MAYO CLINIC LABORATORIES

# Test Definition: PIK3T

PIK3CA Mutation Analysis, Tumor

## Overview

### Useful For

Identification of hormone receptor positive and human epidermal growth factor receptor 2 negative (HR+/HER2-) advanced breast cancer tumors that may be eligible for treatment with targeted kinase inhibitor therapy (eg, alpelisib).

### Testing Algorithm

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

### Method Name

Polymerase Chain Reaction (PCR)

### NY State Available

Yes

## Specimen

### Specimen Type

Varies

### Necessary Information

A 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 20% tumor nuclei.**

The amount of tissue needed is dependent on a variety of preanalytical factors (eg, cellularity, ischemic time, fixation). The FFPE input required is equivalent to a 4 to 5 micron slide thickness with a total tumor surface area of 100 mm(2). This can be created by combining material from multiple slides from one tissue block.

**Preferred:**

**Specimen Type:** Tissue block

**Collection Instructions:** Submit a formalin-fixed, paraffin-embedded tissue block.

**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.

### 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) | | |
| | Refrigerated | | |

## Clinical & Interpretive

### Clinical Information

More than 70% of breast cancers are hormone receptor (HR) positive and human epidermal growth factor receptor 2 (HER2) negative (HR+/HER2-). Approximately 40% of patients with HR+/HER2- advanced breast cancer have activating mutations in the gene *PIK3CA*, inducing hyperactivation of the alpha isoform (p110alpha) of phosphatidylinositol 3-kinase, a key upstream component of the PI3K pathway. Mutations in *PIK3CA* are associated with tumor growth, resistance to endocrine therapy, and a poor overall prognosis.

Patients with HR+/HER2- advanced breast cancer identified to have a *PIK3CA* mutation may be eligible for treatment with targeted kinase inhibitor therapy (eg, alpelisib).

This test uses DNA extracted from tumors to evaluate for the presence of 10 clinically actionable *PIK3CA* mutations:
E542K (c.1624G>A)
E542K (c.1633G>A)
E545D (c.1635G>T)

E545G (c.1634A>G)
E545A (c.1634A>C)
H1047Y (c.3139C>T)
C420R (c.1285C>T)
Q546E (c.1636C>G)
H1047L (c.3140A>T)
H1047R (c.3140A>G)

### Reference Values
An interpretive report will be provided

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

### Cautions
A negative (wildtype) result does not rule out the presence of a mutation that may be present but below the limits of detection of this assay. It also does not rule out the presence of other types of alterations in the *PIK3CA* gene outside those that the assay was designed to detect.

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

Not all tumors that have *PIK3CA* mutations will respond to targeted therapies.

Rare genetic alterations exist that could lead to false-negative or false-positive results.

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

### Clinical Reference
1. Bachman K, Argani P, Samuels Y, et al: The PIK3CA gene is mutated with high frequency in human breast cancers. Cancer Biol Ther. 2004 Aug;3(8):772-775
2. Andre F, Ciruelos EM, Rubovszky G, et al: Alpelisib for PIK3CA-mutated, hormone receptor-positive advanced breast cancer. N Engl J Med. 2019 May 16;380(20):1929-1940
3. Andre F, Ciruelos EM, Juric D, et al: Alpelisib plus fulvestrant for PIK3CA-mutated, hormone receptor-positive, human epidermal growth factor receptor-2-negative advanced breast cancer: final overall survival results from SOLAR-1. Ann Oncol. 2021 Feb;32(2):208-217

## Performance

### Method Description
Microscopic examination is performed by a pathologist to identify areas of tumor for enrichment by macrodissection.

Testing is performed on invasive tissue only. Other tissue components, such as ductal carcinoma in situ (DCIS), are excluded.

A polymerase-chain reaction (PCR)-based assay employing real-time PCR and allele-specific PCR technologies is used to test for 10 mutations within *PIK3CA* (C420R, E542K, E545A, E545D, E545G, E545K, Q546E, H1047L, H1047R, and H1047Y).(Package insert: therascreen PIK3CA RGQ PCR Kit. Qiagen; 05/2019)

### PDF Report
No

### Day(s) Performed
Monday through Friday

### Report Available
8 to 12 days

### Specimen Retention Time
Unused portions of blocks will be returned. Unused slides: Indefinitely

### 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 has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

### CPT Code Information
81309

### LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---|---|---|
| PIK3T | PIK3CA Mutation Analysis, Tumor | 60034-6 |

| Result ID | Test Result Name | Result LOINC® Value |
|---|---|---|
| 616654 | Result Summary | 50397-9 |
| 616655 | Result | 82939-0 |

| | | |
|---|---|---|
| 616656 | Interpretation | 69047-9 |
| 616657 | Additional Information | 48767-8 |
| 616658 | Specimen | 31208-2 |
| 616659 | Source | 31208-2 |
| 616660 | Tissue ID | 80398-1 |
| 616661 | Released By | 18771-6 |