VALIDATION SUMMARY

Therapy Selection FOR SOLID TUMORS

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

NORTHSTAR SELECT

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 FDA-approved 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.

SNVs / Indels 82 genes

AKT1	*CCNE1*	*EZH2*	*JAK2*	*NOTCH1*	*RB1*
AKT2	*CD274* (PD-L1)	*FANCA*	*JAK3*	*NPM1*	*RET*
ALK	*CDH1*	*FBXW7*	*KIT*	*NRAS*	*RHOA*
APC	*CDK12*	*FGFR1*	*KRAS*	*NTRK1*	*RIT1*
AR	*CDK4*	*FGFR2*	*MAP2K1* (MEK1)	*PALB2*	*ROS1*
ARAF	*CDK6*	*FGFR3*	*MAP2K2* (MEK2)	*PDGFRA*	*SF3B1*
ARID1A	*CDKN2A*	*FGFR4*	*MET*	*PIK3CA*	*SMAD4*
ATM	*CDKN2B*	*GATA3*	*MLH1*	*PMS2*	*SMO*
BRAF	*CHEK2*	*GNA11*	*MPL*	*PTEN*	*STK11*
BRCA1	*CTNNB1*	*GNAQ*	*MSH2*	*PTPN11*	*TERT*
BRCA2	*DDR2*	*GNAS*	*MSH6*	*RAD51C*	*TP53*
BRIP1	*EGFR*	*HRAS*	*MTOR*	*RAD51D*	*TSC1*
CCND1	*ERBB2* (HER2)	*IDH1*	*MYC*	*RAF1*	*VHL*
CCND2	*ESR1*	*IDH2*	*NF1*		

CNAs: Amplifications 19 genes

AR	*ERBB2*	*MYC*
BRAF	*ESR1*	*PDGFRA*
CCNE1	*FGFR1*	*PIK3CA*
CD274 (PD-L1)	*FGFR2*	*RAF1*
CDK4	*KIT*	*RET*
CDK6	*KRAS*	
EGFR	*MET*	

CNAs: Losses 5 genes

ATM	*CDKN2A*
BRCA1	*PTEN*
BRCA2	

Fusions 9 genes

ALK
BRAF
FGFR2
FGFR3
NTRK1
NTRK2
NTRK3
RET
ROS1

Biomarker

MSI

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%	>99.9%
CNAs: Amplifications	≥2.1 copies*	2.125 - 2.160 copies**	95%	
CNAs: Losses	≤1.9 copies	≥1.77 copies	>95%	
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.

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