# **Technical Specifications**



#### **Intended Use**

AGCATA

FoundationOne Liquid CDx is a next generation sequencing based in vitro diagnostic device that analyzes 324 genes. Substitutions and insertion and deletion alterations (indels) are reported in 311 genes, copy number alterations (CNAs) are reported in 310 genes, and gene rearrangements are reported in 324 genes. The test also detects tumor fraction and the genomic signatures blood tumor mutational burden (bTMB) and microsatellite instability high (MSI-H) status. FoundationOne Liquid CDx utilizes circulating cell-free DNA (cfDNA) isolated from plasma derived from the anti-coagulated peripheral whole blood of cancer patients. The test is intended to be used as a companion diagnostic to identify patients who may benefit from treatment with targeted therapies in accordance with the approved therapeutic product labeling. Additionally, FoundationOne Liquid CDx is intended to provide tumor mutation profiling to be used by qualified health care professionals in accordance with professional guidelines in oncology for patients with malignant neoplasms.

A negative result from a plasma specimen does not mean that the patient's tumor is negative for genomic findings. Patients who are negative for genomic findings should be reflexed to routine biopsy and their tumor mutation status confirmed using an FDA-approved tumor tissue test, if feasible.

FoundationOne Liquid CDx is a single-site assay performed at Foundation Medicine, Inc. in Cambridge, MA.

### Summary of Analytical Sensitivity and Specificity

Results from our Limit of Detection (LoD) study are shown below, indicating the median variant allele frequency, tumor fraction or unstable loci at which the test has shown 95% probability of detection. Please refer to our product labeling for a list of the 75 genes baited for enhanced sensitivity and complete product specifications.

ALTERATION TYPE	BAIT SET REGION	MEDIAN LIMIT OF DETECTION (LOD)	
Chart Marianta	Enhanced Sensitivity	0.40% VAF	
Short variants	Standard Sensitivity	0.82% VAF	
Desurancements	Enhanced Sensitivity	0.37% VAF	
Rearrangements	Standard Sensitivity	0.90% VAF	
Copy Number Amplification	NA	21.7% TF	
Copy Number Loss	NA	30.4% TF	
MSI	NA	0.8% Unstable loci	
bTMB (component indels)	NA	1.00% VAF	
bTMB (component subs)	NA	1.00% VAF	

VAF = variant allele frequency; TF = tumor fraction

The accuracy of %VAF / %TF have not been analytically validated

In our Limit of Blank study, which evaluated variant calling in healthy donors, 1,735 unique variants were included in the analysis for a total of 137,065 data points. A total of 18 false positives were observed across 4 unique short variants. The LoB was determined to be the ideal value of zero for short variants, rearrangements and CNAs. The false positive rate was shown to be 0% for rearrangements and CNAs and 0.013% (~1 in 8,000) for short variants (substitutions and indels).

## FoundationOne Liquid CDx Gene List<sup>\*</sup>

As a professional service, FoundationOne Liquid CDx interrogates 324 genes, including 309 genes with complete exonic (coding) coverage and 15 genes with only select non-coding coverage (indicated with an \*); **75 genes (indicated in bold) are captured with increased sensitivity** and have complete exonic (coding) coverage unless otherwise noted. The test also detects tumor fraction and the genomic signatures blood mutational burden (bTMB) and microsatellite instability high (MSI-H) status.

ABL1	ALOX12B	ASXL1	BAP1	BCR*	BRIP1	CASP8
	AMER1 (FAM123B)	ATM	BARD1		BTG1	CBFB
ACVRIB	APC	ATR	BCL2	BRAF [Exons 11-18,	BTG2	CBL
[Exon 3]	AR	ATRX	BCL2L1	Introns 7-10j	BTK	CCND1
AKT2	ARAF	AURKA	BCL2L2	[Introns 2, 7, 8, 12,	CilorfZO (EMSV)	CCND2
AKT3	[Exons 4, 5, 7, 11, 15, 15, 16]	AURKB	BCL6	16, 19, 20j	C170rfZ0 (CID 4)	CCND3
ALK	ARFRP1	AXIN1	BCOR	[Intron 2]		CCNE1
Introns 18,19]	ARID1A	AXL	BCORL1	BRD4	CARD11	CD22

#### (FoundationOne Liquid CDx Gene List continued)

CD70	ERBB2	FOXL2	KLHL6	NF1	PPARG	SMAD2
CD74*	ERBB3	FUBP1	KMT2A (MLL)	NF2	PPP2R1A	SMAD4
[Introns 6-8]	[Exons 3, 6, 7, 8, 10, 12, 20, 21, 23, 24, 25]	GABRA6	[Introns 6, 8-11, Intron 7]	NFE2L2	PPP2R2A	SMARCA4
CD79A	ERBB4	GATA3	KMT2D	NFKBIA	PRDM1	SMARCB1
CD79B	ERCC4	GATA4	(MLL2)	NKX2-1	PRKAR1A	SMO
CD2/4 (PD-L1)	ERG	GATA6	KRAS	NOTCH1	PRKCI	SNCAIP
CDC/3	ERRFI1	GNA11	LIK	NOTCH2	PTCH1	SOCS1
CDH1	ESR1	[Exons 4, 5]	LYN	[Intron 26]	PTEN	SOX2
CDK12	[Exons 4-8]	GNA13	MAF	NOTCH3	PTPN11	SOX9
CDK4	ETV4* [Intron 8]	GNAQ [Exons 4, 5]	MAP2K1 (MEK1) [Exons 2, 3]	NPM1 [Exons 4-6, 8, 10]	PTPRO	SPEN
CDK6	ETV5*	GNAS	MAP2K2 (MEK2)	NRAS	QKI	SPOP
CDK8	[Introns 6,7]	[Exons 1, 8]	[Exons 2-4, 6, 7]	[Exons 2, 3]	RAC1	SRC
CDKN1A	ETV6* [Introns 5,6]	GRM3	MAP2K4	NSD3 (WHSC1L1)	RAD21	STAG2
CDKN1B	EWSR1*	GSK3B	MAP3K1	NT5C2	RAD51	STAT3
CDKN2A	[Introns 7-13]	H3F3A	MAP3K13	NTRK1 [Exons 14, 15,	RAD51B	STK11
CDKN2B	EZH2	HDAC1	MAPK1	Introns 8-11]	RAD51C	SUEU
CDKN2C	EZR*	HGF	MCL1	NTRK2 Entrop 121	RAD51D	SVK
CEBPA	[Introns 9-11]	HNF1A	MDM2	NTDK3	PAD52	TRY3
CHEK1	FAM46C	HRAS	MDM4	[Exons 16, 17]	RAD52	TEXS
CHEK2	FANCA		MED12	NUTM1*	RADJ4L	TERC* (poDMA)
CIC	FANCC		MEF2B		Exons 3, 4, 6, 7,	TERC {IICRINA}
CREBBP	FANCG	IDS	MEN1	PZRY8	IO, 14, 15, 17, Introns 4-8]	TERT {Promoter}
CRKL	FANCL	IDHI [Exon 4]	MERTK	PALBZ	RARA	IEIZ
						II-ERD/
CSF1R	FAS	IDH2	MET	PARKZ		TOTENZ
CSF1R CSF3R	FAS FBXW7	IDH2 [Exon 4]	<b>MET</b> MITF	PARN2 PARP1	(Intron 2) RB1	TIPARP
CSFIR CSF3R CTCF	FAS FBXW7 FGF10	IDH2 [Exon 4] IGF1R	<b>MET</b> MITF MKNK1	PARKZ PARP1 PARP2	[intron 2] <b>RB1</b> RBM10	TIPARP TMPRSS2* [Introns 1-3]
CSFIR CSF3R CTCF CTNNA1	FAS FBXW7 FGF10 FGF12	<b>IDH2 [Exon 4]</b> IGFIR IKBKE	<b>MET</b> MITF MKNK1 MLH1	PARN2 PARP1 PARP2 PARP3	R <b>B1</b> RBM10 REL	TIPARP TMPRSS2* [Introns 1-3] TNFAIP3
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b>	FAS FBXW7 FGF10 FGF12 FGF14	<b>IDH2 [Exon 4]</b> IGF1R IKBKE IKZF1	<b>MET</b> MITF MKNK1 MLH1 <b>MPL</b>	PARN2 PARP1 PARP2 PARP3 PAX5	(Intron 2) <b>RB1</b> RBM10 REL RET [Introns 7, 8, <b>Exons 11</b> ,	TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14
CSFIR CSF3R CTCF CTNNA1 CTNNB1 [Exon 3]	FAS FBXW7 FGF10 FGF12 FGF14 FGF19	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B	MET MITF MKNK1 MLH1 MPL [Exon 10]	PARN2 PARP1 PARP2 PARP3 PAX5 PBRM1	(Intron 2) <b>RB1</b> RBM10 REL RET [Introns 7, 8, <b>Exons 11</b> , <b>13-16</b> , <b>Introns 9-11</b> ]	TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b>
CSFIR CSF3R CTCF CTNNA1 CTNNB1 [Exon 3] CUL3	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A	PARA2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1)	RB1 RBM10 REL RET [Introns 7, 8, Exons 11, 13-16, Introns 9-11] RICTOR	TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSCI
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> [Exon 3] CUL3 CUL4A	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 51	PARA2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) <b>PDCD1LG2 (PD-L2)</b>	RB1 RBM10 REL RET [Introns 7. 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43	TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> [Exon 3] CUL3 CUL4A CXCR4	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF4	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3	PARA2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) PDCD1LG2 (PD-L2) PDGFRA IExons 12, 18.	RB1 RBM10 REL RET [Introns 7, 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 ROS1 [Exons 31, 36-38, 40,	TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> <b>[Exon 3]</b> CUL3 CUL4A CXCR4 CYPI7A1	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF4 FGF6	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2 JAK1	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3 MSH6	PARN2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) <b>PDCD1LG2 (PD-L2)</b> <b>PDGFRA</b> [Exons 12, 18, Introns 7, 9, 11]	RB1 RBM10 REL RET [Introns 7. 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 ROS1 [Exons 31, 36-38, 40, Introns 31-35]	TIPARP TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3 U2AF1
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> <b>IExon 3]</b> CUL3 CUL4A CXCR4 CYPI7A1 DAXX	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGF6	IDH2 [Exon 4] IGFIR IKBKE IKZF1 INPP4B IRF2 IRF4 IRF2 IRF4 IRS2 JAK1 JAK2 [Evon 14]	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3 MSH6 MSTIR	PARN2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) PDCD1LG2 (PD-L2) PDGFRA [Exons 12, 18, Introns 7, 9, 11] PDGFRB [Exons 12, 21] 231	RB1 RBM10 REL RET [Introns 7, 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 ROS1 [Exons 31, 36-38, 40, Introns 31-35] RPTOR	TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3 U2AF1 VEGEA
CSFIR CSF3R CTCF CTNNA1 CTNNB1 [Exon 3] CUL3 CUL4A CXCR4 CYPI7A1 DAXX DDR1	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF23 FGF3 FGF4 FGF6 <b>FGFR1</b> [Introns 1, 5, Intron 17]	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2 JAK1 JAK2 [Exon 14]	MET MITF MKNK1 MLH1 MPL [Exon 10] MRETIA MSH2 [Intron 5] MSH3 MSH6 MSTIR MTAP	PARA2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) PDCD1LG2 (PD-L2) PDGFRA [Exons 12, 18, Introns 7, 9, 11] PDGFRB [Exons 12-21, 23] PDGFR	(Introl 2) <b>RB1</b> RBM10 REL RET [Introns 7, 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Introns 31-35] RPTOR RSPO2* [Introl 2]	TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3 U2AF1 <b>VEGFA</b>
CSFIR CSF3R CTCF CTNNA1 CTNNB1 [Exon 3] CUL3 CUL4A CXCR4 CYPI7A1 DAXX DDR1 DDR2 [Exon 6, 17, 10]	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 <b>FGFR1</b> [Introns 1, 5, Intron 17] FGFP2	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2 JAK1 JAK2 [Exon 14] JAK3 [Exons 5, 11, 12, 13	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3 MSH6 MSTIR MTAP	PARA2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) PDCD1LG2 (PD-L2) PDGFRA [Exons 12, 18, Introns 7, 9, 11] PDGFRB [Exons 12-21, 23] PDK1 PUK3C2B	RB1 RBM10 REL RET [Introns 7, 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 ROS1 [Exons 31, 36-38, 40, Introns 31-35] RPTOR RSP02* [Intron 1] SDC4*	TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3 U2AF1 <b>VEGFA</b> VHL
CSFIR CSF3R CTCF CTNNA1 CTNNB1 [Exon 3] CUL3 CUL4A CXCR4 CXCR4 CYP17A1 DAXX DDR1 DDR2 [Exons 5, 17, 18]	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGFR1 [Intron 1, Intron 17] FGFR2 [Intron 1, Intron 17]	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2 JAK1 JAK2 [Exon 55, 11, 12, 13, 15, 16]	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3 MSH6 MST1R MTAP MTOR [Exons 19, 30, 39, 40, [Exons 19, 30, 30, 40, [Exons 19, 40	PARA2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) PDCD1LG2 (PD-L2) PDGFRA [Exons 12, 18, Introns 7, 9, 11] PDGFRB [Exons 12-21, 23] PDK1 PIK3C2B PIK3C2G	(Intron 2) <b>RB1</b> RBM10 REL RET [Introns 7. 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Introns 31-35] RPTOR RSP02* [Intron 1] SDC4* [Intron 2]	TIPARP TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3 U2AF1 <b>VEGFA</b> VHL WHSC1
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> [Exon 3] CUL3 CUL4A CXCR4 CYP17A1 DAXX DDR1 DDR2 [Exons 5, 17, 18] DIS3 DNMTZA	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGFR1 [Introns 1, 5, Intron 17] FGFR2 [Intron 1, Intron 17] FGFR3 FGFR4 FGF	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRF2 JAK1 JAK2 [Exon 14] JAK3 [Exons 5, 11, 12, 13, 15, 16] JUN	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3 MSH6 MST1R MTAP MTAP MTOR [Exons 19, 30, 39, 40, 43-45, 47, 48, 56]	PARN2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) PDCD1LG2 (PD-L2) PDGFR4 [Exons 12, 18, Introns 7, 9, 11] PDGFR8 [Exons 12-21, 23] PDK1 PIK3C2B PIK3C2G PIK3C2G	(Intron 2) <b>RB1</b> RBM10 REL RET [Introns 7. 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Introns 31-35] RPTOR RSP02* [Intron 1] SDC4* [Intron 2] SDHA	TIPARP TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3 U2AF1 <b>VEGFA</b> VHL WHSC1 WT1
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> <b>[Exon 3]</b> CUL3 CUL4A CXCR4 CYPI7A1 DAXX DDR1 <b>DDR2</b> <b>[Exons 5, 17, 18]</b> DIS3 DNMT3A	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGF71 [Intron 1, Intron 17] FGFR2 [Intron 7, 9 (alternative designation exon 10),	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2 JAK1 JAK2 [Exon 14] JAK3 [Exons 5, 11, 12, 13, 15, 16] JUN KDM5A	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3 MSH6 MST1R MTAP MTAP MTOR [Exons 19, 30, 39, 40, 43-45, 47, 48, 53, 56] MUTYH	PARN2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) <b>PDCD1LG2 (PD-L2)</b> <b>PDGFRA</b> [Exons 12, 18, Introns 7, 9, 11] <b>PDGFRB</b> [Exons 12-21, 23] PDK1 PIK3C2B PIK3C2G <b>PIK3CA</b> Exons 2, 3, 5-8, 10, 14,	(Introl 2) <b>RB1</b> RBM10 REL RET [Introns 7, 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Introns 31-35] RPTOR RSP02* [Intron 1] SDC4* [Intron 2] SDHA SDHB	TIPARP TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3 U2AF1 <b>VEGFA</b> VHL WHSC1 WT1 XPO1
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> <b>[Exon 3]</b> CUL3 CUL4A CXCR4 CYPI7A1 DAXX DDR1 <b>DDR2</b> <b>[Exons 5, 17, 18]</b> DIS3 DNMT3A DOTIL	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGF7 [Intron 1, 5, Intron 17] FGFR2 [Intron 1, Intron 17] FGFR3 [Exons 7, 9 (alternative designation exon 10), 14, 18, Intron 17]	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRF2 IRF4 IRS2 JAK1 JAK2 [Exon 14] JAK3 [Exons 5, 11, 12, 13, 15, 16] JUN KDM5A KDM5A	MET MITF MKNK1 MLH1 MLH1 ME11A MRE11A MSH2 [Intron 5] MSH3 MSH6 MSTIR MTAP MTAP MTAP MTOR [Exons 19, 30, 39, 40, 43-45, 47, 48, 53, 56] MUTYH MYB* [Intron 14]	PARA2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) <b>PDCD1LG2 (PD-L2)</b> <b>PDGFRA</b> [Exons 12, 18, Introns 7, 9, 11] <b>PDGFRB</b> [Exons 12-21, 23] PDK1 PIK3C2B PIK3C2G <b>PIK3CA</b> Exons 2, 3, 5-8, 10, 14, 19, 21 (Coding Exons 1, 2, 4-7, 9, 13, 18, 20)	RB1 RBM10 REL RET [Introns 7. 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Introns 31-35] RPTOR RSP02* [Intron 1] SDC4* [Intron 2] SDHA SDHB SDHC	TIPARP TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3 U2AF1 <b>VEGFA</b> VHL WHSC1 WT1 XPO1 XRCC2
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> <b>[Exon 3]</b> CUL3 CUL4A CXCR4 CYPI7A1 DAXX DDR1 <b>DDR2</b> <b>[Exons 5, 17, 18]</b> DIS3 DNMT3A DOT1L EED	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGF7 [Intron 5, 1, 5, Intron 17] FGFR2 [Intron 7, Intron 17] FGFR3 [Exons 7, 9 (alternative designation exon 10), 14, 18, Intron 17] FGFR4	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2 JAK1 JAK2 [Exon 14] JAK2 [Exon 5, 11, 12, 13, 15, 16] JUN KDM5A KDM5C KDM6A	MET MITF MKNK1 MLH1 MLH1 ME11A MSE11A MSH2 [Intron 5] MSH3 MSH6 MSTIR MTAP MTAP MTOR [Exons 19, 30, 39, 40, 43-45, 47, 48, 55, 56] MUTYH MYB* [Intron 14]	PARN2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) PDCD1LG2 (PD-L2) PDGFRA [Exons 12, 18, Introns 7, 9, 11] PDGFRB [Exons 12-21, 23] PDK1 PIK3C2B PIK3CA Exons 2, 3, 5-8, 10, 14, 19, 21 (Coding Exons 1, 2, 4-7, 9, 13, 18, 20) PIK3CB	RB1 RBM10 REL RET [Introns 7. 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Introns 31-35] RPTOR RSP02* [Intron 1] SDC4* [Intron 2] SDHA SDHB SDHC SDHD	TIPARP TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TPS3</b> TSC1 TSC2 TYRO3 U2AF1 <b>VEGFA</b> VHL WHSC1 WHL WHSC1 WT1 XPO1 XRCC2 ZNF217
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> <b>[Exon 3]</b> CUL3 CUL4A CXCR4 CYPI7A1 DAXX DDR1 <b>DDR2</b> <b>[Exons 5, 17, 18]</b> DIS3 DNMT3A DOT1L EED <b>EGFR</b> <b>[Introns 7, 15, 24-27]</b>	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGF6 FGFR1 [Intron 1, 5, Intron 17] FGFR2 [Intron 7, 9 (alternative designation exon 10), 14, 18, Intron 17] FGFR4 FH	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRF2 JAK1 JAK2 [Exons 5, 11, 12, 13, 15, 16] JUN KDM5A KDM5A KDM5C KDM6A KDR	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3 MSH6 MST1R MTAP MTAP MTOR [Exons 19, 30, 39, 40, 43-45, 47, 48, 53, 56] MUTYH MYB* [Intron 14]	PARA2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) <b>PDCD1LG2 (PD-L2)</b> <b>PDGFRA</b> [Exons 12, 18, Introns 7, 9, 11] <b>PDGFRB</b> [Exons 12-21, 23] PDK1 PIK3C2B PIK3C2G <b>PIK3CA</b> Exons 2, 3, 5-8, 10, 14, 19, 21 (Coding Exons 1, 2, 4-7, 9, 13, 18, 20) PIK3CB PIK3CB	RB1 RBM10 REL RET [Introns 7, 8, Exons 11, 13-16, Introns 7, 8, Exons 11, 13-16, Introns 7, 8, Exons 11, 13-16, Introns 7, 8, Exons 11, RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Introns 31-35] RPTOR RSP02* [Intron 1] SDC4* [Intron 2] SDHA SDHB SDHC SDHD SETD2	TIPARP TIPARP TMPRSS2* [Introns 1-3] TNFAIP3 TNFRSF14 <b>TP53</b> TSC1 TSC2 TYRO3 U2AF1 <b>VEGFA</b> VHL WHSC1 WT1 XPO1 XRCC2 ZNF217 ZNF217 ZNF703
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> <b>IExon 3</b> CUL3 CUL4A CXCR4 CYPI7A1 DAXX DDR1 DR2 <b>IExons 5, 17, 18</b> DIS3 DNMT3A DOT1L EED <b>EGFR</b> <b>[Introns 7, 15, 24-27]</b>	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGF7 [Intron 1, Intron 17] FGFR2 [Intron 1, Intron 17] FGFR4 FGFR4 FH FLCN	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2 JAK1 JAK2 [Exon 5, 11, 12, 13, 15, 16] JUN KDM5A KDM5A KDM5A KDM6A KDR	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3 MSH6 MST1R MTAP MTAP MTOR [Exons 19, 30, 39, 40, 43-45, 47, 48, 55, 56] MUTYH MYB* [Intron 14] MYCL [Intron 1] MYCL (MYCL1)	PARN2 PARN2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) <b>PDCD1LG2 (PD-L2)</b> <b>PDGFRA</b> [Exons 12, 18, Introns 7, 9, 11] <b>PDGFRB</b> [Exons 12-21, 23] PDK1 PIK3C2B PIK3C2B PIK3CA Exons 2, 3, 5-8, 10, 14, 19, 21 (Coding Exons 1, 2, 4-7, 9, 13, 18, 20) PIK3CB PIK3CH	(Introl 2) <b>RB1</b> RBM10 REL RET [Introns 7. 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Introns 31-35] RPTOR RSP02* (Intron 1] SDC4* (Intron 2] SDHA SDHB SDHC SDHD SETD2 SF3B1	TIPARP   TMPRSS2*   [Introns 1-3]   TNFAIP3   TNFRSF14 <b>TP53</b> TSC1   TSC2   TYRO3   U2AF1 <b>VEGFA</b> VHL   WHSC1   WT1   XPO1   XRCC2   ZNF217   ZNF703
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> <b>CUL3</b> CUL3 CUL4A CXCR4 CYP17A1 DAXX DDR1 <b>DDR2</b> <b>IDR2</b> <b>IDR3</b> DIS3 DNMT3A DOT1L EED <b>EFFR</b> <b>IINTONS 7</b> , 15, <b>24-27</b> ] EP300 EPHA3	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGFR1 [Intron 1, Intron 17] FGFR2 [Intron 1, Intron 17] FGFR3 [Exons 7, 9 (alternative designation exon 10), 14, 18, Intron 17] FGFR4 FH FLCN FLT1	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2 JAK1 JAK2 [Exon 5, 11, 12, 13, 15, 16] JUN KDM5A KDM5C KDM6A KDR KEAP1 KEL	MET MITF MKNK1 MLH1 MPL [Exon 10] MRE11A MSH2 [Intron 5] MSH3 MSH6 MST1R MTAP MTAP [Exons 19, 30, 39, 40, 43-45, 47, 48, 53, 56] MUTYH MYB* [Intron 14] MYCL (MYCL1) MYCN	PARA2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) <b>PDCD1LG2 (PD-L2)</b> <b>PDGFRA</b> [Exons 12, 18, Introns 7, 9, 11] <b>PDGFRB</b> [Exons 12-21, 23] PDK1 PIK3C2B PIK3C2G <b>PIK3CA</b> Exons 2, 3, 5-8, 10, 14, 19, 21 (Coding Exons 1, 2, 4-7, 9, 13, 18, 20) PIK3CB PIK3R1 PIM1 PMS2	(Introl 2) <b>RB1</b> RBM10 REL RET [Introns 7, 8, Exons 11, 13-16, Introns 9-11] RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Intron 31-35] RPTOR RSP02* [Intron 1] SDC4* [Intron 2] SDHA SDHB SDHC SDHD SETD2 SF3B1 SGK1	TIPARP   TIPARPS   TMPRSS2*   [Introns 1-3]   TNFAIP3   TNFRSF14 <b>TP53</b> TSC1   TSC2   TYRO3   U2AF1 <b>VEGFA</b> VHL   WHSC1   WT1   XPO1   XRCC2   ZNF217   ZNF703
CSFIR CSF3R CTCF CTNNA1 <b>CTNNB1</b> <b>[Exon 3]</b> CUL3 CUL3 CUL4A CXCR4 CYP17A1 DAXX DDR1 <b>DDR2</b> <b>[Exons 5, 17, 18]</b> DIS3 DNMT3A DOT1L EED <b>EGFR</b> <b>[Introns 7, 15, 24-27]</b> EP300 EPHA3 EPHB1	FAS FBXW7 FGF10 FGF12 FGF14 FGF19 FGF23 FGF3 FGF3 FGF4 FGF6 FGF7 [Intron 1, Intron 17] FGFR2 [Intron 1, Intron 17] FGFR3 [Exons 7, 9 (alternative designation exon 10), 14, 18, Intron 17] FGFR4 FH FLCN FLT1 FLT3 [Exons 14, 15, 20]	IDH2 [Exon 4] IGF1R IKBKE IKZF1 INPP4B IRF2 IRF4 IRS2 JAK1 JAK2 [Exon 5, 11, 12, 13, 17. KDM5A KDR KEAP1 KEL KIT [Exons 8, 9, 11, 12, 13, 17.	MET   MITF   MKNK1   MLH1 <b>MPL</b> [Exon 10]   MREIIA   MSH2   [Intron 5]   MSH3   MSH6   MSTIR   MTAP <b>MTOR</b> [Exons 19, 30, 39, 40, 43-45, 47, 48, 53, 56]   MUTYH   MYB*   [Intron 14]   MYCL   MYCN <b>MYD88</b> [Exon 4]	PARN2 PARP1 PARP2 PARP3 PAX5 PBRM1 PDCD1 (PD-1) <b>PDCD1LG2 (PD-L2)</b> <b>PDGFRA</b> [Exons 12, 18, Introns 7, 9, 11] <b>PDGFRB</b> [Exons 12-21, 23] PDK1 PIK3C2B PIK3C2G <b>PIK3CA</b> Exons 2, 3, 5-8, 10, 14, 19, 21 (Coding Exons 1, 2, 4-7, 9, 13, 18, 20) PIK3CB PIK3R1 PIM1 PMS2 POLD1	(Intron 2) <b>RB1</b> RBM10 REL RET [Introns 7. 8, Exons 11, <b>13-16, Introns 9-11]</b> RICTOR RNF43 <b>ROS1</b> [Exons 31, 36-38, 40, Intron 31-35] RPTOR RSP02* [Intron 31-35] SDC4* [Intron 2] SDHA SDHB SDHC SDHD SETD2 SF3B1 SGK1 SLC34A2*	TIPARP   TIPARPS   TMPRSS2*   [Introns 1-3]   TNFAIP3   TNFRSF14 <b>TP53</b> TSC1   TSC2   TYRO3   U2AF1 <b>VEGFA</b> VHL   WHSC1   WT1   XPO1   XRC2   ZNF217   ZNF703

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