MAYO CLINIC LABORATORIES

Test Definition: TIBC

Total Iron Binding Capacity, Serum

Overview

Useful For
Screening for chronic iron overload diseases, particularly hereditary hemochromatosis

Method Name
Only orderable as part of profile. For more information see SFEC / Iron and Total Iron Binding Capacity, Serum

Turbidity/Calculation

NY State Available
Yes

Specimen

Specimen Type
Serum

Specimen Required
Only orderable as part of profile. For more information see SFEC / Iron and Total Iron Binding Capacity, Serum

Patient Preparation:
1. Fasting (12 hours)
2. For 24 hours before collection, patient **should not** take iron-containing supplements.

Supplies: Sarstedt Aliquot Tube 5 mL (T914)
Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions:
1. Draw blood before noon (preferred).
2. Within 2 hours of collection, serum gel tubes should be centrifuged.
3. Within 2 hours of collection, red-top tubes should be centrifuged, and the serum aliquoted into a plastic vial.

Specimen Minimum Volume
0.5 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	21 days	
	Frozen	365 days	

Clinical & Interpretive

Clinical Information

Transferrin is the plasma iron transport protein that binds iron strongly to keep iron nonreactive in circulation and deliver it to cells with transferrin receptors. The rate of transferrin synthesis in the liver can be altered according to the body's iron requirements and iron reserves. The circulating concentration increases in response to iron deficiency and decreases in response to iron overload. Transferrin is generally only 25% to 30% saturated with iron. Total iron-binding capacity (TIBC) is estimated from the transferrin concentration using the molecular weight of transferrin, accounting for each transferrin molecule that can bind 2 atoms of iron.

Iron deficiency, iron overload, and anemia of chronic disease are the most prevalent disorders of iron metabolism. Serum iron, TIBC, and percent saturation are widely used for the diagnosis of iron deficiency and iron overload disorders, such as hemochromatosis. Iron concentration and percent saturation decrease with iron deficiency and increase when iron is in excess. However, serum ferritin is a much more sensitive and reliable test for demonstration of iron deficiency.

Anemia of chronic disease is often observed in patients with autoimmune diseases, chronic kidney diseases, inflammatory bowel disease, and chronic heart failure. It is diagnosed when serum iron concentrations are low despite normal serum ferritin concentrations indicating adequate iron stores. However, in the presence of inflammation, ferritin can mask iron deficiency; therefore, measuring soluble transferrin receptors is suggested.

The biologic variation of iron and, therefore, iron saturation is notable in normal healthy persons and in various clinical disorders owing to both diurnal variation and post-prandial effects. The intraindividual day-to-day variation of iron and iron saturation is approximately 25% to 30%.(1) Recommendations for blood sampling for iron and iron saturation measurements are contradictory; however, minimizing influence of these effects can be accomplished by collecting during the morning after an overnight fast.

Reference Values

Only orderable as part of profile. For more information see SFEC / Iron and Total Iron-Binding Capacity, Serum.

250-400 mcg/dL

Interpretation

Total iron-binding capacity concentrations are elevated in anemia of chronic disease and iron overload conditions.(1)

Total iron-binding capacity concentrations are decreased in iron deficiency, iron deficiency anemia, and iron-refractory iron deficiency anemia.(1)

Cautions

Serum iron concentration, total iron-binding capacity, and percent saturation are widely used for diagnosing iron deficiency. However, serum ferritin is the preferred primary test, as it is a much more sensitive and reliable test for demonstration of iron deficiency.

While measurement of serum iron, total iron-binding capacity, and percent saturation should not be used as the primary test for iron deficiency, they may be helpful when used in conjunction with ferritin and soluble-transferrin receptor analyses, especially in patients with inflammation.

Clinical Reference

1. Swinkels DW. Iron metabolism. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier, 2023:chap 40
2. Kowdley KV, Brown KE, Ahn J, Sundaram V. ACG Clinical Guideline: Hereditary Hemochromatosis. Am J Gastroenterol. 2019;114:1202-1218
3. Lopez A, Cacoub P, Macdougall IC, Peyrin-Biroulet L. Iron deficiency anemia. Lancet. 2016;387:907-916

Performance

Method Description

Transferrin:
Anti-transferrin antibodies react with the antigen in the sample to form an antigen/antibody complex. Following agglutination, this is measured turbidimetrically. Addition of polyethylene glycol allows the reaction to progress rapidly to the end point and increases sensitivity. The result is used to calculate the total iron-binding capacity and is not included on the report.(Package insert: TRSF2. Roche Diagnostics; v10.0, 04/2022)

Total Iron-Binding Capacity:
This test calculates the total iron-binding capacity (TIBC) using results obtained from transferrin analysis. The following calculation is performed in the laboratory information system.
TIBC = Transferrin x 1.18

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 2 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 has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

83550

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
TIBC	Total Iron Binding Capacity	2500-7

Result ID	Test Result Name	Result LOINC® Value
TIBC	Total Iron Binding Capacity	2500-7