Test Definition: CHRST

Chromosomes, Solid Tumor

Overview

Useful For

Assisting in the classification of malignant tumors associated with chromosomal abnormalities

Reflex Tests

Test ID	Reporting Name	Available Separately	Always Performed
_ML20	Metaphases, 1-19	No, (Bill Only)	No
_M25	Metaphases, 20-25	No, (Bill Only)	No
_MG25	Metaphases, >25	No, (Bill Only)	No
_STAC	Ag-Nor/CBL Stain	No, (Bill Only)	No

Testing Algorithm

This test includes a charge for cell culture of fresh specimens and professional interpretation of results. Analysis charges will be incurred for total work performed, and generally include 2 banded karyograms and the analysis of 20 metaphase cells. If no metaphase cells are available for analysis, no analysis charges will be incurred. If additional analysis work is required, additional charges may be incurred.

Method Name

Cell Culture followed by Chromosome Analysis

NY State Available

Yes

Specimen

Specimen Type

Tissue

Specimen Required

Provide a reason for referral with each specimen. The laboratory will not reject testing if this information is not provided, but appropriate testing and interpretation may be compromised or delayed. Include pathology reports, if available.

Container/Tube: Sterile container with sterile Hank's balanced salt solution (T132), Ringer's solution, or normal saline

Specimen Volume: 0.5-3 cm(3) or larger

Additional Information: Advise Express Mail or equivalent if not on courier service.

Forms

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

Specimen Minimum Volume

0.5 cm(3)

Reject Due To

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

Specimen Stability Information

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

Clinical and Interpretive

Clinical Information

Most malignant neoplasms are associated with clonal genetic abnormalities and the observation of an abnormal cytogenetic clone is consistent with a neoplasm. In many instances, these abnormalities can be demonstrated by cytogenetic analysis. Some physicians now consider cytogenetic analysis a useful laboratory test to determine the neoplastic potential of solid tumors.

For some tumors, cytogenetic analysis can help classify solid tumors. For example, an X;18 translocation has been specifically associated with synovial sarcoma, many alveolar rhabdomyosarcomas have an associated 2;13 translocation, and nearly every myxoid liposarcoma has a 12;16 translocation. A complete summary of the correlation between tumor histology and specific chromosome anomalies is too extensive to summarize here. The reader is referred to the Mitelman Database of Chromosome Aberrations and Gene Fusions in Cancer. 2014 Available at URL: http://cgap.nci.nih.gov/Chromosomes/Mitelman

Reference Values

An interpretive report will be provided.

Interpretation

The observation of a chromosomally abnormal clone is evidence of a clonal neoplastic process.

Certain chromosome abnormalities may also be specifically associated with certain morphologic classifications. In many tumors, the cytogenetic interpretation may be complicated by the observation of numerous complex chromosome anomalies. Nevertheless, the presence of certain chromosome abnormalities within a complex karyotype may still aid in classifying the tumor. However, a normal karyotype does not eliminate the possibility of a neoplastic process. Additionally, FISH testing or other strategies may be more appropriate for certain tumor types.

On rare occasions, the presence of an abnormality may be associated with a congenital abnormality that is not related to a malignant neoplastic process. Follow-up with a medical genetics consultation is recommended.

Cautions

Interfering factors:

Technical:

-Lack of viable cells

-Bacterial contamination

-Cell death due to failure to transport tissue in an appropriate media

-Excessive transport time

-Exposure of the specimen to temperature extremes (freezing or >30 degrees C)

-Specimen has been stored or treated with formalin or another fixative or is paraffin-embedded

Biological:

-Numerous complex anomalies making cytogenetic interpretation difficult beyond establishing the presence of an abnormal clone

-Normal metaphases may be present from tissue within and surrounding the tumor. Normal cells may grow better than cells of the tumor and interfere with the cytogenetic studies

Clinical Reference

1. Sandberg AA, Turc-Carel C, Gemmell RM: Chromosomes in solid tumors and beyond. Cancer Res 1988;48:1049-1059

2. Mitelman Database of Chromosome Aberrations and Gene Fusions in Cancer. Edited by F Mitelman, B Johansson, F Mertens. 2014, Available from URL: http://cgap.nci.nih.gov/Chromosomes/Mitelman

Performance

Method Description

The tissue is dissociated using enzymes and/or mechanical means and transferred to culture coverslips and/or culture flasks. The cultures are incubated at 37 degrees C with 5% CO2, 5% O2, and 90% N2 for 1 to 10 days depending on cell growth. For harvesting, the cells are treated with colcemid and hypotonic solution, and fixed with glacial acetic acid and methanol. Metaphase cells are dropped onto microscope slides and are routinely stained by G- or Q-banding. Twenty metaphases are usually examined. However, if a clone is suspected, but not confirmed within 20 metaphases, 30 metaphases will be analyzed. Minimal evidence for the presence of an abnormal clone is defined as 2 or more metaphases with the same structural abnormality or chromosomal gain (trisomy), or 3 or more metaphases lacking the same chromosome. Five to 10 metaphases are captured using a computerized imaging system, and 1 or more representative karyograms from each clone are prepared to document the type of abnormality and to permit systematic interpretation of the anomalies.(De Fusco PA, Frytak S, Dahl RJ, et al: Cytogenetic studies in 11 patients with small cell carcinoma of the lung. Mayo Clin Proc 1989;64:168-176; Dewald GW, Dahl RJ, Spurbeck JL, et al: Chromosomally abnormal clones and nonrandom telomeric translocations in cardiac myxomas. Mayo Clin Proc 1987;62:558-567; Jenkins RB, Hay ID, Herath JF, et al: Frequent occurrence of cytogenetic abnormalities in sporadic nonmedullary thyroid carcinoma. Cancer 1990; 66:1213-1220; Mitelman Database of Chromosome Aberrations in Cancer, 2001. Edited by F Mitelman, B Johansson, F Mertens. Available from URL: http://cgap.nci.nih.gov/Chromosomes/Mitelman)

PDF Report

No

Day(s) and Time(s) Test Performed

Specimens are processed Monday through Sunday.

Results reported Monday through Friday, 8 a.m-5 p.m.

Analytic Time

15 to 50 days, depending on culture growth

Maximum Laboratory Time

50 days

Specimen Retention Time

Any remaining specimen is discarded at the time results are reported.

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

88239, 88291- Tissue culture for tumor, Interpretation and report

88264 w/modifier 52-Chromosome analysis <20 cells (if appropriate)

88264-Chromosome analysis with 20 to 25 cells (if appropriate)

88264, 88285 - Chromosome analysis with >25 cells (if appropriate)

88283-Additional specialized banding technique (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
CHRST	Chromosomes, Solid Tumor	In Process

Result ID	Test Result Name	Result LOINC Value
52350	Result Summary	50397-9
52352	Interpretation	69965-2
52351	Result	82939-0
CG773	Reason for Referral	42349-1
52353	Specimen	31208-2
52354	Source	31208-2
52356	Method	49549-9
52355	Banding Method	62359-5
54628	Additional Information	48767-8
52357	Released By	18771-6