Gaucher Disease: GBA Gene Sequencing

Test Code: AK  
Turnaround time: 6 weeks  
CPT Codes: 81251 x1

Condition Description

Gaucher disease is an autosomal recessive lysosomal storage disorder caused by deficient activity of the enzyme beta-glucocerebrosidase. This deficiency leads to a progressive accumulation of glucocerebroside (glucosylceramide) in certain body tissues such as the spleen, liver, and bone marrow. Symptoms of Gaucher disease usually become apparent in childhood or early adulthood. An individual with Gaucher disease might exhibit one or more of the following symptoms:

- enlarged liver and/or spleen  
- anemia  
- fatigue  
- easy bruising  
- impaired blood clotting (e.g. frequent nose bleeds without trauma, gum bleeding with regular brushing, or bruising for no reason)  
- bone pain  
- fractures

Gaucher disease is classically categorized into 3 main subtypes: non-neuronopathic type I, acute neuronopathic type II, and subacute neuronopathic type III. Type I is the most common form of Gaucher disease and lacks primary central nervous system involvement (non-neuronopathic). Types II and III have central nervous system involvement (neuronopathic) and neurologic manifestations. There is overlap between the clinical presentation of both neuronopathic forms of Gaucher disease, and for this reason, it is thought that neuronopathic Gaucher disease represents a clinical spectrum ranging from mild symptoms to a perinatal-lethal form.

All 3 forms of Gaucher disease are caused by mutation in the GBA gene. Diagnostic sequencing analysis of the GBA gene coding region is available for patients with Gaucher disease and their at-risk relatives on a clinical basis.

For questions about testing for Gaucher disease, please call EGL Genetics at 470-378-2200. For more information about lysosomal storage diseases, including management and treatment, call Emory Lysosomal Storage Disease Center at (404)778-8565 or (800)200-1524.


References:

Genes

GBA

Indications

This test is indicated for:

- Confirmation of a clinical diagnosis of Gaucher disease.  
- Prenatal testing for known familial mutation(s).  
- Assessment of carrier status in high risk family members.

Methodology

PCR amplification of 11 exons contained in the GBA gene coding region will be performed on the patient's genomic DNA. Direct sequencing of amplification products is performed in both forward and reverse directions using automated fluorescence dideoxy sequencing methods. The patient's gene sequences are then compared to a normal reference sequence. Sequence variations are classified as mutations, benign variants unrelated to disease, or variations of unknown clinical significance. Variants of unknown clinical significance may require further studies of the patient and/or family members.

This assay does not interrogate the promoter region, deep intronic regions or other regulatory elements, and does not detect large deletions.

Results of molecular analysis must be interpreted in the context of the patient's clinical and/or biochemical phenotype.

Detection

Clinical Sensitivity: 99%.  
Analytical Sensitivity: ~99%.  
Prevalence:  
The prevalence of Gaucher disease is as high as 1 in 450 in the Ashkenazi Jewish population. In the non-Jewish population, the prevalence is approximately 1 in 40,000.

Specimen Requirements

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Submit only 1 of the following specimen types

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 24 hours of collection. Do not refrigerate or freeze.

Type: DNA, Isolated

Specimen Requirements:
Microtainer
8µg
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.

Related Tests

- **Gaucher Disease: Enzyme Assay**
- **Gaucher Disease: Common Mutation Panel** is available for Ashkenazi Jewish ethnicity based carrier screening.
- **Known Mutation Analysis (KM)** is available to test family members.
- **Prenatal testing** is available to couples who are confirmed carriers of mutations. Please contact the laboratory genetic counselor to discuss appropriate testing prior to collecting a prenatal specimen.
- The following biomarker monitoring assays are also available:
  - Angiotensin Converting Enzyme (ACE), Chitotriosidase (CHITO), and Tartrate Resistant Acid Phosphatase (TRAP) are available individually, or as a panel in the Biomarker Panel (ACE, CHITO, TRAP).