



Lawrence M. Weiss, MD
Laboratory Director, CLIA #05D0665695
Juan-Sebastian Saldivar, MD, FACMG
Director of Molecular Diagnostics

Molecular Diagnostic Laboratory
1500 East Duarte Road
Northwest Building, Second Floor, Room 2236
Duarte, CA 91010-3000
Phone 888-826-4362 Fax 626-301-8142
mdl@coh.org <http://mdl.cityofhope.org>

Assay Summary

FTSJ1 Gene Mutation Analysis

Non-Syndromic X-Linked Mental Retardation

Synopsis

X-linked mental retardation (XLMR) has a prevalence of 2.6 cases per 1,000 in the general population, accounting for over 10% of all cases of mental retardation¹. It is estimated that 2/3 of X-linked mental retardation is non-syndromic (mental retardation without other distinguishing features). Recently, two publications reported strong evidence that mutations in the methyltransferase gene FTSJ1 cause non-syndromic X-linked mental retardation.^{2,3}

Indications for testing

Individuals with a diagnosis of non-syndromic mental retardation, especially those in whom Fragile X disease has been ruled out, are candidates for testing. After a specific mutation is identified in a family, carrier testing can be performed for appropriate at-risk females and presymptomatic males. With appropriate genetic counseling, prenatal testing can be performed for females with an identified mutation.

Methodology

All 12 coding exons and associated intron junctions of the FTSJ1 gene are analyzed by direct DNA sequence analysis using an automated fluorescent sequencing machine. When a mutation is detected, confirmation is carried out by sequencing in the opposite direction, in an independent PCR amplification. If no mutation is found sequence analysis is performed in both directions. At-risk family members can be offered DNA sequence analysis of only the region of the gene with the previously identified mutation.

Limitations

For mutation analysis, the method will not detect mutations located in regions of the genes that are not analyzed (non-coding exon regions, intron regions other than the splice junctions, and upstream and downstream regions). The method also will not detect gross genetic alterations including most deletions (in females), duplications, and inversions. Some sequence alterations that may be detected (such as those causing missense or synonymous changes) will be of unknown clinical significance. Interpretation of test results should be in the context of the patient's ethnicity, clinical and family histories, and other laboratory test results.

Specimen Requirements

- (a) Blood samples: 2 tubes (6 ccs each) in ACD (yellow top) or EDTA (lavender top) tubes.
Keep ambient temperature and ship by overnight courier. Samples must be received in our laboratory within 72 hours of draw.

Note:

- i) for infants, a minimum of 6 ccs is sufficient
- ii) we accept DNA; at least 10 micrograms

(b) Prenatal samples: 2 T25 flasks of confluent cells sent padded to arrive on M/Tu/W/Th.

A blood sample from the mother is also required (6 ccs in ACD, yellow top) for use as positive control. Maternal cell contamination studies are not done here but are required for autosomal disorders and dosage analysis on X-linked disorders. We would be happy to assist in coordinating sending out a specimen for this purpose.

Test Request Form (TRF)

A completed MDL [TRF](#) is required for each specimen. Please submit the completed TRF with the specimen. Complete testing and billing information must be provided before the specimen is processed.

Order Codes	CPT Codes	TAT
FTSJ1-SEQ (FTSJ1 gene, full gene sequencing)	83890, 83898(x11), 83894, 83904(x8), 83912	5 wks
FTSJ1-CAS (FTSJ1 gene, targeted mutation analysis, known mutation)	83890, 83898, 83894, 83904, 83912	4 wks
FTSJ1-PD (FTSJ1 gene, known mutation detection, prenatal)	83890, 83898, 83894, 83904, 83912	2 wks

References

1. Stevenson RE, Schwartz CE (2002). *Cytogenet Genome Res.* 99(1-4):265-75.
2. Freude K, et al. (2004). *Am J Hum Genet.* 75(2):305-9.
3. Ramser J, et al. (2004). *J Med Genet.* 41(9):679-83.

NOTE: This test is performed pursuant to a license agreement with Roche Molecular Systems, Inc.