

Myoclonic Epilepsy and Ragged-Red Fiber Disease (MERRF): Targeted Mutation Analysis

Test Code: QH

Turnaround time: 2 weeks

CPT Codes: 81401 x1

Condition Description

Myoclonic Epilepsy & Ragged-Red Fiber Disease (MERRF) usually presents during childhood and is characterized by myoclonus, epilepsy, ataxia, and the appearance of ragged-red fibers on muscle biopsy. Other common symptoms include hearing loss, peripheral neuropathy, dementia, short stature, optic atrophy, cardiomyopathy, and exercise intolerance. Symptoms may worsen during times of stress or illness. Two mutations in the mitochondrial *tRNA Lys* gene account for about 90% of mutations in patients with MERRF. The most common MERRF mutation, present in over 80% of patients with typical findings, is a heteroplasmic 8344A>G transition. A second mutation, 8356T>C, is present in less than 10% of patients. Heteroplasmy (the presence of both normal and rearranged mitochondrial DNA molecules) and tissue distribution of abnormal mitochondria (replicative segregation) can result in variability of clinical symptoms. Mitochondrial *tRNA Lys* gene mutations result in multiple mitochondrial respiratory chain deficiencies. Enzyme deficiencies, which are most pronounced in complex I and complex IV, are secondary to defects in mitochondrial protein synthesis caused by mutations in *tRNA Lys*. MERRF caused by mtDNA mutations is maternally inherited. It is estimated that approximately 80% of patients have a family history of the disorder.

References:

- [Gene Reviews Clinical Summary](#)

Genes

tRNA Lys

Indications

- Patients with a confirmed or suspected diagnosis of MERRF disease
- Family members of an affected patient who are at risk for MERRF disease

Methodology

Presence or absence of two mutations (8344A>G / 8356T>C) are detected by Sanger sequencing.

Detection

Approximately 85-90% of patients with MERRF have mitochondrial mutations included in this panel. Over 95% of the 8344A>G and 8356T>C mutations, if present, will be detected. This assay will detect any mutation on this panel present at 15-20% heteroplasmy or greater.

Reference Range

Qualitative assay.

Specimen Requirements

Submit only 1 of the following specimen types

Type: DNA, Isolated

Specimen Requirements:

Microtainer

3µg

Isolation using the Perkin Elmer™ Chemagen™ 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.

Related Tests

- MELAS (QA) may be indicated for patients who also have strokes
- CPEO/KSS (QB) may be indicated for patients who also have progressive external ophthalmoplegia and retinopathy