MAYO CLINIC LABORATORIES

Test Definition: WASQR

Alpha-Globin Gene Sequencing, Blood

Overview

Useful For

Testing for nondeletional alpha thalassemia in a symptomatic individual

Follow-up testing to an abnormal hemoglobin electrophoresis that identified an alpha-globin chain variant

Evaluating for nondeletional alpha thalassemias in an algorithmic process for:
-HAEV1 / Hemolytic Anemia Evaluation, Blood
-HBEL1 / Hemoglobin Electrophoresis Evaluation, Blood
-MEV1 / Methemoglobinemia Evaluation, Blood
-REVE2 / Erythrocytosis Evaluation, Blood
-THEV1 / Thalassemia and Hemoglobinopathy Evaluation, Blood and Serum

Method Name

Only orderable as a reflex. For more information see:
-HAEV1 / Hemolytic Anemia Evaluation, Blood
-HBEL1 / Hemoglobin Electrophoresis Evaluation, Blood
-MEV1 / Methemoglobinemia Evaluation, Blood
-REVE2 / Erythrocytosis Evaluation, Blood
-THEV1 / Thalassemia and Hemoglobinopathy Evaluation, Blood and Serum

Polymerase Chain Reaction (PCR)/Sanger Sequencing

NY State Available

Yes

Specimen

Specimen Type

Whole Blood EDTA

Specimen Required

Only orderable as a reflex. For more information see:
-HAEV1 / Hemolytic Anemia Evaluation, Blood
-HBEL1 / Hemoglobin Electrophoresis Evaluation, Blood
-MEV1 / Methemoglobinemia Evaluation, Blood
-REVE2 / Erythrocytosis Evaluation, Blood
-THEV1 / Thalassemia and Hemoglobinopathy Evaluation, Blood and Serum

Specimen Type: Whole blood

Container/Tube:
Preferred: Lavender top (EDTA)
Acceptable: Yellow top (ACD)
Specimen Volume: 4 mL

Specimen Minimum Volume
1 mL

Reject Due To

Gross hemolysis	OK
Moderately to severely clotted	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole Blood EDTA	Refrigerated	14 days	

Clinical & Interpretive

Clinical Information
Alpha-globin gene sequencing detects alpha-globin variants and nondeletional alpha-thalassemia variants.

Alpha thalassemia is the most common monogenic condition in the world. It is estimated that up to 5% of the world's population carries at least one alpha-thalassemia variant, and in the United States, approximately 30% of African Americans are thought to carry an alpha-thalassemia variant. Alpha-thalassemia variants are most common in individuals of Southeastern Asian, African, Mediterranean, Indian, and Middle Eastern descent, but they can be found in persons from any ethnic group.

Four alpha-globin genes are normally present, 2 copies on each chromosome 16. Alpha-thalassemia variants result in decreased alpha-globin chain production. In general, alpha thalassemia is characterized by hypochromic, microcytic anemia and varies clinically from asymptomatic (alpha-thalassemia silent carrier and alpha-thalassemia trait) to lethal hemolytic anemia (hemoglobin [Hb] Barts hydrops fetalis).

Large deletions of the alpha-globin genes account for approximately 90% of alpha-thalassemia alterations, and these will not be detected by alpha-globin gene sequencing. Other alterations, such as point alterations or small deletions within the alpha-globin genes, account for most of the remaining 10% of alpha-thalassemia variants. These nondeletional subtypes can be detected by alpha-globin gene sequencing. The most common nondeletional alpha-thalassemia variant is Hb Constant Spring.

The majority of alpha-globin chain variants are clinically and hematologically benign; however, some cause

erythrocytosis and chronic hemolytic anemia. Hemoglobin electrophoresis may not be able to confirm their identity. In these instances, alpha-globin gene sequencing can be useful.

Reference Values

Only orderable as a reflex. For more information see:
-HAEV1 / Hemolytic Anemia Evaluation, Blood
-HBEL1 / Hemoglobin Electrophoresis Evaluation, Blood
-MEV1 / Methemoglobinemia Evaluation, Blood
-REVE2 / Erythrocytosis Evaluation, Blood
-THEV1 / Thalassemia and Hemoglobinopathy Evaluation, Blood and Serum

An interpretive report will be provided.

Interpretation

A summary interpretation will be provided as a part of the HAEV1 / Hemolytic Anemia Evaluation, Blood; HBEL1 / Hemoglobin Electrophoresis Evaluation, Blood; MEV1 / Methemoglobinemia Evaluation, Blood; REVE2 / Erythrocytosis Evaluation, Blood; THEV1 / Thalassemia and Hemoglobinopathy Evaluation, Blood and Serum.

Cautions

This assay will not detect large deletions or duplications within the alpha-globin genes. Therefore, test results should be interpreted in the context of hemoglobin electrophoresis, clinical findings, family history, and other laboratory data. Misinterpretation of results may occur if the information provided is inaccurate or incomplete.

Rare genetic alterations (ie, 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.

Clinical Reference

1. Harteveld CL, Higgs DR: Alpha-thalassemia. Orphanet J Rare Dis. 2010 May 28;5:13
2. Hoyer JD, Hoffman DR: The Thalassemia and hemoglobinopathy syndromes. In: McClatchey KD, ed. Clinical Laboratory Medicine. 2nd ed. Lippincott Williams and Wilkins; 2002:866-895
3. Farashi S, Harteveld CL: Molecular basis of a-thalassemia. Blood Cells Mol Dis. 2018 May;70:43-53. doi: 10.1016/j.bcmd.2017.09.004
4. Henderson SJ, Timbs AT, McCarthy J, ed al: Ten years of routine a- and B-globin gene sequencing in UK hemoglobinopathy referrals reveals 60 novel mutations. Hemoglobin. 2016;40(2):75-84. doi: 10.3109/03630269.2015.1113990

Performance

Method Description

Genomic DNA is extracted from whole blood. The *HBA1* and *HBA2* genes are amplified by polymerase chain reaction (PCR). The PCR product is then purified and sequenced in both directions using fluorescent dye-terminator chemistry. Sequencing products are separated on an automated sequencer, and the trace files analyzed for variations in all exons, introns, and the polyadenylation site. Results are correlated with routine studies to identify unusual alpha-globin variants.(Reddy PL, Bowie LJ: Sequence-based diagnosis of hemoglobinopathies in the clinical laboratory. Clin Lab Med.

1997;17[1]:85-96; Traeger-Synodinos J, Harteveld CL: Advances in technologies for screening and diagnosis of hemoglobinopathies. Biomarkers Med. 2014;8[1]:119-131)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
10 days

Specimen Retention Time
Blood: 2 weeks; DNA: 3 months

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

CPT Code Information
81259-HBA1/HBA2; full sequence

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
WASQR	Alpha Globin Gene Sequencing, B	87730-8

Result ID	Test Result Name	Result LOINC® Value
47952	Alpha Globin Gene Sequencing Result	50397-9
47953	Interpretation	59466-3