Test Definition: GISTP

GIST Panel, Tumor

Overview

Useful For

Diagnosis and management of patients with gastrointestinal stromal tumors

This test is **not useful for** assessment of hematologic malignancies or germline alterations.

Genetics Test Information

This test uses targeted next-generation sequencing to evaluate for somatic alterations within the *KIT* (exon 2, 9, 10, 11, 13, 14, 15, 17, 18) and *PDGFRA* (exons 12, 14, 15, 18) genes. See Targeted Gene Regions Interrogated by Solid Tumor Targeted Cancer Gene Panel by Next-Generation Sequencing in Special Instructions for details regarding the targeted gene regions identified by this test.

This test is performed to evaluate for somatic alterations within solid tumor samples. This test is not intended for use for hematological malignancies. Additionally, this test does not assess for germline alterations within the genes listed.

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

- Targeted Gene Regions Interrogated by Solid Tumor Targeted Cancer Gene Panel by Next Generation Sequencing
- Tissue Requirements for Solid Tumor Next-Generation Sequencing

Method Name

Polymerase Chain Reaction (PCR)-Based Next-Generation Sequencing

NY State Available

Yes

Specimen

Specimen Type

Varies

Advisory Information

For *KIT* Asp816Val allelic variant analysis in mast cell disease, refer to KITAS / *KIT* Asp816Val Mutation Analysis, Qualitative PCR, Varies.

Necessary Information

Pathology report (final or preliminary) at minimum containing the following information must accompany specimen in order 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 20% tumor nuclei.

-Preferred amount of tumor area with sufficient percent tumor nuclei: tissue144 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 Requirement for Solid Tumor Next-Generation Sequencing in Special Instructions. In this document, the sizes are given as 4mm x 4mm x 10 slides as preferred: approximate/equivalent to 144 mm(2) and the minimum as 3mm x 1mm x 10 slides: approximate/equivalent to 36mm(2).

Preferred:

Specimen Type: Tissue block

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

Acceptable:

Specimen Type: Tissue slide

Slides: 1 stained and 10 unstained

Collection Instructions: Submit 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.

Specimen Type: Cytology slide (direct smears or ThinPrep)

Slides: 1 to 3 slides

Collection Instructions: Submit 1 to 3 slides stained and cover slipped with a preferred total minimum of 5000 total nucleated cells, minimum of 3000 nucleated cells.

Note: Glass coverslips are preferred; plastic coverslips are acceptable but will result in longer turnaround times.

Additional Information: Cytology slides will not be returned.

Forms

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

Specimen Minimum Volume

See Specimen Required

Reject Due To

Specimens that have been decalcified (all methods) Specimens that have not been formalin-fixed, paraffin-embedded	Reject

Specimen Stability Information

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

Clinical and 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 FDA 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.

Next-generation sequencing has recently emerged as an accurate, cost-effective method to identify alterations across numerous genes known to be associated with response or resistance to specific targeted therapies. This test is a single assay that uses formalin-fixed paraffin-embedded tissue to assess for common variations in the *KIT* and *PDGFRA* genes known to be associated with gastrointestinal stromal tumors (GIST). The results of this test can be useful for assessing prognosis and guiding treatment of individuals with GIST.

See Targeted Gene Regions Interrogated by Solid Tumor Targeted Cancer Gene Panel by Next Generation Sequencing in Special Instructions for details regarding the targeted gene regions identified by this test.

Reference Values

An interpretative report will be provided.

Interpretation

An interpretive report will be provided.

Cautions

This test cannot differentiate between somatic and germline alterations. Additional testing may be necessary to clarify the significance of results if there is a potential hereditary risk. DNA variants of uncertain significance may be

identified.

A negative (wild-type) result does not rule out the presence of a alteration that may be present but below the limits of detection of this assay (approximately 5%-10%). This test does not detect large single or multiexon deletions or duplications or genomic copy number variants.

Rare alterations 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 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 PCR failure.

KIT variations can be seen in neoplasms other than gastrointestinal stromal tumors including, but not limited to: mast cell disease, melanoma, seminomas, acute myeloid leukemia, myeloproliferative neoplasms, and some lymphomas.

PDGFRA variations may be occasionally found in inflammatory fibroid polyps.(1)

Supportive Data

We studied a set of 75 formalin-fixed, paraffin-embedded specimens: 40 classic gastrointestinal stromal tumors (GIST), 10 unrelated tumors, 21 neuroendocrine tumors, and 4 other tumors (2 metastatic melanomas, 1 breast cancer, and 1 squamous cell carcinoma). The literature reports that approximately 80% of GIST harbor a alterations in *KIT* gene, while 2% to 5% harbor alterations in *PDGFRA*. Overall, we found 83% of GIST tested demonstrated alternations in *KIT* or *PDGFRA*, which is in accordance with the literature.

Clinical Reference

1. Schildhaus HU, Cavlar T, Binot E, et al: Inflammatory fibroid polyps harbour mutations in the platelet-derived growth factor receptor alpha (PDGFRA) gene. J Pathol 2008;216(2):176-182

2. Robson ME, Blogowski E, Sommer G, et al: Pleomorphic characteristics of a germ-line KIT mutation in a large kindred with gastrointestinal stromal tumors, hyperpigmentation, and dysphagia. Clin Cancer Res 2004;10:1250-1254

3. Li FP, Fletcher JA, Heinrich MC, et al: Familial gastrointestinal stromal tumor syndrome: phenotypic and molecular features in a kindred. J Clin Oncol 2005;23:2735-2743

4. Corless CL, Fletcher JA, Heinrich MC: Biology of gastrointestinal stromal tumors. J Clin Oncol 2004;22:3813-3825

5. Debiec-Rychter M, Raf Sciot R, Le Cesne A, et al: KIT mutations and dose selection for imatinib in patients with advanced gastrointestinal stromal tumors. Eur J Cancer 2006;42:1093-1103

6. Heinrich MC, Corless CL, Demetri GD, et al: Kinase mutations and imatinib mesylate response in patients with metastatic gastrointestinal stromal tumor. J Clin Oncol 2003;21:4342-4349

7. Debiec-Rychter M, Dumez H, Judson I, et al: Use of c-KIT/PDGFRA mutational analysis to predict the clinical response to imatinib in patients with advanced gastrointestinal stromal tumors entered on phase I and II studies of the EORTC Soft Tissue and Bone Sarcoma Group. Eur J Cancer 2004;40:689-695

8. El-Menyar A, Mekkodathil A, Al-Thani H. Diagnosis and management of gastrointestinal stromal tumors: An up-to-date literature review. J Can Res Ther 2017;13:889-900

Performance

Method Description

Next-generation sequencing is performed to test for the presence of an alternation in targeted regions of the *KIT* and *PDGFRA* genes. See Targeted Gene Regions Interrogated by Solid Tumor Targeted Cancer Gene Panel by Next-Generation Sequencing in Special Instructions for details regarding the targeted gene regions identified by this test.(Unpublished Mayo method)

PDF Report

No

Day(s) and Time(s) Test Performed

Monday through Friday; Varies

Analytic Time

12 days

Maximum Laboratory Time

20 days

Specimen Retention Time

Unused portions of blocks will be returned. Unused slides are stored indefinitely.

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

81272-*KIT* (v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog) (eg, gastrointestinal stromal tumor [GIST], acute myeloid leukemia, melanoma), gene analysis, targeted sequence analysis (eg, exons 8, 11, 13, 17, 18)

81314-*PDGFRA* (platelet-derived growth factor receptor alpha polypeptide) (eg, gastrointestinal stromal tumor [GIST]), gene analysis, targeted sequence analysis (eg, exons 12, 18)

88381-Microdissection, manual

LOINC® Information

Test Definition: GISTP

GIST Panel, Tumor

Test ID	Test Order Name	Order LOINC Value
GISTP	GIST Panel, Tumor	In Process

Result ID	Test Result Name	Result LOINC Value
54862	Result	82939-0
54863	Result Summary	50397-9
54864	Interpretation	69047-9
54865	Additional Information	48767-8
54867	Specimen	31208-2
54868	Source	31208-2
54869	Tissue ID	80398-1
54870	Released By	18771-6