Overview

Useful For
Identifying variants within the SGSH, NAGLU, HGSNAT, and GNS genes

Confirmation of a diagnosis of mucopolysaccharidosis type III, also known as Sanfilippo syndrome

Highlights
Testing can be used to confirm a diagnosis of mucopolysaccharidosis type III, also known as Sanfilippo syndrome

Testing includes sequencing of the SGSH, NAGLU, HGSNAT, and GNS genes.

Reflex Tests

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Reporting Name</th>
<th>Available Separately</th>
<th>Always Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CULFB</td>
<td>Fibroblast Culture for Genetic Test</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Testing Algorithm
If a skin biopsy is received, fibroblast culture will be performed at an additional charge.

See Lysosomal Storage Disorders Diagnostic Algorithm, Part 1 in Special Instructions.

Special Instructions
- Molecular Genetics: Biochemical Disorders Patient Information
- Informed Consent for Genetic Testing
- Blood Spot Collection Card-Spanish Instructions
- Blood Spot Collection Card-Chinese Instructions
- Informed Consent for Genetic Testing (Spanish)
- Lysosomal Storage Disorders Diagnostic Algorithm, Part 1
- Blood Spot Collection Instructions

Method Name
Polymerase Chain Reaction (PCR) followed by DNA Sequencing

NY State Available
Yes

Specimen

Specimen Type
Varies

Advisory Information
For aid in diagnostic testing or monitoring ongoing therapy, order either MPSBS / Mucopolysaccharidosis, Blood Spot or MPSQU / Mucopolysaccharides Quantitative, Random, Urine.
Shipping Instructions
Specimen preferred to arrive within 96 hours of collection.

Specimen Required

Patient Preparation: A previous bone marrow transplant from an allogenic donor will interfere with testing. Call 800-533-1710 for instructions for testing patients who have received a bone marrow transplant.

Submit only 1 of the following specimens:

Preferred:
Specimen Type: Whole blood
Container/Tube:
Preferred: Lavender top (EDTA) or yellow top (ACD)
Acceptable: Any anticoagulant
Specimen Volume: 3 mL
Collection Instructions:
1. Invert several times to mix blood.
2. Send specimen in original tube.
Specimen Stability Information: Ambient (preferred)/Refrigerated
Specimen Type: Cultured fibroblasts
Container/Tube: T-75 or T-25 flask
Specimen Volume: 1 Full T-75 or 2 full T-25 flasks
Specimen Stability Information: Ambient (preferred)/Refrigerated <24 hours
Specimen Type: Skin biopsy
Supplies: Fibroblast Biopsy Transport Media (T115)
Container/Tube: Sterile container with any standard cell culture media (eg, minimal essential media, RPMI 1640). The solution should be supplemented with 1% penicillin and streptomycin.
Specimen Volume: 4-mm punch
Specimen Stability Information: Refrigerated (preferred)/Ambient
Acceptable:

**Supplies:** Card-Blood Spot Collection (Filter Paper) (T493)

**Specimen Type:** Blood spot

**Container/Tube:**

**Preferred:** Blood Spot Collection Card

**Acceptable:** Whatman Protein Saver 903 Paper

**Specimen Volume:** 5 blood spots

**Collection Instructions:**

1. Let blood dry on the filter paper at ambient temperature in a horizontal position for 3 hours.
2. Do not expose specimen to heat or direct sunlight.
3. Do not stack wet specimens.
4. Keep specimen dry.

**Specimen Stability Information:** Ambient (preferred)/Refrigerated

**Additional Information:**

1. For collection instructions, see [Blood Spot Collection Instructions](#) in Special Instructions.
2. For collection instructions in Spanish, see [Blood Spot Collection Card-Spanish Instructions](#) (T777) in Special Instructions.
3. For collection instructions in Chinese, see [Blood Spot Collection Card-Chinese Instructions](#) (T800) in Special Instructions.

**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. [Molecular Genetics: Biochemical Disorders Patient Information](#) (T527) in Special Instructions

3. If not ordering electronically, complete, print, and send an [Inborn Errors of Metabolism Test Request](#) (T798) with the specimen.

**Specimen Minimum Volume**

Blood: 1 mL
Blood Spots: 3
Reject Due To
All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varies</td>
<td>Varies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Clinical and Interpretive

Clinical Information
Mucopolysaccharidosis type III (MPS-III), also known as Sanfilippo syndrome, is an autosomal recessive condition that consists of 4 different types (A, B, C, and D). Each type of MPS-III results from the absence of 1 of 4 lysosomal enzymes, which leads to the accumulation of heparan sulfate in various tissues.

Sanfilippo syndrome A is caused by variants in SGSH and is characterized by reduced or absent activity of the sulfamidase enzyme. Sanfilippo syndrome B is caused by variants in NAGLU and is characterized by reduced or absent activity of the N-acetyl-alpha-D-glucosaminidase. Sanfilippo syndrome C is caused by variants in HGSNAT and is characterized by reduced or absent activity of the acetyl-CoA:alpha-glucosaminide N-acetyltransferase enzyme. Sanfilippo syndrome D is caused by variants in GNS and is characterized by reduced or absent activity of the N-acetylglucosamine-6-sulfatase enzyme.

Sanfilippo syndrome presents with a spectrum of central nervous system degeneration and physical disease. Onset of clinical features, most commonly behavioral problems and delayed development, usually occurs between 2 and 6 years in a child who previously appeared normal. Severe neurologic degeneration occurs in most patients by 6 to 10 years, accompanied by a rapid deterioration of social and adaptive skills.

Measurement of mucopolysaccharides in blood or urine can aid in diagnosis and ongoing therapeutic monitoring (MPSBS / Mucopolysaccharidosis, Blood Spot or MPSQU / Mucopolysaccharides Quantitative, Random, Urine).

Reference Values
An interpretive report will be provided.

Interpretation
All detected alterations will be evaluated according to American College of Medical Genetics and Genomics (ACMG) recommendations. Variants will be classified based on known, predicted, or possible pathogenicity and reported with interpretive comments detailing their potential or known significance.

Cautions
A small percentage of individuals who are carriers or have a diagnosis of mucopolysaccharidosis type III (MPS-III) may have a variant that is not identified by this method (e.g., large genomic deletions, promoter alterations). The absence of a variant, therefore, does not eliminate the possibility of positive carrier status or the diagnosis of MPS-III.

In some cases, DNA alterations of undetermined significance may be identified.

Rare polymorphisms exist that could lead to false-negative or false-positive results. If results obtained do not match the clinical findings, additional testing should be considered.
Test Definition: SFPAN
MPS III, Multi-Gene Panel

Test results should be interpreted in the context of clinical findings, family history, and other laboratory data. Errors in our interpretation of results may occur if information given is inaccurate or incomplete.

Clinical Reference


Performance

Method Description
Bidirectional sequencing is performed to test for the presence of a variant in all coding regions and intron/exon boundaries of the SGSH, NAGLU, HGSNAT, and GNS genes. (Unpublished Mayo method)

PDF Report
No

Day(s) and Time(s) Test Performed
Performed Weekly, Varies

Analytic Time
14 days

Maximum Laboratory Time
20 days

Specimen Retention Time
Whole Blood: 2 weeks (if available); Extracted DNA: 3 months

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.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with
Test Definition: SFPAN
MPS III, Multi-Gene Panel

CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

**CPT Code Information**
81479-Unlisted molecular pathology procedure
88233-Tissue culture, skin or solid tissue biopsy (if appropriate)
88240-Cryopreservation (if appropriate)

**LOINC® Information**

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFPAN</td>
<td>MPS III, Multi-Gene Panel</td>
<td>In Process</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Result ID</th>
<th>Test Result Name</th>
<th>Result LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>54458</td>
<td>Result Summary</td>
<td>50397-9</td>
</tr>
<tr>
<td>54459</td>
<td>Result</td>
<td>82939-0</td>
</tr>
<tr>
<td>54460</td>
<td>Interpretation</td>
<td>69047-9</td>
</tr>
<tr>
<td>54461</td>
<td>Additional Information</td>
<td>48767-8</td>
</tr>
<tr>
<td>54462</td>
<td>Specimen</td>
<td>31208-2</td>
</tr>
<tr>
<td>54463</td>
<td>Source</td>
<td>31208-2</td>
</tr>
<tr>
<td>54464</td>
<td>Released By</td>
<td>18771-6</td>
</tr>
</tbody>
</table>