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 a whole blood EDTA specimen and a shipping control specimen are required. The shipping control specimen is used to evaluate whether a patient result has been compromised by handling conditions such as temperature, motion, or other transportation interferences. Temperature and handling extremes can adversely impact the integrity of the specimen.

Patient:

Specimen Type: Whole blood
Container/Tube: Lavender top (EDTA)
Specimen Volume: 4 mL
Collection Instructions:
1. Refrigerate specimen immediately after collection.
2. Send whole blood specimen in original tube. **Do not aliquot.**
3. Rubber band patient specimen and control vial together.

Normal Shipping Control:
Specimen Type: Whole blood
Container/Tube: Lavender top (EDTA)
Specimen Volume: 4 mL
Collection Instructions:
1. Collect a shipping control specimen from a normal (healthy), unrelated, nonsmoking person at the same time as the patient.
2. Clearly **hand write "normal control"** on the outermost label.
3. Refrigerate specimen immediately after collection.
4. Send control specimen in original tube. **Do not aliquot.**
5. Rubber band patient specimen and control vial together. The control and patient specimen must be handled in the same manner from specimen collection to 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

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 do normal red blood cells . Because they have a low surface area:volume ratio, they lyse at a higher osmolarity than do normal discocytes (ie, RBC).

Cells that have a larger surface area: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 of age.

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. Palek J, Jarolin P: Hereditary spherocytosis. In: Williams WJ, Beutler E, Erslev AJ, Lichtman MA, eds. Hematology. 4th ed. McGraw-Hill Book Company; 1990:558-569
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 Jun;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 Jun;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 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