Test Definition: KRASD

cfDNA KRAS 12, 13, 61, 146 Blood

Overview

Useful For

As an alternative to invasive tissue biopsies for the determination of *KRAS* 12, 13, 61,146 (G12A, G12C, G12D, G12R, G12S, G12V, G13D, Q61K, Q61L, Q61R, Q61H, and A146T) mutation status

Selection of patients with colorectal cancer who are most likely to benefit from epidermal growth factor receptor (EGFR)-targeted therapies

Genetics Test Information

This test evaluates cell-free DNA (cfDNA) in the peripheral blood for the presence of *KRAS* mutations at codons 12, 13, 61, and 146 (G12A, G12C, G12D, G12R, G12S, G12V, G13D, Q61K, Q61L, Q61R, Q61H, and A146T) in patients with colorectal cancer and can be used to assess eligibility for targeted therapies.

This test is not validated for serial monitoring of patients with cancer. This test is also not intended as a screening test to identify cancer.

Highlights

This test provides rapid detection of *KRAS* mutations in colorectal cancer patients as an alternative for KRAS analysis of tissue.

Current data suggests that the efficacy of epidermal growth factor receptor (EGFR)-targeted therapy in colorectal cancer patients is limited to patients whose tumors do not harbor mutations in the *KRAS* gene.

Method Name

Digital Droplet Polymerase Chain Reaction (PCR)

NY State Available

Yes

Specimen

Specimen Type

Whole blood

Ordering Guidance

This test is **not** a prenatal screening test. To evaluate for the presence of common fetal chromosome abnormalities using cell-free DNA, order NIPS / Cell-Free DNA Prenatal Screen.

Shipping Instructions

1. Samples should be transported at ambient temperature or refrigerated (4 degrees C).

2. Samples are viable for 7 days in the Streck Black/Tan Top Tube Kit (T715).

Specimen Required

Supplies: Streck Black/Tan Top Tube Kit (T715)

Container/Tube: Streck Cell-Free DNA blood collection kit (T715)

Specimen Volume: Two 10-mL Streck Cell-Free DNA blood collection tubes

Additional Information: Only blood collected in Streck Cell-Free DNA BCT tubes will be accepted for analysis. Whole blood will be processed to produce platelet-poor plasma before cfDNA isolation.

Forms

If not ordering electronically, complete, print, and send an Oncology Test Request (T729) with the specimen.

Specimen Minimum Volume

One 10 mL Streck tube

Reject Due To

No specimen collected in the Streck Cell-Free DNA blood collection tubes will be rejected.

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole blood	Ambient (preferred)	7 days	Streck Black/Tan top
	Refrigerated	7 days	Streck Black/Tan top

Clinical and Interpretive

Clinical Information

Approximately 30% to 50% of colorectal cancers (CRC) have mutations in *KRAS*. Most occur in hotspot regions in codons 12, 13, 61, and 146. These mutations lead to constitutive activation of the RAS/MAPK pathway downstream of epidermal growth factor receptor (EGFR), limiting the effectiveness of anti-EGFR therapies, such as cetuximab and panitumumab, which inhibit ligand-mediated activation of EGFR. Therefore, identification and quantitation of these mutations is critical in selecting the appropriate therapy.

This test uses DNA extracted from peripheral blood to evaluate for the presence of *KRAS* (G12A, G12C, G12D, G12R, G12S, G12V, G13D, Q61K, Q61L, Q61R, Q61H, and A146T) mutations. A positive result indicates the presence of an activating *KRAS* mutation and may be useful for guiding the treatment of individuals with colorectal cancer.

Interpretation

An interpretive report will be provided.

Cautions

Patients with a negative test result may still harbor a KRAS mutation. Mutation testing of a tissue specimen for KRAS mutations should be considered for patients with who have a negative result with this test.

The limit of detection of this assay for the detection of KRAS mutations is influenced by the amount of cell-free DNA (cfDNA) in the blood. This is a biological variable that cannot be controlled.

This assay was designed to detect mutations in KRAS codons 12, 13, 61, and 146 (G12A, G12C, G12D, G12R, G12S, G12V, G13D, Q61K, Q61L, Q61R, Q61H, and A146T).

This test has not been clinically validated for use as a tool to monitor response to therapy or for early detection of

tumors.

This test cannot differentiate between somatic and germline alterations.

Supportive Data

This test has been evaluated by our laboratory as an alternative to assessing paraffin-embedded tumor specimens for *KRAS* mutations in patients with colorectal cancer.Â

Clinical Reference

1. Schwarzenbach H, Hoon DS, Pantel K: Cell-free nucleic acids as biomarkers in cancer patients. Nat Rev Cancer 2011;11(6):426-437

2. Allegra CJ, Rumble BR, Hamilton SR, et al: Extended RAS Gene Mutation Testing in Metastatic Colorectal Carcinoma to Predict Response to Anti-Epodermal Growth Factor Receptor Monoclonal Antibody Therapy: ASCO Provisional Clinical Opinion update 2015. J Clin Oncol 2016 Jan 10;34(2):179-185

3. Olmedillas Lopez S, Garcia-Olmo DC, Garcia-Arranz M, et al: KRAS G12V Mutation Detection by Droplet Digital PCR in Circulating Cell-Free DNA of Colorectal Cancer Patients. Int J Mol Sci 2016;17:484

Performance

Method Description

Blood samples are collected in Streck Cell-Free DNA BCT tubes. cell-free DNA (cfDNA) is isolated from double-spun plasma and assessed for the presence of *KRAS* codon 12, 13, 61, and 146 mutations using digital droplet PCR.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

5 to 10 days

Performing Laboratory Location

Rochester

Fees and Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

Test Classification

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information

81275

81276

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
KRASD	cfDNA KRAS 12, 13, 61, 146 Blood	In Process

Result ID	Test Result Name	Result LOINC Value
113123	Result Summary	50397-9
113508	Result	75974-6
113125	Interpretation	69047-9
113126	Additional Information	48767-8
113127	Specimen	31208-2
113128	Source	31208-2
113129	Released By	18771-6