MAYO CLINIC LABORATORIES

Test Definition: NTRK

NTRK Gene Fusion Panel, Tumor

Overview

Useful For

Identifying solid tumors that may respond to targeted therapies by simultaneously assessing for fusions involving targeted regions of the *NTRK1*, *NTRK2,* and *NTRK3* genes resulting in fusion transcripts.

This test is **not useful for** hematologic malignancies.

Genetics Test Information

This test uses next-generation sequencing to identify rearrangements (fusions) involving targeted regions of the *NTRK1, NTRK2,* and *NTRK3* genes.

The assay was designed to detect the most common *NTRK* gene fusions and novel gene fusion partners in the targeted gene regions. For more information see NTRK RNA Targeted Gene Fusions.

Of note, this test is performed to evaluate rearrangements (fusions) within solid tumor samples. This test is **not intended for** hematological malignancies.

Additional Tests

Test Id	Reporting Name	Available Separately	Always Performed
SLIRV	Slide Review in MG	No, (Bill Only)	Yes

Testing Algorithm

When this test is ordered, slide review will always be performed at an additional charge.

Special Instructions

- NTRK RNA Targeted Gene Fusions
- Tissue Requirements for Solid Tumor Next-Generation Sequencing

Highlights

This test evaluates formalin-fixed, paraffin-embedded tumor slides from patients with advanced solid tumors for rearrangements (fusions) involving targeted regions of the *NTRK1*, *NTRK2*, and *NTRK3* genes to identify candidates for targeted therapy. Current data suggests that solid tumors with *NTRK* rearrangements may be sensitive to multikinase inhibitors.

Method Name

Polymerase Chain Reaction (PCR)-based Next-Generation Sequencing (NGS)

NY State Available

Yes

Specimen

Specimen Type
Varies

Ordering Guidance
Multiple oncology (cancer) gene panels are available. For more information see Hematology, Oncology, and Hereditary Test Selection Guide.

Necessary Information
Pathology report (final or preliminary) at minimum containing the following information **must accompany specimen** for testing to be performed:
1. Patient name
2. Block number-must be on all blocks, slides and paperwork (can be handwritten on the paperwork)
3. Tissue collection date
4. Source of the tissue

Specimen Required
This assay requires at least 10% tumor nuclei.
-Preferred amount of tumor area with sufficient percent tumor nuclei: tissue 144 mm(2)
-Minimum amount of tumor area: tissue 36 mm(2).
-These amounts are cumulative over up to 10 unstained slides and must have adequate percent tumor nuclei.
-Tissue fixation: 10% neutral buffered formalin, not decalcified
-For specimen preparation guidance, see Tissue Requirements for Solid Tumor Next-Generation Sequencing. In this document, the sizes are given as 4 mm x 4 mm x 10 slides as preferred: approximate/equivalent to 144 mm(2) and the minimum as 3 mm x 1 mm x 10 slides: approximate/equivalent to 36 mm(2).

Preferred: Submit 2, if available, of the following specimens.
Acceptable: Submit **at least one** of the following specimens.

Specimen Type: Tissue block
Collection Instructions: Submit a formalin-fixed, paraffin-embedded tissue block with acceptable amount of tumor tissue.

Specimen Type: Tissue slide
Slides: 1 Hematoxylin and eosin-stained and 10 unstained
Collection Instructions:
Submit the followings slides:
1 Slide stained with hematoxylin and eosin
AND
10 Unstained, nonbaked slides with 5-micron thick sections of the tumor tissue.
Note: The total amount of required tumor nuclei can be obtained by scraping up to 10 slides from the same block.
Additional Information: Unused unstained slides will not be returned.

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

Specimen Minimum Volume
See Specimen Required

Reject Due To
All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Varies	Ambient (preferred)		
	Refrigerated		
	Frozen		

Clinical & Interpretive

Clinical Information
Targeted cancer therapies are defined as antibody or small molecule drugs that block the growth and spread of cancer by interfering with specific cell molecules involved in tumor growth and progression. Multiple targeted therapies have been approved by the US Food and Drug Administration for treatment of specific cancers. Molecular genetic profiling is often needed to identify targets amenable to targeted therapies and to minimize treatment costs and therapy-associated risks.

Fusions involving the *NTRK1*, *NTRK2,* and *NTRK3* genes (ie, NTRK gene fusions) are oncogenic drivers of multiple types of pediatric and adult solid tumors. In solid tumors, the presence of an *NTRK* gene fusion is a biomarker for response to tropomyosin receptor kinase (TRK) inhibitor therapies.

This test assesses for fusions involving targeted regions of *NTRK1*, *NTRK2,* and *NTRK3* genes. The results of this test can be useful in guiding treatment of individuals with advanced solid tumors.

See Method Description for details regarding the targeted gene regions evaluated by this test.

Reference Values
An interpretive report will be provided.

Interpretation
The interpretation of molecular biomarker analysis includes an overview of the results and the associated diagnostic, prognostic, and therapeutic implications.

Cautions
This test is not designed to differentiate between somatic mutations and germline alterations. Additional testing may be necessary to clarify the significance of results if there is a potential hereditary risk.

A negative (wildtype) result does not rule out the presence of a rearrangement (fusion) that may be present but below the limits of detection of this assay. The analytical sensitivity of this assay is a minimum coverage of 10 targeted fusion reads with 5 unique fusion molecules in a sample with 10% or greater tumor content.

Only gene rearrangements (fusions) involving targeted regions in *NTRK1, NTRK2,* and *NTRK3* genes will be detected. This test does not detect point mutations, deletion-insertion mutations, large single or multiexon deletions or duplications, or genomic copy number variants in any of the genes tested.

Rare genetic alterations (ie, polymorphisms) may be present that could lead to false-negative or false-positive results.

Test results should be interpreted in the context of clinical findings, tumor sampling, and other laboratory data. If results obtained do not match other clinical or laboratory findings, contact the laboratory for an updated interpretation. Misinterpretation of results may occur if the information provided is inaccurate or incomplete.

Reliable results are dependent on adequate specimen collection and processing. This test has been validated on formalin-fixed, paraffin-embedded tissues; other types of fixatives are discouraged. Improper treatment of tissues, such as decalcification, may cause polymerase chain reaction failure.

Clinical Reference

1. Drilon A, Laetsch TW, Kummar S. Efficacy of Larotrectinib in TRK fusion-positive cancers in adults and children. N Engl J Med. 2018;378(8):731-739. doi:10.1056/NEJMoa1714448
2. Cocco E, Scaltriti M, Drilon A. NTRK fusion-positive cancers and TRK inhibitor therapy. Nat Rev Clin Oncol. 2018;15(12):731-747. doi:10.1038/s41571-018-0113-0

Performance

Method Description

Next-generation sequencing is performed to test for the presence of fusions involving targeted regions in *NTRK1, NTRK2,* and *NTRK3* genes. Fusion gene nomenclature is based on a custom reference sequence using genome build GRCh37 (hg19). See *NTRK* RNA Targeted Gene Fusions for details regarding the targeted gene regions identified by this test.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Varies

Report Available

14 to 21 days

Specimen Retention Time

Tissue blocks: Unused portions of blocks will be returned; Tissue slides: Unused slides are stored for at least 5 years; Extracted RNA: 3 months

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

Fees & 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 account representative. 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. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

81194
88381

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
NTRK	NTRK Gene Fusion Panel	93813-4

Result ID	Test Result Name	Result LOINC® Value
606761	Result Summary	50397-9
606762	Result	81286-7
606763	Interpretation	69047-9
606764	Additional Information	48767-8
606765	Specimen	31208-2
606766	Source	31208-2
606767	Tissue ID	80398-1
606768	Released By	18771-6