

Table SI. Differentially expressed epithelial immune-related genes.

Gene	Coefficient
AREG	0.022092
IFITM2	0.082742
NR4A3	0.081205
MUC1	0.024306
CCL15	0.213759
FABP6	0.122036
RPS6KA5	-0.056319
TSLP	-0.066205

AREG, Amphiregulin; IFITM2, Interferon Induced Transmembrane Protein 2; NR4A3, Nuclear Receptor Subfamily 4 Group A Member 3; MUC1, mucin-1; FABP6, fatty acid-binding protein 6; TSLP, thymic stromal lymphopoietin; CCL15, C-C Motif Chemokine Ligand 15; RPS6KA5, Ribosomal Protein S6 Kinase A5.

Table SII. Primer sequences.

Gene	Primer sequence (5'-3')	
	Forward	Reverse
AREG	CTGCGAAGGACCAATGAGAG	GGTCCAATCCAGCAGCATAA
FABP6	GGTTCTGAGAGCTGTGTTGT	GCTGGGAGGCTTTCTTTAT
MUC1	CGTGGAGACACAGTTCAATCA	GACTGGGCAGAGAAAGGAAAT
TSLP	GCAACAGCATGGGTGAATAA	CTTCCCACCACGAGTGTAAG
β 2-microglobulin	GAGTATGCCTGCCGTGTGAA	TGCGGCATCTTCAAACCTCC

AREG, amphiregulin; MUC1, mucin-1; FABP6, fatty acid-binding protein 6; TSLP, thymic stromal lymphopoietin.

Table SIII. A total of 278 differentially expressed epithelial-related immunity genes.

Gene	HR (95%CI)	P-value
RPS6KA5	0.62 (0.61-0.63)	0.00
CEBPB	1.33 (1.32-1.34)	0.01
TNFRSF12A	1.20 (1.19-1.21)	0.01
UNC93B1	1.44 (1.43-1.45)	0.01
NR4A3	1.21 (1.20-1.22)	0.01
IFITM2	1.25 (1.24-1.26)	0.01
TSLP	0.83 (0.82-0.84)	0.01
AREG	1.14 (1.13-1.15)	0.01
FCGR2A	1.24 (1.23-1.25)	0.01
ICAM1	1.17 (1.16-1.18)	0.02
CXCL2	1.13 (1.12-1.14)	0.03
MUC1	1.13 (1.12-1.14)	0.03
SOD1	0.76 (0.75-0.77)	0.03
CCL15	2.21 (2.20-2.22)	0.03
IRF7	1.19 (1.18-1.20)	0.03
CSF3R	1.17 (1.16-1.18)	0.03
CYBA	1.26 (1.25-1.27)	0.03
DUSP1	1.18 (1.17-1.19)	0.04
TP63	0.92 (0.91-0.93)	0.04
FABP6	1.12 (1.11-1.13)	0.04
NTS	0.96 (0.95-0.97)	0.04
JUN	1.20 (1.19-1.21)	0.04
GAS6	1.17 (1.16-1.18)	0.05
PSMC2	0.73 (0.72-0.74)	0.05
VASP	1.32 (1.31-1.33)	0.06
GLRX	1.19 (1.18-1.20)	0.06
SERPINB9	1.17 (1.16-1.18)	0.06
TPM2	1.16 (1.15-1.17)	0.06
PLAUR	1.17 (1.16-1.18)	0.07
FADD	1.16 (1.15-1.17)	0.07
SERPING1	1.16 (1.15-1.17)	0.07
CFB	1.27 (1.26-1.28)	0.07
MUC5AC	1.15 (1.14-1.16)	0.07
BID	0.81 (0.80-0.82)	0.07
C3	1.11 (1.10-1.12)	0.07
CASP4	1.25 (1.24-1.26)	0.07
CFLAR	1.30 (1.29-1.31)	0.08
GRN	1.24 (1.23-1.25)	0.08
LGALS1	1.13 (1.12-1.14)	0.08
CD81	1.31 (1.30-1.32)	0.08
TGFBR2	1.17 (1.16-1.18)	0.09
PELI1	0.85 (0.84-0.86)	0.09
IFI16	0.85 (0.84-0.86)	0.10
RBCK1	1.27 (1.26-1.28)	0.10
NR4A1	1.13 (1.12-1.14)	0.10
GPI	0.86 (0.85-0.87)	0.11

RPS19	0.80 (0.79-0.81)	0.11
AKNA	1.18 (1.17-1.19)	0.12
HLA-E	1.22 (1.21-1.23)	0.12
TRIB3	1.12 (1.11-1.13)	0.12
LGALS3	0.84 (0.83-0.85)	0.12
IFI27	1.07 (1.06-1.08)	0.12
TNFSF10	0.91 (0.90-0.92)	0.13
SDC4	1.13 (1.12-1.14)	0.13
GNAI2	1.27 (1.26-1.28)	0.14
IL5RA	1.29 (1.28-1.30)	0.14
CAV1	1.10 (1.09-1.11)	0.14
RPL19	0.80 (0.79-0.81)	0.14
C6	1.18 (1.17-1.19)	0.14
HLA-B	1.13 (1.12-1.14)	0.15
HMGB2	0.85 (0.84-0.86)	0.16
CD63	1.24 (1.23-1.25)	0.16
CDK4	0.85 (0.84-0.86)	0.16
SIVA1	0.86 (0.85-0.87)	0.17
STC2	1.09 (1.08-1.10)	0.17
SOCS3	1.15 (1.14-1.16)	0.17
JUND	1.19 (1.18-1.20)	0.17
C2	1.15 (1.14-1.16)	0.17
CSF3	1.08 (1.07-1.09)	0.17
SEMA3C	1.09 (1.08-1.10)	0.18
CD74	1.10 (1.09-1.11)	0.19
CANX	1.21 (1.20-1.22)	0.19
PLXNB2	1.14 (1.13-1.15)	0.20
TYROBP	1.10 (1.09-1.11)	0.20
IFITM3	1.12 (1.11-1.13)	0.20
FAM3D	0.92 (0.91-0.93)	0.20
FCGRT	1.16 (1.15-1.17)	0.21
FXR1	0.88 (0.87-0.89)	0.22
WFDC2	1.06 (1.05-1.07)	0.22
CMTM4	1.15 (1.14-1.16)	0.22
CD37	1.11 (1.10-1.12)	0.23
DDX17	0.84 (0.83-0.85)	0.23
HLA-C	1.11 (1.10-1.12)	0.24
FAM3C	0.89 (0.88-0.90)	0.24
PSMD4	0.82 (0.81-0.83)	0.25
CD53	1.09 (1.08-1.10)	0.25
HLA-DPA1	1.07 (1.06-1.08)	0.25
BIRC3	1.08 (1.07-1.09)	0.26
CXCL3	1.08 (1.07-1.09)	0.26
LRRFIP1	1.18 (1.17-1.19)	0.26
TXNIP	1.09 (1.08-1.10)	0.27
CTSS	1.08 (1.07-1.09)	0.27
FOS	1.06 (1.05-1.07)	0.28
S100A2	0.97 (0.96-0.98)	0.28

S100A11	0.90 (0.89-0.91)	0.29
CTSH	1.08 (1.07-1.09)	0.29
EGR1	1.07 (1.06-1.08)	0.29
HLA-DQB1	1.07 (1.06-1.08)	0.29
CKLF	1.25 (1.24-1.26)	0.30
TNFRSF14	1.11 (1.10-1.12)	0.30
PMAIP1	0.92 (0.91-0.93)	0.30
DHCR24	1.10 (1.09-1.11)	0.30
NFKB1	1.15 (1.14-1.16)	0.31
NR4A2	1.08 (1.07-1.09)	0.31
FCER1G	1.08 (1.07-1.09)	0.32
ATF3	1.08 (1.07-1.09)	0.32
ITGB2	1.08 (1.07-1.09)	0.32
IL20RA	0.92 (0.91-0.93)	0.32
VIM	1.08 (1.07-1.09)	0.32
CXCL8	1.04 (1.03-1.05)	0.32
PTPRC	1.07 (1.06-1.08)	0.33
GMFG	1.09 (1.08-1.10)	0.33
RASGEF1B	1.12 (1.11-1.13)	0.33
CXCR4	1.06 (1.05-1.07)	0.35
ANXA2	1.12 (1.11-1.13)	0.35
CXCL6	0.97 (0.96-0.98)	0.35
AQP3	1.04 (1.03-1.05)	0.36
ARG2	0.92 (0.91-0.93)	0.36
HSPA6	1.06 (1.05-1.07)	0.36
MAP3K8	1.10 (1.09-1.11)	0.36
TYMP	1.07 (1.06-1.08)	0.37
ATF4	0.87 (0.86-0.88)	0.38
CCL26	0.95 (0.94-0.96)	0.38
ISG20	1.09 (1.08-1.10)	0.39
CXCL16	1.10 (1.09-1.11)	0.39
HCST	1.10 (1.09-1.11)	0.39
SDC1	0.93 (0.92-0.94)	0.39
HLA-DRB1	1.06 (1.05-1.07)	0.40
DEFB1	1.00 (0.99-1.01)	0.98
HLA-A	1.00 (0.99-1.01)	0.98
HMGN2	1.00 (0.99-1.01)	0.99
LYN	1.00 (0.99-1.01)	1.00
CYTIP	1.06 (1.05-1.07)	0.41
NDRG1	1.05 (1.04-1.06)	0.42
ADRB2	1.06 (1.05-1.07)	0.42
BPIFA1	0.98 (0.97-0.99)	0.42
TNFAIP3	1.06 (1.05-1.07)	0.43
HSP90AB1	0.91 (0.90-0.92)	0.43
S100P	1.03 (1.02-1.04)	0.44
CLDN4	1.06 (1.05-1.07)	0.44
S100A6	0.94 (0.93-0.95)	0.44
HLA-DRA	1.05 (1.04-1.06)	0.44

IL6ST	1.10 (1.09-1.11)	0.45
PIN1	0.90 (0.89-0.91)	0.46
ADM	0.96 (0.95-0.97)	0.47
GSTP1	0.93 (0.92-0.94)	0.47
HLA-DPB1	1.05 (1.04-1.06)	0.47
BCL2A1	1.05 (1.04-1.06)	0.48
CSF1	1.07 (1.06-1.08)	0.49
IL32	1.05 (1.04-1.06)	0.50
HSPA1A	1.04 (1.03-1.05)	0.50
PSMD7	1.11 (1.10-1.12)	0.50
MIF	0.86 (0.85-0.87)	0.50
PRDX1	0.94 (0.93-0.95)	0.50
LY96	1.05 (1.04-1.06)	0.51
BPIFB1	0.98 (0.97-0.99)	0.51
HSPBP1	0.92 (0.91-0.93)	0.53
IRF1	1.06 (1.05-1.07)	0.53
CXCL17	0.97 (0.96-0.98)	0.53
IFI30	1.07 (1.06-1.08)	0.53
CAT	1.07 (1.06-1.08)	0.54
HBEGF	1.04 (1.03-1.05)	0.54
SCGB3A1	1.02 (1.01-1.03)	0.56
TNFRSF19	0.96 (0.95-0.97)	0.56
TSC22D3	1.06 (1.05-1.07)	0.56
LST1	1.05 (1.04-1.06)	0.57
RCAN1	0.94 (0.93-0.95)	0.57
XBP1	1.07 (1.06-1.08)	0.57
NFKBIZ	1.04 (1.03-1.05)	0.57
HDGF	0.92 (0.91-0.93)	0.57
MDK	0.96 (0.95-0.97)	0.58
EPS8	0.97 (0.96-0.98)	0.61
HSP90AA1	0.94 (0.93-0.95)	0.62
SAMHD1	1.05 (1.04-1.06)	0.62
S100A8	0.98 (0.97-0.99)	0.62
S100A10	1.05 (1.04-1.06)	0.62
HLA-DQA1	1.03 (1.02-1.04)	0.63
HLA-DMA	1.04 (1.03-1.05)	0.63
DDIT3	0.96 (0.95-0.97)	0.63
ANXA4	0.94 (0.93-0.95)	0.63
CLEC7A	0.96 (0.95-0.97)	0.64
CRABP2	1.02 (1.01-1.03)	0.66
CCL20	1.02 (1.01-1.03)	0.66
SAA1	1.02 (1.01-1.03)	0.67
CHP1	0.94 (0.93-0.95)	0.68
PSMD8	0.95 (0.94-0.96)	0.69
CARD16	1.05 (1.04-1.06)	0.69
LCN2	0.99 (0.98-1.00)	0.69
FAM3B	0.98 (0.97-0.99)	0.69
CMTM6	0.94 (0.93-0.95)	0.69

PLXNB1	0.96 (0.95-0.97)	0.70
SOCS2	0.97 (0.96-0.98)	0.70
CDC42	0.94 (0.93-0.95)	0.70
GDF15	0.98 (0.97-0.99)	0.71
CD46	1.05 (1.04-1.06)	0.71
INSR	1.04 (1.03-1.05)	0.71
CALM1	0.95 (0.94-0.96)	0.72
DDX3X	1.06 (1.05-1.07)	0.72
TMSB10	1.05 (1.04-1.06)	0.72
PPIA	0.94 (0.93-0.95)	0.72
GJA1	0.98 (0.97-0.99)	0.72
B2M	1.04 (1.03-1.05)	0.73
UBXN1	1.07 (1.06-1.08)	0.73
IGF1R	1.03 (1.02-1.04)	0.73
STAT3	1.05 (1.04-1.06)	0.74
SYTL1	0.97 (0.96-0.98)	0.74
ANXA1	1.02 (1.01-1.03)	0.74
PROS1	1.02 (1.01-1.03)	0.74
EPPIN	1.22 (1.21-1.23)	0.74
SLPI	1.01 (1.00-1.02)	0.75
DUOX1	0.98 (0.97-0.99)	0.75
IFIT1	1.02 (1.01-1.03)	0.75
TP73	0.98 (0.97-0.99)	0.75
OSMR	1.02 (1.01-1.03)	0.76
FGF14	1.07 (1.06-1.08)	0.76
NAMPT	0.98 (0.97-0.99)	0.76
HLA-DMB	1.02 (1.01-1.03)	0.77
RAB11A	0.96 (0.95-0.97)	0.78
PYCARD	0.98 (0.97-0.99)	0.78
EIF4E	0.95 (0.94-0.96)	0.79
CXCL1	0.99 (0.98-1.00)	0.79
SMARCA2	0.98 (0.97-0.99)	0.79
CDKN2A	0.99 (0.98-1.00)	0.79
CLTC	1.05 (1.04-1.06)	0.79
DKK1	0.99 (0.98-1.00)	0.79
LIMS1	0.96 (0.95-0.97)	0.80
HMGB1	0.96 (0.95-0.97)	0.81
UCP2	0.98 (0.97-0.99)	0.81
TNFRSF21	0.98 (0.97-0.99)	0.83
CDH1	0.98 (0.97-0.99)	0.84
GRB2	1.04 (1.03-1.05)	0.84
CTNNB1	0.97 (0.96-0.98)	0.84
BST2	1.01 (1.00-1.02)	0.85
EGFR	1.01 (1.00-1.02)	0.86
NFKBIA	1.02 (1.01-1.03)	0.88
S100A16	0.99 (0.98-1.00)	0.89
ISG15	1.01 (1.00-1.02)	0.89
CD48	0.99 (0.98-1.00)	0.89

RGS2	0.99 (0.98-1.00)	0.89
PTMA	0.98 (0.97-0.99)	0.90
LYZ	0.99 (0.98-1.00)	0.91
UCHL1	1.00 (0.99-1.01)	0.91
CEBPD	1.01 (1.00-1.02)	0.91
RBP1	0.99 (0.98-1.00)	0.92
FABP5	1.00 (0.99-1.01)	0.93
YWHAE	1.01 (1.00-1.02)	0.93
SQSTM1	0.99 (0.98-1.00)	0.93
RHOA	1.02 (1.01-1.03)	0.93
IL1R1	0.99 (0.98-1.00)	0.94
TRIM56	1.01 (1.00-1.02)	0.94
FOXO3	1.01 (1.00-1.02)	0.94
REST	0.99 (0.98-1.00)	0.94
MUC4	1.00 (0.99-1.01)	0.95
LGALS9	1.01 (1.00-1.02)	0.95
S100A14	1.00 (0.99-1.01)	0.95
TMSB4X	1.01 (1.00-1.02)	0.95
PSMC4	0.99 (0.98-1.00)	0.96
CTSB	1.00 (0.99-1.01)	0.96
PTHLH	1.00 (0.99-1.01)	0.96
TAX1BP1	1.01 (1.00-1.02)	0.96
ELF1	0.99 (0.98-1.00)	0.96
HSPA8	1.01 (1.00-1.02)	0.96
S100A9	1.00 (0.99-1.01)	0.96
PTGS2	1.00 (0.99-1.01)	0.97

HR, hazard ratio; CI, confidence interval.

Table SIV. .A total of 24 differentially expressed epithelial marks genes.

Gene	HR (95% CI)	P-value
NTS	0.959(0.922-0.998)	0.040
CYBA	1.264(1.018-1.569)	0.034
PSMC2	0.729(0.531-1.000)	0.050
DUSP1	1.180(1.011-1.376)	0.035
ICAM1	1.167(1.020-1.335)	0.024
CXCL2	1.125(1.014-1.248)	0.026
IRF7	1.187(1.015-1.388)	0.031
JUN	1.198(1.008-1.425)	0.041
FCGR2A	1.240(1.045-1.472)	0.014
AREG	1.136(1.028-1.256)	0.012
IFITM2	1.253(1.053-1.492)	0.011
NR4A3	1.213(1.045-1.407)	0.011
CEBPB	1.329(1.086-1.627)	0.006
MUC1	1.130(1.015-1.259)	0.026
TNFRSF12A	1.200(1.053-1.369)	0.006
CCL15	2.212(1.074-4.554)	0.031
FABP6	1.124(1.006-1.255)	0.039
UNC93B1	1.444(1.094-1.908)	0.010
SOD1	0.758(0.592-0.971)	0.028
RPS6KA5	0.620(0.454-0.847)	0.003
CSF3R	1.173(1.013-1.358)	0.033
GAS6	1.167(1.001-1.360)	0.049
TSLP	0.826(0.712-0.958)	0.011
TP63	0.922(0.855-0.996)	0.039

HR, hazard ratio; CI, confidence interval.

Table SV. Gene Set Enrichment Analysis pathways for different risk groups.

Pathway	Risk group
c2.cp.kegg.Hs.symbols.gmt	
KEGG_ASTHMA	High
KEGG_TYPE_I_DIABETES_MELLITUS	High
KEGG_ALLOGRAFT_REJECTION	High
KEGG_GRAFT_VERSUS_HOST_DISEASE	High
KEGG_COMPLEMENT_AND_COAGULATION_CASCADES	High
KEGG_AUTOIMMUNE_THYROID_DISEASE	High
KEGG_LEISHMANIA_INFECTION	High
KEGG_CYTOKINE_CYTOKINE_RECEPTOR_INTERACTION	High
KEGG_PROXIMAL_TUBULE_BICARBONATE_RECLAMATION	High
KEGG_TRYPTOPHAN_METABOLISM	High
KEGG_NOD_LIKE_RECEPTOR_SIGNALING_PATHWAY	High
KEGG_INTESTINAL_IMMUNE_NETWORK_FOR_IGA_PRODUCTION	High
KEGG_HEMATOPOIETIC_CELL_LINEAGE	High
KEGG_ANTIGEN_PROCESSING_AND_PRESENTATION	High
KEGG_NATURAL_KILLER_CELL_MEDIATED_CYTOTOXICITY	High
KEGG_CYTOSOLIC_DNA_SENSING_PATHWAY	High
KEGG_JAK_STAT_SIGNALING_PATHWAY	High
KEGG_LEUKOCYTE_TRANSENDOTHELIAL_MIGRATION	High
KEGG_ECM_RECEPTOR_INTERACTION	High
KEGG_SYSTEMIC_LUPUS_ERYTHEMATOSUS	High
KEGG_HYPERTROPHIC_CARDIOMYOPATHY_HCM	High
KEGG_RIG_I_LIKE_RECEPTOR_SIGNALING_PATHWAY	High
KEGG_ARRHYTHMOGENIC_RIGHT_VENTRICULAR_CARDIOMYOPATHY_ARVC	High
KEGG_VIRAL_MYOCARDITIS	High
KEGG_CELL_ADHESION_MOLECULES_CAMS	High
KEGG_CHEMOKINE_SIGNALING_PATHWAY	High
KEGG_TOLL_LIKE_RECEPTOR_SIGNALING_PATHWAY	High
KEGG_FOCAL_ADHESION	High
KEGG_APOPTOSIS	High
KEGG_NEUROACTIVE_LIGAND_RECEPTOR_INTERACTION	High
KEGG_WNT_SIGNALING_PATHWAY	Low
KEGG_OOCYTE_MEIOSIS	Low
KEGG_SPLICEOSOME	Low
KEGG_CELL_CYCLE	Low
KEGG_DRUG_METABOLISM_CYTOCHROME_P450	Low
KEGG_METABOLISM_OF_XENOBIOTICS_BY_CYTOCHROME_P450	Low
KEGG_GLUTATHIONE_METABOLISM	Low
KEGG_DNA_REPLICATION	Low
c5.go.Hs.symbols.gmt	
GOBP_PROTEIN_LIPID_COMPLEX_ASSEMBLY	Low
GOBP_REGULATION_OF_POSTSYNAPTIC_NEUROTRANSMITTER_RECEPTOR_ACTIVIT Y	Low
GOBP_REVERSE_CHOLESTEROL_TRANSPORT	Low
GOBP_NEUROTRANSMITTER_GATED_ION_CHANNEL_CLUSTERING	Low
GOBP_HIGH_DENSITY_LIPOPROTEIN_PARTICLE_REMODELING	Low
GOCC_TRIGLYCERIDE_RICH_PLASMA_LIPOPROTEIN_PARTICLE	Low
GOMF_LIPOPROTEIN_PARTICLE_RECEPTOR_BINDING	Low
GOBP_MORPHOGENESIS_OF_AN_EPITHELIAL_BUD	Low
GOMF_STEROL_TRANSFER_ACTIVITY	Low
GOMF_DNA_REPLICATION_ORIGIN_BINDING	Low
GOMF_PHOSPHATIDYLCHOLINE_BINDING	Low

GOBP_MEIOSIS_II_CELL_CYCLE_PROCESS	Low
GOBP_NEGATIVE_REGULATION_OF_FATTY_ACID_BIOSYNTHETIC_PROCESS	Low
GOCC_AMPA_Glutamate_Receptor_Complex	Low
GOMF_PROTON_CHANNEL_ACTIVITY	Low
GOBP_REGULATION_OF_DNA_TEMPLATED_DNA_REPLICATION_INITIATION	Low
GOMF_LIPASE_INHIBITOR_ACTIVITY	Low
GOBP_QUINONE_METABOLIC_PROCESS	Low
GOBP_NEGATIVE_REGULATION_OF_LIPID_TRANSPORT	Low
GOMF_SINGLE_STRANDED_DNA_HELICASE_ACTIVITY	Low
GOBP_MORPHOGENESIS_OF_AN_EPITHELIAL_FOLD	Low
GOMF_P_TYPE_ION_TRANSPORTER_ACTIVITY	Low
GOBP_PROTEIN_CONTAINING_COMPLEX_REMODELING	Low
GOBP_PROXIMAL_DISTAL_PATTERN_FORMATION	Low
GOBP_POSTSYNAPTIC_SPECIALIZATION_ASSEMBLY	Low
GOCC_LAMELLAR_BODY	High
GOMF_CXCR_CHEMOKINE_RECEPTOR_BINDING	High
GOBP_LEUKOCYTE_MIGRATION_INVOLVED_IN_INFLAMMATORY_RESPONSE	High
GOBP_AXONEMAL_DYNEIN_COMPLEX_ASSEMBLY	High
GOBP_CHRONIC_INFLAMMATORY_RESPONSE	High
GOCC_DYNEIN_AXONEMAL_PARTICLE	High
GOBP_POSITIVE_REGULATION_OF_HETEROTYPIC_CELL_CELL_ADHESION	High
GOCC_MHC_CLASS_II_PROTEIN_COMPLEX	High
GOBP_HEAT_GENERATION	High
GOCC_MHC_PROTEIN_COMPLEX	High
GOBP_ANTIFUNGAL_INNATE_IMMUNE_RESPONSE	High
GOBP_NEGATIVE_REGULATION_OF_SYSTEMIC_ARTERIAL_BLOOD_PRESSURE	High
GOBP_CHEMICAL_HOMEOSTASIS_WITHIN_A_TISSUE	High
GOCC_AXONEMAL_DYNEIN_COMPLEX	High
GOBP_AXONEME_ASSEMBLY	High
GOBP_NEGATIVE_REGULATION_OF_LEUKOCYTE_CHEMOTAXIS	High
GOBP_TRANSCYTOSIS	High
GOBP_PLASMINOGEN_ACTIVATION	High
GOBP_HEPATOCTE_DIFFERENTIATION	High
GOBP_RESPONSE_TO_IMMobilIZATION_STRESS	High
GOBP_NEGATIVE_REGULATION_OF_ENDOTHELIAL_CELL_APOPTOTIC_PROCESS	High
GOBP_PEPTIDE_ANTIGEN_ASSEMBLY_WITH_MHC_PROTEIN_COMPLEX	High

Table SVI. Antineoplastic drug sensitivity for the low sensitivity group.

Drug	IC ₅₀ (25-75%)		P-value
	Low-risk group	High-risk group	
AZ960	14.80	9.73	<0.001
AZD5582	36.88	14.76	<0.001
AZD6482	27.44	24.72	<0.001
AZD8055	0.86	0.82	<0.001
BMS-754807	2.05	1.85	0.004
Camptothecin	0.21	0.16	<0.001
CDK9_5576	28.71	1829.17	0.004
Dasatinib	5.69	5.09	<0.001
Elephantin	15371310.78	25920.04	<0.001
Entospletinib	57.13	42.30	<0.001
ERK_2440	60.60	23.02	<0.001
ERK_6604	46.43	34.80	<0.001
Fludarabine	288.53	185.87	<0.001
Gemcitabine	1200.39	1.87	0.002
GSK269962A	20.08	18.54	0.001
IAP_5620	219.73	198.46	0.032
Irinotecan	28.40	21.40	0.001
JAK1_8709	75.22	71.87	0.002
KRAS (G12C) Inhibitor-12	805.38	155.76	0.001
KU-55933	92.17	78.36	<0.001
Leflunomide	178.99	150.27	<0.001
Luminespib	0.36	0.45	0.010
MIM1	68.98	58.23	0.020
Mirin	524.65	260.50	0.050
NU7441	14.13	13.62	0.040
Obatoclox Mesylate	6.10	5.75	0.030
PD0325901	2.47	1.83	<0.001
PF-4708671	53.42	47.68	<0.001
PRIMA-1MET	191.81	131.85	<0.001
PRT062607	31.44	25.43	<0.001
Ribociclib	48.86	46.43	<0.001
RVX-208	118.51	128.10	0.050
SCH772984	14.12	13.31	<0.001
Selumetinib	68.94	62.39	<0.001
Sepantronium bromide	3.23	1.04	0.030
Staurosporine	0.08	0.08	0.010
Teniposide	13.29	3.21	<0.001
Topotecan	2.67	1.46	<0.001
Trametinib	3.91	2.61	<0.001
ULK1_4989	18.90	11.59	0.030
VSP34_8731	21.65	14.13	<0.001
WIKI4	45.42	41.51	0.010
WZ4003	53.97	45.80	<0.001
ZM447439	20.98	20.03	0.040

IC₅₀, half-maximal inhibitory concentration.

Table SVII. Antineoplastic drug sensitivity information for the high sensitivity group.

Drug	IC ₅₀ (25-75%)		P-value
	Low-risk group	High-risk group	
Afuresertib	28.34	21.21	<0.001
Alpelisib	45.03	69.98	<0.001
AT13148	67.49	81.06	0.050
AZD1208	197.71	237.85	<0.001
AZD4547	17.26	25.61	<0.001
AZD5363	26.18	31.86	0.020
AZD6738	12.24	80.01	<0.001
AZD7762	1.34	1.78	<0.001
BI-2536	1.31	2.00	<0.001
Bortezomib	0.01	0.01	0.030
Cediranib	8.79	10.88	0.010
Crizotinib	27.30	32.55	<0.001
Daporinad	0.14	0.07	<0.001
Dihydrorotenone	2.69	3.40	0.020
EPZ004777	182.04	215.91	0.020
EPZ5676	267.94	325.88	<0.001
Erlotinib	15.15	20.81	<0.001
GDC0810	137.03	173.38	<0.001
Gefitinib	27.93	43.21	<0.001
I-BRD9	79.60	107.58	0.020
Ipatasertib	42.88	58.39	<0.001
JQ1	11.47	13.14	0.020
Lapatinib	27.93	70.29	0.010
MIRA-1	242.90	303.84	0.020
MK-1775	2.45	22.50	<0.001
MK-2206	23.39	33.35	<0.001
MK-8776	26.86	41.55	<0.001
Nilotinib	39.74	57.91	<0.001
NVP-ADW742	16.01	20.98	<0.001
OF-1	65.17	87.80	0.040
Osimertinib	6.37	11.20	<0.001
P22077	96.96	159.13	<0.001
Paclitaxel	0.28	35.35	<0.001
PD173074	66.30	76.83	0.020
Pevonedistat	3.62	27.41	<0.001
PFI3	193.53	216.92	0.040
Pyridostatin	31.04	52.59	<0.001
Rapamycin	0.14	0.18	<0.001
Savolitinib	12.95	19.96	<0.001
Sorafenib	15.07	23.02	<0.001
TAF1_5496	53.86	79.58	0.020
Tamoxifen	36.40	48.58	0.010
Taselisib	23.26	19.12	<0.001
Tozasertib	18.10	21.57	<0.001
Uprosertib	28.41	31.31	<0.001
VE821	75.14	114.80	0.010
VE-822	39.67	62.13	0.030
Venetoclax	8.91	10.34	0.010
Vorinostat	4.63	5.26	0.020
Wee1 Inhibitor	10.35	42.86	<0.001
Zoledronate	45.84	54.65	0.020

IC₅₀, half-maximal inhibitory concentration.

Table SVIII. Drug sensitivity for 198 medications across various risk groups.

Drug	IC ₅₀ (25-75%)		P-value
	Low-risk group	High-risk group	
5-Fluorouracil	189.99	224.98	<0.001
ABT737	10.98	12.63	0.520
Acetalax	195.75	209.70	0.060
Afatinib	8.37	8.86	0.490
Afuresertib	28.34	21.21	0.210
AGI-5198	111.19	120.35	<0.001
AGI-6780	73.76	79.09	0.490
Alisertib	13.76	23.56	0.020
Alpelisib	45.03	69.98	<0.001
AMG-319	136.18	149.41	0.840
AT13148	67.49	81.06	0.990
Axitinib	23.36	23.88	<0.001
AZ6102	14.63	16.01	0.600
AZ960	14.80	9.73	<0.001
AZD1208	197.71	237.85	0.860
AZD1332	56.21	52.61	0.010
AZD2014	10.46	11.37	0.910
AZD3759	15.89	21.10	0.040
AZD4547	17.26	25.61	0.180
AZD5153	7.13	7.48	<0.001
AZD5363	26.18	31.86	0.260
AZD5438	121.38	397.31	0.050
AZD5582	36.88	14.76	0.020
AZD5991	141.01	202.40	0.040
AZD6482	27.44	24.72	0.830
AZD6738	12.24	80.01	0.140
AZD7762	1.34	1.78	<0.001
AZD8055	0.86	0.82	0.540
AZD8186	32.58	36.06	0.150
BDP-00009066	12.79	15.78	0.120
BI-2536	1.31	2.00	<0.001
BIBR-1532	159.93	187.23	<0.001
BMS-345541	48.13	99.74	0.030
BMS-536924	9.90	9.48	0.530
BMS-754807	2.05	1.85	<0.001
Bortezomib	0.01	0.01	<0.001
BPD-00008900	100.86	112.07	<0.001
Buparlisib	3.00	3.59	<0.001
Camptothecin	0.21	0.16	<0.001
Carmustine	526.23	535.44	<0.001
CDK9_5038	6.47	34701.50	0.010
CDK9_5576	28.71	1829.17	0.420
Cediranib	8.79	10.88	0.580
Cisplatin	42.66	81.34	0.950
Crizotinib	27.30	32.55	<0.001
Cyclophosphamide	197.81	213.81	<0.001
Cytarabine	9.33	9.37	<0.001
CZC24832	173.18	173.52	<0.001
Dabrafenib	123.69	122.80	0.080
Dactinomycin	0.15	0.15	<0.001
Dactinomycin	0.07	0.08	0.080
Dactolisib	0.26	0.38	0.020

Daporinad	0.14	0.07	0.030
Dasatinib	5.69	5.09	0.010
Dihydrorotenone	2.69	3.40	0.200
Dinaciclub	937.88	2156.76	0.010
Docetaxel	0.02	8.14	0.130
Docetaxel	41265.33	100.33	0.020
Doramapimod	96.63	95.91	0.520
Eg5_9814	1.81	0.53	<0.001
Elephantin	15371310.78	25920.04	0.070
Entinostat	13.61	12.39	<0.001
Entospletinib	57.13	42.30	0.820
Epirubicin	1.20	0.69	0.630
EPZ004777	182.04	215.91	<0.001
EPZ5676	267.94	325.88	0.250
ERK_2440	60.60	23.02	0.390
ERK_6604	46.43	34.80	0.070
Erlotinib	15.15	20.81	0.020
Fludarabine	288.53	185.87	0.690
Foretinib	3.01	3.67	<0.001
Fulvestrant	19.18	21.84	0.050
Fulvestrant	102.93	119.94	0.320
Gallibiscoquinazole	15.16	17.64	0.450
GDC0810	137.03	173.38	0.300
Gefitinib	27.93	43.21	0.830
Gemcitabine	1200.39	1.87	<0.001
GNE-317	1.96	2.29	0.740
GSK1904529A	103.03	110.69	<0.001
GSK2578215A	138.96	152.08	0.200
GSK2606414	48.12	48.54	0.010
GSK269962A	20.08	18.54	0.010
GSK343	18.50	17.62	<0.001
GSK591	101.14	113.84	<0.001
IAP_5620	219.73	198.46	<0.001
I-BET-762	31.88	35.31	<0.001
I-BRD9	79.60	107.58	0.110
Ibrutinib	122.94	156.18	<0.001
IGF1R_3801	7.66	8.56	0.130
Ipatasertib	42.88	58.39	0.590
IRAK4_4710	146.60	154.34	0.310
Irinotecan	28.40	21.40	0.030
IWP-2	17.77	17.32	<0.001
JAK_8517	26.18	27.00	0.140
JAK1_8709	75.22	71.87	<0.001
JQ1	11.47	13.14	0.090
KRAS (G12C) Inhibitor-12	805.38	155.76	0.040
KU-55933	92.17	78.36	0.360
Lapatinib	27.93	70.29	0.520
LCL161	147.84	162.87	0.320
Leflunomide	178.99	150.27	0.050
LGK974	74.84	80.68	0.950
Linsitinib	48.31	52.37	0.080
LJI308	179.21	214.00	0.770
Luminespib	0.36	0.45	<0.001
LY2109761	225.16	237.46	<0.001
MG-132	0.21	0.25	<0.001

MIM1	68.98	58.23	0.690
MIRA-1	242.90	303.84	0.300
Mirin	524.65	260.50	0.870
Mitoxantrone	3.70	3.58	0.040
MK-1775	2.45	22.50	0.060
MK-2206	23.39	33.35	0.500
MK-8776	26.86	41.55	<0.001
ML323	105.32	119.17	<0.001
MN-64	128.98	139.68	0.490
Navitoclax	9.40	10.48	0.020
Nelarabine	583.46	475.40	0.860
Nilotinib	39.74	57.91	0.160
Niraparib	106.47	93.75	0.020
NU7441	14.13	13.62	0.030
Nutlin-3a (-)	181.78	189.43	<0.001
NVP-ADW742	16.01	20.98	<0.001
Obatoclax Mesylate	6.10	5.75	0.770
OF-1	65.17	87.80	0.700
Olaparib	99.79	101.94	<0.001
OSI-027	135.62	143.93	0.060
Osimertinib	6.37	11.20	0.020
OTX015	14.92	15.26	0.380
Oxaliplatin	58.78	72.83	0.780
Oxaliplatin	211.28	193.35	<0.001
P22077	96.96	159.13	<0.001
Paclitaxel	0.28	35.35	0.360
PAK_5339	11.96	11.52	0.030
Palbociclib	51.40	46.72	<0.001
PCI-34051	144.91	114.17	0.050
PD0325901	2.47	1.83	0.930
PD173074	66.30	76.83	0.060
Pevonedistat	3.62	27.41	0.020
PF-4708671	53.42	47.68	0.130
PFI3	193.53	216.92	<0.001
Picolinici-acid	192.86	191.74	0.780
Pictilisib	5.03	6.22	0.920
PLX-4720	106.29	120.93	0.330
Podophyllotoxin bromide	1.65	25.15	0.040
PRIMA-1MET	191.81	131.85	0.660
PRT062607	31.44	25.43	0.010
Pyridostatin	31.04	52.59	0.130
Rapamycin	0.14	0.18	0.240
Ribociclib	48.86	46.43	0.700
RO-3306	15.79	16.57	0.320
Ruxolitinib	132.93	138.84	0.010
RVX-208	118.51	128.10	0.080
Sabutoclax	1.12	0.98	<0.001
Sapitinib	74.47	87.90	0.730
Savolitinib	12.95	19.96	0.080
SB216763	207.00	198.63	0.020
SB505124	10.40	11.53	<0.001
SCH772984	14.12	13.31	0.640
Selumetinib	68.94	62.39	<0.001
Sepantronium bromide	3.23	1.04	0.010
Sinularin	45.52	43.32	<0.001

Sorafenib	15.07	23.02	<0.001
Staurosporine	0.08	0.08	0.180
TAF1_5496	53.86	79.58	0.360
Talazoparib	32.05	34.76	<0.001
Tamoxifen	36.40	48.58	0.230
Taselisib	23.26	19.12	0.020
Telomerase Inhibitor IX	2.30	2.84	<0.001
Temozolomide	450.23	492.60	<0.001
Teniposide	13.29	3.21	<0.001
Topotecan	2.67	1.46	0.340
Tozasertib	18.10	21.57	0.010
Trametinib	3.91	2.61	0.030
Ulixertinib	18.72	18.88	0.020
Ulixertinib	12.88	11.84	0.240
ULK1_4989	18.90	11.59	0.540
UMI-77	80.67	34.94	0.060
Uprosertib	28.41	31.31	0.200
Uprosertib	116.17	36.66	<0.001
VE821	75.14	114.80	0.250
VE-822	39.67	62.13	<0.001
Venetoclax	8.91	10.34	0.510
Vinblastine	0.08	1.01	0.100
Vincristine	2365.60	18.19	0.500
Vinorelbine	0.18	0.83	0.160
Vorinostat	4.63	5.26	0.130
VSP34_8731	21.65	14.13	0.010
VX-11e	22.50	20.22	<0.001
Wee1 Inhibitor	10.35	42.86	0.050
WEHI-539	47.73	39.40	0.040
WIKI4	45.42	41.51	0.020
Wnt-C59	76.04	85.71	<0.001
WZ4003	53.97	45.80	0.520
XAV939	87.31	88.78	0.060
YK-4-279	20.16	216.44	0.490
ZM447439	20.98	20.03	0.210
Zoledronate	45.84	54.65	<0.001

IC₅₀, half maximal inhibitory concentration.