

QIAseq RNA Fusion XP Panels

Oncology Research

Cat. nos. 334602 JHS-300IZ-12 and 334605 JHS-300IZ-96

For constructing molecularly barcoded libraries from RNA for gene fusion, exon skipping, gene expression, and RNA SNV/InDel analysis using digital NGS

The QIAseq RNA Fusion XP Oncology Research Panel permits the use of next-generation sequencing using 4,366 primers to detect fusions to 445 genes and RNA SNP/indels in 110 genes frequently observed in many cancer samples as well as the relative gene expression of 289 genes with signatures relevant to oncology. Such frequently detected mutations and fusions are likely to be relevant or even important to cancer biology and may be used in translational research to classify samples with known phenotypes. Using the Catalogue of Somatic Mutations in Cancer (COSMIC), frequently mutated genes and frequently detected fusions were collected for bone cancers, brain cancers, breast cancers, colorectal cancers, kidney cancers, leukemias, liver cancers, lung cancers, lymphomas, myelodysplastic syndromes (MDS), myeloproliferative neoplasms (MPN), ovarian cancers, pancreatic cancers, prostate cancers, sarcomas, skin cancers, thyroid cancers, urinary tract cancers, uterine cancers, other myeloid neoplasms, and other solid tumors. For the same cancer types, additional fusions were also collected from the Archer Quiver Database, the Human Somatic Mutation Database (HSMD), requests and suggestions by QIAGEN KOLs and SMEs, and other peer-reviewed publications. Genes signatures important for immuno-oncology research were collected from peer-reviewed publications. Using digital DNA sequencing, fusions to, relative gene expression of, and RNA SNP/indels in three different focused panels of genes relevant to oncology can be assessed with this primer pool.

For further details, consult the *QIAseq RNA Fusion XP Panels Handbook*.

Shipping and storage

The QIAseq RNA Fusion XP Panel Kit is shipped with dry ice (Box 1) and must be stored at -20°C upon arrival. Box 2 (QIAseq Beads) is shipped on cold packs and should be stored at 4°C . When stored under these conditions and handled correctly, the product can be kept based on the expiration date on each component without reduction in performance.

Note: Open the package and store the products appropriately immediately upon receipt.



Panel Contents

QIAseq RNA Fusion XP Panel catalog number	334602	334605
No. of preps	12	96
Box 1 of 2		
QIAseq RNA Fusion XP Panel	48 µL	384 µL
RP Primer II	12 µL	96 µL
EZ Reverse Transcriptase	15 µL	96 µL
BC3 Buffer, 5x	24 µL	192 µL
RNase Inhibitor	12 µL	96 µL
RH RNase	12 µL	96 µL
dNTP II	18 µL	144 µL
BLU Buffer, 10x	24 µL	192 µL
POL Enzyme	12 µL	96 µL
ERA Enzyme	120 µL	960 µL
ERA Buffer, 10x	60 µL	480 µL
DNA Ligase	120 µL	960 µL
Ligation Buffer, 5x	240 µL	2 × 1250 µL
TEPCR Buffer, 5x	60 µL	500 µL
RNA Buffer II, 5x	48 µL	2 × 384 µL
TaqIT Plus enzyme	15 µL	2 × 120 µL
HotStarTaq® DNA Polymerase	30 µL	240 µL
Box 2 of 2		
QIAseq Beads	10 mL	55 mL

Gene Table: RNA Fusions

Gene Symbol	Gene Symbol	Gene Symbol	Gene Symbol	Gene Symbol	Gene Symbol	Gene Symbol	Gene Symbol
ABI1	ABI2	ABL1	ABL2	ACSL3	ACSL6	ACTN4	ACVR2A
ADGRG7	AFDN	AFF1	AFF3	AFF4	AGGF1	AGK	AKAP9
AKT1	AKT2	AKT3	ALK	ANLN	ARHGAP26	ARHGEF12	ARL17A
ASNS	ASPSCR1	ATF1	ATF7IP	ATIC	ATXN2L	AUTS2	AXL
BAG4	BAIAP2L1	BCL11A	BCL11B	BCL2	BCL6	BCL9	BCOR
BCR	BIRC3	BRAF	BRD3	BRD4	BTBD18	CAMTA1	CANT1
CARS	CASC5	CBFA2T3	CBFB	CBL	CCDC6	CCDC88C	CCNB3
CCND1	CCND3	CD28	CD74	CDK6	CDX1	CEP170B	CEP85L
CEP89	CHD1	CHIC2	CIC	CIITA	CITED2	CLCN6	CLIP4
CLTC	CNTRL	COL1A1	COL6A3	CREB1	CREB3L1	CREB3L2	CREBBP
CREM	CRLF2	CRTC1	CSF1	CSF1R	CT45A2	CTLA4	CUX1
CXorf67	DAB2IP	DAZL	DCTN1	DDIT3	DDX10	DDX3X	DDX5
DEK	DHH	DIAPH2	DNAH5	DUSP22	DVL2	EBF1	EGFR
EIF4A1	ELK4	ELL	ELN	EML1	EML4	EP300	EPC1
EPOR	EP515	ERBB2	ERBB4	ERC1	ERG	ESR1	ESRP1
ESRRA	ESRRB	ETV1	ETV4	ETV5	ETV6	EW5R1	EZR
FAM131B	FCHSD1	FER	FEV	FGF1	FGFR1	FGFR1OP	FGFR2
FGFR3	FGR	FIP1L1	FLI1	FLNA	FLT3	FN1	FNBP1
FOXO1	FOXO3	FOXO4	FOXP1	FRYL	FUS	GAS7	GATA1
GATM	GCC2	GLI1	GLIS2	GLRX5	GNAI1	GOLGA5	GOPC
GOT1	GPHN	GTF2H3	HACL1	HAUS1	HERPUD1	HEY1	HIP1
HLA-DRB1	HLF	HMGA2	HNRNPA2B1	HNRNPUL1	HOOK3	HOXA11	HOXA13
HOXA9	HOXC11	HOXC13	HOXD13	IGLL5	IKZF2	IKZF3	IL2RB
INPP5D	INSR	IRF2BP2	ITK	JAK1	JAK2	JAK3	JAZF1
KANK1	KANS1	KAT6A	KDM5A	KIAA1217	KIAA1524	KIF5B	KIT
KLC1	KLF17	KLF2	KMT2A	KMT2A	KMT2E	KRAS	KTN1
LASPI	LEUTX	LGR5	LMNA	LNPI	LPP	LRIQ3	LSM14A
LYN	MALT1	MAML2	MAML3	MAN2A1	MAPK13	MAPRE1	MAST1
MAST2	MBTD1	MEAF6	MECOM	MED12	MEF2D	MET	MKL1
MKL2	MKRN1	MLF1	MLLT1	MLLT10	MLLT11	MLLT3	MLLT6
MN1	MNX1	MPRIIP	MSMB	MSN	MUSK	MYB	MYC
MYH11	MYO1F	MYO5A	NAB2	NCKIP5D	NCOA1	NCOA2	NCOA4
NDE1	NDRG1	NF1	NFATC2	NFKB2	NOTCH1	NOTCH2	NPM1
NR4A3	NRG1	NSD1	NTRK1	NTRK2	NTRK3	NUMA1	NUMBL
NUP107	NUP214	NUP98	NUTM1	NUTM2A	NUTM2B	P2RY8	PAG1
PAN3	PAP5S1	PATZ1	PAX3	PAX5	PAX7	PAX8	PBX1
PBX3	PCM1	PDCD1LG2	PDGFB	PDGFRA	PDGFRB	PD55A	PHF1
PHF23	PICALM	PIK3CA	PIM1	PKN1	PLAG1	PLEKHA6	PML
POU5F1	PPARG	PPF1BP1	PRCC	PRDM10	PRDM16	PRKARIA	PRKCA
PRKCB	PRKG2	PRRX1	PSIP1	PSMA2	PTK2B	PTPRK	PTPRR
PWAP2A	RAD51	RAF1	RANBP2	RAP1GDS1	RARA	RBM15	RCSD1
REL	RELA	RET	RHEBL1	RNF130	ROS1	RPL22	RPN1
RSPO2	RSPO3	RUNX1	RUNX1T1	S100A10	S100A7	SALL2	SARNP
SDC4	SEC31A	SEMA6A	SEPT2	SEPT5	SEPT6	SEPT9	SEPTIN14
SEPTIN2	SEPTIN5	SEPTIN6	SEPTIN9	SET	SETD2	SFPQ	SH3GL1
SLC34A2	SLC3A2	SLC45A3	SMARCA5	SND1	SORBS2	SP3	SPI1
SQSTM1	SRF	SRGAP3	SS18	SS18L1	SSBP2	SSX1	SSX2
SSX2B	SSX4B	STARD3NL	STAT5B	STAT6	STIL	STMN1	STRN
SUZ12	SYK	TACC1	TACC3	TAF15	TAL1	TBLIXR1	TCF12
TCF3	TCF7	TCF7L2	TEAD1	TERT	TET1	TFE3	TFEB
TFG	THADA	THAP4	TMPRSS2	TNIP1	TOM1L2	TOMM40	TOPI
TOP3A	TP63	TPM3	TPM4	TPR	TRA2B	TRIM24	TRIM27
TRIM33	TRIP11	TSLP	TYK2	UBA2	UBE2L3	USP42	USP6
USP9X	VAV1	VCL	VGLL2	VSNL1	VTI1A	WHSC1L1	WT1
WTIP	YAP1	YWHAE	ZBTB16	ZC3H7B	ZCCHC7	ZFYVE19	ZMIZ1
ZMYM2	ZNF384	ZNF521	ZNF703	ZSCAN30			

Gene Table: Gene Expression

Gene Symbol	Gene Symbol	Gene Symbol	Gene Symbol	Gene Symbol	Gene Symbol
ACTG1	ADAM17	ADAM28	ADORA2A	AKNA	AKT3
ANP32B	AOAH	APOE	APP	ARHGAP9	ATM
B2M	BANK1	BATF	BCL2	BCL6	BLK
BNIP3L	BTLA	BTNL2	C10orf54	CACNA2D2	CAPZB
CARD11	CARD16	CCL1	CCL13	CCL17	CCL22
CCL4	CCL5	CCL7	CCR2	CCR3	CCR6
CD109	CD160	CD19	CD1A	CD1B	CD1E
CD2	CD200	CD200R1	CD209	CD244	CD247
CD27	CD274	CD276	CD28	CD38	CD3D
CD3E	CD3G	CD40	CD40LG	CD44	CD48
CD52	CD6	CD68	CD69	CD70	CD74
CD79A	CD80	CD86	CD8A	CD8B	CDK2
CDKN2A	CHIT1	CLEC11A	CMA1	CMKLR1	CORO1A
CORO1B	CR2	CSF2	CSF3R	CSNK1E	CTLA4
CTSG	CX3CL1	CXCL10	CXCL11	CXCL13	CXCL5
CXCL9	CXCR4	CXCR6	DOCK9	DPP4	EBI3
EHD1	EOMES	ERBB2	EW5R1	F13A1	FAS
FEZ1	FLT3	FLT3LG	FMNL1	FOXP1	FOXN3
FOXP3	FPR2	FUT5	FYB	GATA3	GBA2
GBP1	GTF3C1	GZMA	GZMB	GZMM	HAVCR2
HHLA2	HIVEP1	HIVEP2	HLA-A	HLA-B	HLA-C
HLA-DMA	HLA-DMB	HLA-DOA	HLA-DOB	HLA-DPA1	HLA-DPB1
HLA-DQA1	HLA-DQA2	HLA-DQB1	HLA-DQB2	HLA-DRA	HLA-DRB1
HLA-DRB5	HLA-E	HLA-F	HLA-G	HLA-H	HSD11B1
ICOS	ICOSLG	IDO1	IDO2	IFI16	IFI27
IFI30	IFI44L	IFITM1	IFNG	IGHA1	IGHM
IGSF6	IKZF1	IL12RB2	IL15RA	IL17A	IL17RA
IL21R	IL26	IL2RB	IL3RA	IL5RA	INHBA
IRF1	IRF2	ITGA4	ITGAV	ITGB2	ITGB3
ITGB7	ITPKA	JAK1	KIR3DL1	KIT	KLRC1
KLRD1	LAG3	LAIR1	LAIR2	LAMP3	LARGE
LGALS9	LILRB1	LILRB3	LSM4	LST1	LTA
LTA4H	LTK	MAF	MAP3K14	MARCO	MICA
MICB	MME	MPPED1	MR1	MS4A1	MS4A2
MSR1	MYC	NAB2	NAIP	NCR1	NEFL
NFAM1	NFATC4	NFKBIL1	NKG7	NRAS	NRP1
NUP107	OAS3	ODF2	OPTN	PAX5	PDCD1
PDCD1LG2	PHKG2	PLA2G2D	PLA2G6	PMCH	POU2AF1
PPIF	PRF1	PRG2	PRRC2B	PSMB10	PSMB9
PTEN	PTGDR2	PTPRCAP	RBL2	REPS1	RHOC
RORC	RRAD	SELL	SERPINA3	SERPINB9	SH3BP5
SHMT2	SIGMAR1	SMAD2	SMAD3	SMPD3	STAT1
STAT4	STAT6	SYTI7	SYTL1	TAP1	TAP2
TAPBPL	TBX21	TGFB1	THBS1	TIA1	TIGIT
TIMP1	TMC8	TMIGD2	TNFRSF13B	TNFRSF14	TNFRSF17
TNFRSF18	TNFRSF19	TNFRSF25	TNFRSF4	TNFRSF8	TNFRSF9
TNFSF14	TNFSF15	TNFSF4	TNFSF9	TPSAB1	TRAC
TRGC1	TRGC2	TXK	USP9Y	VTCN1	ZFYVE9
ZNF205					

Gene Table: RNA SNP/indel

Gene Symbol	Gene Symbol	Gene Symbol	Gene Symbol
ABL1	ACVR1B	AKT1	ALK
AMER1	APC	AR	ARID1A
ARID2	ASXL1	ATM	B2M
BCL2	BCOR	BRAF	BTB
CBL	CBLB	CD79B	CDKN2A
CHEK2	CIC	CREBBP	CSF3R
CTNNA1	CUX1	CXCR4	DAXX
DICER1	DNM2	DNMT3A	EGFR
EPAS1	ERBB2	ERBB3	ESR1
EZH2	FBXW7	FGFR1	FGFR2
FGFR3	FGFR4	FLT3	FOXO1
GATA2	GNAI1	GNAQ	GNAO1
H3F3A	HIST1H3B	HRA5	ID3
IDH1	IDH2	JAK1	JAK2
JAK3	KIT	KMT2D	KRAS
MAP2K1	MAP2K2	MAPK1	MED12
MET	MLH1	MPL	MYC
MYCN	MYD88	NFE2L2	NKX2-1
NOTCH2	NRAS	PAX5	PBRM1
PDGFRA	PIK3CA	PIK3R1	PLCG1
POLE	PPM1D	PPP2R1A	PRSS1
PTEN	PTPN11	RAC1	RAD21
RAF1	RET	RHOA	RUNX1
SETBP1	SF3B1	SMAD2	SMAD4
SMARCB1	SMO	SPOP	SRC
SRSF2	STAT3	STK11	TERT
TSHR	U2AF1	WHSC1	WT1
XPO1	ZRSR2		

Functional Groupings

GENE FUSIONS:

Bone Cancers:

Askins Tumors: ERG, EWSR1, FLI1, FUS.

Ewing's Sarcomas: ERG, ETV1, ETV4, EWSR1, FEV, FLI1, FUS, NFATC2, SMARCA5.

Giant Cell Tumors: EWSR1, FLI1.

Mesenchymal Chondrosarcomas: CDX1, HEY1, IRF2BP2, NCOA2.

Myxoid Chondrosarcomas: EWSR1, NR4A3, TAF15, TCF12, TFG.

Brain Cancers:

Gliomas: AKT2, BRAF, CLCN6, FAM131B, FGFR1, FGFR3, FIP1L1, GNAI1, GOPC, MKRN1, MYB, PDGFRA, PRKCB, RAF1, RNF130, ROS1, SRGAP3, TACC1, TACC3.

Neuroblastomas: EWSR1, FLI1.

Pilocytic Astrocytomas: CLCN6, FAM131B, GNAI1, MKRN1, RNF130, SRGAP3, TACC1.

Other Brain Cancers: EWSR1, FLI1, NAB2, PDGFRA, PRKCA, STAT6.

Breast Cancers:

Carcinomas: AKT2, BRD3, DAZL, ETV6, FGFR1, JAK1, KIT, MAST1, MAST2, NTRK3, PIK3CA, RAF1, TBL1XR1, ZC3H7B, ZNF703.

Ductal Carcinomas: DAZL, ETV6, NTRK3.

Other Breast Cancers: AKT3, ESR1, NOTCH2.

Colorectal Cancers:

Adenocarcinomas: ETV6, INSR, NTRK1, NTRK3, TCF7L2, TPM3, VTI1A.

Kidney Cancers:

Carcinomas: ALK, ASPSCR1, PRCC, TFE3, VCL.

Clear Cell Sarcomas: TERT.

Mesoblastic Nephromas: ETV6, NTRK3.

Renal Cell Carcinomas: TFE3, VCL.

Leukemia:

Acute Leukemia of Ambiguous Lineage: ABL1, AFF1, BCR, CT45A2, ETV6, EW5R1, GPHN, KMT2A, MLLT10, MN1, NUP214, PBX1, SET, TCF3, ZNF384.

Acute Lymphoblastic Leukemia (ALL): ABL1, ABL2, ACTN4, AFDN, AFF1, AFF3, AFF4, AGGF1, ANLN, ASNS, ATF7IP, AUTS2, BCL11B, BCL9, BCR, BTBD18, CASC5, CREBBP, CRLF2, CSF1R, DDX3X, EBF1, ELL, ELN, EML1, EP300, EPOR, EPS15, ESRRB, ETV6, EW5R1, FGFR1, FGFR1OP, FLT3, FOXO4, FOXP1, FRYL, GAS7, GPHN, HLF, HNRNPUL1, IL2RB, INPP5D, JAK2, KMT2A, KMT2E, LNP1, MAML2, MEF2D, MLLT1, MLLT10, MLLT3, MN1, MNX1, MYB, MYC, NCOA2, NOTCH1, NUP214, NUP98, P2RY8, PAG1, PAX5, PBX1, PCM1, PDGFRB, PICALM, PML, PRDM16, RAP1GDS1, RARA, RCSD1, RUNX1, SALL2, SET, SFPQ, SPI1, SSBP2, STIL, STMN1, TAF15, TAL1, TCF3, TCF7, TET1, TSLP, TYK2, USP9X, ZBTB16, ZCCHC7, ZMIZ1, ZMYM2, ZNF384, ZNF521.

Acute Myeloid Leukemia (AML): ABI1, ABI2, ABL1, AFDN, AFF1, AFF4, ALK, ANLN, ARHGAP26, ARHGEF12, BCOR, BCR, CASC5, CBFA2T3, CBF3, CBL, CCDC88C, CEP170B, CHD1, CHIC2, CREBBP, DAB2IP, DDX10, DEK, DHH, DIAPH2, ELL, EP300, EPS15, ERG, ETV6, FGFR1, FIP1L1, FLNA, FNBP1, FOXO3, FOXO4, FRYL, FUS, GAS7, GATA1, GLIS2, GPHN, HAUS1, HOXA9, HOXC11, HOXC13, HOXD13, IRF2BP2, JAK2, KAT6A, KDM5A, KIAA1524, KIT, KMT2A, LASP1, LNP1, LPP, LYN, MAML2, MECOM, MKL1, MLF1, MLLT1, MLLT10, MLLT11, MLLT3, MLLT6, MN1, MNX1, MYB, MYH11, MYO1F, NCKIPSD, NCOA2, NF1, NPM1, NSD1, NTRK3, NUMA1, NUP214, NUP98, PAN3, PBX1, PCM1, PDGFRA, PDGFRB, PDS5A, PHF23, PICALM, PML, PRDM16, PRRX1, PSIP1, PSMA2, PTPRR, RANBP2, RARA, RBM15, RHEBL1, RPL22, RPN1, RUNX1, RUNX1T1, SARNP, SEPT2, SEPT5, SEPT6, SEPT9, SET, SH3GL1, SORBS2, STAT5B, TAF15, TCF3, TET1, TFG, TOP1, TOP3A, TRIP11, TYK2, UBA2, USP42, WHSC1L1, WTIP, ZBTB16, ZFYVE19, ZNF384.

Acute Myelomonocytic Leukemia (AMML): FLNA, HOXD13, NUP98.

B-Cell Acute Lymphoblastic Leukemia (B-ALL): ABL1, ACTN4, AFF1, AFF3, AFF4, ATF7IP, BCR, BTBD18, CRLF2, EPS15, ERG, ESRRB, ETV6, EW5R1, FUS, GAS7, JAK2, KMT2A, MAPRE1, MLLT1, NUP214, P2RY8, PAX5, PBX1, PCM1, RUNX1, SET, SSBP2, TCF3, USP9X, ZNF384, ZNF521.

Blast Phase Chronic Myeloid Leukemia: ABL1, BCR, ETV6, JAK2.

Chronic Eosinophilic Leukemia: ACSL6, TNIP1.

Chronic Lymphocytic Leukemia (CLL): MYC, NOTCH1.

Chronic Myeloid Leukemia (CML): ABL1, BCR, CCDC88C, ETV6, HOXA11, HOXA13, JAK2, MECOM, MN1, NDE1, NUP98, PCM1, PDGFRB, RUNX1.

Chronic Myelomonocytic Leukemia (CMML): CREBBP, ELL, ETV6, KMT2A, MN1.

Myelodysplastic Syndromes (MDS): ABL1, ACTN4, ALK, CASC5, CREBBP, DEK, ERG, ETV6, FRYL, FUS, HOXD13, JAK2, KMT2A, LNP1, MAML2, MECOM, MLF1, MN1, MNX1, NDE1, NPM1, NUP214, NUP98, PCM1, PDGFRB, PRDM16, PTPRR, RANBP2, RUNX1, RUNX1T1, TOP1.

Myeloproliferative Neoplasms (MPN): ABL1, ACSL6, BCR, ETV6, FGFR1, FGFR1OP, FIP1L1, FLT3, HOXA9, HOXD13, JAK2, LYN, MECOM, MLF1, MN1, NPM1, NUP98, PDGFRB, PRKG2, PSIP1, RARA, RUNX1, TNIP1, ZMYM2.

T-Cell Acute Lymphoblastic Leukemia (T-ALL): ABL1, AFDN, AGGF1, ASNS, BCL11B, BCR, CASC5, DDX3X, ETV6, JAK2, KMT2A, KMT2E, MLLT1, MLLT10, NOTCH1, NUP214, PBX1, RUNX1, SALL2, SET, SPI1, STIL, STMN1, TAL1, TCF3, TCF7.

Other Leukemias: BCL11B, IKZF2, IKZF3, IRF2BP2, MYC, NPM1, PDCD1LG2, SETD2, TYK2.

Liver Cancers:

Cholangiocarcinomas: CCDC6, FGFR2, TACC3.

Hepatocellular Carcinomas: PKN1.

Lung Cancers:

Acinar Adenocarcinomas: ALK, CD74, EML4, HIP1, KIF5B, ROS1, SDC4.

Adenocarcinomas: ALK, BAIAP2L1, BCL11A, BRAF, CCDC6, CD74, CUX1, EML4, ERBB2, ERBB4, EZR, FGFR2, FGFR3, GCC2, GOPC, HIP1, HLA-DRB1, KIAA1217, KIF5B, KLC1, LRIG3, MET, MPRIP, NCOA4, NRG1, NTRK1, NTRK2, PBX1, PRKCB, RET, ROS1, SDC4, SLC34A2, SND1, STARD3NL, STRN, TACC3, TCF3, TFG, TPM3, TPR, TRIM24, TRIM33.

Bronchioloalveolar Adenocarcinomas: ALK, EML4, KLC1, PBX1, ROS1, SDC4, TCF3.

Inflammatory Myofibroblastic Tumors: ALK, CD74, EML4, EZR, GOPC, LRIG3, PPFIBP1, ROS1, SDC4, SLC34A2, TPM3.

Invasive Mucinous Adenocarcinomas: ALK, CD74, EML4, NRG1, SLC3A2.

Mixed Adenosquamous Carcinomas: ALK, EML4, KIF5B, RET.

Mucoepidermoid Carcinomas: ALK, CRTC1, EML4, MAML2.

Non-Small Cell Carcinomas: ALK, BCL11A, CCDC6, CD74, CUX1, EGFR, EML4, EZR, GCC2, GOPC, HIP1, KIAA1217, KIF5B, KLC1, LRIG3, NCOA4, RET, ROS1, SDC4, SLC34A2, STRN, TFG, TPM3, TPR, TRIM33.

Non-Small Cell Lung Cancers (NSCLC): ALK, BAG4, BAIAP2L1, BCL11A, CCDC6, CD74, CLIP4, CUX1, DNAH5, EGFR, EML4, ETV6, EZR, FER, FGFR1, FGFR3, GCC2, GLRX5, GOPC, HIP1, HLA-DRB1, IRF2BP2, KIAA1217, KIF5B, KLC1, LRIG3, MAN2A1, MET, MPRIP, NCOA4, NRG1, NTRK1, NTRK3, RAD51, RET, ROS1, RUNX1, SDC4, SLC34A2, SLC3A2, SQSTM1, STRN, TACC3, TFG, TPM3, TPR, TRA2B, TRIM33, VSNL1.

Squamous Cell Carcinomas (SCC): ALK, BAIAP2L1, CD74, EML4, FGFR2, FGFR3, FGR, HIP1, KIF5B, KIT, NRG1, PKN1, PRKCA, PRKCB, RET, TACC3.

Other Carcinomas: ALK, BRD4, EML4, NUTM1.

Other Lung Cancers: ARL17A, BAG4, BAIAP2L1, CCDC6, CD74, CUX1, EZR, FGFR1, FGFR3, GOPC, IRF2BP2, KANSL1, KIAA1217, KIF5B, LRIG3, MPRIP, NCOA4, NRG1, NTRK1, NUTM1, PTPRK, RET, ROS1, RSPO3, SDC4, SLC34A2, SLC3A2, SQSTM1, TACC3, TPM3, TPR, TRIM33, WHSC1L1.

Lymphomas:

Acute Lymphoblastic Lymphomas: BCL11B, CREBBP, EBF1, KMT2A, MLLT10, MYC, P2RY8, PRDM16, STIL.

Anaplastic Large Cell Lymphomas: ADGRG7, ALK, ATIC, CLTC, MSN, MYC, NPM1, TFG, TPM3, TPM4.

Angioimmunoblastic T Cell Lymphomas: CD28, CTLA4, FIP1L1, PDGFRA.

Burkitt Lymphomas: BCL6, MYC, PBX1, TCF3.

Diffuse Large B Cell Lymphomas (DLBCL): ALK, BCL11A, BCL6, CCND3, CIITA, CLTC, IGLL5, LPP, MAPK13, MYC, NPM1, PIM1, REL, SQSTM1, TBL1XR1, TOMM40, TP63, ZCCHC7.

Follicular Lymphomas: AFF3, BCL2, BCL6, CIITA, MYC, TBL1XR1, TP63.

Granulocytic Sarcomas: RUNX1, RUNX1T1.

Hodgkin Lymphomas: ALK, CIITA, JAK2, NPM1, SEC31A.

Inflammatory Myofibroblastic Tumors: ALK, CARS, DCTN1.

Lymphoblastic Lymphomas: BCR, CRLF2, EPOR, ETV6, FGFR1, NOTCH1, PBX1, PDGFRB, RARA, TERT, ZCCHC7.

Lymphoblastic T Cell Lymphomas: BCR, ETV6, FGFR1, FIP1L1, LYN, PDGFRA.

Mantle Cell Lymphomas: CCND3, MYC.

Mediastinal Large B Cell Lymphomas (MLBL): CIITA, PDCD1LG2.

Mediastinal Large B-Cell Lymphomas: CIITA, PDCD1LG2.

Mucosa-Associated Lymphoid Tissue (MALT) Lymphomas: BCL6, BIRC3, CCND3, MALT1, MYC.

Peripheral T Cell Lymphomas: ALK, ETV6, FGFR3, IKZF2, ITK, MYO1F, NPM1, S100A7, SYK, TBL1XR1, THAP4, TP63, VAV1.

Precursor T Cell Lymphoblastic Lymphomas: ABL1, JAK2, NUP214, PCM1, SET.

T Cell Lymphomas: ATXN2L, BCL11B, FGFR1, IKZF2, JAK2.

Other Lymphomas: ALK, ATXN2L, BCL6, BIRC3, CBF3, CCND1, CCND3, CDK6, CHIC2, CLTC, DEK, DUSP22, EIF4A1, JAK2, KMT2A, MALT1, MKL1, MLF1, MLLT10, MYC, NFKB2, NPM1, PICALM, PRDM16.

Myelodysplastic Syndromes (MDS): ABL1, ACTN4, ALK, CASC5, CREBBP, DEK, DIAPH2, ERG, ETV6, FGFR1, FRYL, FUS, GOT1, HOXA11, HOXA13, HOXD13, JAK2, KMT2A, LNPI, MAML2, MECOM, MLF1, MN1, MNX1, MYH11, NDE1, NPM1, NUP214, NUP98, PAN3, PCM1, PDGFRB, PRDM16, P5MA2, PTPRR, RANBP2, RUNX1, RUNX1T1, SEPT9, SYK, TOP1, ZMYM2.

Myeloproliferative Neoplasms (NPM): ABL1, ACSL6, BCR, CNTRL, ETV6, FGFR1, FGFR1OP, FIP1L1, FLT3, FOXP1, HOXA9, HOXD13, JAK2, KANK1, LYN, MECOM, MLF1, MN1, NPM1, NUP98, PCM1, PDGFRA, PDGFRB, PRKG2, PSIP1, RARA, RUNX1, TNIP1.

Ovarian Cancers:

Carcinomas: ESRRA.

Serous Cyst Adenocarcinomas: AKT2, AXL, FGR, INSR, JAK1.

Pancreatic Cancers:

Acinar Cell Carcinomas: GATM, HAC11, HERPUD1, SND1, ZSCAN30.

Adenocarcinomas: ACSL3, ACVR2A, AKT3, BRAF, CANT1, DDX5, ELK4, ERG, ESRP1, ETV1, ETV4, ETV5, HNRNPA2B1, KLK2, KRAS, NDRG1, PIK3CA, RAF1, SLC45A3, TBL1XR1, TMPRSS2, UBE2L3.

Carcinomas: BRAF, RAF1.

Prostate Cancers:

Adenocarcinomas: ACSL3, ACVR2A, AKT3, BRAF, CANT1, DDX5, ELK4, ERG, ESRP1, ETV1, ETV4, ETV5, HNRNPA2B1, KLK2, KRAS, NDRG1, PIK3CA, RAF1, SLC45A3, TBL1XR1, TMPRSS2, UBE2L3.

Glandular Intraepithelial Neoplasia: ERG, TMPRSS2.

Other Carcinomas: ERG, ETV1, TMPRSS2.

Salivary Gland Cancers:

Adenomas: FGFR1, PLAG1.

Mucoepidermoid Carcinomas: CRTC1, MAML2.

Warthin Tumors: CRTC1, MAML2.

Other Carcinomas: ETV6, NTRK3.

Other Salivary Gland Cancers: MYB.

Sarcomas:

Alveolar Soft Part Sarcomas: ASPSCR1, TFE3.

Angiosarcomas & Epithelioid Haemangioendotheliomas: CAMTA1, CEP85L, CIC, LEUTX, ROS1, TFE3, YAP1.

Askins Tumors: ERG, EWSR1, FLI1, FUS.

Chondrosarcomas: ACVR2A, CDX1, EWSR1, FN1, HEY1, IRF2BP2, NCOA2, NR4A3, TAF15, TCF12, TFG.

Clear Cell Sarcomas: ATF1, CREB1, EWSR1, FLI1, NUTM2B, YWHAE.

Congenital (Infantile) Fibrosarcomas: ETV6, MET, NTRK3, TFG.

Dermatofibrosarcoma Protuberans: COL1A1, PDGFB.

Desmoplastic Small Round Cell Tumors: ERG, EWSR1, FLI1, PATZ1, WT1.

Endometrial Stromal Sarcomas: ALK, BCOR, CXorf67, EPC1, FN1, JAZF1, MBTD1, MEAF6, NUTM2A, NUTM2B, PHF1, SUZ12, YWHAE, ZC3H7B.

Epithelioid Sarcomas: CREB3L1, CREB3L2, EWSR1, FUS, KLF17, SS18, SSX1.

Ewing's Sarcomas: CIC, ERG, ETV1, ETV4, EWSR1, FEV, FLI1, FOXO4, FUS, NFATC2, SMARCA5, SP3.

Fibrosarcomas: BRAF, COL1A1, CREB3L1, CREB3L2, EWSR1, FUS, LMNA, NTRK1, PDGFB, TOM1L2.

Leiomyosarcomas: EWSR1, HMGA2, PBX3, WT1.

Liposarcomas: DDIT3, EWSR1, FUS, HMGA2, LGR5, NUP107, TERT.

Myofibroblastic Sarcomas: ALK, LMNA, NTRK1, RELA, ROS1, SRF, TFG, TPM3, YWHAE.

Myxofibrosarcomas: CREB3L1, CREB3L2, FUS.

Myxoid Chondrosarcomas: NR4A3, TAF15.

Perivascular Epithelioid Cell Tumors (PEComa): DVL2, SFPQ, TFE3.

Pleomorphic Sarcomas (Malignant Fibrous Histiocytoma): CITED2, MED12, PRDM10.

Rhabdoid Tumors: NCOA4, RET.

Rhabdomyosarcomas: CITED2, EWSR1, FLI1, FOXO1, NCOA1, NCOA2, PAX3, PAX7, SRF, TEAD1, VGLL2.

Small Round Cell Tumors: ERG, ETV1, EWSR1, FEV, FLI1, FOXO1, PAX3.

Solitary Fibrous Tumors: NAB2, STAT6.

Synovial Sarcomas: COL6A3, CSF1, S100A10, SS18, SS18L1, SSX1, SSX2, SSX2B, SSX4B.

Undifferentiated; Unclassified or Other Sarcomas: ATF1, BCOR, BRD4, CCNB3, CREM, ERG, ETV4, EWSR1, FGF1, FGFR1, FLI1, FN1, FOXO1, FUS, GLI1, JAZF1, MAML3, MKL2, NPM1, NUTM1, PAX3, PLAG1, POU5F1, RUNX1, RUNX1T1, SUZ12, USP6.

Skin Cancers:

Adnexal Tumors; Hidradenomas: CRTC1, MAML2.

Atypical Spitzoid Tumors: ALK, TPM3.

Benign Melanocytic Nevus: ALK, BRAF, CEP89, ERC1, FCHSD1, GOLGA5, KIF5B, LSM14A, MYO5A, PPFIBP1, PWWP2A, RET, ROS1, TPM3.

Melanomas: AGK, ATF1, BRAF, CREB1, EWSR1, FCHSD1, FGR, PAPSS1, TRIM24.

Spitzoid Melanomas: CEP89, LSM14A, MYO5A, PPFIBP1, PWWP2A.

Soft Tissue Cancer:

Clear Cell Sarcomas: ATF1, EWSR1.

Congenital (Infantile) Fibrosarcomas: ETV6, NTRK3.

Desmoplastic Small Round Cell Tumors: ERG, EWSR1.

Endometrial Stromal Sarcomas: ALK, FN1.

Epithelioid Sarcomas: SS18.

Desmoplastic Small Round Cell Tumors: SSX1.

Inflammatory Myofibroblastic Tumors: ALK, ATIC, CARS, CLTC, DCTN1, PPFIBP1, RANBP2, SEC31A, TPM3, TPM4.

Leiomyosarcomas: EWSR1, WT1.

Liposarcomas; Myxoid-Round Cell: DDIT3, EWSR1.

Liposarcomas; Pleomorphic: DDIT3, FUS.

Rhabdoid Tumors: NCOA4, RET.

Rhabdomyosarcomas: FOXO1, PAX3, PAX7.

Sarcomas: ETV4, EWSR1.

Small Round Cell Tumors: ETV1, EWSR1, FEV, FLI1.

Solitary Fibrous Tumors: NAB2, STAT6.

Synovial Sarcomas: SS18, SSX2, SSX2B.

Other Fibrosarcomas: COL1A1, PDGFB.

Stomach Cancers:

Adenocarcinomas: AKT1, ERBB2, INSR.

Thyroid Cancers:

Adenoma-Nodule-Goitre: CCDC6, NCOA4, PAX8, PPARG, PRKARIA, RET.

Anaplastic Carcinomas: ALK, CCDC6, NCOA4, RET, STRN.

Follicular Carcinomas: PAX8, PPARG.

Hurthle Cell Carcinomas: CCDC6, NCOA4, RET.

Mucoepidermoid Carcinomas: CRTC1, MAML2.

Papillary Carcinomas: AGK, AKAP9, ALK, BRAF, CCDC6, EML4, ERC1, ETV6, GOLGA5, HOOK3, KTN1, NCOA4, NTRK1, NTRK3, PAX8, PCMI, PPARG, PRKARIA, RET, STRN, TFG, TPM3, TRIM24, TRIM27, TRIM33.

Urinary Tract Cancers:

Endometrial Carcinomas: INSR, PIK3CA.

Transitional Cell Carcinomas: BAIAP2L1, FGFR3, TACC3.

Uterine Cancers:

Endometrial Carcinomas: INSR, PIK3CA.

Other Hematological Malignancies:

Eosinophilia: ETV6, FOXP1, LYN, PDGFRA.

Langerhans Cell Histiocytosis: NTRK3, PLEKHA6.

Plasma Cell Myelomas: ABL1, BCR.

Polycythemia Vera: GTF2H3.

Severe Thrombocytopenia: KANK1, PDGFRB.

Other Myeloid Neoplasms: KLF2, PTK2B, SEMA6A.

Other Solid Tumors:

Midline Carcinomas: BRD3, BRD4, NUTM1, WHSC1L1.

Squamous Cell Carcinomas (SCC): MAST2.

Other Solid Tumors: ARHGAP26, BRD3, INSR, MAST2, MSMB, MUSK, NUMBL, NUTM1, PDGFRB, RSPO2, THADA.

Other Cancers:

Midline Carcinomas: BRD3, BRD4, NUTM1, WHSC1L1.

Squamous Cell Carcinomas (SCC): MAST2.

Other Cancers: JAK3.

Commercial Control Samples: ALK, BAIAP2L1, BRAF, CCDC6, CD74, EGFR, EML4, ERG, ETV6, FGFR3, KIF5B, LMNA, MET, NCOA4, NTRK1, NTRK3, PAX8, PPARG, RET, ROS1, SEPT14, SLC34A2, SLC45A3, TACC3, TFG, TMPRSS2, TPM3.

GENE EXPRESSION:

Checkpoint Molecules:

Inhibitory on Tumor Cells: CD200, CD274, CD48, CD80, CD86, ITGAV, ITGB3, LGALS9, MICA, MICB, PDCD1LG2, TNFRSF14, VSIR.

Stimulatory on Tumor Cells: CD40, CD40LG, CD48, CD70, CD86, ICOSLG, TNFRSF9, TNFSF14, TNFSF4, TNFSF9.

Inhibitory on T Cells: BTLA, CD160, CD200R1, CD244, CD274, CD28, CTLA4, HAVCR2, KLRC1, LAG3, LILRB1, LILRB3, PDCD1, VSIR.

Stimulatory on T Cells: CD244, CD27, CD28, CD40, CD40LG, ICOS, TNFRSF14, TNFRSF18, TNFRSF4, TNFRSF9, TNFSF14, TNFSF9.

T Cell Receptor Genes: CD247, CD3D, CD3E, CD3G, TRAC, TRGC2.

Major Histocompatibility Complex I Genes: B2M, HLA-A, HLA-B, HLA-C, HLA-E, HLA-F, HLA-G, HLA-H, MR1.

Major Histocompatibility Complex II Genes: CD74, HLA-DMA, HLA-DMB, HLA-DOA, HLA-DOB, HLA-DPA1, HLA-DPB1, HLA-DQA1, HLA-DQA2, HLA-DQB1, HLA-DQB2, HLA-DRA, HLA-DRB1, HLA-DRB5, IFI30.

Other Checkpoint Molecules: ADORA2A, BTNL2, CD160, CD276, CD44, CD52, CD8A, HHLA2, IDO1, IDO2, KIR3DL1, KLRD1, LAIR1, MS4A1, NRP1, TIGIT, TMIGD2, TNFRSF25, TNFRSF8, TNFSF15, VTCN1.

Checkpoint Blockade Therapy Biomarkers: BTLA, CD274, CD80, CD8A, CSF2, CXCL11, HAVCR2, HLA-DRA, HLA-DRB1, HLA-DRB5, ICOS, IFNG, LAG3, PDCD1, PDCD1LG2.

Immuno Regulatory Gene Signature: ERBB2, FAS, IL5RA, INHBA, TNFRSF8, TNFSF4, TNFSF9.

Immuno Stimulatory Gene Signature: CD160, CD19, CD200, CD27, CD44, CTLA4, HLA-A, IL12RB2, IL17A, KIT, TNFRSF17.

Immuno Suppressive Gene Signature: CD274, CD276, HAVCR2, PDCD1LG2, TGFBI.

Upregulated in Cancer Vaccination Response: CCL5, CD3D, CD86, CD8A, CXCL10, CXCL9, GBP1, ICOS, IRF1, KLRD1, PSMB9, STAT1.

Immune Cell Markers:

CD8 T Cells: CD8A, CD8B, FLT3LG, GZMM, PRF1.

Th1 Cells: CCL4, CD38, CD70, CSF2, CTLA4, DPP4, IFNG, IL12RB2, LTA, STAT4, TBX21.

Th17 Cells: IL17A, IL17RA, RORC.

Th2 Cells: CXCR6, GATA3, IL26, LAIR2, MAF, PMCH, SMAD2, STAT6.

Follicular Helper T Cells: BCL6, CXCL13, MAF, PDCD1.

Other T Helper Cell Markers: ANP32B, BATF, CD28, ICOS, NUP107.

Regulatory T Cells: FOXP3.

Gamma Delta T Cells: CD160, FEZ1, TRGC1.

Central Memory T Cells: ATM, DOCK9, FYB1, NEFL, REPS1, TXK, USP9Y.

Effector Memory T Cells: AKT3, CCR2, EWSR1, IL15RA, LTK, NFATC4.

Other T Cell Markers: CD2, CD247, CD3D, CD3E, CD3G, CD6, IL2RB, TNFRSF25, TRAC, TRGC2.

Myeloid Derived Suppressor Cells: TGFBI.

Cytotoxic Lymphocytes: CD3E, CD3G, CD8A, CD8B, EOMES, GZMA, GZMB, IFNG, KLRC1, KLRD1, NKG7, TBX21.

Natural Killer Cells: BCL2, CD160, FOXP1, FUT5, GTF3C1, GZMB, IL21R, KIR3DL1, MPPED1, NCR1, PLA2G6, RRAD, ZNF205.

Activated Dendritic Cells: CCL1, EBI3, LAMP3, OAS3.

Immature Dendritic Cells: CD1A, CD1B, CD1E, F13A1, SYT17.

Myeloid Dendritic Cells: CD1A, CD1B, CD1E.

Plasmacytoid Dendritic Cells: IL3RA.

Other Dendritic Cell Markers: CCL13, CCL17, CCL22, CD209, HSD11B1.

Macrophages: APOE, CCL7, CD68, CHIT1, CXCL5, MARCO, MSR1.

Neutrophils: CSF3R, FPR2, MME.

Eosinophils: CCR3, IL5RA, PTGDR2, SMPD3, THBS1.

Mast Cells: CMA1, CTSG, KIT, MS4A2, PRG2, TPSAB1.

B Cells: BANK1, BLK, CD19, CD79A, CR2, HLA-DOB, HLA-DQA1, MS4A1, PAX5, TNFRSF17.

Antigen Presenting Cells: CMKLR1.

Regulatory T Cell Gene Signature: CD274, JAK1, PDCD1LG2, TIGIT, TNFRSF18, TNFRSF4, TNFRSF8, TNFRSF9.

T Cell Trafficking & Infiltration into Tumors:

Stimulates T Cell Trafficking & Infiltration into Tumors: CCL5, CX3CL1, CXCL10, CXCL9, ITGB2, SELL.

Other T Cell Trafficking & Infiltration into Tumors Genes: CCL17, CCL4, CCR3, CCR6, CD274, CD44, CSF2, CXCL11, CXCL13, FOXP3, IFNG, ITGA4, ITGB7, LTA, PDCD1, PDCD1LG2, PTEN, TNFRSF25, TNFSF14.

T Cell Exhaustion:

Upregulated in T Cell Exhaustion: CCL5, CD200, CD27, CD69, CTLA4, CXCL10, CXCL13, GBP1, HLA-DMA, HLA-DQA1, ICOS, IFI16, IFNG, ITGAV, TAP1, TIGIT, TNFRSF9.

Downregulated in T Cell Exhaustion: TNFRSF25.

T Cell Exhaustion Transcriptional Nodes: BATF, TBX21.

Responsiveness or Response Biomarkers:

Enhanced Expression in Responsive Versus Nonresponsive Cancers: APP, CAPZB, CCL4, CCL5, CD8A, CSNK1E, CTLA4, CXCL10, CXCL11, CXCL9, EBI3, EHD1, GBA2, GZMB, HLA-DQA1, IDO1, IFNG, INHBA, IRF2, NKG7, ODF2, PHKG2, PPIF, PRF1, SERPINA3, SHMT2, SIGMAR1, SMAD3, TIA1.

Suppressed Expression in Responsive Versus Nonresponsive Cancers: ACTG1, BNIP3L, CX3CL1, FOXN3, IFI27, JAK1, LTA4H, NAIP, OPTN, PRRC2B, PTEN, RBL2, TXK.

Differentially Expressed in Responsive Versus Nonresponsive Cancers: ADAM28, AKNA, AOA, ARHGAP9, CACNA2D2, CARD11, CARD16, CD109, CLEC11A, CORO1A, CORO1B, CXCR4, FLT3, FMNL1, HIVEP1, HIVEP2, IFI44L, IFITM1, IGHA1, IGHM, IGSF6, IKZF1, ITPKA, LSM4, LST1, MAP3K14, NFAM1, NFKBIL1, PLA2G2D, POU2AF1, PTPRCAP, SERPINB9, SH3BP5, SYTL1, TMC8, TNFRSF13B, TNFRSF19, ZFYVE9.

Expression Correlates with Positive Objective Response Rates: CD274, CD276, CTLA4, HAVCR2, IDO1, LAG3, PDCD1LG2, VTCN1.

Upregulated during Treatment: CD8A, CTLA4, CXCL10, EOMES, GZMA, GZMB, ICOS, IFNG, PRF1.

Regulated during Treatment: IRF1.

Pre-Treatment Response Prediction:

Predicts Enhanced Response: ADAM17, MYC, RHOC, TIMP1.

Other Pre-Treatment Response Predictors: CDK2, CDKN2A, LARGE1, NAB2, NRAS.

Cancer Cell Killing:

Inhibits Cancer Cell Killing: BTLA, CD274, CD80, HAVCR2, IDO1, IDO2, LAG3, MICA, MICB, PDCD1, TGFBI, VSIR, VTCN1.

Stimulates Cancer Cell Killing: IFNG.

Antigen Processing & Presentation:

Proteasome: PSMB10, PSMB9.

Proteases: IFI30.

Endoplasmic Reticulum & Lysosomal Transport: TAP1, TAP2, TAPBPL.

Major Histocompatibility Complex I Genes: B2M, HLA-A, HLA-B, HLA-C, HLA-E, HLA-F, HLA-G, HLA-H, MR1.

Major Histocompatibility Complex II Genes: CD74, HLA-DMA, HLA-DQA1, HLA-DRA, HLA-DRB1, HLA-DRB5, IFI30.

Immune Cell Receptors & Co-Receptors: CD8A, CD8B, KIR3DL1, KLRC1, KLRD1.

Stimulates Antigen Presentation: CD40, CD40LG.

Interferon Gamma Response:

Cytokines & Chemokines: CCL5, IL15RA, STAT1.

Major Histocompatibility Complex I Genes: B2M, HLA-A, HLA-B, HLA-C, HLA-E, HLA-F, HLA-G, HLA-H.

Major Histocompatibility Complex II Genes: HLA-DMA, HLA-DQA1, HLA-DRA, HLA-DRB1, HLA-DRB5, IFI30.

RNA Degradation: OAS3.

Transcription Factors: IRF1, IRF2.

Other Interferon Gamma Response Genes: CD44, GBP1.

Cytosolic DNA-Sensing Pathway:

Cytokines & Interferons: CCL4, CCL5, CXCL10.

RNA SNP/INDELS::

Oncogenes: ABL1, AKT1, ALK, AR, BCL2, BRAF, CBL, CTNNB1, DNMT3A, EGFR, ERBB2, EZH2, FGFR2, FGFR3, FLT3, FOXL2, GATA2, GNA11, GNAQ, GNAS, H3-3A, H3C2, HRAS, IDH1, IDH2, JAK1, JAK2, JAK3, KIT, KRAS, MAP2K1, MED12, MET, MPL, MYD88, NFE2L2, NRAS, PDGFRA, PIK3CA, PPP2R1A, PTPN11, RET, SETBP1, SF3B1, SMO, SPOP, SRC, SRSF2, TSHR, U2AF1.

Tumor Suppressor Genes: ACVR1B, AMER1, APC, ARID1A, ARID2, ASXL1, ATM, B2M, BCOR, CDKN2A, CIC, CREBBP, DAXX, FBXW7, KMT2D, MLH1, NOTCH2, PAX5, PBRM1, PIK3R1, PTEN, RUNX1, SMAD2, SMAD4, SMARCB1, STK11, WT1.

Cell Adhesion Molecules: ABL1, APC, CSF3R, CTNNB1, EGFR, ERBB2, JAK2, PDGFRA, PTEN, PTPN11, RAC1, RET, RHOA, SRC.

Angiogenesis: CTNNB1, ERBB2, FGFR2, GATA2, PIK3CA, PLCG1, PTEN, RUNX1.

Apoptosis: ABL1, APC, BCL2, BRAF, CBL, CTNNB1, DAXX, FLT3, FOXL2, HRAS, ID3, MYCN, PTEN, RAD21, RAF1, STK11, WT1.

Cell Cycle: ABL1, AKT1, APC, CDKN2A, CHEK2, CREBBP, CUX1, FBXW7, FGFR2, HRAS, ID3, MYC, PTEN, RAD21, RHOA, SMARCB1, STK11, XPO1.

DNA Damage & Repair: ABL1, APC, ATM, CHEK2, MLH1, POLE, RAD21, STK11.

Epigenetics: ARID1A, ARID2, ASXL1, BCOR, DICER1, DNMT3A, EZH2, H3-3A, H3C2, KMT2D, NSD2, PBRM1, SETBP1, SMARCB1, SPOP.

Hypoxia Signaling: CREBBP, EPAS1, SMAD4.

Immune Response: ALK, B2M, BTK, CBLB, CD79B, CREBBP, CXCR4, JAK1, JAK2, JAK3, MAP2K1, MAP2K2, MYD88, PAX5, PIK3CA, PIK3R1, PTEN, PTPN11.

Inflammatory Response: CXCR4, JAK2, MYD88.

Metabolism: IDH1, IDH2.

mRNA Splicing: SF3B1, SRSF2, U2AF1, ZRSR2.

Signal Transduction:

AKT & PI3 Kinase Signaling: AKT1, CBL, ERBB2, FLT3, JAK2, KIT, PDGFRA, PIK3CA, PIK3R1, PTEN.

Fibroblast Growth Factor Signaling: AKT1, FGFR1, FGFR2, FGFR3, FGFR4, PIK3CA, PIK3R1, PTEN, PTPN11, SRC.

G-Protein Coupled Receptor Signaling: AKT1, GNA11, GNAQ, GNAS, SMO, TSHR.

Hormone Receptors: AR, ESR1.

JAK / STAT Signaling: JAK1, JAK2, JAK3, STAT3.

MAP Kinase Signaling: MAP2K1, MAP2K2, MAPK1, NRAS, PPM1D, RAF1.

Notch Signaling: FBXW7, GATA2, NOTCH2.

Receptor Tyrosine Kinases: ALK, EGFR, ERBB2, ERBB3, FGFR1, FGFR4, FLT3, KIT, PDGFRA, RET.

TGFb Signaling: ACVR1B, SMAD2.

WNT Signaling: AMER1, APC, CTNNB1, MED12, PPP2R1A.

Other Signal Transduction Genes: KRAS, MET, SMAD4.

Transcription Factors: AR, CIC, CUX1, ESR1, FBXW7, FOXL2, GATA2, ID3, MYC, MYCN, NFE2L2, NKX2-1, PAX5, RUNX1, WT1.

Ubiquitination: BCOR, CBLB, DAXX.

Unfolded Protein Response: NFE2L2.

Other Cancer Related Genes: DNM2, MPL, PRSS1, TERT.

Ordering Information

Product	Contents	Cat. no.
QIAseq RNA Fusion XP Panel (12)	Kit containing ALL reagents (except indices) sufficient to process 12 samples for RNA sequencing analysis of gene fusions, gene expression and RNA SNP/InDel	334602
QIAseq RNA Fusion XP Panel (96)	Kit containing ALL reagents (except indices) sufficient to process 96 samples for RNA sequencing analysis of gene fusions, gene expression and RNA SNP/InDel	334605
QIAseq RNA Fusion XP Custom Panel	Kit containing reagents for first-strand synthesis, second- strand synthesis, end-repair/A-addition, gene-specific amplification, and QIAseq Beads for RNA Fusion XP sequencing, custom panel for 96 samples	334625
QIAseq RNA Fusion XP Booster Panel	Pool of primers used in combination with either catalogued or custom panels	334635
QIAseq 8-Unique Dual Index Set A (48)	Box containing unique dual-indexed adapters, for indexing up to 8 samples for QIAseq Targeted Panel sequencing on Illumina platforms; enough to process a total of 48 samples; the first of 2 sets required for multiplexing up to 16 samples	333715
QIAseq 8-Unique Dual Index Set B (48)	Box containing unique dual-indexed adapters, for indexing up to 8 samples for QIAseq Targeted Panel sequencing on Illumina platforms; enough to process a total of 48 samples; the second of 2 sets required for multiplexing up to 16 samples	333716
QIAseq 96-Unique Dual Index Set A (384)	Box containing unique dual-indexed adapters, for indexing up to 96 samples for QIAseq Targeted Panel sequencing on Illumina platforms; enough to process a total of 384 samples; the first of 2 sets required for multiplexing up to 192 samples	333725
QIAseq 96-Unique Dual Index Set B (384)	Box containing unique dual-indexed adapters, for indexing up to 96 samples for QIAseq Targeted Panel sequencing on Illumina platforms; enough to process a total of 384 samples; the second of 2 sets required for multiplexing up to 192 samples	333735
QIAseq 96-Unique Dual Index Set A V2 (96) *	Box containing unique dual-indexed adapters, for indexing up to 96 samples for QIAseq Targeted Panel sequencing on Illumina platforms; enough to process a total of 96 samples; four sets are required for multiplexing up to 384 samples	331745

Product	Contents	Cat. no.
QIAseq 96-Unique Dual Index Set B V2 (96) *	Box containing unique dual-indexed adapters, for indexing up to 96 samples for QIAseq Targeted Panel sequencing on Illumina platforms; enough to process a total of 96 samples; four sets are required for multiplexing up to 384 samples	331755
QIAseq 96-Unique Dual Index Set C V2 (96) *	Box containing unique dual-indexed adapters, for indexing up to 96 samples for QIAseq Targeted Panel sequencing on Illumina platforms; enough to process a total of 96 samples; four sets are required for multiplexing up to 384 samples	331765
QIAseq 96-Unique Dual Index Set D V2 (96) *	Box containing unique dual-indexed adapters, for indexing up to 96 samples for QIAseq Targeted Panel sequencing on Illumina platforms; enough to process a total of 96 samples; four sets are required for multiplexing up to 384 samples	331775
QIAseq 12-Index L (48)	Box containing oligos, enough for a total of 48 samples, for indexing up to 12 samples for targeted panel sequencing on Ion Torrent platforms	333764
QIAseq 96-Index L (384)	Box containing oligos in arrays, enough for a total of 384 samples, for indexing up to 96 samples for targeted panel sequencing on Ion Torrent platforms	333777
Human XpressRef Universal Total RNA	2 tubes each containing 100 µg human RNA at 1mg/mL	338112
RNeasy Mini Kit (50)	50 RNeasy Mini Spin Columns, Collection Tubes (1.5 mL and 2 mL), RNase-free reagents, and buffers	74104
RNeasy FFPE Kit (50)	50 RNeasy MinElute® Spin Columns, Collection Tubes, Proteinase K, RNase-Free DNase I, DNase Booster Buffer, RNase-free buffers, and Nuclease-Free Water	73504
PAXgene® Blood RNA Kit (50)	50 PAXgene Spin Columns, 50 PAXgene Shredder Spin Columns, Processing Tubes, RNase-Free DNase I, RNase-free reagents, and buffers; to be used in conjunction with PAXgene Blood RNA Tubes	762174
RNeasy Micro Kit (50)	50 RNeasy MinElute Spin Columns, Collection Tubes (1.5 mL and 2 mL), RNase-free DNase I, Carrier RNA, RNase-free reagents, and buffers	74004
QIAamp® RNA Blood Mini Kit (50)	50 QIAamp Mini Spin Columns, 50 QIAshredder Spin Columns, Collection Tubes (1.5 mL and 2 mL), RNase-free reagents, and buffers	52304

Product	Contents	Cat. no.
QIAseq FastSelect – rRNA HMR Kit (24)	Includes 3 tubes of QIAseq FastSelect reagent for rRNA removal: sufficient for 24 reactions from human, mouse, and rat samples	334386
QIAseq FastSelect – rRNA/Globin Kit (24)	Includes 1 tube of QIAseq FastSelect reagent for rRNA removal and 1 tube of QIAseq FastSelect reagent for globin mRNA removal	335376

QIAseq RNA Fusion XP Panels are intended for molecular biology applications. These products are not intended for the diagnosis, prevention or treatment of a disease.

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