

QIAseq RNA Fusion XP Panels

Solid Tumor

Cat. nos. 334602 JHS-002Z-12 and 334605 JHS-002Z-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 Solid Tumor Panel permits the use of next-generation sequencing using 3,161 primers to detect fusions to 286 genes and RNA SNP/indels in 21 genes frequently observed in solid tumor samples as well as the relative gene expression of 289 genes with signatures relevant to solid tumors. Such frequently detected mutations and fusions are likely to be relevant or even important to solid tumor 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, liver cancers, lung cancers, lymphomas, ovarian cancers, pancreatic cancers, prostate cancers, sarcomas, skin cancers, thyroid cancers, urinary tract cancers, 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 solid tumors 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 × 384µL
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
ABL1	ACSL3	ACVR2A	ADGRG7	AFF3	AGK
AKAP9	AKT3	ALK	ARHGAP26	ARL17A	ASPSCR1
ATF1	ATIC	ATXN2L	AXL	BAG4	BAIAP2L1
BCL11A	BCL2	BCL6	BCOR	BCR	BIRC3
BRAF	BRD3	BRD4	CAMTA1	CANT1	CARS
CBFB	CCDC6	CCNB3	CCND1	CCND3	CD28
CD74	CDK6	CDX1	CEP85L	CEP89	CHIC2
CIC	CIITA	CITED2	CLCN6	CLIP4	CLTC
COL1A1	COL6A3	CREB1	CREB3L1	CREB3L2	CREBBP
CREM	CRTC1	C5F1	CTLA4	CUX1	CXorf67
DAZL	DCTN1	DDIT3	DDX5	DEK	DNAH5
DUSP22	DVL2	EGFR	EIF4A1	ELK4	EML4
EPC1	ERC1	ERG	ESR1	ESRP1	ETV1
ETV4	ETV5	ETV6	EW5R1	EZR	FAM131B
FCHSD1	FER	FEV	FGF1	FGFR1	FGFR2
FGFR3	FGR	FIP1L1	FLI1	FN1	FOXO1
FOXO4	FUS	GATM	GCC2	GLI1	GLRX5
GNAI1	GOLGA5	GOPC	HACL1	HERPUD1	HEY1
HIP1	HLA-DRB1	HMGAA2	HNRNPA2B1	HOOK3	IGLL5
INSR	IRF2BP2	ITK	JAK2	JAZF1	KANS1L1
KIAA1217	KIF5B	KLC1	KLF17	KLK2	KMT2A
KRAS	KTN1	LEUTX	LGR5	LMNA	LRIG3
LSM14A	LYN	MALT1	MAML2	MAML3	MAN2A1
MAPK13	MAST1	MAST2	MBTD1	MEAF6	MED12
MET	MKL1	MKL2	MKRN1	MLF1	MLLT10
MPRIIP	MSMB	MSN	MUSK	MYB	MYC
MYO1F	MYO5A	NAB2	NCOA1	NCOA2	NCOA4
NDRG1	NFATC2	NFKB2	NOTCH1	NOTCH2	NPM1
NR4A3	NRG1	NTRK1	NTRK2	NTRK3	NUMBL
NUP107	NUP214	NUTM1	NUTM2A	NUTM2B	P2RY8
PAPSS1	PATZ1	PAX3	PAX7	PAX8	PBX1
PBX3	PCMI	PDCCD1LG2	PDGF8	PDGFRA	PDGFRB
PHF1	PIK3CA	PIM1	PKN1	PLAG1	POU5F1
PPARG	PPFIBP1	PRCC	PRDM10	PRDM16	PRKARIA
PRKCA	PRKCB	PTPRK	PWWP2A	RAD51	RAF1
RANBP2	REL	RELA	RET	RNF130	ROS1
RSP02	RSP03	RUNX1	RUNX1T1	S100A10	S100A7
SDC4	SEC31A	SEPTIN14	SET	SFPQ	SLC34A2
SLC3A2	SLC45A3	SMARCA5	SND1	SP3	SQSTM1
SRF	SRGAP3	SS18	SS18L1	SSX1	SSX2
SSX4B	STARD3NL	STAT6	STIL	STRN	SUZ12
SYK	TACC1	TACC3	TAF15	TBL1XR1	TCF12
TCF3	TCF7L2	TEAD1	TERT	TFE3	TFEB
TFG	THADA	THAP4	TMPRSS2	TOM1L2	TOMM40
TP63	TPM3	TPM4	TPR	TRA2B	TRIM24
TRIM27	TRIM33	UBE2L3	USP6	VAV1	VCL
VGLL2	VSNL1	VT11A	WHSC1L1	WT1	YAPI
YWHAE	ZC3H7B	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	EWSR1	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	SYT17	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	Gene Symbol	Gene Symbol
AKT1	ALK	BRAF	CTNNB1	EGFR	ERBB2
ERBB3	ESR1	FOXL2	GNAI1	GNAQ	IDH1
IDH2	KIT	KRAS	MET	NRAS	PDGFRA
PIK3CA	RAF1	RET			

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: 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: BRD3, DAZL, ETV6, FGFR1, MAST1, MAST2, NTRK3, PIK3CA, RAF1, TBL1XR1, ZC3H7B, ZNF703.

Ductal Carcinomas: DAZL, ETV6, NTRK3.

Other Breast Cancers: AKT3, ESR1, NOTCH2.

Colorectal Cancer:

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.

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, 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, 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, KANS1, 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: CREBBP, 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, MAPK13, MYC, NPM1, PIM1, REL, SQSTM1, TBL1XR1, TOMM40, TP63.

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

Granulocytic Sarcomas: RUNX1, RUNX1T1.

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

Inflammatory Myofibroblastic Tumors: ALK, CAR5, DCTN1.

Lymphoblastic Lymphomas: BCR, ETV6, FGFR1, NOTCH1, PBX1, PDGFRB, TERT.

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, ITK, MYO1F, NPM1, S100A7, SYK, TBL1XR1, THAP4, TP63, VAV1.

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

T Cell Lymphomas: ATXN2L, FGFR1, JAK2.

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

Ovarian Cancers:

Serous Cyst Adenocarcinomas: AXL, FGR, INSR.

Pancreatic Cancers:

Acinar Cell Carcinomas: GATM, HACL1, 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, 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 Cancers:

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, 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.

Other Fibrosarcomas: COL1A1, PDGFB.

Thyroid Cancers:

Adenoma-Nodule-Goitre: CCDC6, NCOA4, PAX8, PPARG, PRKAR1A, 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, PCM1, PPARG, PRKAR1A, RET, STRN, TFG, TPM3, TRIM24, TRIM27, TRIM33.

Urinary Tract Cancers:

Endometrial Carcinomas: INSR, PIK3CA.

Transitional Cell Carcinomas: BAIAP2L1, FGFR3, TACC3.

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.

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, TGFB1.

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: TGFB1.

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

Natural Killer Cells: BCL2, CD160, FOXJ1, 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, FOXP3, 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: AKT1, ALK, BRAF, CTNNB1, EGFR, ERBB2, FOXL2, GNA11, GNAQ, IDH1, IDH2, KIT, KRAS, MET, NRAS, PDGFRA, PIK3CA, RET.

Cell Adhesion Molecules: CTNNB1, EGFR, ERBB2, PDGFRA, RET.

Angiogenesis: CTNNB1, ERBB2, PIK3CA.

Apoptosis: BRAF, CTNNB1, FOXL2, RAF1.

Cell Cycle: AKT1.

Immune Response: ALK, PIK3CA.

Metabolism: IDH1, IDH2.

Signal Transduction:

AKT & PI3 Kinase Signaling: AKT1, ERBB2, KIT, PDGFRA, PIK3CA.

Fibroblast Growth Factor Signaling: AKT1, PIK3CA.

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

Hormone Receptors: ESR1.

MAP Kinase Signaling: NRAS, RAF1.

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

WNT Signaling: CTNNB1.

Other Signal Transduction Genes: KRAS, MET.

Transcription Factors: ESR1, FOXL2.

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.

For up-to-date licensing information and product-specific disclaimers, see the respective QIAGEN kit handbook or user manual. QIAGEN kit handbooks and user manuals are available at www.qiagen.com or can be requested from QIAGEN Technical Services or your local distributor.

Trademarks: QIAGEN® (QIAGEN Group)
1100784 02/2016 © 2016 QIAGEN, all rights reserved.

www.qiagen.com

Australia ■ 1-800-243-800

Austria ■ 0800/281010

Belgium ■ 0800-79612

Brazil ■ 0800-557779

Canada ■ 800-572-9613

China ■ 8621-3865-3865

Denmark ■ 80-885945

Finland ■ 0800-914416

France ■ 01-60-920-930

Germany ■ 02103-29-12000

Hong Kong ■ 800 933 965

Ireland ■ 1800 555 049

Italy ■ 800-787980

Japan ■ 03-6890-7300

Korea (South) ■ 080-000-7145

Luxembourg ■ 8002 2076

Mexico ■ 01-800-7742-436

The Netherlands ■ 0800 0229592

Norway ■ 800-18859

Singapore ■ 1800-742-4368

Spain ■ 91-630-7050

Sweden ■ 020-790282

Switzerland ■ 055-254-22-11

UK ■ 01293-422-911

USA ■ 800-426-8157



Sample to Insight