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Apoptosis

APAF1	BCL2L1	CARD11	CASP4	CD5L	FADD	KSR2	OPTN	SAMD12	TCF19
BAX	BCL2L11	CASP1	CASP5	COR01A	FAS	LRG1	PLA2G6	SAMD9	XAF1
BCL10	BCL6	CASP10	CASP8	DAPK2	FASLG	MECOM	PYCARD	SPOP	
BCL2	BID	CASP3	CAV1	DAPL1	GLIPR1	MELK	RIPK2	TBK1	

Cancer Antigens

ANKRD30A	BAGE2_BAGE3	CEACAM6	CTAG1A_1B	LIPE	MAGEA3_A6	MAGEC2	PAGE3	SPANXACD	SPANXN4	XAGE1B_1E
ARMCX6	BAGE4_BAGE5	CEACAM8	CTAG2	MAGEA1	MAGEA4	MTFR2	PAGE4	SPANXB1	SPANXN5	XAGE2
BAGE	CEACAM1	CT45_family	GAGE_family	MAGEA10	MAGEB2	PAGE1	PAGE5	SPANXN1	SYCP1	XAGE3
BAGE_family	CEACAM5	CT47_family	HPN	MAGEA12	MAGEC1	PAGE2	PBK	SPANXN3	TEX14	XAGE5

Cell Adhesion

ADAM17	CDH15	CLEC5A	DSG3	ICAM2	ITGA5	ITGB2	LAMC3	MBL2	PVR	UPK2
ADD2	CDH5	CLEC6A	DST	ICAM3	ITGA6	ITGB3	LAMP1	MTDH	RRAS2	UPK3A
ADGRE5	CLDN3	CLEC7A	EPCAM	ICAM4	ITGAE	ITGB4	LGALS1	NECTIN2	SELE	VCAM1
ALCAM	CLEC12A	CLEC9A	FBLN1	ITGA1	ITGAL	ITGB7	LGALS3	OCLN	SELL	ZYX
CD63	CLEC2B	DIAPH3	FXYD5	ITGA2	ITGAM	ITLN2	LYVE1	OLR1	SELPLG	
CD99	CLEC4A	DLGAP5	IBSP	ITGA3	ITGAX	JAML	M6PR	PECAM1	THY1	
CDH1	CLEC4C	DSC3	ICAM1	ITGA4	ITGB1	L1CAM	MADCAM1	PKP1	UNC5D	

Cell Cycle

ANAPC1	CCND3	CDCA5	CENPH	CNNM1	ESCO2	HORMAD2	KIF2C	MELK	ORC6	SKA3	TPX2
ASPM	CCNE1	CDCA8	CENPI	CNTLN	ESPL1	IKZF1	KIF4A	MND1	PATZ1	SP100	TRIP13
AURKA	CCNE2	CDK1	CENPL	CNTLN	ETS1	IKZF2	KIF5C	MYBL2	PIF1	SP110	TROAP
AURKB	CCNF	CDK4	CENPU	DBF4	ETS2	IKZF3	KIFC1	NCAPG	PIMREG	SPC24	TUBB
BEX1	CDK20	CDK6	CENPW	E2F2	EZH2	IKZF4	KNL1	NCAPG2	PKMYT1	SPC25	ZWILCH
BEX2	CDC25A	CDKN1A	CEP250	E2F7	GADD45GIP1	KDM5B	LMNA	NCAPH	POC1A	SPDL1	
BUB1	CDC25C	CDKN1B	CEP55	ECT2	GTSE1	KHDRBS2	LMNB1	NDC80	PRC1	STIL	
BUB1B	CDC45	CDKN2A	CGREF1	EGR1	H2AFZ	KIF14	MAD2L1	NPM1	RBX1	SUSD3	
CCNA2	CDC6	CDKN3	CIP2A	EGR2	HASPIN	KIF15	MCM10	NUF2	SALL2	TACC3	
CCNB1	CDT1	CDK2	CKAP2	EGR3	HEXIM2	KIF18B	MCM2	NUSAP1	SGO1	TEDC2	
CCNB2	CDCA2	CENPA	CKAP2L	ELK1	HIST1H2BH	KIF20A	MCM6	OIP5	SGO2	TFE1	
CCND1	CDCA3	CENPE	CLSPN	EP300	HORMAD1	KIF23	MCM7	ORC1	SKA1	TMPO	

Cytokines and Receptors

A2M	CCL25	CSF1R	CXCR3	IFNA_Family	IL13	IL1RL2	IL33	IRF7	PTGER3	TNFRSF11A	TNFSF18
ACKR3	CCL26	CSF2	CXCR4	IFNAR1	IL13RA1	IL1RN	IL34	IRF8	PTGER4	TNFRSF11B	TNFSF4
ANXA1	CCL27	CSF2RA	CXCR5	IFNAR2	IL13RA2	IL2	IL3RA	IRF9	PTGS1	TNFRSF12A	TNFSF8
APP	CCL28	CSF2RB	CXCR6	IFNB1	IL15	IL20	IL4	ISG20	PTGS2	TNFRSF13B	TNFSF9
ATXN1	CCL3	CSF3	DCN	IFNG	IL15RA	IL20RA	IL4R	ITK	SOCS1	TNFRSF13C	TRAF2
BMP6	CCL4	CSF3R	EGFR	IFNGR1	IL16	IL20RB	IL5	LIF	SOCS3	TNFRSF14	TRAF3
BMP7	CCL5	CX3CL1	F2RL1	IFNL1	IL17A	IL21	IL5RA	LTB	SOCS5	TNFRSF17	TRAF6
CAMP	CCL7	CX3CR1	FGFR3	IFNL2	IL17B	IL21R	IL6	LTBP1	SPN	TNFRSF18	TRAP1
CCL1	CCL8	CXCL1	GDF15	IFNL3	IL17C	IL22	IL6R	LTBR	SPP1	TNFRSF19	TTK
CCL11	CCR1	CXCL10	HAVCR2	IFNL4	IL17D	IL22RA1	IL6ST	LY9	TGFB1	TNFRSF1A	TXLNA
CCL13	CCR10	CXCL11	HGF	IFNLR1	IL17F	IL22RA2	IL7	MIF	TGFB2	TNFRSF1B	VEGFA
CCL14	CCR2	CXCL12	IFI27	IGF1R	IL17RA	IL23A	IL7R	MST1R	TGFB1	TNFRSF21	VEGFC
CCL15	CCR3	CXCL13	IFI35	IGF2R	IL17RB	IL23R	IL9	NCF1	TGFBR1	TNFRSF25	XCL1
CCL16	CCR4	CXCL14	IFI44L	IGFBP3	IL18	IL24	IL9R	NGFR	TGFBR2	TNFRSF4	XCL1_XCL2
CCL17	CCR5	CXCL16	IFI6	IL10	IL18BP	IL25	IL25	IRAK1	NTRK2	TNFRSF8	XCR1
CCL18	CCR6	CXCL2	IFIH1	IL10RA	IL18R1	IL26	IL26	IRAK2	OLR1	THY1	
CCL19	CCR7	CXCL3	IFIT1	IL10RB	IL19	IL27	IL27	IRAK3	OSM	TNF	TNFSF10
CCL2	CCR8	CXCL5	IFIT2	IL11	IL1A	IL2RA	IL2RA	IRAK4	PDGFC	TNFAIP3	TNFSF11
CCL20	CCR9	CXCL6	IFIT3	IL11RA	IL1B	IL2RB	IL2RB	IRF1	PDGFRB	TNFAIP8	TNFSF12
CCL21	CCR10	CXCL8	IFIT5	IL12A	IL1R1	IL2RG	IL2RG	IRF2	PGF	TNFRSF10A	TNFSF13
CCL22	CKLF	CXCL9	IFITM1	IL12B	IL1R2	IL3	IL3	IRF3	PTGDR2	TNFRSF10B	TNFSF13B
CCL23	CMKLR1	CXCR1	IFITM2	IL12RB1	IL1RAP	IL31	IL31	IRF4	PTGER1	TNFRSF10C	TNFSF14
CCL24	CSF1	CXCR2	IFITM3	IL12RB2	IL1RL1	IL32	IL32	IRF5	PTGER2	TNFRSF10D	TNFSF15

Annotated Gene List

HTG EdgeSeq

Precision Immuno-Oncology Panel

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DNA Repair

AUNIP	DDIAS	EME1	FANCD2	HJURP	MSH5	PCLAF	POLR2A	RDM1	RNASEH2A
BMI1	DDX5	ERCC6L	FANCI	MSH2	MSH6	PCNA	RAD51	REV3L	SLFN11
CLCA2	DNMT1	EXO1	FEN1	MSH3	NUDT1	PML	RAD51AP1	RFC4	TOP2A
DCLRE1A	DONSON	FANCA	GINS4	MSH4	ORC1	POLQ	RAD54L	RMI2	

Drug Targets

ABL1	BTK	CD37	CXCR4	FLT1	IGF1R	KDR	PDCD1LG2	SLAMF7	TNFRSF18
ABL2	CD19	CD40	EGFR	FOLH1	IGF2R	LAG3	PIK3CA	SYK	TNFRSF4
ARG1	CD27	CSF1R	ERBB2	ICOS	IL2RB	MAP2K1	PIK3CD	TGFB1	TNFSF4
ARG2	CD274	CTAG1A_1B	ERBB3	IDO1	JAK1	MS4A1	PIK3CG	TGFB2	TYMS
BCL2	CD276	CTLA4	FGFR3	IDO2	JAK2	PDCD1	SLAMF1	TIGIT	VSIR

EMT, WNT Pathway and Cancer Stem Cells

ADAM17	BNC1	COL1A2	EPCAM	HMMR	IQGAP3	MELK	PDGFRB	RACGAP1	SOX2	THBD	WNT7B
APC2	CAV1	COL3A1	EPSTI1	HMX2	KDR	MLF1	PLAU	RBM24	SOX9	THBS1	ZEB1
AXL	CD44	CTNNB1	ERBB3	ID2	KREMEN1	MMP2	PLAUR	ROR2	SPIN4	TRABD2A	
CD24	CDH1	EFNA4	FAP	ID3	LAPTM5	MYC	PML	RUNX1	TCF12	TWIST1	
ACTR3B	CDKN2A	EFNB3	FN1	ID4	LCN2	MYOF	PODXL2	SEMA4D	TCF12	TWIST2	
AXIN1	CLDN3	EMP1	FZD3	IDH1	LOXL2	OSM	PTK7	SNAI1	TESC	VEGF	
AXIN2	COL1A1	EP300	HIF1A	IDH2	MECOM	OCLN	RAC1	SNAI2	THAP11	WNT5A	

Immunophenotyping and Response

IMMUNE RESPONSE

TH1 RESPONSE	BST2	CCR5	CD70	CTLA4	CXCL9	DPP4	IL12A	IL12RB2	IL22	STAT1	TBX21
	CCL4	CD38	CSF2	CXCL10	CXCR3	IFNG	IL12B	IL2	LTA	STAT4	TNF
TH2 RESPONSE	ADCY1	CDC7	GATA3	IL10	IL25	IL5	MAF	SMAD2			
	BIRC5	CENPF	GATA3	IL10	IL26	LAI2	NEIL3	STAT6			
	CDC25C	CXCR6	HELLS	IL13	IL4	LIMA1	PMCH	WDHD1			
TH17 RESPONSE	CCR4	IL17A	IL17C	IL17RA	IL21	IL24	RORC	TGFB			
	CCR6	IL17B	IL17F	IL1B	IL22	IL26	STAT3				
MDSC	ANPEP	ARG1	CD33	CD34	FUT4	IL10	ITGAM	TGFB1			

T CELLS

CYTOTOXIC CD8 T CELLS	CD27	CD8A	FLT3LG	GZMB	GZMM	KLRD1	NKG7	RUNX3			
	CD3E	CD8B	GNLY	GZMH	IFNG	KLRF1	PF4	SIGIRR			
	CD3G	EOMES	GZMA	GZMK	KLRB1	KLRK1	PRF1	TBX21			
GENERAL T CELL MARKERS	CD14	CD247	CD3D	CD3E	CD3G	CD5	CD96	LAMP1	SH2D1A	TRAT1	
	CD2	CD247	CD3D	CD3E	CD3G	CD6	IL2RB	LCK	TNFRSF25	ZAP70	
CD4 T HELPER	ANP32B	ATF2	BATF	CD28	CXCL13	FRYL	ICOS	LRBA	NUP107		
	ASF1A	B3GAT1	BORA	CD4	CXCR5	HEY1	KCNK5	MAF	PHF10		
REGULATORY T CELLS	FOXP3	IL2RA	KLF2								
MEMORY T CELLS	ATM	CYLD	FOXP1	NEFL	NFATC3	TCF7					
	CASP8	DOCK9	MAP3K1	NFATC1	REPS1	USP9Y					
EFFECTOR MEMORY T CELLS	AKT3	EWSR1	LTK								
	CCR2	FLI1	NFATC4								

OTHER IMMUNE CELLS

GAMMA DELTA TC	CD160	FEZ1	TARP								
NK CELLS	BCL2	DUSP4	FUT5	GZMB	KIR2DL1	KIR2DL4	KIR3DL2	KIR3DS1	MPPED1	NCAM1	
	CD160	FOXJ1	GTF3C1	IL21R	KIR2DL3	KIR3DL1	KIR3DL3	LAMP1	NCR1	NCR3LG1	
B CELL MARKERS	BLK	CCR9	CD22	CD79A	COCH	FCRL2	HLA-DQA1	MS4A1	PNOC	TCL1A	
	BLNK	CD19	CD72	CD79B	CR2	HLA-DQB	MEF2C	PAX5	SPIB	TNFRSF17	

Immunophenotyping and Response Continued

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DENDRITIC CELLS

DENDRITIC CELL MARKERS	CCL13	CCL17	CCL22	CD209	HSD11B1				
IMMATURE DENDRITIC CELLS	ABCG2 CD1A	CD1B CD1C	CD1E CSF1R	F13A1 FABP4	MMP12 PPARG	SYT17 TACSTD2			
ACTIVATED DENDRITIC CELLS	CCL1 CD83	EBI3 LAMP3	OAS3						
PLASMACYTOID DENDRITIC CELLS	CLEC4C IL3RA								

MYELOID CELLS

MACROPHAGE MARKERS	APOE ATG7	CCL7 CD163	CD68 CD84	CHIT1 CLEC5A	CXCL5 CYBB	EMP1 FN1	MARCO MS4A4A	MSR1 PPBP	
NEUTROPHIL MARKERS	ALOX15B ALOX5	CA4 CREB5	CSF3R CXCR1	CXCR2 FCAR	FPR1 FPR2	LILRB2 MME	S100A12 SIGLEC5	TNFRSF10C	
EOSINOPHIL MARKERS	CCR3 HES1	IL5RA KCNH2	PTGDR2 SMPD3	THBS1					
MAST CELL MARKER	CEACAM8 CMA1	CPA3 CTSG	GATA2 HDC	KIT MPO	MS4A2 PRG2	PTGS1 TAL1	TPSAB1		
MISC MONOCYTE MARKERS	CSF1R PLA2G7								

TUMOR CELL SURFACE RECEPTORS

T CELL INHIBITORY	BTLA CD160 CD200	CD244 CD274 CD274	CD28 CD48 CD80	CD86 CTLA4 HAVCR2	ITGB3 LGALS9				
T CELL STIMULATORY	CD244 CD27	CD28 CD40	CD40 CD40LG	CD40LG CD48	CD70 CD86	ICOS ICOSLG	TNFRSF14 TNFRSF9		
MHCI GENES	HLA-A HLA-B	HLA-C HLA-E	HLA-F HLA-G	MR1					
MHCII GENES	CD74	HLA-DMA	HLA-DMB	HLA-DOA	HLA-DOB	HLA-DPA1	HLA-DPB1		
IMMUNE CHECKPOINTS	ADORA2A CD160	CD276 CD44	CD52 CD8A	HHLA2 KIR3DL1	KLRD1 MS4A1	NRP1 TIGIT	TNFRSF25 TNFRSF8		

Kinases and Transcription Factors

ADAM17	ATM	DLX6	FYN	HNF1B	LYN	MAPK14	NEK2	PLK1	RELA	SSX1	TIRAP
ADD2	ATOH1	DUSP4	GBP1	HRAS	MAB21L2	MAPK3	NFKB1	PLK4	RELB	SSX2	TYK2
ADORA2B	AXL	DUSP6	GBP5	IHH	MAP2K1	MAPK8	NFKB2	PML	RGS20	STAT1	TYROBP
ADRB2	BRMS1L	ENO1	GPR18	IKKBK	MAP2K2	MAPKAPK2	NFKBIA	POU2AF1	RHOA	STAT2	VSNL1
AKT1	CEBPB	FGD6	GPR19	IKBKG	MAP2K4	MECOM	NMRAL1	POU2F2	RIC8A	STAT3	WNK2
AKT3	CHUK	FICD	GRAP2	IRGM	MAP2K6	MERTK	NOTCH1	POU5F1	RIPK2	STAT4	ZWILCH
ARHGAP11A	CORO1A	FLT1	HCAR1	IRS1	MAP2K7	MGA	NOTCH3	PPM1E	RND2	STAT5A	
ARHGAP11B	CREB1	FLT3	HCAR2	JAK1	MAP3K1	MOB3A	OPTN	PRDM1	SH2D1B	STAT5B	
ARHGAP11C	CREBBP	FOS	HES5	JAK2	MAP3K5	MRAP2	PBX1	PRDM6	SHCBP1	STAT6	
ARHGAP26	CSK	FOXO1	HEY2	JAK3	MAP3K7	MT2A	PIK3CA	PTPN11	SIT1	STK32A	
ATF1	CTBP1	FOXG1	HEYL	JAKMIP3	MAP4	MTOR	PIK3CD	PTPN6	SKAP2	SVIL	
ATF2	DDX58	FOXM1	HLF	KSR2	MAP4K1	MX1	PIK3CG	PTPN7	SMAD2	SYK	
ATF3,activating	DEPDC1	FOXO1	HMGB1	LRP1	MAPK1	MXD3	PLEKHG4	RB1	SMAD3	TAB1	
ATF3,repressing	DLGAP5	FYB1	HNF1A	LTB4R	MAPK11	NCK1	PLEKHG6	REL	SMAD7	TBK1	

Metabolism

ABHD1	DGAT2	G6PD	GLB1L2	HMGCS2	KHK	PDHA2	PDK4	PRKCD	RRM2
ACP6	DGKA	GAD1	GPI	HMOX1	LGSN	PDHB	PDP1	PRKCE	SERINC2
ADA	DLAT	GCK	GUSB	HPDL	NOS2	PDHX	PFKFB3	PYCR1	TDO2
AHR	DLD	GCK_liver_T2	HK1	IDH1	NOS3	PDK1	PFKFB4	PYGL	TK1
ASRGL1	ENO1	GCK_pan_T2	HK2	IDH2	NOX1	PDK2	PKLR	RAC1	TYMS
CHDH	FM05	GGT7	HMBS	ITPKC	PDHA1	PDK3	PKM	RRM1	YWHAZ

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MHC and Associated Receptors

CIITA	FCGR2A_2C	FCRLA	HLA-DMB	HLA-DQA1	HLA-DRB1	JCHAIN	KIR2DL5A_5B	KIR3DL2	LILRA4	MR1	TAPBP
FCAR	FCGR2B	HLA-A	HLA-DOA	HLA-DQA2	HLA-E	KIR2DL1	KIR2DS2_2DS4	KIR3DL3	LILRB1	NLRC5	
FCERTG	FCGR3A_3B	HLA-B	HLA-DOB	HLA-DQB1	HLA-F	KIR2DL1_2DL2	KIR2DS4	KIR3DS1	LILRB2	NLRP3	
FCER2	FCMR	HLA-C	HLA-DPA1	HLA-DQB2	HLA-G	KIR2DL3	KIR2DSx	KIR-panL	MICA	TAP1	
FCGRI1A_FCGR1B	FCRL2	HLA-DMA	HLA-DPB1	HLA-DRA	IGSF6	KIR2DL4	KIR3DL1	KIR-panS	MICB	TAP2	

TCGA Immune Modulator Genes

CO STIMULATOR	CD28	CD80	ICOSLG								
CO INHIBITOR	CD274	CD276	PDCD1LG2	SLAMF7	VTCN1						
LIGAND	CCL5	CD70	CXCL10	IFNA1	IFNG	IL12A	IL1B	IL4	TNF	TNFSF9	VEGFB
	CD40LG	CX3CL1	CXCL9	IFNA2	IL10	IL1A	IL2	TGFB1	TNFSF4	VEGFA	
RECEPTOR	ADORA2A	CD27	CTLA4	ICOS	KIR2DL1	LAG3	TIGIT	TNFRSF14	TNFRSF4		
	BTLA	CD40	HAVCR2	IL2RA	KIR2DL3	PDCD1	TLR4	TNFRSF18	TNFRSF9		
CELL ADHESION	ICAM1	ITGB2									
ANTIGEN PRESENTATION	HLA-A	HLA-C	HLA-DPB1	HLA-DQA2	HLA-DQB2	HLA-DRB1	MICB				
	HLA-B	HLA-DPA1	HLA-DQA1	HLA-DQB1	HLA-DRA	MICA					
OTHER	ARG1	ENTPD1	GZMA	HMGB1	IDO1	PRF1					
UBIQUITIN AND PROTEASOME	CBLB	HERC6	NMRAL1	PSMB5	PSMB7	PSMB9	RBX1	TSG101	UBE2C	UBE3A	USP9Y
	DTL	ISG15	PSMB10	PSMB6	PSMB8	PSMD7	SKP2	UBA6	UBE2T	UHRF1	

Toll-like Receptors

AGER	LY86	MYD88	TICAM1	TIRAP	TLR10	TLR3	TLR5	TLR7	TLR9
CD180	LY96	SMPDL3B	TICAM2	TLR1	TLR2	TLR4	TLR6	TLR8	TOLLIP