

## Overview

### Useful For

Identification of loss of SMAD4 (mothers against decapentaplegic homolog 4 drosophila) expression within pancreatic ductal adenocarcinoma

### Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
IHTOA	IHC Additional, Tech Only	No	No
IHTOI	IHC Initial, Tech Only	No	No

### Testing Algorithm

For the initial technical component only immunohistochemical (IHC) stain performed, the appropriate bill-only test ID will be reflexed and charged (IHTOI). For each additional technical component only IHC stain performed, an additional bill-only test ID will be reflexed and charged (IHTOA).

### Method Name

Immunohistochemistry (IHC)

### NY State Available

Yes

## Specimen

### Specimen Type

TECHONLY

### Ordering Guidance

This test includes only technical performance of the stain; **no pathologist interpretation is provided.**

Technical component only stains **should not** be ordered with PATHC / Pathology Consultation. If ordered with PATHC, the technical component stains **will be canceled.** Any immunohistochemistry (IHC)/in situ hybridization (ISH) stain performed as a part of the PATHC will be performed at the reviewing pathologist's discretion at an additional charge.

### Shipping Instructions

Attach the green "Attention Pathology" address label (T498) and the pink Immunostain Technical Only label included in the kit to the outside of the transport container.

### Specimen Required

**Specimen Type:** Tissue

**Supplies:** Immunostain Technical Only Envelope (T693)

**Container/Tube:** Immunostain Technical Only Envelope

**Preferred:**

-Formalin-fixed, paraffin-embedded tissue block

OR

-2 Unstained, positively charged glass slides (25- x 75- x 1-mm) per test ordered; sections 4-microns thick

**Acceptable:** None

### Digital Image Access

1. Information on accessing digital images of immunohistochemical (IHC) stains and the manual requisition form can be accessed through this website: <https://news.mayocliniclabs.com/pathology/digital-imaging/>
2. Clients ordering stains using a manual requisition form will not have access to digital images.
3. Clients wishing to access digital images must place the order for IHC stains electronically. Information regarding digital imaging can be accessed through this website: <https://news.mayocliniclabs.com/pathology/digital-imaging/#section3>

### Forms

[If not ordering electronically, complete, print, and send a Immunohistochemical \(IHC\)/In Situ Hybridization \(ISH\) Stains Request \(T763\)](#) with the specimen.

### Reject Due To

Wet/frozen tissue Cytology smears Nonformalin fixed tissue Nonparaffin embedded tissue Noncharged slides ProbeOn slides Snowcoat slides	Reject
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### Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
TECHONLY	Ambient (preferred)		
	Refrigerated		

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## Clinical & Interpretive

### Clinical Information

SMAD4 (mothers against decapentaplegic homolog 4 drosophila) is a tumor suppressor and transcription factor that is part of the transforming growth factor beta signaling pathway. Normally SMAD4 is expressed within the nucleus of epithelial cells, while loss of SMAD4 expression is caused by inactivation of the *SMAD4* gene due to sporadic genetic variants. The status of SMAD4 expression is useful in the diagnosis of pancreatic adenocarcinoma.

### Interpretation

This test does not include pathologist interpretation, only technical performance of the stain. If interpretation is required, order PATHC / Pathology Consultation for a full diagnostic evaluation or second opinion of the case.

The positive and negative controls are verified as showing appropriate immunoreactivity.

Interpretation of this test should be performed in the context of the patient's clinical history and other diagnostic tests by a qualified pathologist.

### Cautions

Age of a cut paraffin section can affect immunoreactivity. Stability thresholds vary widely among published literature and are antigen dependent. Best practice is for paraffin sections to be cut within 6 weeks.

The charge of glass slides can be affected by environmental factors and subsequently may alter slide staining. Sending unsuitable glass slides can result in inconsistent staining due to poor slide surface chemistry.

Best practices for storage of positively charged slides:

- Minimize time slides are stored after being unpackaged
- Limit exposure to high humidity and heat
- Minimize exposure to plastics

### Clinical Reference

1. Hata T, Suenaga M, Marchionni L, et al. Genome-wide somatic copy number alterations and mutations in high-grade pancreatic intraepithelial neoplasia. *Am J Pathol*. 2018;188(7):1723-1733
2. Voorneveld PW, Jacobs RJ, Kodach LL, Hardwick JC. A meta-analysis of SMAD4 immunohistochemistry as a prognostic marker in colorectal cancer. *Transl Oncol*. 2015;8(1):18-24
3. Chen YW, Hsiao PJ, Weng CC, et al. SMAD4 loss triggers the phenotypic changes of pancreatic ductal adenocarcinoma cells. *BMC Cancer*. 2014;14:181
4. Magaki S, Hojat SA, Wei B, So A, Yong WH. An introduction to the performance of immunohistochemistry. *Methods Mol Biol*. 2019;1897:289-298. doi:10.1007/978-1-4939-8935-5

## Performance

**Method Description**

Immunohistochemistry on sections of paraffin-embedded tissue.(Unpublished Mayo method)

**PDF Report**

No

**Day(s) Performed**

Monday through Friday

**Report Available**

1 to 3 days

**Specimen Retention Time**

Until staining is complete.

**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 cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

**CPT Code Information**

88342-TC, primary

88341-TC, if additional IHC

**LOINC® Information**

Test ID	Test Order Name	Order LOINC® Value
SMAD4	SMAD4 IHC, Tech Only	No LOINC Needed

Result ID	Test Result Name	Result LOINC® Value
613981	SMAD4 IHC, Tech Only	No LOINC Needed