Test Definition: LALB
Lysosomal Acid Lipase, Blood

Overview

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

This test is not useful to determine carrier status for cholesteryl ester storage disease or Wolman disease.

Genetics Test Information
This test provides diagnostic testing for patients with clinical signs and symptoms suspicious for lysosomal acid lipase deficiency (LALD).

LALD is expressed phenotypically as infantile-onset Wolman disease or later-onset cholesterol ester storage disease.

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

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:
   - Informed Consent for Genetic Testing (T576)
   - Informed Consent for Genetic Testing-Spanish (T826)
2. Biochemical Genetics Patient Information (T602)
3. If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:

- **Biochemical Genetics Test Request** (T798)
- **Gastroenterology and Hepatology Client Test Request** (T728)

### Specimen Minimum Volume

0.5 mL

### Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

### Specimen Stability Information

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<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
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<tbody>
<tr>
<td>Whole blood</td>
<td>Refrigerated (preferred)</td>
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### Clinical & 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 variant 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, hepatosplenomegaly, and liver failure. Enlarged adrenal glands with calcification, a classic finding in WD, can lead to adrenal cortical insufficiency. Unless successfully treated, survival is rare beyond infancy.

CESD, the late-onset phenotype of LAL deficiency, is clinically variable with patients presenting at any age with progressive hepatomegaly and often splenomegaly, serum lipid abnormalities, and elevated liver enzymes. In childhood, patients can also present with failure to thrive and delayed milestones. Common features include premature atherosclerosis leading to coronary artery disease and strokes, liver disease of varying severity, and organomegaly. Lipid deposition in the intestinal tract can lead to diarrhea and weight loss.

CESD is likely underdiagnosed and frequently diagnosed incidentally after liver pathology reveals findings similar to nonalcoholic fatty liver disease or nonalcoholic steatohepatitis. Birefringent cholesteryl ester crystals in hepatocytes or Kupffer cells in fresh-frozen tissues are visualized under polarized light and pathognomonic.

Enzyme replacement therapy (sebelipase alfa) was recently approved for both WD and CESD and 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/hour/mL) are not consistent with lysosomal acid lipase deficiency.

**Cautions**
No significant cautionary statements

**Clinical Reference**
doi:10.1016/S2468-1253(17)30052-3

**Performance**

**Method Description**
The whole blood specimen is spotted onto filter paper and dried overnight. A 3-mm (one-eighth inch) disk is punched out of the dried blood spot into a microcentrifuge tube, and water is added as a preincubation extraction that takes place on an orbital shaker. Extraction liquid is combined with either water (total activity well) or Lalistat (inhibited well) in a black 96-well plate. The plate is incubated. The substrate is then added to the same plate. After the incubation period, 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-methylumbelliferylone (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 spectrofluorometer. 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 Aug 16;413(15-16):1207-1210; Cowan T, Pasquali M: Laboratory investigations of inborn errors of metabolism. In: Sarafoglou K, Hoffman GF, Roth KS, eds. Pediatric Endocrinology and Inborn Errors of Metabolism. 2nd ed. McGraw-Hill; 2017:1139-1158)

**PDF Report**
No

**Day(s) Performed**
Friday

**Report Available**
8 to 15 days
Test Definition: LALB
Lysosomal Acid Lipase, Blood

Specimen Retention Time
1 year

Performing Laboratory Location
Rochester

Fees & 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.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

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 US Food and Drug Administration.

CPT Code Information
82657

LOINC® Information

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