Test Definition: HERBN

HER2, Breast, Quantitative Immunohistochemistry, Automated, No Reflex

Overview

Useful For

Determining overexpression of HER2 protein on formalin-fixed, paraffin-embedded tissue sections without a reflex to FISH testing

This FDA-approved test is most frequently used to evaluate HER2 overexpression in breast cancer

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
HERBM	HER Breast Semi Quant IHC Manual	No	No
H2BR	HER2, Breast Tumor, FISH, Tissue	Yes	No

Testing Algorithm

Cases that are not able to be scanned for automated analysis due to technical issues will be changed to the manual process for analysis.

Method Name

Ventana Pathway Immunoperoxidase Stain with Automated Quantitative Immunohistochemistry

NY State Available

Yes

Specimen

Specimen Type

Special

Ordering Guidance

For gastroesophageal cancer, order HERGM / HER2, Gastric/Esophageal, Semi-Quantitative Immunohistochemistry, Manual or HERGN / HER2, Gastric/Esophageal, Semi-Quantitative Immunohistochemistry, Manual, No Reflex.

Shipping Instructions

Attach the green pathology address label included in the kit to the outside of the transport container.

Necessary Information

1. **Include accompanying pathology report stating the final diagnosis.** If not available, a preliminary diagnosis is

acceptable **only** if it refers to invasive or metastatic breast carcinoma.

2. Information regarding fixative used, time to fixation, and duration of fixation is required.

Specimen Required

Supplies: Pathology Packaging Kit (T554)

Specimen Type:

Preferred: A paraffin-embedded tissue block containing breast cancer tissue that has been fixed in 10% neutral buffered formalin within 1 hour from surgical collection time and for a total of 6 to 72 hours and shipped at ambient temperature

Acceptable: 2 unstained sections, containing breast carcinoma, on charged slides cut at 4 microns less than 1 month ago and shipped at ambient temperature. Tissue on the slides should have been fixed in 10% neutral buffered formalin within 1 hour from surgical collection time and for a total of 6 to 72 hours.

Submission Container/Tube: Pathology Packaging Kit (T554)

Collection Instructions: Submit paraffin-embedded invasive or metastatic breast carcinoma tissue.

Additional Information:

1. When ordering this test, the following questions, as stated on the order form or presented electronically, must be answered:

a. "Was specimen fixed in 10% NB formalin w/in 1 hour? Yes, No, or Unknown"

b. "Was specimen fixed in 10% NB formalin 6-72 hours? Yes, No, or Unknown"

c. "Tissue was decalcified? Yes, No, or Unknown."

d. "Tumor type? Primary invasive breast carcinoma or metastatic breast carcinoma."

e. "Tumor classification? Invasive breast carcinoma, metastatic breast carcinoma, or micro-invasive breast carcinoma."

2. According to the American Society of Clinical Oncology (ASCO)/College of American Pathologists (CAP) guidelines, HER2 protein immunohistochemical test results are only valid for nondecalcified, paraffin-embedded specimens fixed in 10% neutral buffered formalin within 1 hour from surgical collection time and for a total time of 6 to 72 hours. Under- or overfixation may affect these results.

3. HER2 immunohistochemistry testing on intracystic papillary carcinoma and solid papillary carcinoma, without clearly stating invasive carcinoma, is not appropriate and will be canceled without processing.

4. Paraffin blocks will be returned with final report.

Forms

If not ordering electronically, complete, print, and send an Immunohistochemical (IHC)/In Situ Hybridization (ISH) Stains Request (T763)

Specimen Minimum Volume

Entire block

Reject Due To

No specimen should be rejected.

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

The *HER2* (official gene name *ERBB2*) proto-oncogene encodes a membrane receptor with tyrosine kinase activity and homology to the epidermal growth factor receptor.

Amplification and overexpression of the *HER2* gene in human breast, endometrial, ovarian, and other epithelial cancers have been associated with a shorter disease-free interval and shorter overall survival. Overexpression of HER2 protein is an indication for Herceptin therapy in patients with breast cancer.

Reference Values

Reported as negative (0, 1+), equivocal (2+), and strongly positive (3+) according to the interpretation guidelines for the FDA-approved Ventana Pathway HER2 (4B5) antibody.

Interpretation

Results are reported as negative (0, 1+), equivocal (2+), and strongly positive (3+) according to the interpretation guidelines for the FDA-approved Ventana Pathway HER2 (4B5) antibody.

The scoring method using the Aperio digital pathology system was developed and validated in the Molecular Anatomic Pathology Laboratory, Department of Laboratory Medicine and Pathology, Mayo Clinic (see Method Description).

Cautions

The performance and quality of immunohistochemical stains in formalin-fixed, paraffin-embedded tissue depends critically on proper fixation.

Clinical Reference

1. Riber-Hansen R, Vainer B, Steiniche T: Digital image analysis: a review of reproducibility, stability and basic requirements for optimal results. Apmis 2012 April;120(4):276-289
2. Gavrielides MA, Gallas BD, Lenz P, et al: Observer variability in the interpretation of HER2/neu immunohistochemical expression with unaided and computer-aided digital microscopy. Arch Pathol Lab Med Feb;135(2):233-242
3. Cuadros M, Villegas R: Systematic review of HER2 breast cancer testing. Appl Immunohistochem Mol Morphol Jan 2009;17(1):1-7
4. Nassar A, Cohen C, Agersborg SS, et al: Trainable immunohistochemical HER2/neu image analysis: a multisite performance study using 260 breast tissue specimens. Arch Pathol Lab Med 2011 July;135(7):896-902

Performance

Method Description

Testing is performed using FDA-approved Ventana Pathway HER2 (4B5) rabbit monoclonal primary antibody and a proprietary detection system.(Package insert: PATHWAY anti-HER-2/neu (4B5) Rabbit Monoclonal Primary Antibody)

Scoring is performed according to American Society of Clinical Oncology (ASCO)/College of American Pathologists (CAP) guidelines as follows:
Score of 3+ is defined as circumferential membrane staining that is complete, intense and in greater than 10% of invasive tumor cells;
Score of 2+ is defined as weak to moderate complete membrane staining observed and in greater than 10% of the invasive tumor cells; or circumferential membrane staining that is complete, intense and in less than or equal to 10% of invasive tumor cells;
Score of 1+ is defined as incomplete membrane staining that is faint or barely perceptible and in greater than 10% of the invasive tumor cells; or weak to moderate complete membrane staining observed and less than 10% of the invasive tumor cells;
Score of 0 is defined as no staining observed or membrane staining that is incomplete and is faint or barely perceptible and in less than or equal to 10% of the invasive tumor cells.(Wolff AC, Hammond ME, Hicks DG, et al. Human Epidermal Growth Factor Receptor 2 Testing in Breast Cancer: American Society of Clinical Oncology/College of American Pathologists Clinical Practice Guideline Focused Update. J Clin Oncol. 2018 Jul 10;36(20):2105-2122 doi: 10.1200/JCO.2018.77.8738)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
4 to 6 days

Specimen Retention Time
Until 1 week after results are reported. Materials made at Mayo Clinic may be retained at Mayo Clinic 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.

Test Definition: HERBN

HER2, Breast, Quantitative Immunohistochemistry, Automated, No Reflex

CPT Code Information

88361

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
HERBN	HER Breast IHC Automated NO Reflex	Obsolete

Result ID	Test Result Name	Result LOINC® Value
MA012	Fixed in 10% NB formalin w/in 1 hr	8100-0
MA013	Fixed in 10% NB formalin 6-72 hrs	8100-0
MA014	Tumor type	44638-5
MA015	Tumor classification	21918-8
70975	Interpretation	50595-8
70976	Participated in the Interpretation	No LOINC Needed
70979	Material Received	81178-6
70977	Report electronically signed by	19139-5
71622	Disclaimer	62364-5
71836	Case Number	80398-1
MA047	Tissue was decalcified	8100-0