

## Overview

### Useful For

Supporting the biochemical diagnosis of mucopolysaccharidosis type VII (MPS VII, Sly syndrome) in whole blood

This test is **not useful for** carrier detection.

### Genetics Test Information

This test provides diagnostic testing for individuals with clinical signs and symptoms suspicious for mucopolysaccharidosis type VII (MPS VII, Sly syndrome). If an enzyme deficiency is detected by this test, additional biochemical or molecular testing is required to confirm a diagnosis.

### Special Instructions

- [Informed Consent for Genetic Testing](#)
- [Biochemical Genetics Patient Information](#)
- [Informed Consent for Genetic Testing \(Spanish\)](#)

### Method Name

Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

### NY State Available

Yes

## Specimen

### Specimen Type

Whole Blood ACD

### Shipping Instructions

**For optimal isolation of leukocytes, it is recommended the specimen arrive refrigerated within 6 days of collection to be stabilized.** Collect specimen Monday through Thursday only and not the day before a holiday. Specimen should be collected and packaged as close to shipping time as possible.

### Necessary Information

1. Patient's age is required.
2. Reason for testing is required.

### Specimen Required

Container/Tube:

**Preferred:** Yellow top (ACD solution B)

**Acceptable:** Yellow top (ACD solution A) or lavender top (EDTA)

**Specimen Volume:** 6 mL  
**Collection Instructions:** Send specimen in original tube. **Do not aliquot.**

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 a [Biochemical Genetics Test Request](#) (T798) with the specimen.

**Specimen Minimum Volume**  
5 mL

Reject Due To

Gross hemolysis	Reject
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Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole Blood ACD	Refrigerated (preferred)	6 days	
	Ambient	6 days	

Clinical & Interpretive

Clinical Information

Mucopolysaccharidosis VII (MPS VII, Sly syndrome) is an autosomal recessive lysosomal storage disorder caused by the deficiency of beta-glucuronidase. Clinical features and severity of symptoms of MPS VII are widely variable ranging from severe lethal hydrops fetalis to more mild forms which generally present with later onset and a milder clinical presentation. In general, symptoms may include skeletal anomalies, coarse facies, hepatomegaly, neurological issues, and intellectual disability. Sly syndrome is one of the least common mucopolysaccharidoses with an incidence of 1 in 250,000 live births.

A diagnostic workup for MPS includes glycosaminoglycan (GAG) determination in urine (MPSQU / Mucopolysaccharides Quantitative, Random, Urine) or blood (MPSBS / Mucopolysaccharidosis, Blood Spot, or MPSESR / Mucopolysaccharides Quantitative, Serum) and molecular genetic analysis of the relevant gene. For MPS VII, molecular analysis of the *GUSB* gene (CGPH / Custom Gene Panel, Hereditary, Next-Generation Sequencing, Varies; specify Gene List ID: IEMCP-L613TF) allows for detection of disease-causing variants in affected patients and subsequent carrier detection in relatives.

Reference Values

>3.50 nmol/hour/mg protein

An interpretive report will be provided.

### Interpretation

Abnormal results are not sufficient to establish a diagnosis of a particular disease. To verify a preliminary diagnosis based on this assay, additional biochemical or molecular genetic analyses are required.

When abnormal results are detected, a detailed interpretation is given, including an overview of the results and of their significance, a correlation to available clinical information, elements of differential diagnosis, recommendations for additional biochemical testing, and in vitro, confirmatory studies (enzyme assay, molecular analysis), and a phone number to reach one of the laboratory directors in case the referring physician has additional questions.

### Cautions

Individuals with pseudodeficiency alleles can show reduced enzyme activity.

Carrier status (heterozygosity) for these conditions cannot be reliably detected.

Enzyme levels may be normal in individuals receiving enzyme replacement therapy or who have undergone hematopoietic stem cell transplant.

### Clinical Reference

1. Neufeld EF, Muenzer J. The mucopolysaccharidoses. In: Valle DL, Antonarakis S, Ballabio A, Beaudet AL, Mitchell GA. eds. The Online Metabolic and Molecular Bases of Inherited Disease. McGraw-Hill; Accessed May 25, 2023.  
<https://ommbid.mhmedical.com/content.aspx?bookid=2709&sectionid=225544161>
2. Hopwood JJ, Ballabio A. Multiple sulfatase deficiency and the nature of the sulfatase family. In: Valle DL, Antonarakis S, Ballabio A, Beaudet AL, Mitchell GA. eds. The Online Metabolic and Molecular Bases of Inherited Disease. McGraw-Hill; Accessed May 25, 2023.  
<https://ommbid.mhmedical.com/content.aspx?bookid=2709&sectionid=225546905>

## Performance

### Method Description

Leukocytes are incubated with four cocktail mixes: 1) substrate and internal standard (IS) for iduronate 2-sulfatase, heparan N-sulfatase, alpha-N-acetylglucosaminidase, N-acetylgalactosamine-sulfate, beta-galactosidase, arylsulfatase B, beta-glucuronidase, and tripeptidyl peptidase 1; 2) substrate and IS for acetyl-CoA:alpha-glucosaminide N-acetyltransferase; 3) substrate and IS for N-acetylglucosamine-6-sulfatase; and 4) substrate and IS for palmitoyl-protein thioesterase 1 in 96-well plates. Following overnight incubation, the plates are combined and purified by liquid-liquid extraction. The extracts are evaporated, reconstituted with mobile phase, and analyzed by tandem mass spectrometry.(Unpublished Mayo method)

### PDF Report

No

### Day(s) Performed

Preanalytical processing: Monday through Saturday  
Testing performed: Tuesday

Report Available  
8 to 15 days

Specimen Retention Time  
WBC homogenate: 1 month

Performing Laboratory Location  
Mayo Clinic Laboratories - Rochester Main Campus

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. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information  
82657

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
GUSBW	Beta-Glucuronidase, WBC	24065-5

Result ID	Test Result Name	Result LOINC® Value
BG763	Reason for Referral	42349-1
618289	Beta-glucuronidase	24065-5
618452	Interpretation	59462-2
618451	Reviewed By	18771-6