Cystic Fibrosis: CFTR Gene Deletion/Duplication

Test Code: JL
Turnaround time: 2 weeks
CPT Codes: 81222 x1

Condition Description

Cystic Fibrosis (CF) is a chronic genetic condition involving multiple organ systems [1]. Classical CF primarily involves the respiratory and digestive systems, and may have a range of clinical severity. Pulmonary symptoms often include lower airway inflammation, chronic cough, chronic sinusitis, and recurrent infections. Digestive symptoms often include meconium ileus, pancreatic insufficiency resulting in malabsorption and/or failure to thrive, diabetes mellitus, and hepatobiliary disease. Congenital bilateral absence of the vas deferens (CBAVD) is seen in men without pulmonary or digestive symptoms of CF, and results in azoospermia [2]. CBAVD is a significant cause of male infertility.

CF is caused by mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene. Individuals with mutations in the CFTR gene may also present with milder or atypical symptoms such as pancreatitis or chronic sinusitis.

The incidence of CF is approximately 1 in 3200 live births among Caucasians and is inherited in an autosomal recessive pattern. The carrier frequency is estimated to be approximately 1 in 22-28 in the Caucasian population, 1 in 29 in the Ashkenazi Jewish population, 1 in 60-65 in the African American population, 1 in 46 in the Hispanic population and 1 in 90 in the Asian population.

Initial evaluation and screening of patients for CFTR mutations is accomplished through a panel of 23 common mutations as recommended by the American College of Medical Genetics Subcommittee on Cystic Fibrosis [3] and American College of Obstetrics and Gynecologists [4]. The detection rate of this panel depends on the patients ethnicity (refer to the Cystic Fibrosis Common Mutation Panel).

When the common mutation panel is negative and mutations to the CFTR gene are suspected, sequencing of the entire gene is recommended to detect more rare mutations. Gene sequence analysis is available to test for mutations in the CFTR gene (JK).

Click here for the GeneReviews summary on this condition.


References:
7. Chevalier-Porst (2005) Identification and Characterization of Three Large Deletions and a Deletion/Polymorphism in the CFTR Gene. Hum Mut Mutation in Brief #806 Online
8. http://www.genet.sickkids.on.ca/

Genes

CFTR

Indications

Testing is indicated for:

- Patients suspected to have a mutation to the CFTR gene and who tested negative for mutation by the common mutation panel.
- Family members of an affected individual at risk to be carriers of CF.

Methodology

DNA isolated from peripheral blood is hybridized to a CGH array to detect deletions and duplications. The targeted CGH array has overlapping probes which cover the entire genomic region.

Detection

Detection is limited to duplications and deletions. Array CGH will not detect point mutations or intronic mutations. Results of molecular analysis must be interpreted in the context of the patient's clinical phenotype.

Specimen Requirements

Submit only 1 of the following specimen types

Type: DNA, Isolated
Specimen Requirements:
Microtainer
3µg
Isolation using the Perkin Elmer™ Chemagen™ Automated Extraction method or Qiagen™ Puregene kit for DNA extraction is recommended.

Specimen Collection and Shipping:
Refrigerate until time of shipment in 100 ng/µL in TE buffer. Ship sample at room temperature with overnight delivery.

**Type: Whole Blood (EDTA)**

Specimen Requirements:
EDTA (Purple Top)
Infants and Young Children (2 years of age to 10 years old): 3-5 ml
Older Children & Adults: 5-10 ml
Autopsy: 2-3 ml unclotted cord or cardiac blood

Specimen Collection and Shipping:
Ship sample at room temperature for receipt at EGL within 72 hours of collection. Do not freeze.

**Special Instructions**

Completion of the cystic fibrosis common mutation panel should be completed PRIOR to CFTR gene sequence analysis.

**Related Tests**

- CF common mutation panel (CF).
- Ashkenazi Jewish Carrier Panel is available to screen for the panel of 9 autosomal recessive conditions common in individuals of Ashkenazi Jewish background
- Custom diagnostic mutation analysis (KM) is available to family members if mutations are identified by sequencing.
- Prenatal testing is available for known familial mutations only. Please call the Laboratory Genetic Counselor before collecting a fetal sample.