Overview

**Useful For**
Evaluation of patients with a clinical presentation suggestive of lysosomal acid lipase deficiency in blood specimens

**Special Instructions**
- Informed Consent for Genetic Testing
- Biochemical Genetics Patient Information
- Informed Consent for Genetic Testing (Spanish)

**Method Name**
Fluorometric Enzyme Assay

**NY State Available**
Yes

**Specimen**

**Specimen Type**
Whole blood

**Specimen Required**

**Collection Container/Tube:**
- **Preferred:** Lavender top (EDTA)
- **Acceptable:** Yellow top (ACD) or green top (sodium heparin)

**Specimen Volume:** 2 mL

**Forms**
1. **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)
2. Biochemical Genetics Patient Information (T602) in Special Instructions.
3. If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
   - Gastroenterology and Hepatology Client Test Request (T728)
   - Inborn Errors of Metabolism Test Request (T798)

**Specimen Minimum Volume**
0.5 mL
Test Definition: LALB
Lysosomal Acid Lipase, B

Reject Due To

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<th>Temperature</th>
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Specimen Stability Information

Clinical and Interpretive

Clinical Information

Deficiency of lysosomal acid lipase (LAL) results in 2 clinically distinct phenotypes, Wolman disease (WD) and cholesteryl ester storage disease (CESD). Both phenotypes follow an autosomal recessive inheritance pattern and are caused by mutation in the LIPA gene.

WD, the early onset phenotype of LAL deficiency, is a lipid storage disorder characterized by vomiting, diarrhea, failure to thrive, abdominal distension, and hepatosplenomegaly. Peripheral blood lymphocytes are vacuolated and foam cells are present in the bone marrow. Approximately 50% of infants have adrenal calcifications. WD typically presents in the first weeks of life and is fatal in infancy.

CESD, the late onset phenotype of LAL deficiency, is clinically variable with patients presenting at any age with progressive hepatomegaly and often splenomegaly, leading to microvesicular steatosis and often liver failure. CESD is likely underdiagnosed and frequently diagnosed incidentally after liver pathology reveals findings similar to nonalcoholic fatty liver disease (NAFLD) or nonalcoholic steatohepatitis (NASH). Birefringent cholesteryl ester crystals in hepatocytes or Kupffer cells in fresh-frozen tissues are visualized under polarized light and pathognomonic. Elevated total cholesterol, low-density lipoprotein cholesterol, and triglycerides lead to premature atherosclerosis.

Historically, treatment options for WD and CESD were limited, but enzyme replacement therapy is now clinically available.

Reference Values

> or =21.0 nmol/hour/mL

Interpretation

Enzyme activity below 1.5 nmol/hour/mL in properly submitted samples is consistent with lysosomal acid lipase deficiency: Wolman disease or cholesteryl ester storage disease.

Normal results (> or =21.0 nmol/h/mL) are not consistent with lysosomal acid lipase deficiency.

Cautions
This test cannot reliably determine carrier status for cholesteryl ester storage disease (CESD) or Wolman disease (WD).

**Clinical Reference**


**Performance**

**Method Description**

The whole blood specimen is spotted onto filter paper. A 3-mm (one-eighth-inch) disk is punched out of the dried blood spot into a microcentrifuge tube and 200 mcL of water is added as a preincubation extraction that takes place on an orbital shaker for 60 minutes at ambient conditions. Forty (40) mcL of the extraction liquid is combined with either 10 mcL of water (total activity well) or 10 mcL of 30 mcM Lalistat (inhibited well) in a black 96-well plate (50 mcL total volume). The plate is incubated for 10 minutes at 37 degrees C. The substrate consists of 150 mcL of 13.6 mM 4-methylumbelliferyl palmitate in 0.15 M acetate buffer, pH 4.0 plus 1.0% Triton and 0.5% cardiolipin and is added to the same plate (200 mcL total volume). After the incubation period (3 hours at 37 degrees C), calibrators are prepared and analyzed on every plate to calculate enzyme activity results based on fluorescence units in patient wells vs calibrators. The calibration is derived from 4-methylumbelliferone (4-MU) that is serially diluted manually in the plate, with the highest calibrator being equivalent to an enzyme activity of 672.0 nmol/hour/mL blood. The plate is then ready to be read using the spectrophotometer. Enzyme activity is calculated by subtracting the inhibited activity from total activity. (Hamilton J, Jones I, Srivastava R, Galloway P: A new method for the measurement of lysosomal acid lipase in dried blood spots using the inhibitor Lalistat 2. Clin Chim Acta 2012;413:1207-1210)

**PDF Report**

No

**Day(s) and Time(s) Test Performed**

Varies

**Analytic Time**

8 days

**Maximum Laboratory Time**

15 days

**Specimen Retention Time**

1 year

**Performing Laboratory Location**

Rochester

**Fees and 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.
Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information
82657

LOINC® Information

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