MAYO CLINIC LABORATORIES

Test Definition: XYMF

Known 45,X, Mosaicism Reflex Analysis, FISH, Whole Blood

Overview

Useful For

Detecting sex chromosome mosaicism in patients with a 45,X karyotype

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
_I099	Interphases, 25-99	No, (Bill Only)	No
_I300	Interphases, >=100	No, (Bill Only)	No
_IL25	Interphases, <25	No, (Bill Only)	No
_PADD	Probe, +1	No, (Bill Only)	No
_PB02	Probe, +2	No, (Bill Only)	No
_PB03	Probe, +3	No, (Bill Only)	No
_PBCT	Probe, +2	No, (Bill Only)	No

Genetics Test Information

Only appropriate to detect low levels of sex chromosome mosaicism when a nonmosaic 45,X karyotype has been observed.

Testing Algorithm

This test includes a charge for application of the first probe set (2 FISH probes) and professional interpretation of results.

Additional charges will be incurred for all reflex probes performed. Analysis charges will be incurred based on the number of cells analyzed per probe set. If no cells are available for analysis, no analysis charges will be incurred.

Special Instructions

- Informed Consent for Genetic Testing
- Informed Consent for Genetic Testing (Spanish)

Method Name

Fluorescence In Situ Hybridization (FISH)

NY State Available

Yes

Specimen

Specimen Type

Whole blood

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.

Container/Tube: Green top (sodium heparin)
Specimen Volume: 4 mL
Collection Instructions:
1. Invert several times to mix blood.
2. Other anticoagulants are not recommended and are harmful to the viability of the cells.

Forms

New York Clients-Informed consent is required. Document on the request form or electronic order that a copy is on file.
The following documents are available in Special Instructions:
-Informed Consent for Genetic Testing (T576)
-Informed Consent for Genetic Testing-Spanish (T826)

Specimen Minimum Volume

2 mL

Reject Due To

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

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

This test is appropriate for use in individuals with a karyotype of 45, X.

Ullrich-Turner syndrome (UTS), also called Turner syndrome, is a genetic disorder associated with the apparent loss of a sex chromosome. Routine cytogenetic methods have identified 3 types of chromosomal abnormalities in UTS patients: loss of an entire X chromosome (45,X), structural X chromosome abnormalities, and mosaicism with an X or Y abnormality. In mosaicism, 2 or more populations of cells with different karyotypes are present (eg, 45,X/47,XXX).

The incidence of UTS is approximately 1 in 3,000 newborn girls. Many of these patients demonstrate the 45,X karyotype. About 30% to 50% are mosaic, with either a 45,X/46,XX karyotype or a structurally abnormal X chromosome. Fewer than 15% of patients with UTS appear to have mosaicism with a 46,XY cell population or a Y chromosome rearrangement.

Identifying the mosaic status of patients with UTS is of clinical importance because phenotypic expression and clinical management are dependent upon the karyotype result. Patients with a Y chromosome have a 15% to 25% increased risk of gonadoblastoma.

Failure to identify an XY signal pattern does not rule out the possibility of <0.6% Y chromosome mosaicism.

Reference Values

An interpretive report will be provided.

Interpretation

An XX clone is confirmed when > or =1.0% cells display with 2 X chromosome signals. An XY clone is confirmed when > or =0.6% cells display a 1 X and 1 Y signal pattern.

Females with a 45,X/46,XX karyotype have no increased risk of gonadoblastoma and generally have a more moderate expression of Turner syndrome features than females with a nonmosaic 45,X karyotype. The presence of a Y chromosome confers increased risk of gonadoblastoma.

Cautions

Because this FISH test is not approved by the U.S. Food and Drug Administration, it is important to confirm X or Y chromosome mosaicism by other established methods, such as clinical history or physical evaluation.

Interfering factors

-Cell lysis caused by forcing the blood quickly through the needle
-Use of an improper anticoagulant or improperly mixing the blood with the anticoagulant
-Excessive transport time
-Inadequate amount of specimen may not permit adequate analysis
-Improper packaging may result in broken, leaky, and contaminated specimen during transport.
-Exposure of the specimen to temperature extremes (freezing or > 30 degrees C) may kill cells and interfere with attempts to culture cells
-In prenatal specimens, a bloody specimen may interfere with attempts to culture cells and contamination by maternal cells may cause interpretive problems

Supportive Data

In a group of 22 patients with a nonmosaic 45,X karyotype by conventional cytogenetics, we have identified 3 (14%) patients with a mosaic X/XX result using FISH analysis. These results were confirmed by analysis of additional metaphase cells. Of the 3 patients, 2 have an iso(X) chromosome and 1 has what appears to be a structurally normal X chromosome.

The potential of maternal cells in the peripheral circulation of newborn females with a 45,X/46,XX karyotype result was investigated. Thirty specimens from newborn males (<2 days old) were tested, and based on the analysis of 500 interphase nuclei from each specimen, no XX cells were identified in any specimen, suggesting a low likelihood of maternal cells in newborn specimens.

Clinical Reference

1. Canto P, Kofman-Alfaro S, Jiminez AL, et al: Gonadoblastoma in Turner syndrome patients with nonmosaic 45,X karyotype and Y chromosome sequences. Cancer Genet Cytogenet 2004;150:70-72

2. Wiktor A, Van Dyke, DL: FISH analysis helps identify low-level mosaicism in Ullrich-Turner syndrome patients. Genet Med 2004;6:132-135
3. Sybert VP, McCauley E: Turner syndrome. N Engl J Med 2004;351:1227-1238

Performance

Method Description
This test is performed using commercially available probes for the centromere regions of the X (DXZ1) and Y (DYZ3) chromosomes. A total of 500 interphase nuclei (250 each by 2 technologists) are examined to determine the sex chromosome complement.(Wiktor A, Van Dyke DL: FISH analysis helps identify low level mosaicism in Ullrich-Turner syndrome patients. Genet Med 2004;6:132-135)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
7 to 9 days

Specimen Retention Time
Amniotic Fl. (remaining supernatant/whole fluid aliquots): Discarded 14 days after report. Blood: 4 weeks. Products of Conception (identifiable fetal tissue): Cremated quarterly after results reported. All Other Specimens: Discarded when results reported.

Performing Laboratory Location
Rochester

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 was developed using an analyte specific reagent. 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

88271x2, 88291-DNA probe, each (first probe set), Interpretation and report
88271x2-DNA probe, each; each additional probe set (if appropriate)
88271x1-DNA probe, each; coverage for sets containing 3 probes (if appropriate)
88271x2-DNA probe, each; coverage for sets containing 4 probes (if appropriate)
88271x3-DNA probe, each; coverage for sets containing 5 probes (if appropriate)
88274 w/modifier 52-Interphase in situ hybridization, <25 cells, each probe set (if appropriate)
88274-Interphase in situ hybridization, 25 to 99 cells, each probe set (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
XYMF	Known 45,X Mosaicism Reflex, FISH	87436-2

Result ID	Test Result Name	Result LOINC® Value
51844	Result Summary	50397-9
51846	Interpretation	69965-2
54537	Result	62356-1
CG668	Reason for Referral	42349-1
51847	Specimen	31208-2
51848	Source	31208-2
51849	Method	85069-3
54451	Additional Information	48767-8
51850	Released By	18771-6
55279	Disclaimer	62364-5