Therapy Selection For solid tumors



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Northstar Select™ detects mutations across 84 genes in cell-free tumor DNA in blood specimens from patients with advanced-stage solid tumors.

INDICATIONS FOR USE

Northstar Select™ is a liquid biopsy that is appropriate for stage III/IV patients with solid tumor malignancies. It can provide insight into which therapies may be most appropriate based on the genomic profile of the patient's tumor. The assay can provide therapeutic options for first-line therapy, immunotherapy, and/or therapies that may be beneficial upon progression and/or resistance.

SUMMARY

This ultra-sensitive next generation sequencing (NGS) assay focuses on actionable mutations, including resistance mutations, associated with FDAapproved targeted and immunotherapies. The assay interrogates 82 genes for single nucleotide variants (SNVs) / indels, 19 genes for copy number amplification, 5 genes for copy number loss and 9 genes for fusions. The panel also covers genes relevant to early phase drug development efforts. The assay has been CLIA validated and requires at least one 8.5mL Streck tube of peripheral blood.

ndels 82 genes					CNAs: Ampl	lifications	19 genes	Fusions 9 gen
CCNE1	EZH2	JAK2	NOTCH1	RB1	AR	ERBB2	MYC	ALK
CD274 (PD-L1)	<i>FANCA</i>	JAK3	NPM1	RET	BRAF	ESR1	PDGFRA	BRAF
CDH1	FBXW7	KIT	NRAS	RHOA	CCNE1	FGFR1	PIK3CA	FGFR2
CDK12	FGFR1	KRAS	NTRK1	RIT1	CD274 (PD-L1)	FGFR2	RAF1	FGFR3
CDK4	FGFR2	MAP2K1 (MEK1)	PALB2	ROS1	CDK4	KIT	RET	NTRK1
CDK6	FGFR3	MAP2K2 (MEK2)	PDGFRA	SF3B1	CDK6	KRAS		NTRK2
CDKN2A	FGFR4	MET	PIK3CA	SMAD4	EGFR	MET		NTRK3
CDKN2B	GATA3	MLH1	PMS2	SMO				RET
CHEK2	GNA11	MPL	PTEN	STK11				ROS1
CTNNB1	GNAQ	MSH2	PTPN11	TERT	CNAs: Losses 5 genes			
DDR2	GNAS	MSH6	RAD51C	TP53	0.12.10. 2000	o o gonos		
EGFR	HRAS	MTOR	RAD51D	TSC1	ATM	CDKN2A		
ERBB2 (HER2)	IDH1	MYC	RAF1	VHL	BRCA1	PTEN		Biomarker
ESR1	IDH2	NF1			BRCA2			MSI
	CCNE1 CD274 (PD-L1) CDH1 CDK12 CDK4 CDK6 CDKN2A CDKN2B CHEK2 CTNNB1 DDR2 EGFR ERBB2 (HER2)	CCNE1 EZH2 CD274 (PD-L1) FANCA CDH1 FBXW7 CDK12 FGFR1 CDK4 FGFR2 CDK6 FGFR3 CDKN2A FGFR4 CDKN2B GATA3 CHEK2 GNA11 CTNNB1 GNAQ DDR2 GNAS EGFR HRAS ERBB2 (HER2) IDH1	CCNE1 EZH2 JAK2 CD274 (PD-L1) FANCA JAK3 CDH1 FBXW7 KIT CDK12 FGFR1 KRAS CDK4 FGFR2 MAP2K1 (MEK1) CDK6 FGFR3 MAP2K2 (MEK2) CDKN2A FGFR4 MET CDKN2B GATA3 MLH1 CHEK2 GNA11 MPL CTNNB1 GNAQ MSH2 DDR2 GNAS MSH6 EGFR HRAS MTOR ERBB2 (HER2) IDH1 MYC	CCNE1 EZH2 JAK2 NOTCH1 CD274 (PD-L1) FANCA JAK3 NPM1 CDH1 FBXW7 KIT NRAS CDK12 FGFR1 KRAS NTRK1 CDK4 FGFR2 MAP2K1 (MEK1) PALB2 CDK6 FGFR3 MAP2K2 (MEK2) PDGFRA CDKN2A FGFR4 MET PIK3CA CDKN2B GATA3 MLH1 PMS2 CHEK2 GNA11 MPL PTEN CTINNB1 GNAQ MSH2 PTPN11 DDR2 GNAS MSH6 RAD51C EGFR HRAS MTOR RAD51D	CCNE1 EZH2 JAK2 NOTCH1 RB1 CD274 (PD-L1) FANCA JAK3 NPM1 RET CDH1 FBXW7 KIT NRAS RHOA CDK12 FGFR1 KRAS NTRK1 RIT1 CDK4 FGFR2 MAP2K1 (MEK1) PALB2 ROS1 CDK6 FGFR3 MAP2K2 (MEK2) PDGFRA SF3B1 CDKN2A FGFR4 MET PIK3CA SMAD4 CDKN2B GATA3 MLH1 PMS2 SMO CHEK2 GNA11 MPL PTEN STK11 CTNNB1 GNAQ MSH2 PTPN11 TERT DDR2 GNAS MSH6 RAD51C TP53 EGFR HRAS MTOR RAD51D TSC1 ERBB2 (HER2) IDH1 MYC RAF1 VHL	CCNE1 EZH2 JAK2 NOTCH1 RB1 AR CD274 (PD-L1) FANCA JAK3 NPM1 RET BRAF CDH1 FBXW7 KIT NRAS RHOA CCNE1 CDK12 FGFR1 KRAS NTRK1 RIT1 CD274 (PD-L1) CDK4 FGFR2 MAP2K1 (MEK1) PALB2 ROS1 CDK4 CDK6 FGFR3 MAP2K2 (MEK2) PDGFRA SF3B1 CDK6 CDKN2A FGFR4 MET PIK3CA SMAD4 EGFR CDKN2B GATA3 MLH1 PMS2 SMO CHEK2 GNA11 MPL PTEN STK11 CTNNB1 GNAQ MSH2 PTPN11 TERT DDR2 GNAS MSH6 RAD51C TP53 EGFR HRAS MTOR RAD51D TSC1 ATM ERBB2 (HER2) IDH1 MYC RAF1 VHL BRCA1	CCNE1 EZH2 JAK2 NOTCH1 RB1 AR ERBB2 CD274 (PD-L1) FANCA JAK3 NPM1 RET BRAF ESR1 CDH1 FBXW7 KIT NRAS RHOA CCNE1 FGFR1 CDK12 FGFR1 KRAS NTRK1 RIT1 CD274 (PD-L1) FGFR2 CDK4 FGFR2 MAP2K1 (MEK1) PALB2 ROS1 CDK4 KIT CDK6 FGFR3 MAP2K2 (MEK2) PDGFRA SF3B1 CDK6 KRAS CDKN2A FGFR4 MET PIK3CA SMAD4 CDKN2B GATA3 MLH1 PMS2 SMO CHEK2 GNA11 MPL PTEN STK11 CTINNB1 GNAQ MSH2 PTPN11 TERT DDR2 GNAS MSH6 RAD51C TP53 EGFR HRAS MTOR RAD51D TSC1 ATM CDKN2A ERBB2 (HER2) IDH1 MYC RAF1 VHL BRCA1	CCNE1 EZH2 JAK2 NOTCH1 RB1 AR ERBB2 MYC CD274 (PD-L1) FANCA JAK3 NPM1 RET BRAF ESR1 PDGFRA CDH1 FBXW7 KIT NRAS RHOA CCNE1 FGFR1 PIK3CA CDK12 FGFR1 KRAS NTRK1 RIT1 CD274 (PD-L1) FGFR2 RAF1 CDK4 FGFR2 MAP2K1 (MEK1) PALB2 ROS1 CDK4 KIT RET CDK6 FGFR3 MAP2K2 (MEK2) PDGFRA SF3B1 CDK6 KRAS CDKN2A FGFR4 MET PIK3CA SMAD4 EGFR MET CDKN2B GATA3 MLH1 PMS2 SMO STK11 CNAs: Losses 5 genes CHEK2 GNAS MSH2 PTPN11 TERT CNAs: Losses 5 genes DDR2 GNAS MSH6 RAD51D TSC1 ATM CDKN2A EGFR HRAS MTOR RAD51D TSC1 <t< td=""></t<>

PERFORMANCE SPECIFICATIONS

Utilizing BillionToOne's proprietary cfDNA enrichment and bioinformatic processes, Northstar Select™ can detect SNVs / indels and fusions down to two mutated molecules in a single tube of blood. This translates to variant detection at a 0.02 - 0.04% allele fraction even with limited DNA input quantities (i.e. 15 - 30ng of cfDNA). Clinical sequencing is performed to a depth ~40,000 - 60,000x coverage.

Alteration Type	Reportable Range	Allele Fraction / Copy Number	Analytical Sensitivity		Analytical Specificity	
SNVs / Indels	≥0.01%	>0.31% 0.17 - 0.30% 0.13 - 0.16% 0.06 - 0.12%		100% 98.9% 95.5% 78.4%		
CNAs: Amplifications	≥2.1 copies*	2.125 - 2.160 copies**		95%		
CNAs: Losses	≤1.9 copies	≥1.77 copies		>95%	>99.9%	
Fusions	≥0.02%	>1%		>99%		
MSIs	n/a	0.07%** >0.4%		95% 100%		

^{* 2.5%} tumor fraction at 6 copies of amplification. ** Impacted by biological variability.

Internal data on file, Jun 2023.

