MAYO CLINIC LABORATORIES

Test Definition: FRAG

Osmotic Fragility, Erythrocytes

Overview

Useful For

Evaluating suspected hereditary spherocytosis-associated hemolytic anemia

Confirming or detecting mild spherocytosis

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
FRAGO	Osmotic Fragility	No	Yes
SCTRL	Shipping Control Vial	No	Yes

Special Instructions

- Specimen Collection and Labeling Instructions for Osmotic Fragility Testing of Erythrocytes

Method Name

Osmotic Lysis

NY State Available

Yes

Specimen

Specimen Type

Control
Whole Blood EDTA

Shipping Instructions

Specimens must arrive within 72 hours of collection.

Necessary Information

Patient's age is required.

Specimen Required

Both patient and shipping control whole blood specimens are required. For complete instructions, refer to Specimen Collection and Labeling Instructions for Osmotic Fragility Testing of Erythrocytes.

Shipping Control Specimen
Specimen Type: Whole blood (non-patient)
Container/Tube: Lavender top (EDTA)

Specimen Volume: 4 mL
Collection Instructions:
1. Collect a shipping control specimen from a healthy person unrelated to the patient at the same time (or within 4 hours) as the patient specimen.
Note: The shipping control specimen can be collected from a phlebotomist, volunteer or another heathy patient.
2. Clearly handwrite "CONTROL" on the outermost label of the tube.
3. Immediately refrigerate (or place on cold gel pack/small amount of wet ice) after collection.
4. Send shipping control in the original tube. **Do not aliquot**.
5. Keep the shipping control and the patient specimens **together**, either rubber banded or in a bag.
Additional Information:
1. **The shipping control and patient specimens must be handled identically** from the time of collection through receipt in the testing laboratory.
2. **If the shipping control is not sent with the patient specimen, test cancellation is likely.**
3. The shipping control specimen evaluates whether the patient result has been compromised by handling conditions such as temperature, motion, or other transportation interferences, as temperature and handling extremes can adversely impact the integrity of the specimen.

Patient Specimen
Specimen Type: Whole blood
Container/Tube: Lavender top (EDTA)
Specimen Volume: 4 mL
Collection Instructions:
1. Collect and label patient specimen.
2. Immediately refrigerate (or place on cold gel pack/small amount of wet ice) specimen after collection.
3. Send whole blood specimen in the original tube. **Do not aliquot**.
4. Keep the shipping control and the patient specimens together, either rubber banded or in a bag.
Additional Information: The shipping control and patient specimens must be handled identically from the time of collection through receipt in the testing laboratory.

Forms

If not ordering electronically, complete, print, and send a Benign Hematology Test Request (T755) with the specimen.

Specimen Minimum Volume

Patient whole blood, shipping control: 2 mL each

Reject Due To

Gross hemolysis	Reject
Clotted blood	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Control	Refrigerated	72 hours	PURPLE OR PINK TOP/EDTA
Whole Blood EDTA	Refrigerated	72 hours	

Clinical & Interpretive

Clinical Information

Spherocytes are osmotically fragile cells that rupture more easily in a hypotonic solution than normal red blood cells. Because they have a low surface area to volume ratio, they lyse at a higher osmolarity than do normal discocytes (ie, red blood cells). Cells that have a larger surface area to volume ratio, such as target cells or hypochromic cells, are more resistant to lysing. After incubation, an increase in hemolysis is seen in spherocytes. Hereditary spherocytosis typically has a greater number of spherocytes than other causes of spherocytosis. Therefore, the degree of lysis is usually more pronounced, but this is not always the case. Some rare disorders can also cause marked fragility, and hereditary spherocytosis cases can display moderate fragility.

Reference Values

> or =12 months:
0.50 g/dL NaCl (unincubated): 3-53% hemolysis
0.60 g/dL NaCl (incubated): 14-74% hemolysis
0.65 g/dL NaCl (incubated): 4-40% hemolysis
0.75 g/dL NaCl (incubated): 1-11% hemolysis

NaCl = Sodium chloride
Reference values have not been established for patients who are younger than 12 months

Interpretation

An interpretive report will be provided.

Cautions

Spherocytosis of any cause will result in increased osmotic fragility. Infrequently, other congenital hemolytic disorders may also be associated with positive results, as in patients with congenital nonspherocytic hemolytic anemia due to red blood cells (RBC) enzyme deficiencies.

Patients with an immunohemolytic anemia or who have recently received a blood transfusion may also have increased RBC lysis.

Resulting Cautions:
-Osmotic fragility results will be reported if the shipping control is normal.
-If the shipping control is abnormal and the osmotic fragility results on the patient are within normal range, the results will be reported; however, a comment will be added to the report indicating that the shipping control was not entirely satisfactory.
-The test will be canceled if the patient specimen and shipping control are both abnormal.

Clinical Reference

1. Coetzer, TL. Erythrocyte Membrane Disorders. In: Kaushansky K, Prchal JT, Burns LJ, Lichtman MA, Levi M, Linch DC, eds. Williams Hematology. 10th ed. McGraw Hill; 2021:Ch47
2. King MJ, Garcon L, Hoyer JD, et al. International Council for Standardization in Haematology. ICSH guidelines for the laboratory diagnosis of nonimmune hereditary red cell membrane disorders. Int J Lab Hematol. 2015;37(3):304-325

Performance

Method Description

Specimens for erythrocyte osmotic fragility tests are anticoagulated with EDTA. Osmotic lysis is performed using sodium chloride solution, 0.5 g/dL. An incubated fragility test is performed following 24-hour incubation at 37 degrees C at the following sodium chloride concentrations: 0.60, 0.65, and 0.75 g/dL. Results are reported and interpreted.(Larson CJ, Scheidt R, Fairbanks VF. The osmotic fragility test for hereditary spherocytosis: use of EDTA-anticoagulated blood stored at 4 degrees C for up to 96 hours. Am Soc Clin Pathol Meeting Abstract, 1988; Larson CJ, Scheidt R, Fairbanks VF. The osmotic fragility test for hereditary spherocytosis: objective criteria for test interpretation. Am Soc Clin Pathol Meeting Abstract, 1988; King MJ, Zanella A: Hereditary red cell membrane disorders and laboratory diagnostic testing. Int J Lab Hematol. 2013;35[3]:237-243)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

2 to 5 days

Specimen Retention Time

7 days

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

85557

LOINC® Information

Test Definition: FRAG

Osmotic Fragility, Erythrocytes

Test ID	Test Order Name	Order LOINC® Value
FRAG	Osmotic Fragility, RBC	98904-6

Result ID	Test Result Name	Result LOINC® Value
9064	Osmotic Fragility, RBC	34964-7
3306	Osmotic Fragility, 0.50 g/dL NaCl	23915-2
3307	Osmotic Fragility, 0.60 g/dL NaCl	23918-6
3308	Osmotic Fragility, 0.65 g/dL NaCl	23920-2
3309	Osmotic Fragility, 0.75 g/dL NaCl	23921-0
3310	Osmotic Fragility Comment	59466-3
SCTRL	Shipping Control Vial	40431-9