



Precise Mutation Detection to Empower Targeted Therapy

Broad Gene Coverage

Analyzes 27 genes, including SNVs/INDELs, fusions, amplifications.

FDA/NCCN-aligned Actionability

Detects clinically relevant mutations that can be targeted with 50+ FDA-approved therapies.

Advanced NGS Technology

High-depth sequencing (10,000X coverage) for liquid biopsy.

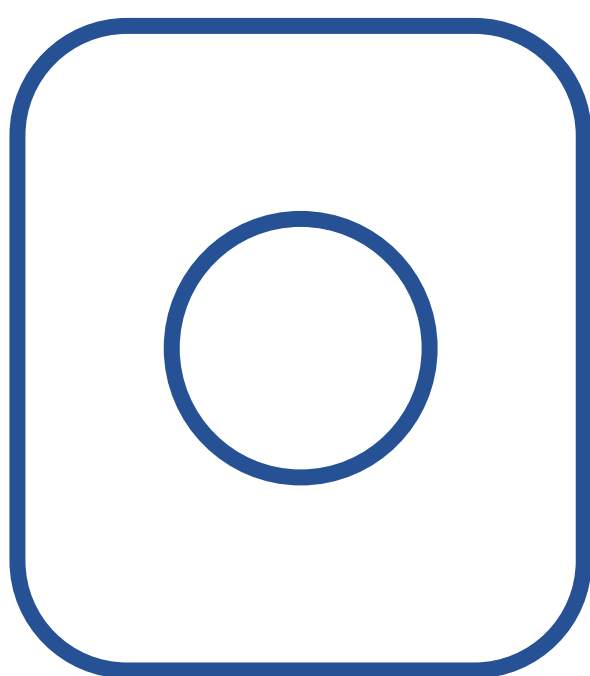
Resistance Mechanism Insights

Identifies mutations linked to drug resistance, optimizing treatment strategies.

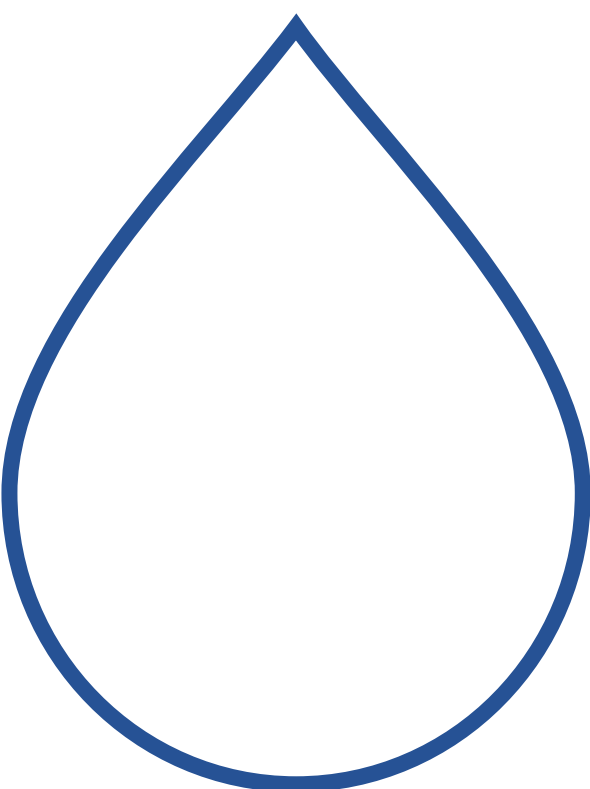
Flexible Sampling

Accepts both FFPE and blood samples.

High Accuracy for Reliable Results



FFPE Sample	Sensitivity	Specificity	LOD (%VAF)
SNVs/INDELs	94.6%	>99.0%	1%
Fusions	94.0%	>99.0%	1%
Amplifications	95.0%	97%	



Blood Sample	Sensitivity	Specificity	LOD (%VAF)
SNVs/INDELs	91.2%	>99.0%	0.1%
Fusions	>99.0%	>99.0%	1%

For fusions with VAF 0.01–1.0%, sensitivity may decrease to ~66%

1. Tran, L. S., Pham, H. T., Tran, V., Tran, T., Dang, A. H., Le, D., Nguyen, S., Nguyen, N., Nguyen, T., Vo, B. T., Dao, H. T., Nguyen, N. H., Tran, T. H., Van Nguyen, C., Pham, P. C., Dang-Mai, A. T., Dinh-Nguyen, T. K., Phan, V. H., Thi, T., DO, ... Nguyen, H. (2019). Ultra-deep massively parallel sequencing with unique molecular identifier tagging achieves comparable performance to droplet digital PCR for detection and quantification of circulating tumor DNA from lung cancer patients. PLoS ONE, 14(12), e0226193. <https://doi.org/10.1371/journal.pone.0226193>

2. Hoang, T. N., Nguyen, T. A., Tran, N. H. B., Hoang, V. N., Dao, H. T. T., Tran, V., Nguyen, Y. N., Nguyen, A. T., Thi, C. T. N., Thi, T. T. D., Nguyen, D. S., Nguyen, H., Giang, H., & Tu, L. N. (2024). Analytical validation and clinical utilization of K-4CARE: a comprehensive genomic profiling assay with personalized MRD detection. Frontiers in Molecular Biosciences, 11. <https://doi.org/10.3389/fmolb.2024.1334808>

27-gene panel for actionable mutation detection

  01. AKT1	  08. ERBB2^(HER2)	  15. KRAS	  22. PIK3CA
  02. ALK	  09. ESR1	  16. MAP2K1	  23. PTEN
  03. AR	  10. FGFR2	  17. MET	  24. RET
  04. BRAF	  11. IDH1	  18. NRAS	  25. ROS1
  05. BRCA1	  12. IDH2	  19. NTRK^{1/2/3}	  26. STK11
  06. BRCA2	  13. KEAP1	  20. PALB2	  27. TP53
  07. EGFR	  14. KIT	  21. PDGFRA	

 Fusions

 Amplifications

 SNVs

 Indels

*Amplifications will not be assessed in liquid biopsy samples

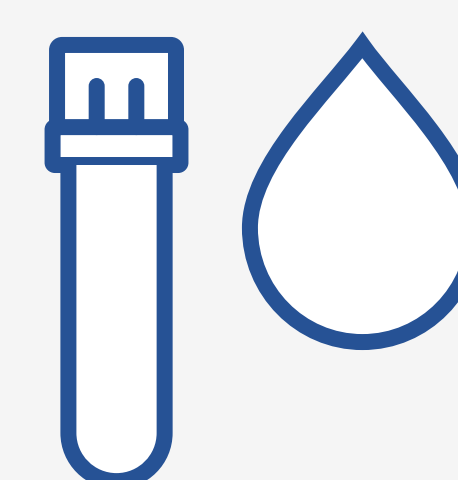
9-gene panel

ALK	ESR1
AR	MET
BRAF	NRAS
EGFR	PIK3CA
ERBB2 (HER2)	

More ways to test, more ways to access targeted therapy



Applicable to all 14 cancer types:
lung, colorectal, breast, gastric, thyroid, ovarian, prostate, cervical,
pancreatic, GIST, melanoma, histiocytosis, brain tumor,
cholangiocarcinoma



Applicable to 7 cancer types:
lung, breast, colorectal, ovarian, gastric, pancreatic and
cholangiocarcinoma

All the Data You Need in a Single Report


GENE SOLUTIONS

oncoGS
THE ACTIONABLE-RESISTANT MUTATIONS ANALYSIS RESULTS


PATIENT INFORMATION

PERSONAL INFORMATION		SAMPLE INFORMATION		TEST INFORMATION	
Full Name:		Sample Type:		Ordering Physician:	
NRIC/PassportID:		Pathology Block ID:		MCR/MMC no.:	
Gender:	Male	Site of Biopsy:	Omentum	Date Reported:	Oct-03-2025
Date of Birth:	Nov-15-1980	Date of Biopsy/Surgery:	20-08-2025	Name of Hospital/Clinic:	
Race:		Date/Time Received by Lab:	Sep-24-2025 12:37:31		


CLINICAL INFORMATION

Remark:	
Diagnosis:	Colorectal Cancer
Site of Metastasis:	Treatment Regimen:


TEST RESULTS


ACTIONABLE/RESISTANT MUTATIONS RESULTS


PERFORMED TEST: oncoGS


INDICATION FOR: COLORECTAL CANCER

This panel includes 7 different genes covering more than two hundred hotspots in coding regions, amplification and gene fusions. These genes covered in this panel are as follows:

Targeted gene	Result	Targeted gene	Result
BRAP	Not Detected	KRAS	Detected
NRAS	Not Detected	PIK3CA	Not Detected
RET	Not Detected		--

The following mutations were detected:

Gene	Locus (GRCh38)	Transcript	Coding	Protein Change	Variant Effect	Allele Frequency
KRAS	chr12:25245350	NM_004985.6	<35G>A	G12D	Missense	15%


RELEVANT THERAPEUTIC RECOMMENDATIONS

Genomic Alteration	FDA Level	Relevant Therapeutic Recommendations	Associated Therapy			
			FDA	EMA	NCN	ESMO
KRAS G12D	Ⓢ	Cetuximab, Cetuximab + Chemotherapy	R	R	R	R
	Ⓢ	Panitumumab, Panitumumab + Chemotherapy	R	R	R	R
	Ⓢ	RMC-6235	X	X	X	X

 Approved this Indication +  Approved in other Indication  No evidence  Resistance

- The following public databases are used to indicate relevant therapeutic recommendations: FDA, EMA, NCN, and ESMO.
- The FDA level of evidence is modified with reference to the FDA white paper "CDRP's Approach to Tumor-Profiling Next-Generation Sequencing Tests".


Disclaimer:

Therapeutic information in this report is curated from the current knowledge base of public information but may not be exhaustive. The content of this report has not been approved by the FDA, EMA, or other regulatory agencies.


 This report is electronically signed by

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01 Actionable/Resistance mutations detection result

Overview of the gene list corresponding to each cancer type and indication of which genes have detected mutations.

03 Therapeutic Relevance

This section provides treatment options based on the detected alterations.

- Therapies are categorized into four levels: Approved this indication, approved in other indication, no evidence, resistance.
- Treatment recommendations are based on globally recognized therapeutic guidelines, including: FDA, EMA, NCCN, ESMO

02 Alteration Overview

This section identifies clinically relevant somatic mutations, including actionable and resistance-associated variants.

- Detected Mutations Data: Includes details on gene, locus, transcript, coding sequence, protein change, variant effect, and allele frequency.
- Reporting Thresholds: Mutations with variant allele frequency (VAF) $>1\%$ in tissue samples or VAF $> 0,1\%$ in blood sample

04 Clinical Trial Relevance

Identified genomic alterations may correspond to ongoing clinical trials evaluating emerging treatment options. Participation in a clinical trial could provide access to novel therapies currently under investigation.

Precision Targeted Therapy: Leveraging the Latest Variants

No.	Genes	Variants
01 Lung Cancer (NSCLC)		
1	ALK	ALK-EML4 fusion, ALK-HIP1 fusion, ALK-PHACTR1 fusion, G1202R, Other mutation
2	BRAF	V600E, Other mutation
3	EGFR	G719X, L861Q, S768I, C797S, T790M, Exon 19 deletion or L858R, Exon 20 insertion, Other mutation
4	ERBB2 (HER2)	L755S, T798I, L869R, Amplification, Other mutation
5	FGFR2	FGFR2-BICC1 fusion, FGFR2-CCDC6 fusion, Other mutation
6	KEAP1	C23Y, S102L, E117K ,T142M, V155F, G186R, Other mutation
7	KRAS	G12[AID V S I R C], G13[A D I V S I R C], Q61[K E P L I R,H], Other mutation
8	MAP2K1	R49L, F53C, F53I, F53_Q58del, Q56P, Q56_V60del, Q56_G61delinsR, Other mutation
9	MET	Exon 14 skipping mutation, Other mutation
10	NRAS	G12[AID V S I R C], G13[A D I V S I R C], Q61[K E P L I R,H], Other mutation
11	NTRK1/2/3	CD74-NTRK1 fusion, MPRIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
12	PIK3CA	H1047[R L], E545K, Other mutation
13	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation
14	ROS1	CD74-ROS1 fusion, SLC34A2-ROS1 fusion, SDC4-ROS1 fusion, EZR-ROS1 fusion, Other mutation
15	STK11	G56W, Y60*, L67P, K78A, M136R, F148S, Other mutation
16	TP53	Y220C, Other mutation

02 Colorectal Cancer		
1	BRAF	V600E, Other mutation
2	ERBB2 (HER2)	L755S, T798I, L869R, Amplification, Other mutation
3	KRAS	G12[AID V S I R C], G13[A D I V S I R C], Q61[K E P L I R,H], Other mutation
4	NRAS	G12[AID V S I R C], G13[A D I V S I R C], Q61[K E P L I R,H], Other mutation
5	NTRK1/2/3	CD74-NTRK1 fusion, MPRIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
6	PIK3CA	H1047[R L], E545K, Other mutation
7	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation

03 Breast Cancer		
1	AKT1	E17K, R23A, E40K, N53A, Other mutation
2	BRCA1	Pathogenic mutation positive
3	BRCA2	Pathogenic mutation positive
4	ESR1	K303R, E380Q, V392I, V422del, S436P, S463P, L469V, R503W, V534E, P535H, L536H, L536P, L536R, L536Q, L536G, L536K, Y537S, Y537C, Y537D, Y537H, Y537N, D538G, D538E, T594R Missense mutations between codons 310 - 547
5	ERBB2 (HER2)	L755S, T798I, L869R, Amplification, Other mutation
6	FGFR2	FGFR2-BICC1 fusion, FGFR2-CCDC6 fusion, Other mutation
7	NTRK1/2/3	CD74-NTRK1 fusion, MPRIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
8	PALB2	Pathogenic mutation positive
9	PIK3CA	H1047[R L Y], E545[A D G K], E542K, Q546 [E I R], Other mutation
10	PTEN	K6E, K6I, S10N, R15K, R15S, G20E, F21A, Other mutation
11	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation

No.	Genes	Variants
04 Ovarian Cancer		
1	BRAF	V600E, Other mutation
2	BRCA1	Pathogenic mutation positive
3	BRCA2	Pathogenic mutation positive
4	NTRK1/2/3	CD74-NTRK1 fusion, MPRIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
5	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation

05 Prostate Cancer		
1	AR	L702H, W742C, H875Y, T878A, Other mutation
2	BRCA1	Pathogenic mutation positive
3	BRCA2	Pathogenic mutation positive
4	NTRK1/2/3	CD74-NTRK1 fusion, MPRIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
5	PALB2	Pathogenic mutation positive
6	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation

06 Pancreatic Cancer		
1	BRAF	V600E, Other mutation
2	BRCA1	Pathogenic mutation positive
3	BRCA2	Pathogenic mutation positive
4	KRAS	G12[AID V S I R C], G13[A D I V S I R C], Q61[K E P L I R,H], Other mutation
5	NRAS	G12[AID V S I R C], G13[A D I V S I R C], Q61[K E P L I R,H], Other mutation
6	NTRK1/2/3	CD74-NTRK1 fusion, MPRIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
7	PALB2	Pathogenic mutation positive
8	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation

07 GIST		
1	BRAF	V600E, Other mutation
2	KIT	V559D, V560D, W557R, L576P, V559G, W557_K558del, P551_M552del, Other mutation
3	PDGFRA	Exon 18 mutation, Other mutation
4	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation

08 Gastric Cancer		
1	BRAF	V600E, Other mutation
2	ERBB2 (HER2)	L755S, T798I, L869R, Amplification, Other mutation
3	NTRK1/2/3	CD74-NTRK1 fusion, MPRIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
4	PIK3CA	H1047[R L Y], E545[A D G K], E542K, Q546 [E I R], Other mutation
5	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation

Precision Targeted Therapy:
Leveraging the Latest Variants

No.	Genes	Variants
09 Thyroid Cancer		
1	ALK	ALK-EML4 fusion, ALK-HIP1 fusion, ALK-PHACTR1 fusion, G1202R, Other mutation
2	BRAF	V600E, Other mutation
3	FGFR2	FGFR2-BICC1 fusion, FGFR2-CCDC6 fusion, Other mutation
4	NTRK1 NTRK2 NTRK3	CD74-NTRK1 fusion, MPRIIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
5	RET	M918T, M918V, R886W, A883F, A883T, G810S, G810C, CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation
10 Cervical Cancer		
1	NTRK1/2/3	CD74-NTRK1 fusion, MPRIIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
2	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation
11 Cholangiocarcinoma		
1	BRAF	V600E, Other mutation
2	ERBB (HER2)	L755S, T798I, L869R, Amplification, Other mutation
3	FGFR2	FGFR2-BICC1 fusion, FGFR2-CCDC6 fusion, Other mutation
4	IDH1	R132, Other mutation
5	IDH2	R172, R140, Other mutation
6	KRAS	G12[AIDIVISIRIC], G13[AIDIVISIRIC], Q61[KIEPILIR,H], Other mutation
7	NTRK1/2/3	CD74-NTRK1 fusion, MPRIIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
8	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation
12 Melanoma		
1	BRAF	V600E, Other mutation
2	KIT	Exon [9 11 13 17] mutation, Other mutation
3	NRAS	G12[AIDIVISIRIC], G13[AIDIVISIRIC], Q61[KIEPILIR,H], Other mutation
4	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation
13 Brain Tumor		
1	BRAF	V600E, Other mutation
2	FGFR2	FGFR2-BICC1 fusion, FGFR2-CCDC6 fusion, Other mutation
3	IDH1	R132, Other mutation
4	IDH2	R172, R140, Other mutation
5	NTRK1/2/3	CD74-NTRK1 fusion, MPRIIP-NTRK1 fusion, PAN3-NTRK2 fusion, TRIM24-NTRK2 fusion, BTBD1-NTRK3 fusion, ETV6-NTRK3 fusion, Other mutation
6	RET	CCDC6-RET fusion, KIF5B-RET fusion, NCOA4-RET fusion, TRIM27-RET fusion, Other mutation
14 Histiocytosis (Erdheim-Chester, Langerhans, Rosai-Dorfman)		
1	BRAF	V600K, G466K, G469V , Other mutation
2	KRAS	G12[AIDIVISIRIC], G13[AIDIVISIRIC], Q61[KIEPILIR,H], Other mutation
3	MAP2K1	F53L, F53_158del, Q56P, I99_K104del, L115P, R49L, Other mutation
4	NRAS	G12[AIDIVISIRIC], G13[AIDIVISIRIC], Q61[KIEPILIR,H], Other mutation



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