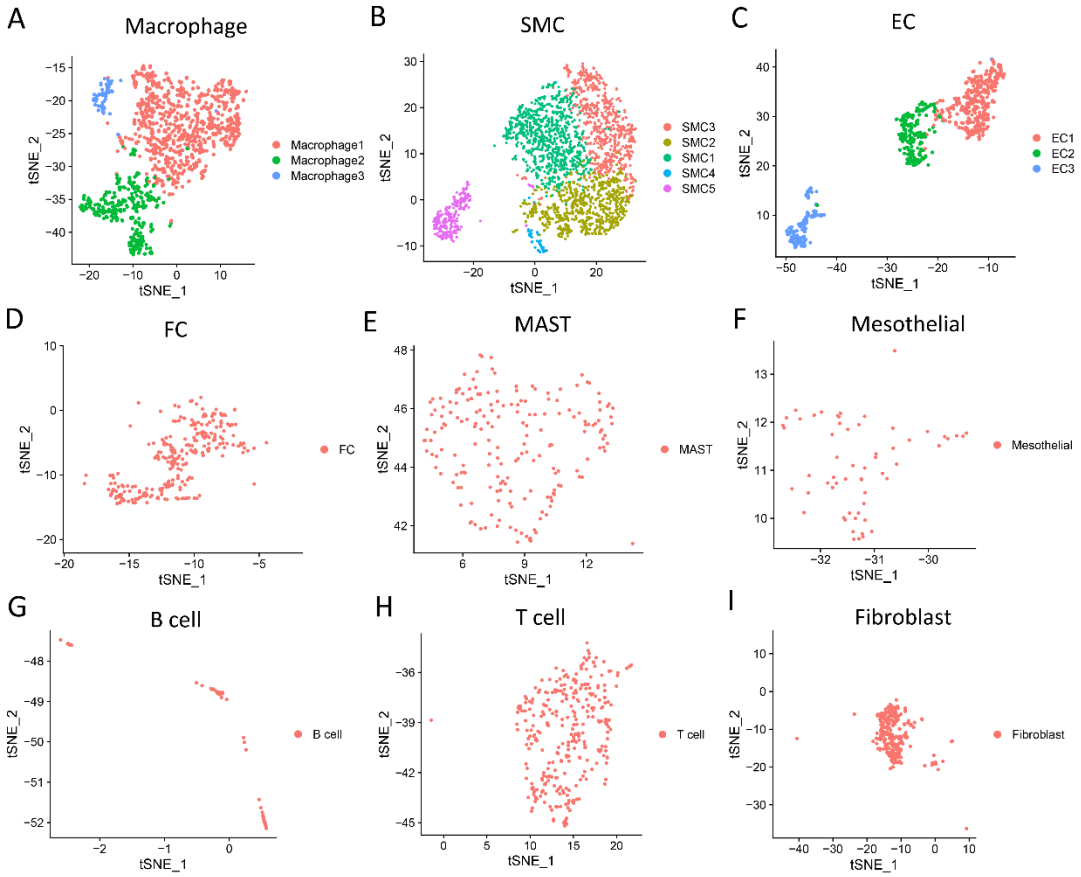
Supplementary Figure 5. External validation (GSE57691) to further test the diagnostic performance of ANN model and AS signature genes. (A) Differences in the expression of AS signature genes between different groups. (B) The ROC curves of the ANN model. (C-J) The ROC curves of the AS signature genes. * indicates P < 0.05 compared to cluster A, ** indicates P < 0.01 compared to cluster A, and *** indicates P < 0.001 compared to cluster A.



Supplementary Figure 6. (A) The expression of chemokines differed between the two clusters. (B) Oxidative stress scores differed between the two clusters. (C) The expression of immune checkpoints differed between the two clusters. * indicates P < 0.05 compared to cluster A, ** indicates P < 0.01 compared to cluster A, and *** indicates P < 0.001 compared to cluster A.



Supplementary Figure 7. tSNE plot of each cell subtype.



Supplementary Table S1. All genes included in the lytic cell death-related gene (LCDG) and Oxidative stress

Pyroptosis	Necroptosis	Ferroptosis	Lytic cell death	Oxidative stress
RPL8	TNF	RPL8	TNFRSF1A	RYR2
IREB2	TNFRSF1A	IREB2	TRADD	NOS3
ATP5MC3	TRADD	ATP5MC3	TRAF2	NOS2
CS	TRAF2	CS	TRAF5	ELAC2
EMC2	TRAF5	EMC2	RIPK1	TRDN
ACSF2	RIPK1	ACSF2	BIRC2	CARS2
NOX1	BIRC2	NOX1	BIRC3	CPT2
CYBB	BIRC3	CYBB	XIAP	SOD1
NOX3	XIAP	NOX3	RBCK1	CAT
NOX4	RBCK1	NOX4	RNF31	SOD2-OT1
NOX5	RNF31	NOX5	SHARPIN	FARS2
DUOX1	SHARPIN	DUOX1	SPATA2L	NOS1
DUOX2	SPATA2L	DUOX2	SPATA2	MTO1
G6PD	SPATA2	G6PD	CYLD	AIFM1
PGD	CYLD	PGD	FADD	CASQ2
VDAC2	FADD	VDAC2	CASP8	GFM1
PIK3CA	CASP8	PIK3CA	CFLAR	TP53
FLT3	CFLAR	FLT3	RIPK3	NFE2L2
SCP2	RIPK3	SCP2	CYBB	HMOX1
TP53	CYBB	TP53	CAMK2A	AARS2
ACSL4	CAMK2A	ACSL4	CAMK2D	SOD2
LPCAT3	CAMK2D	LPCAT3	CAMK2B	TNF
NRAS	CAMK2B	NRAS	CAMK2G	POLR1C
KRAS	CAMK2G	KRAS	SLC25A4	BDNF-AS
HRAS	SLC25A4	HRAS	SLC25A5	MAPK14
TF	SLC25A5	TF	SLC25A6	NARS2
TFRC	SLC25A6	TFRC	SLC25A31	MAPK8
TFR2	SLC25A31	TFR2	PPID	GSR
SLC38A1	PPID	SLC38A1	VDAC1	OXSR1
SLC1A5	VDAC1	SLC1A5	VDAC2	MTRFR
GLS2	VDAC2	GLS2	VDAC3	XDH
GOT1	VDAC3	GOT1	GLUD2	TUFM
CARS1	GLUD2	CARS1	GLUD1	TXN
TP53	GLUD1	TP53	GLUL	TSFM
ALOX5	GLUL	ALOX5	PYGL	MPO
KEAP1	PYGL	KEAP1	PYGM	OSGIN1

HMOX1	PYGM	HMOX1	PYGB	VARS2
TP53	PYGB	TP53	MAPK8	PNPT1
TP53	MAPK8	TP53	MAPK10	MAPK1
GLS2	MAPK10	GLS2	MAPK9	LINC01672
ATG5	MAPK9	ATG5	FTH1	IL6
ATG7	FTH1	ATG7	FTL	EARS2
NCOA4	FTL	NCOA4	PLA2G4E	OSER1
TF	PLA2G4E	TF	PLA2G4A	G6PD
ALOX5	PLA2G4A	ALOX5	JMJD7-PLA2G4B	OLR1
ALOX12	JMJD7-PLA2G4B	ALOX12	PLA2G4B	SIRT1
ALOX12B	PLA2G4B	ALOX12B	PLA2G4C	CYCS
ALOX15	PLA2G4C	ALOX15	PLA2G4D	PARK7
ALOX15B	PLA2G4D	ALOX15B	PLA2G4F	CASP3
ALOXE3	PLA2G4F	ALOXE3	ALOX15	TXN2
PHKG2	ALOX15	PHKG2	CAPN1	MTFMT
TFRC	CAPN1	TFRC	CAPN2	OSGIN2
ACO1	CAPN2	ACO1	SMPD1	IL1B
IREB2	SMPD1	IREB2	MLKL	GPX1
SLC38A1	MLKL	SLC38A1	PGAM5	NQO1
GLS2	PGAM5	GLS2	DNM1L	CALM1
G6PDX	DNM1L	G6PDX	NLRP3	HSPA5
ULK1	NLRP3	ULK1	PYCARD	PON1
ATG3	PYCARD	ATG3	CASP1	CXCL8
ATG4D	CASP1	ATG4D	IL1B	MAP3K5
ATG5	IL1B	ATG5	CHMP2A	APP
BECN1	CHMP2A	BECN1	CHMP2B	CYBA
MAP1LC3A	CHMP2B	MAP1LC3A	CHMP3	JUN
GABARAPL2	CHMP3	GABARAPL2	RNF103-CHMP3	GTPBP3
GABARAPL1	RNF103-CHMP3	GABARAPL1	CHMP4B	ALB
ATG16L1	CHMP4B	ATG16L1	CHMP4A	TMX2-CTNND1
WIPI1	CHMP4A	WIPI1	CHMP4C	INS
WIPI2	CHMP4C	WIPI2	CHMP6	FASTKD2
SNX4	CHMP6	SNX4	VPS4B	SMAD5-AS1
ATG13	VPS4B	ATG13	VPS4A	ACADVL
ULK2	VPS4A	ULK2	CHMP1B	PTGS2
NCOA4	CHMP1B	NCOA4	CHMP1A	OGG1
ACSL4	CHMP1A	ACSL4	CHMP5	FOXO3

TP53	CHMP5	TP53	CHMP7	PRDX2
SAT1	CHMP7	SAT1	TRPM7	DDIT3
ALOX15	TRPM7	ALOX15	IL1A	PARP1
ACSL4	IL1A	ACSL4	IL33	CRP
LPCAT3	IL33	LPCAT3	HMGB1	ATF4
ALOX15	HMGB1	ALOX15	TNFSF10	GSTP1
ACSL4	TNFSF10	ACSL4	TNFRSF10A	MRPL44
KEAP1	TNFRSF10A	KEAP1	TNFRSF10B	GSTM1
EGFR	TNFRSF10B	EGFR	FASLG	TARS2
NOX4	FASLG	NOX4	FAS	CERNA3
MAPK3	FAS	MAPK3	FAF1	AKT1
MAPK1	FAF1	MAPK1	IFNA1	NOS1AP
BID	IFNA1	BID	IFNA2	HADHA
ACSL4	IFNA2	ACSL4	IFNA4	SLC6A4
ZEB1	IFNA4	ZEB1	IFNA5	GFM2
KEAP1	IFNA5	KEAP1	IFNA6	CRH
DPP4	IFNA6	DPP4	IFNA7	XBP1
ALOX15	IFNA7	ALOX15	IFNA8	KEAP1
ALOX12	IFNA8	ALOX12	IFNA10	FOXO1
CDKN2A	IFNA10	CDKN2A	IFNA13	MAPK10
PEBP1	IFNA13	PEBP1	IFNA14	G3BP1
SOCS1	IFNA14	SOCS1	IFNA16	BCL2
CDO1	IFNA16	CDO1	IFNA17	HSF1
MYB	IFNA17	MYB	IFNA21	CYBB
HMOX1	IFNA21	HMOX1	IFNB1	EIF2AK3
MAPK8	IFNB1	MAPK8	IFNG	RYR1
MAPK9	IFNG	MAPK9	IFNAR1	HSPB1
MAPK1	IFNAR1	MAPK1	IFNAR2	PRDX5
MAPK3	IFNAR2	MAPK3	IFNGR1	HSP90AA1
SLC1A5	IFNGR1	SLC1A5	IFNGR2	HADHB
CHAC1	IFNGR2	CHAC1	JAK1	HSPA4
MAPK14	JAK1	MAPK14	JAK2	ACADM
LINC00472	JAK2	LINC00472	JAK3	IFNG
NOX4	JAK3	NOX4	TYK2	NFKB1
GOT1	TYK2	GOT1	STAT1	EDN1
BECN1	STAT1	BECN1	STAT2	ADPRS
PRKAA2	STAT2	PRKAA2	STAT3	MIPEP
PRKAA1	STAT3	PRKAA1	STAT4	MSRA
ELAVL1	STAT4	ELAVL1	STAT5A	EIF2S1
BAP1	STAT5A	BAP1	STAT5B	PRKN

TP53	STAT5B	TP53	STAT6	GAPDH
ABCC1	STAT6	ABCC1	IRF9	HIF1A
ACSL4	IRF9	ACSL4	EIF2AK2	CPT1A
MIR6852	EIF2AK2	MIR6852	TLR4	BDNF
ACVR1B	TLR4	ACVR1B	TICAM2	CCL2
TGFBR1	TICAM2	TGFBR1	TICAM1	APEX1
BAP1	TICAM1	BAP1	TLR3	SNCA
EPAS1	TLR3	EPAS1	ZBP1	NDUFS4
HILPDA	ZBP1	HILPDA	USP21	VEGFA
HIF1A	USP21	HIF1A	SQSTM1	H19
ALOX12	SQSTM1	ALOX12	HSP90AA1	BAX
ACSL4	HSP90AA1	ACSL4	HSP90AB1	CYP2D6
HMOX1	HSP90AB1	HMOX1	TNFAIP3	HSPA1A
IFNG	TNFAIP3	IFNG	PARP1	SLC25A26
ANO6	PARP1	ANO6	BID	ACE
LPIN1	BID	LPIN1	BAX	MRPS22
HMGB1	BAX	HMGB1	AIFM1	TGFB1
TNFAIP3	AIFM1	TNFAIP3	H2AX	SOD3
TLR4	H2AX	TLR4	H2AC20	ANK2
NOX4	H2AC20	NOX4	H2AC12	ATP5F1A
ATF3	H2AC12	ATF3	H2AC1	CAV1
ATM	H2AC1	ATM	H2AW	CP
YY1AP1	H2AW	YY1AP1	H2AB3	MAPK9
EGLN2	H2AB3	EGLN2	H2AC8	ABL1
MIOX	H2AC8	MIOX	H2AC4	CYP1A1
TAZ	H2AC4	TAZ	MACROH2A2	NR3C1
MTDH	MACROH2A2	MTDH	MACROH2A1	CYP3A4
IDH1	MACROH2A1	IDH1	H2AC19	PRDX6
SIRT1	H2AC19	SIRT1	H2AJ	STIP1
TAZ	H2AJ	TAZ	H2AB1	GSTT1
BECN1	H2AB1	BECN1	H2AC17	UCP2
FBXW7	H2AC17	FBXW7	H2AC18	ACADS
PANX1	H2AC18	PANX1	H2AC11	FOS
DNAJB6	H2AC11	DNAJB6	H2AC21	NFS1
BACH1	H2AC21	BACH1	H2AZ2	VWF
ACSL4	H2AZ2	ACSL4	H2AC7	PGR-AS1
LONP1	H2AC7	LONP1	H2AZ1	MAOA
CD82	H2AZ1	CD82	H2AC15	HBG2
IL1B	H2AC15	IL1B	H2AC6	ATM

CTSB	H2AC6	CTSB	H2AC13	C1QBP
POR	H2AC13	POR	H2AC14	CYP2E1
CYB5R1	H2AC14	CYB5R1	H2AC16	APOE
ELOVL5	H2AC16	ELOVL5	H2AB2	CYP1A2
FADS1	H2AB2	FADS1	PPIA	QRSL1
ALOX12	PPIA	ALOX12	BCL2	NPY
FBW7	BCL2	FBW7	RPL8	PRDX3
PTEN		PTEN	IREB2	PRKCD
NR1D1		NR1D1	ATP5MC3	ATF6
NR1D2		NR1D2	CS	SHC1
TBK1		TBK1	EMC2	NUDT1
IL6		IL6	ACSF2	KNG1
USP7		USP7	NOX1	PRDX1
miR-182-5p		miR-182-5p	NOX3	FMO3
miR-378a-3p		miR-378a-3p	NOX4	PPARGC1A
CTSB		CTSB	NOX5	MAPK3
ACSL4		ACSL4	DUOX1	HSD17B4
ATF4		ATF4	DUOX2	MRPS34
BECN1		BECN1	G6PD	PPARG
AQP3		AQP3	PGD	SELENON
AQP5		AQP5	PIK3CA	POMC
AQP8		AQP8	FLT3	ATP5F1B
LINC00618		LINC00618	SCP2	SDHA
IREB2		IREB2	TP53	SCN5A
MT1DP		MT1DP	ACSL4	G3BP2
ACSL4		ACSL4	LPCAT3	PINK1
PEX10		PEX10	NRAS	CREB1
KEAP1		KEAP1	KRAS	POLRMT
AGPAT3		AGPAT3	HRAS	ERN1
PEX12		PEX12	TF	TRMT10C
CHP1		CHP1	TFRC	TLR4
GPAT4		GPAT4	TFR2	SERP1
BRPF1		BRPF1	SLC38A1	COX5A
OSBPL9		OSBPL9	SLC1A5	CAV3
INTS2		INTS2	GLS2	ICAM1
MMD		MMD	GOT1	PTCD3
CYP4F8		CYP4F8	CARS1	MTOR
MLLT1		MLLT1	ALOX5	GPX3
TTPA		TTPA	KEAP1	HSPA8
GRIA3		GRIA3	HMOX1	NOX4

EPT1		EPT1	ATG5	MRPS16
POM121L12		POM121L12	ATG7	CDKN1A
LIG3		LIG3	NCOA4	MAOB
AEBP2		AEBP2	ALOX12	FXN
AGPS		AGPS	ALOX12B	IL10
CDCA3		CDCA3	ALOX15B	LMNA
PEX2		PEX2	ALOXE3	ACAD9
LPCAT3		LPCAT3	PHKG2	VARS1
PEX6		PEX6	ACO1	P4HB
TIMM9		TIMM9	G6PDX	ACOX1
DCAF7		DCAF7	ULK1	MIR7-3HG
LCE2C		LCE2C	ATG3	TRPM2
FAR1		FAR1	ATG4D	MRPL12
PHF21A		PHF21A	BECN1	TRIT1
SMAD7		SMAD7	MAP1LC3A	GCH1
LYRM1		LYRM1	GABARAPL2	TXNRD1
AMN		AMN	GABARAPL1	CACNA1C
PEX3		PEX3	ATG16L1	TXNIP
MTCH1		MTCH1	WIPI1	CALM3
ZEB1		ZEB1	WIPI2	SDHB
SIRT1		SIRT1	SNX4	EMSLR
ACADSB		ACADSB	ATG13	PRKAA1
PVT1		PVT1	ULK2	HBB
hsa_circ_0008367		hsa_circ_0008367	SAT1	MAP2K4
SLC39A14		SLC39A14	EGFR	SFXN4
NCOA4		NCOA4	MAPK3	ALDH2
MAP3K11		MAP3K11	MAPK1	CD36
GSK3B		GSK3B	ZEB1	CASP9
MAPK8		MAPK8	DPP4	CLU
BRD7		BRD7	CDKN2A	ADIPOQ
TP53		TP53	PEBP1	KCNJ5
SLC25A28		SLC25A28	SOCS1	AGTR1
ACSL4		ACSL4	CDO1	OXR1
MFN2		MFN2	MYB	ETFDH
ACSL4		ACSL4	CHAC1	EIF2AK2
SLC11A2		SLC11A2	MAPK14	SP1
ZFAS1		ZFAS1	LINC00472	APOA1
SLC38A1		SLC38A1	PRKAA2	TRA-TGC7-1

TSC1		TSC1	PRKAA1	MRPS2
PEBP1		PEBP1	ELAVL1	ACADL
TGFB1		TGFB1	BAP1	CRHR1
SNCA		SNCA	ABCC1	PRKAA2
SIRT3		SIRT3	MIR6852	NOX1
PRKAA2		PRKAA2	ACVR1B	BLVRB
TFRC		TFRC	TGFBR1	LYRM4
CGAS		CGAS	EPAS1	PRORP
STING1		STING1	HILPDA	KCNH2
HDDC3		HDDC3	HIF1A	SQSTM1
MIR761		MIR761	ANO6	MAP2K6
MDM2		MDM2	LPIN1	ESR1
MDM4		MDM4	ATF3	PPARA
ALOX15		ALOX15	ATM	EHHADH
POR		POR	YY1AP1	MDM2
MIR214		MIR214	EGLN2	SLC25A20
DLD		DLD	MIOX	ABCD1
LONP1		LONP1	TAZ	VCAM1
ACSL4		ACSL4	MTDH	IL1A
BACH1		BACH1	IDH1	NUBPL
DNAJB6		DNAJB6	SIRT1	GPX7
WWTR1		WWTR1	FBXW7	GATB
SIRT1		SIRT1	PANX1	SNTA1
ATM		ATM	DNAJB6	AGT
PRKCA		PRKCA	BACH1	STAT3
LGMN		LGMN	LONP1	OXT
ACSL4		ACSL4	CD82	SRC
TP53		TP53	CTSB	MAPKAPK2
IFNG		IFNG	POR	VCP
SMPD1		SMPD1	CYB5R1	BRCA1
MYCN		MYCN	ELOVL5	SDHD
SLC11A2		SLC11A2	FADS1	HADH
IFNA1		IFNA1	FBW7	MAPK11
IFNA2		IFNA2	PTEN	HMGB1
IFNA4		IFNA4	NR1D1	MT-CO1
IFNA5		IFNA5	NR1D2	ATF2
IFNA6		IFNA6	TBK1	PDE5A
IFNA7		IFNA7	IL6	EIF2AK1
IFNA8		IFNA8	USP7	PLA2G7
IFNA10		IFNA10	miR-182-5p	MSRB2
IFNA13		IFNA13	miR-378a-3p	MICOS13
IFNA14		IFNA14	ATF4	NR3C2
IFNA16		IFNA16	AQP3	LEP

IFNA17		IFNA17	AQP5	MAPT
IFNA21		IFNA21	AQP8	TRA-TGC5-1
SMG9		SMG9	LINC00618	TRMT5
NR1D1		NR1D1	MT1DP	NDUFS8
ACSL4		ACSL4	PEX10	COMT
PPARG		PPARG	AGPAT3	ETFA
TLR4		TLR4	PEX12	POLG
IL6		IL6	CHP1	TF
miR-335		miR-335	GPAT4	NCF2
ATF3		ATF3	BRPF1	GATC
HMOX1		HMOX1	OSBPL9	GLRX
HMGB1		HMGB1	INTS2	MRPL3
EPAS1		EPAS1	MMD	MB
SNX5		SNX5	CYP4F8	PON2
PAQR3		PAQR3	MLLT1	MSRB1
MICU1		MICU1	TTPA	CS
NOX4		NOX4	GRIA3	GCLC
TOR2A		TOR2A	EPT1	KCNQ1
MIR375		MIR375	POM121L12	TIMM22
MAP3K14		MAP3K14	LIG3	FKBP5
SIRT3		SIRT3	AEBP2	EPO
CircKDM4C		CircKDM4C	AGPS	CYP1B1
MIR324		MIR324	CDCA3	CDKN2A
QSOX1		QSOX1	PEX2	SERPINE1
MIB2		MIB2	PEX6	PTGS1
CLTRN		CLTRN	TIMM9	HMOX2
KLF2		KLF2	DCAF7	PRDX4
MIR5096		MIR5096	LCE2C	MAP2K3
TFRC		TFRC	FAR1	CYP2C9
HOTAIR		HOTAIR	PHF21A	UCP3
H19		H19	SMAD7	RHOA
FOXO4		FOXO4	LYRM1	POR
ELAVL1		ELAVL1	AMN	AGER
YTHDC2		YTHDC2	PEX3	RPS6KA5
DDR2		DDR2	MTCH1	SIRT3
SLC39A7		SLC39A7	ACADSB	SELP
TRIM46		TRIM46	PVT1	CYGB
ACSL1		ACSL1	hsa_circ_0008367	FAS
KDM5A		KDM5A	SLC39A14	MRPS7
TRIM21		TRIM21	MAP3K11	KCNE1
HMOX1		HMOX1	GSK3B	SELE

DPEP1		DPEP1	BRD7	EP300
CYGB		CYGB	SLC25A28	CYP2C19
IDO1		IDO1	MFN2	PSEN1
GSTZ1		GSTZ1	SLC11A2	EME2
TP53		TP53	ZFAS1	IGF1
ACO1		ACO1	TSC1	ANXA5
GJA1		GJA1	TGFB1	PRKCB
IREB2		IREB2	SNCA	GGT1
SLC7A11		SLC7A11	SIRT3	STK25
PGRMC1		PGRMC1	CGAS	FMO1
CIRBP		CIRBP	STING1	C2orf69
FAR1		FAR1	HDDC3	MAP2K7
circPSEN1		circPSEN1	MIR761	PIK3CG
USP11		USP11	MDM2	HERPUD1
STING1		STING1	MDM4	BCL2L1
YAP		YAP	MIR214	CALM2
HMOX1		HMOX1	DLD	SCARNA5
MIR135B		MIR135B	WWTR1	SGCB
TRIM26		TRIM26	PRKCA	MMP2
YAP		YAP	LGMN	GPX4
NDRG1		NDRG1	MYCN	LOC110806262
MIR302A		MIR302A	SMG9	TTN
ASMTL-AS1		ASMTL-AS1	PPARG	SLC2A1
ZFAS1		ZFAS1	miR-335	PCNA
FADS2		FADS2	SNX5	ATF3
PIEZO1		PIEZO1	PAQR3	SESN2
LIFR		LIFR	MICU1	DDAH2
PTPN6		PTPN6	TOR2A	LINC02605
MIR15A		MIR15A	MIR375	MUTYH
EGR1		EGR1	MAP3K14	VHL
ADAM23		ADAM23	CircKDM4C	TARDBP
ARHGEF26-AS1		ARHGEF26-AS1	MIR324	SRXN1
ACSL4		ACSL4	QSOX1	ATP2A2
CPEB1		CPEB1	MIB2	MALAT1
COX4I2		COX4I2	CLTRN	SLC25A4
lncRNA AABR07017145.1		lncRNA AABR07017145.1	KLF2	MTHFR
TIMP1		TIMP1	MIR5096	TPO

MIR15A		MIR15A	HOTAIR	MRPS25
KDM6B		KDM6B	H19	MT-CYB
NCOA4		NCOA4	FOXO4	HTR2A
GSK3B		GSK3B	YTHDC2	NLRP3
IFNG		IFNG	DDR2	RAC1
METTL14		METTL14	SLC39A7	EGFR
CHAC1		CHAC1	TRIM46	NCF1
MIB1		MIB1	ACSL1	KDR
KDM5C		KDM5C	KDM5A	GSTA1
ACSL4		ACSL4	TRIM21	TERT
MEG3		MEG3	DPEP1	PTGIS
CCDC6		CCDC6	CYGB	TXNRD2
ATF3		ATF3	IDO1	KRIT1
IREB2		IREB2	GSTZ1	NDUFS2
CFL1		CFL1	GJA1	NDUFS1
		SLC7A11	SLC7A11	REN
		GPX4	PGRMC1	DYNLL1
		AKR1C1	CIRBP	EPHX1
		AKR1C2	circPSEN1	CRYAB
		AKR1C3	USP11	ETFB
		GPX4	YAP	ALOX5
		RB1	MIR135B	MAP2K1
		HSPB1	TRIM26	NOSTRIN
		HSF1	NDRG1	MYC
		SLC7A11	MIR302A	NPPA
		GPX4	ASMTL-AS1	OXTR
		GCLC	FADS2	MRPS28
		SLC7A11	PIEZO1	MAPK13
		NFE2L2	LIFR	ASL
		SQSTM1	PTPN6	GCLM
		NQO1	MIR15A	SIRT2
		HMOX1	EGR1	CHKB-CPT1B
		FTH1	ADAM23	PTEN
		MUC1	ARHGEF26-AS1	PPP1R15A
		SLC3A2	CPEB1	CEBPB
		MT1G	COX4I2	SUOX
		NFE2L2	lncRNA AABR07017145.1	ADCYAP1
		SLC40A1	TIMP1	HSPD1
		SLC7A11	KDM6B	BMP6
		GPX4	METTL14	MRPS14
		SLC7A11	MIB1	JAK2

		CISD1	KDM5C	UQCRFS1
		SLC7A11	MEG3	MRPS23
		FANCD2	CCDC6	CALR
		GPX4	CFL1	HP
		NFE2L2	GPX4	TIA1
		FTMT	AKR1C1	HYOU1
		HSPA5	AKR1C2	MT-ND1
		ATF4	AKR1C3	HSP90B1
		SLC7A11	RB1	NDUFV1
		GPX4	HSPB1	MGST1
		GPX4	HSF1	HSD17B10
		HMOX1	GCLC	H6PD
		ATF4	NFE2L2	ADRB2
		NFE2L2	NQO1	PGD
		TP53	MUC1	SNORD15A
		SLC7A11	SLC3A2	CALCA
		HELLS	MT1G	CASP8
		SCD	SLC40A1	NFE2L1
		FADS2	CISD1	PRKCZ
		SRC	FANCD2	MMP9
		STAT3	FTMT	NOSIP
		NFE2L2	HSPA5	HTRA2
		PML	HELLS	EIF4E
		MTOR	SCD	AKR1A1
		NFS1	SRC	EGF
		TP63	PML	LONP1
		SLC7A11	MTOR	CYP2B6
		TP53	NFS1	BCL2L11
		CDKN1A	TP63	PRL
		MIR137	CDKN1A	OGDH
		SLC40A1	MIR137	GAS5
		GPX4	ENPP2	EPRS1
		GPX4	FH	TH
		ENPP2	CISD2	ALDH3A2
		VDAC2	MIR9-1	ARG1
		FH	MIR9-2	MAPKAPK3
		CISD2	MIR9-3	GLRX2
		SLC40A1	CBS	THBS1
		MIR9-1	ISCU	GSS
		MIR9-2	ACSL3	PRKCA
		MIR9-3	OTUB1	PRKD1
		CBS	CD44	GJA1
		NFE2L2	LINC00336	TAMM41

		SQSTM1	BRD4	THBD
		GPX4	PRDX6	NGB
		ISCU	MIR17	PIK3CA
		FTH1	SESN2	TYR
		ACSL3	NF2	MEG3
		OTUB1	ARNTL	ADH5
		CD44	JUN	IL18
		LINC00336	CA9	ARG2
		STAT3	TMBIM4	SIRT6
		BRD4	PLIN2	ASS1
		PRDX6	MIR212	VIP
		MIR17	Fer1HCH	NTHL1
		SCD	AIFM2	PTK2B
		SESN2	LAMP2	DUSP1
		NF2	ZFP36	RMRP
		ARNTL	PROM2	SMPD1
		HIF1A	CAV1	HSPA9
		JUN	GCH1	CHAT
		CA9	DAZAP1	GSK3B
		HSPA5	PIR	UCP1
		TMBIM4	HCAR1	RPS27A
		HSPA5	SLC16A1	ERO1A
		PLIN2	RRM2	GHRL
		MIR212	NR4A1	FMO5
		Fer1HCH	RPTOR	PRKG1
		AIFM2	SREBF1	PRKAB1
		AIFM2	SREBF2	AKR1B1
		LAMP2	FZD7	ATR
		ZFP36	P4HB	BCKDHB
		GPX4	NT5DC2	CDK2
		PROM2	BCAT2	CYP11B2
		CHMP5	PLA2G6	NPPB
		CHMP6	MIR424	ACP1
		AKR1C1	PARK7	DLD
		AKR1C2	FXN	SDHC
		AKR1C3	SUV39H1	ABCC1
		CBS	ATF2	HFE
		NFE2L2	ACOT1	GLO1
		CAV1	ALDH3A2	APOB
		GCH1	STK11	NDUFB9
		SIRT3	FNDC5	DRD2
		DAZAP1	CircIL4R	BAK1
		PIR	CDH1	MAPK12

		GCLC	NEDD4L	NRF1
		FTL	BRD2	BMP2
		HCAR1	BRD3	SLC7A11
		SLC16A1	BRDT	EEF1A1
		RRM2	DECR1	STUB1
		SCD	GLRX5	NFKBIA
		NR4A1	NCOA3	HSPA1B
		PIK3CA	NR5A2	FMO2
		RPTOR	PANX2	TLR2
		SREBF1	RHEBP1	BRCA2
		SREBF2	TFAP2A	EGR1
		FZD7	CP	CFTR
		NFE2L2	ARF6	SCARA3
		NFE2L2	GDF15	SLC6A3
		P4HB	ABHD12	TRE-TTC3-1
		NT5DC2	PPP1R13L	LOC110973015
		BCAT2	TFAM	DLEU2
		HSF1	KDM3B	ERCC8
		PLA2G6	RNF113A	NDUFAF2
		MIR424	AHCY	CBS
		PARK7	circ-TTBK2	DDAH1
		FXN	MIR522	CYC1
		SUV39H1	IDH2	CHUK
		ATF2	PPARA	FN1
		CDKN1A	NOS2	CREBBP
		FTH1	SIAH2	STK4
		NFE2L2	RELA	HTR1A
		STAT3	VDR	SETD2
		ACOT1	NEDD4	NDUFS7
		NFE2L2	PRDX1	NEIL1
		ALDH3A2	AR	ALDH9A1
		NFE2L2	MTF1	LDHA
		STK11	COPZ1	TNFRSF1A
		FNDC5	NUPR1	PTPN1
		CircIL4R	USP35	CDKN3
		CDH1	NEAT1	WARS2
		NFE2L2	PARP2	INSR
		MIR214	PARP3	MT-CO2
		NEDD4L	PARP4	LPO
		SQSTM1	PARP6	CTNNB1
		TF	PARP8	SCN4B

		FTMT	PARP9	BCS1L
		BRD2	PARP10	CRAT
		BRD3	PARP11	PTK2
		BRD4	PARP12	ECHS1
		BRDT	PARP14	ISCU
		SCD	PARP15	TRAF2
		SLC7A11	PARP16	MT-TL1
		DECR1	PDSS2	GADD45A
		NFE2L2	TXN	RELA
		GPX4	SENP1	MT-ATP6
		SLC7A11	OIP5-AS1	LRRK2
		NFE2L2	MIR190A	NDUFA6
		GLRX5	FGF21	MIR21
		GPX4	CREB1	MT-CO3
		NCOA3	CREB3	CDKN1B
		NR5A2	CREB5	ADM
		GPX4	MIR130B	COX4I1
		MTOR	BEX1	GSTM3
		PANX2	ASAH2	SLC22A5
		RHEBP1	FABP4	ATP13A2
		TFAP2A	AKT1S1	MYH7
		CP	MLST8	LOC111365141
		SLC7A11	TYRO3	FAM120A
		ARF6	SIRT6	FDXR
		GDF15	TMSB4X	DLG4
		ABHD12	TMSB4Y	CRHR2
		PPP1R13L	KIF20A	MIEF2
		TFAM	ECH1	CNR1
		KDM3B	circRHOT1	DAXX
		RNF113A	ETV4	AOC3
		PARK7	MEG8	ACO2
		AHCY	VCP	XRCC1
		FXN	circ_0007142	RNY5
		circ-TTBK2	RBMS1	PRNP
		MIR522	KDM4A	CUL3
		IDH2	MGST1	HRAS
		PPARA	circKIF4A	HBA1
		NOS2	miR-7-5p	UGT1A1
		SIAH2	circ_0067934	FASLG
		RELA	MPC1	PPARD
		PRKAA2	CAMKK2	AKAP9
		VDR	SOX2	SCP2

		NEDD4	SRSF9	IKBKB
		FXN	PROK2	ALDH1A1
		AIFM2	MIR4443	IL2
		PRDX1	SIRT2	NDUFS3
		AR	circRNA1615	SESN1
		CBS	MIR27A	IDH1
		NFE2L2	MIR670	AHSP
		CHMP5	MEF2C	GCDH
		CHMP6	EZH2	DSP
		HMOX1	PEDS1	CYP2A6
		ZFP36	ADAMTS13	CTSB
		LAMP2	CDC25A	MDH2
		MTF1	SFRS9	CLEC4A
		COPZ1	CAV	PAH
		NUPR1	CircFNDC3B	LINC01554
		USP35	PPARD	BAD
		HSF1	ENO3	IRS1
		PROM2	LCN2	MTR
		PLA2G6	MARCHF5	CASP2
		HIF1A	TRIB2	SST
		NEAT1	DHODH	FMO4
		RRM2	MIR545	CDC42
		SLC7A11	PDK4	PDHA1
		FTMT	CircPVT1	AR
		PARP1	MIR9-3HG	SMAD3
		PARP2	ADIPOQ	TPH1
		PARP3	circDTL	CCND1
		PARP4	mmu_circRNA_000309	CYP27A1
		PARP6	PTPN18	CDK5
		PARP8	ABCC5	TRR-TCT2-1
		PARP9	CISD3	SGK1
		PARP10	MS4A15	KCNQ1OT1
		PARP11	FURIN	CHEK1
		PARP12	circRHBG	RAD51
		PARP14	GALNT14	DSPP
		PARP15	KLHDC3	
		PARP16	LINC01833	
		PDSS2	circGFRA1	
		TXN		
		SENP1		
		PLA2G6		

		OIP5-AS1		
		MIR190A		
		FGF21		
		CREB1		
		CREB3		
		CREB5		
		FTMT		
		GOT1		
		TFRC		
		GPX4		
		MIR130B		
		BEX1		
		ASAH2		
		SCD		
		FABP4		
		AKT1S1		
		MLST8		
		MTOR		
		RPTOR		
		CDH1		
		SIRT1		
		TYRO3		
		SIRT6		
		TMSB4X		
		TMSB4Y		
		KIF20A		
		ECH1		
		circRHOT1		
		ETV4		
		MEG8		
		VCP		
		circ_0007142		
		ENPP2		
		RBMS1		
		KDM4A		
		CBS		
		MGST1		
		circKIF4A		
		miR-7-5p		
		PRDX6		
		circ_0067934		
		MPC1		
		CHMP1A		

		CAMKK2		
		SOX2		
		SRSF9		
		PROK2		
		MIR4443		
		SIRT2		
		circRNA1615		
		MIR27A		
		MIR670		
		MEF2C		
		NF2		
		CDH1		
		HSPB1		
		EZH2		
		PEDS1		
		SMPD1		
		ADAMTS13		
		CDC25A		
		G6PD		
		SFRS9		
		CAV		
		CircFNDC3B		
		PPARD		
		CISD2		
		ENO3		
		SESN2		
		LCN2		
		MARCHF5		

Supplementary Table S2. Model performance correlation index. AUC (Area under the curve)

Dataset	AUC	Precision	Recall	F1-Score
GSE100927	97.30%	96.10%	96.50%	97.10%
GSE57691	79.20%	79.50%	78.30%	78.60%
GSE28829	82.70%	81.70%	80.80%	81.30%
GSE43292	78.90%	78.50%	78.40%	78.30%

Supplementary Table S3. List of marker genes for subgroup annotation. P val: p-value; Avg log2FC: Average log2 Fold Change; Pct.1: Percentage of cells expressing in cluster 1; Pct.2: Percentage of cells expressing in cluster 2; P_val_adj: Adjusted p-value.

Gene	P val	Avg log2FC	Pct.1	Pct.2	P_val_adj	Cluster
CD27	4.74149030880579e-82	4.489448604466 92	0.519	0.032	6.877531692 9228e-78	B cell
SLC38A5	5.15056377096834e-19	4.539811782121 71	0.148	0.012	7.470892749 78957e-15	B cell
LY9	4.10919801237344e-41	4.562898148075 74	0.241	0.014	5.960391716 94768e-37	B cell
CD24	4.34070421988813e-28	4.658815139427 86	0.185	0.012	6.296191470 94774e-24	B cell
CD38	1.31098966627885e-42	4.668835650111 93	0.259	0.015	1.901590510 93747e-38	B cell
XBP1	1.32683220810009e-06	4.684001978189 73	0.648	0.524	0.019245701 1784918	B cell
NEB	3.05534471487194e-23	4.732277707304 21	0.13	0.007	4.431777508 92175e-19	B cell
BRSK1	3.45829920771619e-06	4.759835560354 19	0.111	0.021	0.050162630 0079234	B cell
FCRLB	3.25213571930583e-11	4.869678190796 01	0.111	0.012	4.717222860 85311e-07	B cell
AC023590.1	1.58276329602 92e-34	4.879238197795 83	0.148	0.006	2.295798160 89036e-30	B cell
IRF4	6.68124388179356e-35	4.910617625012 84	0.241	0.016	9.691144250 54156e-31	B cell
CPNE5	2.17684806183738e-20	4.978563145583 51	0.222	0.024	3.157518113 69512e-16	B cell
CLECL1	1.20435494568387e-19	5.001486901816 52	0.13	0.009	1.746916848 71446e-15	B cell
RALGPS2	1.83899206581976e-71	5.003105193688 69	0.556	0.044	2.667457991 47157e-67	B cell
E2F5	1.10898515904434e-29	5.042845309022 53	0.148	0.007	1.608582973 19381e-25	B cell
BCL11A1	9.37821412995082e-48	5.236672102579 36	0.352	0.026	1.360309959 54937e-43	B cell
PAIP2B	6.75761262239043e-28	5.326468196877 33	0.315	0.036	9.801917108 77732e-24	B cell
LINC01857	7.74004796965776e-21	5.461545939077 39	0.148	0.011	1.122693957 99886e-16	B cell

GNB3	4.1075340795 5865e-29	5.5805465 9961912	0.1 85	0.0 12	5.957978182 39982e-25	B cell
LINC00 309	2.4357129598 44e-20	5.7544996 5820223	0.1 3	0.0 08	3.533001648 25372e-16	B cell
FKBP11	1.5545024641 3513e-17	5.8913290 8563885	0.4 81	0.1 36	2.254805824 228e-13	B cell
TSPAN 13	1.9952762365 3197e-76	5.9474663 7783144	0.3 7	0.0 17	2.894148181 08962e-72	B cell
CD79B	1.0980808219 8822e-104	6.0365518 2699989	0.6 3	0.0 39	1.592766232 29392e-100	B cell
SPAG4	2.2710826005 5636e-74	6.2755476 5795206	0.3 15	0.0 13	3.294205312 107e-70	B cell
LINC00 926	1.8911272091 4141e-58	6.6716939 9860641	0.2 78	0.0 13	2.743080016 85961e-54	B cell
GZMB	7.7841833726 1829e-116	6.8184546 0288651	0.3 89	0.0 12	1.129095798 19828e-111	B cell
PIM2	1.0480240225 247e-54	6.8510748 1956722	0.4 44	0.0 37	1.520158844 67208e-50	B cell
HLA-DOB	1.8040645824 7361e-106	7.0143807 3033472	0.3 15	0.0 08	2.616795676 87798e-102	B cell
BANK1	6.4814501684 1807e-169	7.1205864 6144343	0.4 44	0.0 1	9.401343469 29041e-165	B cell
DERL3	3.7487336104 54e-182	9.6265063 7478606	0.6 67	0.0 23	5.437538101 96353e-178	B cell
GPRC5 B	0	4.6983129 6492104	0.6 28	0.0 4	0	EC1
RAMP2	0	4.7193264 9388064	0.9 95	0.0 82	0	EC1
PLLP	0	4.7381040 1047726	0.4 89	0.0 28	0	EC1
NOS3	0	4.7815124 6835765	0.5 44	0.0 27	0	EC1
KCNJ12	7.3551980316 6651e-67	4.7927887 4051104	0.1 07	0.0 06	1.066871474 49323e-62	EC1
TSPAN 1	5.2884665753 3045e-83	4.8361972 8674041	0.1 31	0.0 07	7.670920767 51682e-79	EC1
FBLN21	0	4.8560835 6435269	0.8 52	0.0 78	0	EC1
GRB14	4.9522570188 1424e-158	4.8586982 8048886	0.2 4	0.0 12	7.183248805 79006e-154	EC1
ST8SIA 61	0	4.9258783 3095417	0.5 3	0.0 24	0	EC1
MPZL2	0	4.9304170 600063	0.9 78	0.0 69	0	EC1

PTPRB	0	5.0240462 0295896	0.9 67	0.0 61	0	EC1
PTPRR	1.4183552548 0724e-110	5.0830802 0162578	0.1 37	0.0 04	2.057324297 0979e-106	EC1
LINC01 133	6.9042904327 8168e-250	5.1125281 5683148	0.3 93	0.0 22	1.001467327 27498e-245	EC1
SEMA3 F	0	5.1513428 7055935	0.8 33	0.0 58	0	EC1
CDH23	3.0726339788 8802e-304	5.2050555 9149547	0.4 4	0.0 21	4.456855586 37708e-300	EC1
FAM107 A	0	5.2435570 9225965	0.5 87	0.0 26	0	EC1
CPAMD 8	0	5.2498478 852794	0.7 08	0.0 4	0	EC1
HYAL1	2.8324682895 6941e-250	5.3996351 3235586	0.3 03	0.0 09	4.108495254 02044e-246	EC1
AC0045 40.2	0	5.4213249 7658257	0.5 77	0.0 18	0	EC1
KIF26A	0	5.4440964 142288	0.3 99	0.0 13	0	EC1
ARFGE F3	2.6784297769 3066e-173	5.4489922 6358307	0.2 19	0.0 07	3.885062391 43792e-169	EC1
ALDH3 A1	5.1955128398 9372e-124	5.4573075 7732089	0.1 53	0.0 05	7.536091374 26584e-120	EC1
FGF18	0	5.5738663 8685177	0.6 58	0.0 25	0	EC1
F5	0	6.0291723 9038843	0.6 97	0.0 22	0	EC1
AL3555 96.1	0	6.1098745 819704	0.4 86	0.0 12	0	EC1
PCDH1 7	0	6.2055070 2348608	0.8 44	0.0 37	0	EC1
CLDN5	0	6.2195776 7202863	0.9 18	0.0 33	0	EC1
DKK2	0	6.8015516 0756091	0.8 47	0.0 21	0	EC1
ITLN1	0	6.8674987 4003712	0.9 73	0.1 08	0	EC1
SSTR1	0	7.3319964 1874552	0.4 29	0.0 05	0	EC1
SLC16A 51	4.4009843160 5539e-178	3.8430274 6784256	0.5 02	0.0 45	6.383627750 43834e-174	EC2
RIMS4	2.6282419369 8781e-61	3.8588735 7021553	0.1 34	0.0 08	3.812264929 60081e-57	EC2

SLCO2A11	3.435689592390074e-164	3.90859921981859	0.394	0.028	4.98346775376277e-160	EC2
ACSM3	3.981052927946601e-50	3.94811761609621	0.195	0.024	5.77451727198569e-46	EC2
NPAS2	6.117524377190074e-50	3.99803417417372	0.147	0.013	8.87346910911517e-46	EC2
PLA1A	1.485772117911175e-64	3.99900986255475	0.186	0.016	2.15511245703099e-60	EC2
VWF1	4.691796180888135e-294	4.01889628148667	1	0.141	6.805450360 3684e-290	EC2
ESM11	1.285391831859998e-167	4.02915051027615	0.364	0.022	1.86446085211291e-163	EC2
GDF71	2.201740866776193e-189	4.07275991955635	0.732	0.112	3.19362512723818e-185	EC2
ALDH1A31	2.381510596190006e-250	4.11975107372138	0.494	0.026	3.45438111977369e-246	EC2
ABCA81	2.959535277677618e-186	4.12836228193489	0.403	0.025	4.292805920 2693e-182	EC2
CRTAC11	0	4.13070712015985	0.939	0.096	0	EC2
BMX1	0	4.20514359315972	0.926	0.061	0	EC2
PLCXD3	2.018010536700184e-159	4.36334798230904	0.355	0.023	2.92712428348602e-155	EC2
MDFI	5.959634780514427e-121	4.43530870063897	0.238	0.013	8.64445024913595e-117	EC2
OTC1	2.815118720227 28e-122	4.44192641508716	0.225	0.011	4.08332970368967e-118	EC2
CCL23	5.439037907 3855e-51	4.45762867695471	0.117	0.008	7.88932448466266e-47	EC2
BMPER	5.170207596519 77e-72	4.49111144013145	0.147	0.008	7.49938611875193e-68	EC2
POU4F11	1.534240957930 45e-95	4.50895708 80422	0.182	0.009	2.22541650947811e-91	EC2
SLC26A4-AS1	8.488745683613 23e-61	4.53945436505241	0.139	0.009	1.231292561 4081e-56	EC2
FAM43A1	3.401120416476 82e-237	4.54259545534509	0.554	0.04	4.93332516409963e-233	EC2
HHIP-AS12	9.846492598664 46e-173	4.63229066 93057	0.325	0.016	1.42823375143628e-168	EC2
BMP61	0	4.89886241886862	0.74	0.034	0	EC2
BMP41	0	5.17546676857238	0.918	0.1	0	EC2

EDN11	0	5.4449095 6116713	0.9 48	0.0 67	0	EC2
HMCN2 1	0	5.6444439 397571	0.4 37	0.0 13	0	EC2
ACKR1	1.3546256952 2282e-67	5.8432337 2730902	0.1 47	0.0 09	1.964884570 92069e-63	EC2
PKHD1 L11	2.7717909965 9901e-289	6.1162578 8976019	0.3 2	0.0 05	4.020482840 56687e-285	EC2
GDF6	6.7683802767 073e-209	6.2131238 0100128	0.2 55	0.0 05	9.817535591 36394e-205	EC2
NRG1	0	6.4067291 1274838	0.5 5	0.0 13	0	EC2
NR2F11	1.3657675541 3388e-205	5.4160686 4376005	0.3 73	0.0 13	1.981045837 27119e-201	EC3
CRHBP	1.1003434423 7069e-119	5.4487024 3260375	0.3 8	0.0 3	1.596048163 15869e-115	EC3
LINC01 985	6.7666165042 2118e-120	5.4488225 9585401	0.1 99	0.0 06	9.814977239 37283e-116	EC3
KANK3 2	0	5.4799477 6197936	0.7 59	0.0 36	0	EC3
ADGRL 42	0	5.5324717 6454389	0.9 28	0.0 53	0	EC3
DOC2B 1	1.7997124290 8407e-159	5.6035187 6619731	0.2 59	0.0 07	2.610482878 38644e-155	EC3
CCL141	0	5.7281508 2219995	0.5 9	0.0 18	0	EC3
EXOC3 L1	1.1913202046 8516e-148	5.7709297 3823011	0.2 35	0.0 06	1.728009956 89582e-144	EC3
SEMA3 A	1.6068887366 5432e-142	5.8058403 350728	0.2 59	0.0 09	2.330792112 51709e-138	EC3
ADM5	1.8589597559 9459e-93	5.8612426 962103	0.1 87	0.0 08	2.696421126 07016e-89	EC3
ADGRF 52	0	5.9655790 7892035	0.8 55	0.0 25	0	EC3
CXorf36 1	0	5.9829965 7276046	0.4 46	0.0 06	0	EC3
NOSTRI N1	0	6.0292989 135357	0.5 18	0.0 1	0	EC3
C2CD4 B	1.8224712103 259e-65	6.0429538 6178946	0.1 27	0.0 05	2.643494490 57771e-61	EC3
FAM167 B1	0	6.2727217 7257834	0.5 66	0.0 18	0	EC3
EMCN1	0	6.4413621 7593509	0.8 92	0.0 23	0	EC3

PDE2A	0	6.51730748140008	0.452	0.01	0	EC3
MEOX1	1.051093674464429e-141	6.61511513561285	0.151	0.002	1.52461137481046e-137	EC3
TM4SF181	0	7.00811804437853	0.741	0.013	0	EC3
ALPL	8.115085507000829e-132	7.01607082473567	0.139	0.001	1.17709315279155e-127	EC3
SEMA6A	0	7.05362070321523	0.343	0.004	0	EC3
HAGLROS	2.394358212466712e-195	7.14372700767902	0.199	0.002	3.47301658718356e-191	EC3
TSHZ2	0	7.27849268472268	0.464	0.004	0	EC3
KDR	0	7.56583165653446	0.608	0.007	0	EC3
DNASE1L31	0	7.77026144211454	0.56	0.014	0	EC3
FLT4	0	7.85419707666183	0.446	0.004	0	EC3
SELE	5.233875822125533e-306	8.52292169482935	0.259	0.001	7.59173687999279e-302	EC3
LHX6	1.305419323054464e-187	8.76256852261127	0.151	0	1.89351072809075e-183	EC3
FABP4	0	9.26982670152 42	0.434	0.006	0	EC3
APLNR	0	9.64023073653005	0.614	0.002	0	EC3
TFPI23	4.282620328080046e-39	3.45833521571356	0.257	0.059	6.2119407858807e-35	FC
OLFML2A	3.383225206016638e-26	3.50874140205208	0.119	0.019	4.90736816132676e-22	FC
TBX15	1.946426861319 24e-39	3.50991574800312	0.116	0.012	2.82329216234356e-35	FC
EPHA3	1.084396710291 03e-85	3.50998815084271	0.224	0.02	1.57291742827714e-81	FC
CD248	1.791107198184447e-44	3.52613109068936	0.153	0.019	2.59800099096657e-40	FC
FOXS12	2.731378732013 64e-142	3.57914925634 43	0.586	0.097	3.96186485078578e-138	FC
HIC1	1.288101171171 25e-62	3.79851273082475	0.198	0.022	1.8683907487839e-58	FC
CCDC102B	2.151568580939 39e-127	3.83007551306216	0.399	0.046	3.12085022665259e-123	FC

STEAP4	3.882553009294425e-54	3.84172949929876	0.179	0.021	5.63164313998132e-50	FC
ATP1B2	3.703806344833696e-58	3.89338163297004	0.172	0.018	5.37237110318602e-54	FC
OLFM2	2.665222977963388e-68	3.94743876546255	0.123	0.006	3.86590592953589e-64	FC
CABP1	4.884939387720 9e-41	4.01706696488205	0.101	0.008	7.08560458188916e-37	FC
MMP11	1.559298060435592e-37	4.01962333217118	0.146	0.02	2.2617618366623e-33	FC
LAMA3	2.075026385919961e-103	4.06642365825271	0.201	0.012	3.00982577277639e-99	FC
TRPC6	3.566053972393 1e-49	4.09121873667691	0.112	0.008	5.17256128695619e-45	FC
TPPP3	5.257826357765558e-153	4.10721999363644	0.384	0.033	7.62647713193897e-149	FC
CRISPLD2	9.737712095295 33e-73	4.17583905655286	0.175	0.014	1.41245513942259e-68	FC
GGT5	4.189467302342 92e-233	4.17886699737881	0.563	0.049	6.07682232204841e-229	FC
AGT	1.324426771258 65e-240	4.26086411931556	0.608	0.056	1.92108103171067e-236	FC
ABCC91	2.955600389266634e-28	4.30736801242888	0.187	0.043	4.28709836463083e-24	FC
KRT18	1.208142053777713e-144	4.35252542105983	0.455	0.053	1.75241004900373e-140	FC
KRT16	5.894455609482 38e-55	4.41833046946997	0.131	0.01	8.5499078615542e-51	FC
CRLF1	2.797891668355576e-153	4.48467739979148	0.287	0.016	4.05834186495002e-149	FC
AC018647.1	5.660901472998 8e-87	4.624274	0.153	0.008	8.21113758658476e-83	FC
BRINP1	1.408872717638 44e-56	4.63152180712278	0.101	0.005	2.04356987693456e-52	FC
LINGO1	7.951014799493 46e-60	4.66694767462108	0.108	0.006	1.15329469666653e-55	FC
DSP	1.253846743444432e-86	4.72651338246 25	0.134	0.005	1.81870470136599e-82	FC
COL5A3	2.644083306675541e-83	4.76075328948933	0.142	0.007	3.83524283633269e-79	FC
COLEC11	5.466762387997 83e-143	5.35300971165522	0.224	0.009	7.92953884379086e-139	FC
GUCY1A2	9.567480086095 7e-138	5.82216593133463	0.149	0.002	1.38776298648818e-133	FC

CDKN2A2	2.604737393405585e-150	3.30535577732931	0.467	0.058	3.77817158913519e-146	Fibroblast
ADAMTS21	3.246503596699936e-71	3.32578278789045	0.194	0.02	4.70905346701243e-67	Fibroblast
PCOLCE3	4.652900455296698e-193	3.35351669003585	0.891	0.232	6.74903211040827e-189	Fibroblast
CRLF11	3.015687217297708e-69	3.37241416395909	0.191	0.019	4.37425430868942e-65	Fibroblast
LPAR4	1.271553874335701e-34	3.40022620563721	0.112	0.014	1.84438889475484e-30	Fibroblast
GAP432	2.534104568330532e-163	3.41128625504674	0.398	0.036	3.67571867632686e-159	Fibroblast
VCAM14	1.290577688922275e-124	3.41251052282752	0.609	0.13	1.87198293778245e-120	Fibroblast
EPHA31	1.849496908266427e-65	3.41303800997915	0.188	0.02	2.68269526543733e-61	Fibroblast
PYCR12	6.098462836229e-90	3.47190926679001	0.227	0.021	8.84582034394132e-86	Fibroblast
FNDC1	5.553555290977758e-81	3.47403632034737	0.23	0.025	8.05543194956298e-77	Fibroblast
CFH5	1.823428000833677e-201	3.49941247622919	0.951	0.265	2.64488231521374e-197	Fibroblast
POSTN4	1.773891499568874e-187	3.56808973753485	0.658	0.099	2.57302962012446e-183	Fibroblast
TNC1	2.433195352819951e-99	3.64828267127787	0.391	0.063	3.5293498592647e-95	Fibroblast
COL3A12	6.201944221306621e-129	3.65243955563689	0.914	0.411	8.99592009300466e-125	Fibroblast
TMEM119	1.178979617735586e-72	3.72728573032115	0.194	0.019	1.71010993552587e-68	Fibroblast
CGREF1	2.976392077244419e-69	3.73440689405764	0.148	0.011	4.3172567080427e-65	Fibroblast
SFRP42	2.669520528065503e-103	3.81458082966288	0.615	0.162	3.87213952595832e-99	Fibroblast
SFTA1P	4.182447239462698e-66	3.98655406406328	0.115	0.006	6.06663972084105e-62	Fibroblast
STEAP41	4.450053300711197e-160	4.11230304870265	0.276	0.015	6.45480231268271e-156	Fibroblast
FGF7	2.182687683772258e-213	4.13970370427305	0.507	0.046	3.16598848531213e-209	Fibroblast
NTRK21	2.962656431232247e-122	4.19004544069791	0.329	0.034	4.29733315350269e-118	Fibroblast
TNFAIP62	4.453608434003 6e-159	4.23532338810106	0.326	0.023	6.45995903352222e-155	Fibroblast

COL1A12	8.052038808944443e-175	4.24536737025726	0.888	0.281	1.16794822923739e-170	Fibroblast
MXRA51	3.122980413568868e-221	4.30531746346728	0.424	0.028	4.52988308988136e-217	Fibroblast
DCN1	3.795655903014152e-288	4.490728304443 41	0.668	0.062	5.50559888732256e-284	Fibroblast
CRABP2	1.070968509853 69e-104	4.503432183729 62	0.299	0.033	1.55343982354278e-100	Fibroblast
CEMIP	2.420402692920 57e-109	5.108617112051 72	0.168	0.007	3.51079410608129e-105	Fibroblast
LUM1	0	5.637286396785 97	0.868	0.073	0	Fibroblast
SFRP2	0	6.992064484290 67	0.539	0.015	0	Fibroblast
COMP	2.098912494942 28e-177	7.026812096243 47	0.263	0.011	3.04447257391378e-173	Fibroblast
SLC45A3	0	6.581894597193 76	0.5	0.013	0	MAST
STXBP6	0	6.628059684984 12	0.589	0.013	0	MAST
DHRS9	0	6.722978324389 25	0.573	0.013	0	MAST
PAQR5	1.378991341277794e-146	6.850002717488 28	0.172	0.003	2.00022694052365e-142	MAST
LIF	2.878747281522227e-214	6.985959758082 74	0.25	0.004	4.17562293184805e-210	MAST
CDK15	0	7.592893900117 98	0.401	0.005	0	MAST
RAB27B	0	7.712900067020 86	0.568	0.004	0	MAST
HPGD	0	7.807950805475 14	0.693	0.012	0	MAST
RGS13	0	7.876720373426 87	0.849	0.017	0	MAST
EFHC2	9.174354133745 62e-146	7.880547594417 18	0.135	0.001	1.330740067 0998e-141	MAST
MYB	3.843483913440 04e-237	7.949572886374 11	0.224	0.002	5.57497341644478e-233	MAST
NTM	0	8.579307950401 7	0.432	0.004	0	MAST
KCNH2	0	9.028750629066 3	0.271	0.001	0	MAST
KIT	0	9.677155492106 54	0.932	0.008	0	MAST

AL157895.1	0	9.84325649086853	0.63	0.002	0	MAST
MLPH	0	9.95124884400434	0.708	0.002	0	MAST
NTRK1	3.23853523179932e-269	9.96517156862342	0.219	0	4.69749535372491e-265	MAST
RHEX	0	10.3842106315859	0.88	0.003	0	MAST
GCSAML	0	10.6457750054244	0.333	0.001	0	MAST
TPSD1	0	10.9312507629868	0.417	0	0	MAST
MS4A2	0	11.5302373350912	0.99	0.003	0	MAST
SLC18A2	0	11.6326514552631	0.906	0.001	0	MAST
HDC	0	11.7000254449286	0.932	0.001	0	MAST
IL1RL1	0	11.9583982795043	0.672	0.001	0	MAST
TPSAB1	0	12.210313404753	1	0.006	0	MAST
CPA3	0	12.3694814215461	0.995	0.002	0	MAST
CTSG	0	12.4926741387605	0.5	0.002	0	MAST
AL731557.1	0	12.5923986836747	0.354	0	0	MAST
TPSB2	0	12.7511144298823	1	0.01	0	MAST
CALB2	0	13.2160810060775	0.688	0	0	MAST
FOLR2	0	4.856332591710 34	0.929	0.053	0	Macrophage1
MS4A7	0	4.881499387623 27	0.987	0.087	0	Macrophage1
TRPV4	2.173187723162 07e-165	4.895417634436 18	0.176	0.005	3.15220879244659e-161	Macrophage1
ADAP2	0	4.906862583498 15	0.88	0.054	0	Macrophage1
C3	0	4.910828975949 01	0.633	0.048	0	Macrophage1
ACSM5	2.101344406471 57e-162	4.946764910307 66	0.177	0.006	3.04800006158701e-158	Macrophage1

SIGLEC1	0	4.96302252811127	0.483	0.018	0	Macrophage1
C2	0	4.99488048450896	0.592	0.022	0	Macrophage1
IGF1	0	5.01874777715001	0.637	0.021	0	Macrophage1
EBI3	0	5.05486314757336	0.512	0.014	0	Macrophage1
SLC16A10	0	5.07599353690038	0.445	0.022	0	Macrophage1
GAS2L3	0	5.10622320645251	0.348	0.012	0	Macrophage1
CCL3	0	5.13277512028309	0.729	0.057	0	Macrophage1
IGSF21	0	5.14593474589687	0.721	0.023	0	Macrophage1
SLCO2B1	0	5.19168613275 42	0.961	0.077	0	Macrophage1
PROX1	1.461757028699999e-148	5.20999911709014	0.156	0.004	2.12027857012934e-144	Macrophage1
CLDN1	1.294464737690014e-257	5.25644199842807	0.277	0.009	1.87762110201955e-253	Macrophage1
SLC2A5	3.154916893933386e-225	5.40161149764759	0.223	0.004	4.57620695465106e-221	Macrophage1
SLC1A3	0	5.40427457108767	0.408	0.01	0	Macrophage1
CH25H	4.802909402533447e-302	5.42090399544246	0.343	0.015	6.96662008837625e-298	Macrophage1
KCNQ3	1.194003839816 27e-200	5.44805240551261	0.201	0.004	1.7319025696535e-196	Macrophage1
CCL13	1.666326011828 63e-173	5.59026959352506	0.185	0.006	2.41700588015743e-169	Macrophage1
IL2RA	0	5.60489738940084	0.478	0.009	0	Macrophage1
LILRB5	0	5.70910061022 91	0.466	0.013	0	Macrophage1
KCNJ5	0	5.71336071361532	0.414	0.007	0	Macrophage1
LINC02345	2.125877274671 39e-114	5.77634562161 75	0.113	0.002	3.08358498691086e-110	Macrophage1
AP003481.1	1.164058050380 34e-260	6.01507175227107	0.243	0.003	1.68846620207669e-256	Macrophage1
CCL8	0	6.27280625812684	0.374	0.012	0	Macrophage1

CALCR	1.042515261175588e-179	6.5117020344845	0.167	0.002	1.51216838633562e-175	Macrophage1
FCGBP	0	6.81606085404406	0.577	0.031	0	Macrophage1
MYCL	1.583872018752286e-173	4.43728823885708	0.247	0.011	2.29740636320102e-169	Macrophage2
S100Z	2.212681589647784e-114	4.46575072061533	0.145	0.005	3.20949464578419e-110	Macrophage2
CCR2	8.925286071031 4e-295	4.46820065156398	0.342	0.009	1.294612744 6031e-290	Macrophage2
LINC00877	7.772313084732 01e-90	4.5389710285208	0.115	0.004	1.12737401294038e-85	Macrophage2
AL034397.3	3.161810418446668e-120	4.5559480116643	0.178	0.008	4.58620601195691e-116	Macrophage2
LUCAT1	5.850278066 86813e-138	4.5764443059546	0.222	0.012	8.48582833599222e-134	Macrophage2
LILRA1	1.738014739 60848e-115	4.63368815682106	0.159	0.006	2.52099037980211e-111	Macrophage2
C19orf38	4.502866449 00856e-248	4.79885184232567	0.359	0.016	6.53140778428692e-244	Macrophage2
C15orf481	0	4.85887065699744	0.485	0.024	0	Macrophage2
LILRA5	2.443661189 63412e-226	5.31103242165766	0.29	0.01	3.54453055556429e-222	Macrophage2
PRAM1	8.723630838 8302e-248	5.34707490293011	0.279	0.007	1.26536265317232e-243	Macrophage2
MEFV	3.355420385 14275e-80	5.35609060557342	0.101	0.003	4.86703726864956e-76	Macrophage2
AC020656.11	0	5.40197066926412	0.685	0.032	0	Macrophage2
CSTA1	0	5.42653806143486	0.825	0.04	0	Macrophage2
FCER1A1	3.397442918 64706e-237	5.47947497348775	0.441	0.033	4.92799095349756e-233	Macrophage2
LYZ1	0	5.56147173040567	0.992	0.173	0	Macrophage2
IL1R2	2.389898889 20618e-125	5.83299872359813	0.156	0.005	3.46654833879356e-121	Macrophage2
PKIB	0	5.96386710199661	0.567	0.013	0	Macrophage2
CFP	2.521288202 66347e-297	6.02701962905459	0.318	0.006	3.65712853796336e-293	Macrophage2
CD1D1	0	6.08318513887082	0.458	0.009	0	Macrophage2

CLEC10A	0	6.37335703000072	0.581	0.019	0	Macrophage2
S100A9	2.484685143104448e-225	6.61511023683592	0.559	0.066	3.60403580007305e-221	Macrophage2
CD300E	0	6.85837129746769	0.342	0.004	0	Macrophage2
RETN	6.885123361922949e-195	7.07070215425673	0.192	0.003	9.98687143647872e-191	Macrophage2
EREG	1.973831302439 46e-171	7.44172382889532	0.195	0.005	2.86304230418844e-167	Macrophage2
LGALS2	0	7.44957760352219	0.584	0.009	0	Macrophage2
CD1C	0	8.08036560554589	0.268	0.001	0	Macrophage2
S100A8	1.216644575875516e-274	9.15883435828207	0.351	0.012	1.76474295730692e-270	Macrophage2
FCN1	0	9.51407720886252	0.392	0.002	0	Macrophage2
S100A12	9.766677190654437e-176	10.4200836751021	0.148	0.001	1.41665652650442e-171	Macrophage2
C21	1.680146078755668e-22	2.85229669794438	0.415	0.102	2.43705188723656e-18	Macrophage3
CR12	9.780042086711303e-05	2.89586886667212	0.159	0.061	1	Macrophage3
QPRT3	7.560442151143 5e-05	2.91079158621868	0.146	0.053	1	Macrophage3
TMEM176B3	2.891355726335219e-57	2.95727368359295	0.878	0.215	4.19391148107385e-53	Macrophage3
SELENOP1	1.941368322181 8e-44	2.96679655154759	0.951	0.422	2.8159547513247e-40	Macrophage3
PLTP1	1.888816142599971e-33	2.99679681179652	0.805	0.307	2.73972781484088e-29	Macrophage3
FTL2	9.797881869801 45e-45	3.02814620775209	1	0.991	1.4211827652147e-40	Macrophage3
C1QB2	4.529267058035564e-80	3.09618774909604	1	0.211	6.5697018676807e-76	Macrophage3
NPL2	2.218475507857 36e-30	3.15055850503777	0.488	0.113	3.2178987241471e-26	Macrophage3
HMOX12	9.023877737377319e-12	3.16803584558454	0.427	0.18	1.30891346580598e-07	Macrophage3
SLC15A32	6.657575616596632e-25	3.17396102640722	0.537	0.165	9.65681343187296e-21	Macrophage3
RAB3IL11	0.002269091350 19086	3.17932243446475	0.134	0.06	1	Macrophage3

FOLR21	1.900051934922204e-62	3.21027347899419	0.829	0.173	2.75602533160441e-58	Macrophage3
CD2091	7.019297979923269e-20	3.22710624467944	0.341	0.079	1.0181491718877e-15	Macrophage3
RNASE14	6.912493769855487e-44	3.26686762743335	0.854	0.28	1.00265722131745e-39	Macrophage3
C1QA2	7.331225884755548e-80	3.27500073842978	0.988	0.224	1.06339431458378e-75	Macrophage3
ADORA31	3.303922627653 4e-05	3.2832593619867	0.122	0.037	0.479233977141125	Macrophage3
SLC12A51	4.474492333508 2e-06	3.42604999292626	0.134	0.039	0.0649025112975364	Macrophage3
SCD1	1.147374534589 11e-19	3.55375465916141	0.293	0.06	1.66426676242151e-15	Macrophage3
ACP52	1.138446864351 11e-19	3.55478742076384	0.354	0.085	1.65131717674128e-15	Macrophage3
GAPLINC1	8.870837849407 13e-07	3.69104236047678	0.122	0.03	0.012867150300565	Macrophage3
F13A11	1.978467057498 94e-47	3.8031577143985	0.72	0.173	2.86976646690221e-43	Macrophage3
CFD2	1.073336588433 8e-67	3.87773715021207	0.878	0.198	1.55687472152323e-63	Macrophage3
TMIGD31	5.367446463691 92e-10	3.94021832812092	0.122	0.021	7.78548109558514e-06	Macrophage3
APOE2	9.520755692868 11e-39	4.16780973247859	0.634	0.154	1.38098561325052e-34	Macrophage3
OTOA1	2.369465008823 04e-35	4.34200780659989	0.305	0.038	3.43690899529782e-31	Macrophage3
TGFA1	8.604063463128 39e-07	4.35616109457807	0.122	0.03	0.0124801940532677	Macrophage3
HS3ST2	4.214062416899 9e-20	4.76339518569201	0.122	0.011	6.112497535712e-16	Macrophage3
APOC11	4.372452191408 57e-44	5.28618281435358	0.537	0.096	6.34224190363812e-40	Macrophage3
CCL18	4.796577188710 77e-34	5.69682670598877	0.171	0.012	6.95743521222497e-30	Macrophage3
CRTAC13	1.598255210752 4e-68	3.11498640584098	0.864	0.121	2.31826918319636e-64	Mesothelial
C3orf80	6.470920564216 24e-14	3.12929287428066	0.119	0.011	9.38607027839565e-10	Mesothelial
BDNF2	1.062996352670 19e-18	3.16155708328052	0.322	0.054	1.54187620954811e-14	Mesothelial
FOXD1	1.943624795433 66e-15	3.17243915114248	0.153	0.016	2.81922776577652e-11	Mesothelial

BMP63	2.3442309326 6972e-47	3.2095766 4365865	0.5 08	0.0 57	3.400306967 83743e-43	Mesoth elial
BCO21	1.1556145879 997e-46	3.3999820 7823853	0.3 9	0.0 34	1.676218959 89357e-42	Mesoth elial
AKR1C 13	1.7785698948 1728e-44	3.4531535 5553364	0.7 63	0.1 45	2.579815632 43247e-40	Mesoth elial
SERPIN E23	2.1114357402 9192e-33	3.4532931 9421319	0.5 25	0.0 86	3.062637541 29343e-29	Mesoth elial
LMO7- AS12	3.2801547237 3395e-44	3.4586352 8848516	0.3 73	0.0 32	4.757864426 7761e-40	Mesoth elial
PIR2	1.0700375857 7734e-41	3.4789450 725299	0.5 93	0.0 9	1.552089518 17003e-37	Mesoth elial
KCNK1 53	4.6924281979 3218e-43	3.5067617 8014523	0.5 93	0.0 9	6.806367101 10062e-39	Mesoth elial
RIMS41	4.0848730744 3463e-26	3.5876794 7212927	0.1 69	0.0 12	5.925108394 46743e-22	Mesoth elial
PAMR1	2.7787671181 0622e-32	3.6946122 7227842	0.2 2	0.0 16	4.030601704 81308e-28	Mesoth elial
RAMP3 3	5.6352446937 7334e-96	3.7758747 7101353	0.9 66	0.1 12	8.173922428 31824e-92	Mesoth elial
RAB381	3.3598521363 155e-75	3.8146790 5697251	0.5 93	0.0 5	4.873465523 72563e-71	Mesoth elial
ART42	3.8452566469 5611e-79	3.8171483 3836059	0.7 63	0.0 81	5.577544766 40984e-75	Mesoth elial
AC0079 20.2	2.2949799926 924e-22	3.8274287 5348032	0.1 19	0.0 07	3.328868479 40033e-18	Mesoth elial
PLCXD 31	1.7914642979 8235e-85	3.8726955 0980416	0.5 08	0.0 31	2.598518964 22339e-81	Mesoth elial
SMOC1 1	1.3870185025 4941e-109	3.9672061 2903748	0.4 41	0.0 17	2.011870337 94792e-105	Mesoth elial
RAB3C 2	2.5694351563 1784e-67	4.0096863 0724741	0.2 88	0.0 12	3.726965694 23903e-63	Mesoth elial
HHIP- AS13	9.1185002982 2609e-96	4.0184859 0611074	0.4 75	0.0 24	1.322638468 25769e-91	Mesoth elial
MELTF	7.0097490329 252e-35	4.1210423 8512823	0.2 71	0.0 22	1.016764097 2258e-30	Mesoth elial
TNFRS F11B2	1.3597425643 0945e-51	4.1611852 8302309	0.9 83	0.2 65	1.972306589 53085e-47	Mesoth elial
HTR2B 1	5.6813456565 8436e-94	4.1869030 3003117	0.5 08	0.0 28	8.240791874 87561e-90	Mesoth elial
MASP1 2	6.6891852602 8431e-113	4.5151080 2101222	0.6 44	0.0 39	9.702663220 0424e-109	Mesoth elial
ABCA9	1.1644146714 4853e-64	4.6479475 5073817	0.2 54	0.0 1	1.688983480 93609e-60	Mesoth elial

SHISA31	2.570741614259984e-109	4.72696508550336	0.525	0.026	3.7288607114839e-105	Mesothelial
SFRP5	1.085119292744477e-118	6.22281574273475	0.271	0.005	1.5739655341263e-114	Mesothelial
ANKRD13	3.541101081742212e-104	6.40825231688531	0.407	0.016	5.13636711906694e-100	Mesothelial
SGCG	0	6.73422792285459	0.864	0.017	0	Mesothelial
SMPX1	1.699029520708847e-31	1.96271642011808	0.121	0.032	2.4644423197876 4e-27	SMC1
SCARA32	1.305360528798 1e-195	1.96392915093183	0.695	0.225	1.8934254470216 4e-191	SMC1
GPC3	3.494213813088891e-77	1.98457176729062	0.211	0.042	5.0683571353 8546e-73	SMC1
COL4A4	1.999134222428898e-50	2.01182227449726	0.167	0.04	2.8997441896 3323e-46	SMC1
MKX	1.420518436156684e-32	2.06128299314432	0.115	0.029	2.0604619916455e-28	SMC1
MTUS22	9.863335093422427e-51	2.06495245475921	0.197	0.054	1.4306767553 0119e-46	SMC1
CRISPLD12	5.745548649338896e-223	2.1390613	0.733	0.238	8.3339183159 3869e-219	SMC1
SLC14A1	2.953533281053378e-126	2.16782980155448	0.337	0.069	4.2841000241 6851e-122	SMC1
ISLR	1.236133994316 72e-214	2.17558675467663	0.619	0.159	1.7930123587 5641e-210	SMC1
TMEM1301	9.474635236133313e-140	2.17828590963283	0.388	0.084	1.3742958410 0111e-135	SMC1
GSG1L2	3.395306116987781e-143	2.18254738998992	0.398	0.086	4.9248915226 9081e-139	SMC1
SERPINE11	3.351470592790 91e-119	2.19190266748459	0.617	0.257	4.8613080948 4321e-115	SMC1
CST61	8.808349328975585e-129	2.21447916041439	0.479	0.147	1.2776510701 6795e-124	SMC1
CLMP1	4.790499637800245e-141	2.23203981629443	0.408	0.093	6.9486197246 3245e-137	SMC1
FAM180A1	1.164848363106671e-121	2.25009234911445	0.382	0.094	1.6896125506 8628e-117	SMC1
SUSD52	0	2.25647824948509	0.894	0.285	0	SMC1
ITGA112	1.311861617730 42e-196	2.29576492225169	0.575	0.145	1.9028552765 1798e-192	SMC1
SCG2	4.422024357196651e-61	2.33725120744711	0.163	0.032	6.4141463301 1353e-57	SMC1

CYTL1	1.9937675710 3489e-82	2.3857570 2489652	0.3 58	0.1 17	2.891959861 78611e-78	SMC1
TPH11	1.1227351919 6226e-236	2.4074427 8255083	0.6 12	0.1 38	1.628527395 94126e-232	SMC1
WISP22	1.3471468359 8951e-189	2.4239022 3187437	0.5 96	0.1 68	1.954036485 60278e-185	SMC1
GALNT 5	3.5264102974 6383e-56	2.4382704 1316521	0.1 47	0.0 28	5.115058136 47128e-52	SMC1
WISP1	9.5073787538 7364e-39	2.4710652 4279143	0.1 11	0.0 23	1.379045288 24937e-34	SMC1
C5orf46 1	9.1393834512 2653e-163	2.5391098 7440216	0.4 54	0.1 03	1.325667569 60041e-158	SMC1
NOX41	1.2051739839 1974e-176	2.6103991 7275467	0.3 61	0.0 54	1.748104863 67558e-172	SMC1
ATRNL 11	2.5781049457 197e-135	2.7014623 3931088	0.2 83	0.0 43	3.739541223 76643e-131	SMC1
ROBO2	3.5525814757 8723e-84	2.7064883 0020445	0.1 62	0.0 21	5.153019430 62938e-80	SMC1
WSCD2	2.8304927272 4585e-61	2.8196550 655119	0.1 16	0.0 15	4.105629700 8701e-57	SMC1
MFAP5	1.4621391711 6715e-81	3.0318331 9051268	0.1 63	0.0 23	2.120832867 77795e-77	SMC1
RPRML	6.9475665521 4157e-82	3.6204511 9961335	0.1 21	0.0 1	1.007744528 38814e-77	SMC1
EDNRA	1.0419379505 2202e-71	2.0456635	0.2 4	0.0 54	1.511330997 23219e-67	SMC2
BTC1	3.5342168845 2668e-100	2.0600671 9843646	0.3 95	0.1 11	5.126381591 00595e-96	SMC2
ATP1A2 1	3.8903601145 4615e-75	2.0645897 6533605	0.2 93	0.0 77	5.642967346 14919e-71	SMC2
CASQ2 1	1.6692447779 2783e-42	2.0881261 1326528	0.1 46	0.0 33	2.421239550 38432e-38	SMC2
FZD3	3.4380665177 322e-29	2.0886604 8872002	0.1 05	0.0 25	4.986915483 97056e-25	SMC2
CKMT2 1	1.0038208809 0789e-72	2.0897272 9348947	0.2 87	0.0 78	1.456042187 7569e-68	SMC2
IL17B	5.8271684880 421e-35	2.0966874 6445404	0.1 4	0.0 37	8.452307891 90507e-31	SMC2
ASTN2	2.6902298373 1552e-36	2.1116423 3697616	0.1 09	0.0 22	3.902178379 02616e-32	SMC2
DES1	2.7292918775 7473e-56	2.1278134 6523277	0.2 33	0.0 63	3.958837868 42215e-52	SMC2
RYR21	1.2292362349 0861e-92	2.1314515 7649541	0.3 15	0.0 76	1.783007158 73494e-88	SMC2

ADRA2C1	4.01582216680557e-96	2.14147334009869	0.36	0.094	5.82495005295148e-92	SMC2
FNDC5	7.236977486431 74e-30	2.17819688150413	0.106	0.025	1.04972358440692e-25	SMC2
LINC008441	1.97785386477049e-37	2.19419815917753	0.158	0.043	2.8688770308496e-33	SMC2
FAM181B	6.46994877997748e-31	2.19664150739313	0.101	0.022	9.38466070535733e-27	SMC2
REEP11	9.17497655600643e-58	2.22133691639541	0.188	0.042	1.33083034944873e-53	SMC2
PART11	5.09060455908002e-73	2.22716795595515	0.261	0.064	7.38392191294557e-69	SMC2
NUPR21	9.19483379834138e-44	2.26526259304517	0.162	0.04	1.33371064244942e-39	SMC2
PTH1R	8.30284831991438e-39	2.29746806499517	0.125	0.027	1.20432814880358e-34	SMC2
KCNA51	3.86615035439595e-106	2.33801117675425	0.335	0.076	5.60785108905133e-102	SMC2
CSRP21	7.47414994629559e-287	2.37495575419911	0.889	0.291	1.08412544971018e-282	SMC2
HRC	4.73282763643 94e-41	2.38154831518271	0.107	0.019	6.86496648665535e-37	SMC2
TCAP1	5.24147997567574e-63	2.39341288498 97	0.197	0.042	7.60276670471766e-59	SMC2
SLCO5A1	1.83401980166835e-55	2.42417624614929	0.16	0.031	2.66024572231995e-51	SMC2
PPP1R1A1	1.54105728820548e-99	2.46224666559732	0.313	0.069	2.23530359654205e-95	SMC2
PGAM2	1.32387876517862e-74	2.47025341279951	0.195	0.034	1.92028614889159e-70	SMC2
SBSPON1	7.54276199856 61e-191	2.59363569272399	0.544	0.125	1.09407762789201e-186	SMC2
ACTC11	8.71012479218868e-230	2.66617270162304	0.623	0.137	1.26340360110697e-225	SMC2
SEMA3E	1.00140358148296e-53	2.81286724355308	0.117	0.016	1.45253589494103e-49	SMC2
RRAD	7.55454938701056e-284	2.88612835866749	0.731	0.171	1.09578738858588e-279	SMC2
RERGL	0	4.14921810187877	0.491	0.047	0	SMC2
ANGPTL1	6.13356578933672e-164	2.43444241175223	0.466	0.096	8.89673717743292e-160	SMC3
DNAJB5	1.24429088743964e-158	2.43522555674959	0.446	0.091	1.80484393232312e-154	SMC3

TNFRSF12A	0	2.45059950104782	0.984	0.408	0	SMC3
FSTL3	5.813225058926621e-293	2.488234185489 85	0.805	0.203	8.43208294797247e-289	SMC3
BAMBI	5.757264359109 03e-151	2.510348404378 21	0.447	0.097	8.35091195288765e-147	SMC3
CNN1	0	2.515307229857 3	1	0.366	0	SMC3
SAMMSON	3.081573706266627e-119	2.520968128274 68	0.292	0.048	4.46982266093922e-115	SMC3
AC018742.1	1.577214281704 1e-96	2.523461820883 64	0.306	0.068	2.28774931561179e-92	SMC3
RAB23	8.658422809589 51e-240	2.571211561141 24	0.656	0.148	1.25590422853096e-235	SMC3
CREB5	2.758451858833 14e-237	2.613577569842 31	0.716	0.195	4.00113442123747e-233	SMC3
CNTN4	7.214931546935 05e-199	2.620762780852 82	0.477	0.082	1.04652582088293e-194	SMC3
SLMAP	0	2.622629902429 94	0.931	0.324	0	SMC3
AC093390.1	1.507161730305 77e-142	2.629110994800 54	0.35	0.058	2.18613808980852e-138	SMC3
FHL5	9.021111511621 28e-261	2.633017353978 6	0.658	0.133	1.30851222476067e-256	SMC3
FILIP1L	0	2.652920019395 99	0.999	0.567	0	SMC3
LINC00670	9.119647808463 47e-100	2.740985682766 35	0.238	0.038	1.32280491461763e-95	SMC3
CASQ2	1.897110364629 17e-78	2.812625543003 34	0.183	0.028	2.75175858389462e-74	SMC3
CCDC144NL-AS1	5.760709791732 29e-58	2.818262770851 02	0.158	0.028	8.35590955290768e-54	SMC3
AC027237.3	1.923057123055 526e-63	2.845782062684 91	0.142	0.02	2.78939435699165e-59	SMC3
MBNL1-AS1	2.896973577886 605e-246	2.846727785418 86	0.788	0.24	4.20206017472372e-242	SMC3
RBP4	8.528759856190 22e-47	2.846755903983 54	0.135	0.026	1.23709661714039e-42	SMC3
DES	1.930350561890 03e-130	2.915274720745 73	0.315	0.052	2.79997349002149e-126	SMC3
BAG2	0	2.931227914408 94	0.872	0.237	0	SMC3

ACTG2	0	2.94403056115415	0.846	0.209	0	SMC3
AL136084.3	3.308569822651117e-79	3.08791419290168	0.166	0.022	4.79908052775552e-75	SMC3
MYRFL	3.426764631555514e-130	3.10205780813949	0.288	0.043	4.97052209807073e-126	SMC3
NPY1R	9.002134916893 7e-115	3.21035601990396	0.256	0.038	1.30575966969543e-110	SMC3
BDNF	1.154852575477196e-145	3.26946684090617	0.26	0.028	1.67511366072208e-141	SMC3
MYOZ2	0	3.6726712511603	0.606	0.078	0	SMC3
IL31RA	4.404913499277932e-95	3.88124893381047	0.152	0.013	6.38932703070465e-91	SMC3
FOXJ3	0.004452776881 38881	1.57359595766677	0.045	0.191	1	SMC4
BAG4	0.004292346427 53194	1.57709858026536	0.015	0.138	1	SMC4
PBX13	0.002160634535 68978	1.58004523419933	0.06	0.235	1	SMC4
THUMPD3-AS1	0.007122520879 33577	1.58100260113402	0.09	0.259	1	SMC4
CSNK1G3	0.008839728547 4483	1.58940774874776	0.06	0.201	1	SMC4
HIP11	0.009316637776 13375	1.59229763144931	0.09	0.252	1	SMC4
SFPQ	0.000287841879951389	1.59993893061759	0.224	0.604	1	SMC4
NFATC3	0.008335411344 39388	1.60858881913488	0.045	0.177	1	SMC4
CDC42SE1	0.007881160579 99578	1.6156946	0.134	0.337	1	SMC4
MAP1B3	8.613633135827 01e-06	1.62124529 40981	0.672	0.556	0.124940748635171	SMC4
KANSL1	0.007103669494 37714	1.62224575835061	0.164	0.396	1	SMC4
CDS23	0.003152088130 32572	1.64786171081561	0.104	0.302	1	SMC4
KIF1B3	0.009976273284 25184	1.65394217212695	0.119	0.304	1	SMC4
AHI11	0.001206746710 07892	1.65488434624815	0.134	0.381	1	SMC4
DLGAP43	0.005141308054 8359	1.67588390950198	0.134	0.345	1	SMC4

HIBCH2	0.0021021356 6369138	1.6959418 4760688	0.0 75	0.2 63	1	SMC4
TMEM3 3	0.0050892389 5692217	1.7023754 0096423	0.0 45	0.1 88	1	SMC4
NFAT5	0.0024372679 2151901	1.7239890 3408574	0.1 04	0.3 14	1	SMC4
PRRC2 C1	0.0058561980 3081045	1.7327860 624204	0.3 43	0.7 81	1	SMC4
USP531	0.0074436183 2879514	1.7355959 371687	0.2 09	0.4 67	1	SMC4
PREX1	0.0058561325 9587706	1.7608533 3011056	0.1 04	0.2 91	1	SMC4
INSR3	0.0054449882 9933662	1.7983668 7266793	0.0 75	0.2 39	1	SMC4
KCTD9 3	0.0074455502 3186896	1.8089776 4040517	0.0 6	0.2 05	1	SMC4
TMTC1 2	0.0085554124 9687054	1.8284232 647137	0.0 45	0.1 76	1	SMC4
RNF411	0.0030613650 2583734	1.9104466 4689778	0.0 6	0.2 27	1	SMC4
SYNPO 23	0.0040269858 1642929	2.0450990 8802481	0.4 33	0.3 98	1	SMC4
NDUFA 4L22	0.0059738995 0551369	2.4890572 2642546	0.3 13	0.2 2	1	SMC4
LMO7-AS1	0.0014823898 9310585	3.2349542 0318281	0.1 04	0.0 35	1	SMC4
GRIA23	0.0037256361 51692	3.2748852 8669919	0.2 99	0.2 12	1	SMC4
ADAM3 33	0.0001387831 65721019	4.1861018 2202294	0.1 64	0.0 61	1	SMC4
SIX12	6.8067199336 4793e-39	3.2538221 457649	0.1 48	0.0 2	9.873147263 75632e-35	SMC5
SNAI2	1.5497651464 0611e-37	3.3039222 8553995	0.1 26	0.0 15	2.247934344 86206e-33	SMC5
TSPAN 132	4.2277112344 2487e-66	3.3069179 2623482	0.1 62	0.0 14	6.132295145 53327e-62	SMC5
C2orf40 2	4.0979959536 339e-192	3.3894736 9321587	0.9 49	0.2 59	5.944143130 74597e-188	SMC5
DLX2	2.7666493560 3656e-51	3.4494741 1976613	0.1 73	0.0 21	4.013024890 93103e-47	SMC5
AMPH	7.2990020568 4284e-30	3.5272227 4459115	0.1 16	0.0 16	1.058720248 34505e-25	SMC5
MSX2	4.6774925077 6883e-67	3.5278235 0415939	0.2 09	0.0 23	6.784702882 51869e-63	SMC5

THSD44	1.589260340928824e-153	3.56645582617434	0.704	0.152	2.30522212451641e-149	SMC5
SLC16A9	3.537235838477407e-56	3.64572472526811	0.159	0.016	5.13076058370664e-52	SMC5
GPC31	3.028646836585858e-97	3.65732542507087	0.368	0.053	4.3930522364677e-93	SMC5
BARX1	8.289816465581115e-33	3.68643364651746	0.105	0.012	1.20243787833255e-28	SMC5
RGS7BP3	6.012255672607038e-124	3.77400091509828	0.386	0.045	8.720776853117e-120	SMC5
EXPH5	9.675690669333331e-65	3.89160208225146	0.155	0.012	1.4034589315868e-60	SMC5
GDF101	4.641148502524 1e-101	4.07210893221034	0.278	0.027	6.7319859029112e-97	SMC5
SAMD112	1.689408741877179e-202	4.2937961314679	0.466	0.038	2.45048738008503e-198	SMC5
INSC	1.516734133215 02e-51	4.3825992336998	0.101	0.006	2.20002286022839e-47	SMC5
SOST3	1.703567272283 47e-214	4.44216963252241	0.747	0.118	2.47102432844717e-210	SMC5
PAMR11	8.288793764056 9e-99	4.65702271108223	0.181	0.01	1.20228953547645e-94	SMC5
PAX9	4.873090307482 97e-69	4.75540620254097	0.105	0.004	7.06841749100405e-65	SMC5
CPNE4	7.824111631725 76e-198	5.15047709797779	0.285	0.01	1.13488739218182e-193	SMC5
PTN2	5.589850708743 75e-232	5.22782793891499	0.722	0.098	8.10807845303281e-228	SMC5
AC012085.2	4.786909393324 89e-81	5.23396872882108	0.123	0.005	6.94341207501775e-77	SMC5
LINC025441	0	5.80538853958 96	0.469	0.013	0	SMC5
SUCNR12	0	6.10603846420948	0.657	0.039	0	SMC5
DLX3	1.174860421674 86e-124	6.12296256432619	0.152	0.004	1.70413504163938e-120	SMC5
DLX51	0	6.18944309188 15	0.711	0.02	0	SMC5
PHYHIPL	1.811042391900 96e-277	6.30991335272054	0.3	0.005	2.62691698945234e-273	SMC5
DLX6	0	6.41402230412 28	0.444	0.007	0	SMC5
RSPO2	0	7.74431921348185	0.372	0.004	0	SMC5

DLX6-AS1	0	8.12012155649984	0.639	0.011	0	SMC5
CD6	0	7.38316195066213	0.364	0.008	0	T cell
SH2D2A	3.188751494803 12e-191	7.45007976162495	0.191	0.003	4.625284043 21193e-187	T cell
CAMK4	5.238117175502 85e-193	7.5144985389235	0.188	0.002	7.597888963 06689e-189	T cell
GATA3	5.293854018150 22e-210	7.57027614406704	0.213	0.003	7.678735253 3269e-206	T cell
SLA21	3.762603092342 63e-223	7.77897305231318	0.21	0.002	5.457655785 44299e-219	T cell
PYHIN1	2.016070787779 64e-252	7.80652432842603	0.248	0.003	2.924310677 67437e-248	T cell
SLFN12L	1.795931846508 02e-247	8.09402382276011	0.232	0.002	2.604999143 35988e-243	T cell
CXCR31	0	8.1823343566874	0.376	0.003	0	T cell
SPOCK2	0	8.18550086327669	0.514	0.004	0	T cell
CD961	0	8.20066736678452	0.458	0.004	0	T cell
CCL5	0	8.27829539202404	0.871	0.022	0	T cell
SAMD3	0	8.33264444266435	0.408	0.005	0	T cell
TRAC	0	8.66740281143965	0.765	0.009	0	T cell
BCL11B	0	8.67312817486012	0.32	0.002	0	T cell
CD2	0	8.67980494549554	0.875	0.011	0	T cell
CD247	0	8.90675103229102	0.498	0.003	0	T cell
CD3E	0	8.93263708926524	0.79	0.004	0	T cell
TRBC2	0	8.96898836037894	0.749	0.004	0	T cell
GZMM	0	9.29126129796331	0.737	0.004	0	T cell
NKG7	0	9.36306496483264	0.677	0.009	0	T cell
LCK	0	9.49988295442428	0.687	0.003	0	T cell

TRBC1	0	9.5274177 0750258	0.5 96	0.0 03	0	T cell
CD3D	0	9.5587008 1270272	0.8 9	0.0 05	0	T cell
CD8A	0	9.6162635 7644487	0.4 67	0.0 02	0	T cell
LINC01 871	0	9.6585477 7987009	0.4 11	0.0 02	0	T cell
GZMH	0	9.7113896 6218851	0.4 98	0.0 02	0	T cell
CD3G	0	9.8950291 8458844	0.7 77	0.0 02	0	T cell
GZMK	0	9.9733007 9904193	0.7 12	0.0 04	0	T cell
GZMA	0	10.088617 8316234	0.8 59	0.0 04	0	T cell
KLRB1	0	10.218068 7125084	0.2 73	0.0 01	0	T cell

Supplementary Table S4. Drug prediction based on LCDEGs.

Search term	Match type	Gene	Drug	Interaction_types
CYBB	Definite	CYBB	CHRYSIN	
CYBB	Definite	CYBB	APIGENIN	
CYBB	Definite	CYBB	LUTEOLIN	
CASP1	Definite	CASP1	NIVOCASAN	inhibitor
CASP1	Definite	CASP1	EMRICASAN	inhibitor
CASP1	Definite	CASP1	PRALNACASAN	inhibitor
CASP1	Definite	CASP1	BERKELEYAMIDE C	
CASP1	Definite	CASP1	CHEMBL337173	
CASP1	Definite	CASP1	4-CHLOROMERCURIBENZOIC ACID	
CASP1	Definite	CASP1	BERKELEYDIONE	
CASP1	Definite	CASP1	GOSSYPOL	
CASP1	Definite	CASP1	MESALAMINE	
CASP1	Definite	CASP1	BERKELEYACETAL A	
CASP1	Definite	CASP1	DIACEREIN	
CASP1	Definite	CASP1	VERMISTATIN	
CASP1	Definite	CASP1	BERKELEYACETAL B	
CASP1	Definite	CASP1	BELNACASAN	
CASP1	Definite	CASP1	CHEMBL578512	
CASP1	Definite	CASP1	CHEMBL429095	
CASP1	Definite	CASP1	JUGLONE	

CASP1	Definite	CASP 1	ISOBOLDINE	
CASP1	Definite	CASP 1	CHEMBL415893	
CASP1	Definite	CASP 1	BERKELEYAMIDE B	
CASP1	Definite	CASP 1	BERKELEYACETAL C	
CASP1	Definite	CASP 1	CHEMBL580421	
CASP1	Definite	CASP 1	BERKELEYTRIONE	
IL1B	Definite	IL1B	RILONACEPT	inhibitor|binder
IL1B	Definite	IL1B	CANAKINUMAB	antibody|binder|inhibitor
IL1B	Definite	IL1B	MELATONIN	
IL1B	Definite	IL1B	VERAPAMIL	
IL1B	Definite	IL1B	TILUDRONIC ACID	
IL1B	Definite	IL1B	HYDROQUINONE	
IL1B	Definite	IL1B	PENTOXIFYLLINE	
IL1B	Definite	IL1B	CLODRONIC ACID	
IL1B	Definite	IL1B	MAFOSFAMIDE	
IL1B	Definite	IL1B	DIACEREIN	
IL1B	Definite	IL1B	LANSOPRAZOLE	
IL1B	Definite	IL1B	INFLIXIMAB	
IL1B	Definite	IL1B	ASPIRIN	
IL1B	Definite	IL1B	USTEKINUMAB	
IL1B	Definite	IL1B	RISEDRONIC ACID	
IL1B	Definite	IL1B	CELASTROL	
IL1B	Definite	IL1B	HYDROCORTISONE	
IL1B	Definite	IL1B	GLUCOSAMINE	
IL1B	Definite	IL1B	MORPHINE	
IL1B	Definite	IL1B	RALOXIFENE	
IL1B	Definite	IL1B	GEVOKIZUMAB	
IL1B	Definite	IL1B	RESVERATROL	
IL1B	Definite	IL1B	TT-301	
IL1B	Definite	IL1B	ECHINACEA, UNSPECIFIED	

IL1B	Definite	IL1B	NICARDIPINE	
IL1B	Definite	IL1B	LITHIUM	
IL1B	Definite	IL1B	PENTAMIDINE	
IL1B	Definite	IL1B	ACITRETIN	
IL1B	Definite	IL1B	IBUDILAST	
IL1B	Definite	IL1B	PRAVASTATIN	
IL1B	Definite	IL1B	ERYTHROMYCIN	
IL1B	Definite	IL1B	OMEPRAZOLE	
IL1B	Definite	IL1B	ALTEPLASE	
IL1B	Definite	IL1B	CEFACLOR	
IL1B	Definite	IL1B	THYROGLOBULIN	
IL1B	Definite	IL1B	RABEPRAZOLE	
IL1B	Definite	IL1B	OFLOXACIN	
HMOX1	Definite	HMOX1	SORAFENIB	
HMOX1	Definite	HMOX1	SUNITINIB	
HMOX1	Definite	HMOX1	STANNSOPORFIN	
HMOX1	Definite	HMOX1	ASPIRIN	
DPP4	Definite	DPP4	OMARIGLIPTIN	inhibitor
DPP4	Definite	DPP4	LINAGLIPTIN	inhibitor
DPP4	Definite	DPP4	BEGELOMAB	inhibitor|antibody
DPP4	Definite	DPP4	SAXAGLIPTIN	inhibitor
DPP4	Definite	DPP4	VILDAGLIPTIN	inhibitor
DPP4	Definite	DPP4	ALOGLIPTIN	inhibitor
DPP4	Definite	DPP4	SITAGLIPTIN PHOSPHATE	inhibitor
DPP4	Definite	DPP4	GOSOGLIPTIN	inhibitor
DPP4	Definite	DPP4	CARMEGLIPTIN	inhibitor
DPP4	Definite	DPP4	SITAGLIPTIN	inhibitor
DPP4	Definite	DPP4	SAXAGLIPTIN HYDROCHLORIDE	inhibitor
DPP4	Definite	DPP4	TRELAGLIPTIN SUCCINATE	inhibitor
DPP4	Definite	DPP4	TENELIGLIPTIN	inhibitor
DPP4	Definite	DPP4	ALOGLIPTIN BENZOATE	inhibitor
DPP4	Definite	DPP4	GEMIGLIPTIN	
DPP4	Definite	DPP4	DUTOGLIPTIN	

DPP4	Definite	DPP4	BISEGLIPTIN	
DPP4	Definite	DPP4	VALACYCLOVIR	
DPP4	Definite	DPP4	EVOGLIPTIN	
DPP4	Definite	DPP4	ENALAPRIL	
DPP4	Definite	DPP4	DENAGLIPTIN	
DPP4	Definite	DPP4	ANAGLIPTIN	
DPP4	Definite	DPP4	TRELAGLIPTIN	
DPP4	Definite	DPP4	CAPTOPRIL	
PTPN6	Definite	PTPN6	TOFACITINIB	
PTPN6	Definite	PTPN6	CHEMBL510966	
PTPN6	Definite	PTPN6	CHEMBL472004	
PTPN6	Definite	PTPN6	SORAFENIB	
TLR2	Definite	TLR2	TOMARALIMAB	antibody
TLR2	Definite	TLR2	DIAPEP-277	
TLR2	Definite	TLR2	CHEMBL1836411	
TLR2	Definite	TLR2	RESVERATROL HEXANOIC ACID	