Test Definition: STFR1

sTfR (Soluble Transferrin Receptor), Serum

Overview

Useful For
Aiding in the diagnosis of iron deficiency anemia in patients with chronic disease

Method Name
Chemiluminescent Immunoassay

NY State Available
Yes

Specimen

Specimen Type
Serum

Ordering Guidance
This test should not be used for routine iron status evaluation for patients without confounding pathologies (such as inflammation, infection, chronic disease, or malignancy). For such cases order FERR1 / Ferritin, Serum.

Specimen Required
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL Serum
Collection Instructions:
1. Within 2 hours of collection, centrifuge the specimen.
2. For red-top tubes, aliquot serum into a plastic vial prior to sending.

Specimen Minimum Volume
Serum: 0.6 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	7 days	
	Ambient	7 days	
	Frozen	90 days	

Clinical & Interpretive

Clinical Information

Transferrin receptor (TfR) mediates iron uptake by cells. It is a transmembrane, disulfide-linked dimer of two identical subunits that binds and internalizes diferric transferrin, thereby delivering iron to the cell cytosol. When a cell needs iron, TfR expression increases to facilitate iron uptake. Since the major use of iron is for hemoglobin synthesis, about 80% of total TfR is located on erythroid progenitor cells.

Soluble transferrin receptor (sTfR) is the product of the proteolysis of TfR at a specific site in the extracellular domain, which leads to monomers that are measurable in serum. A constant relationship is reported between total TfR and the concentration of sTfR in serum. Thus, the concentration of sTfR in serum is an indirect measure of total TfR.

The concentration of sTfR in serum elevates with iron deficiency and hyperplastic erythropoiesis (eg, hemolytic anemia, beta-thalassemia, polycythemia) and decreases in subjects with hypoplastic erythropoiesis (eg, chronic renal failure, aplastic anemia or post-transplant anemia).

Anemia of chronic disease (ACD) and iron deficiency anemia (IDA), the most common forms of anemia, are differentiated primarily by estimates of iron status. Standard measures of iron status, such as ferritin, total iron-binding capacity, and serum iron are confounded by chronic disease, which leads to equivocal results.
Measurement of sTfR is valuable as an indicator of iron deficiency in individuals with chronic disease (eg, inflammatory diseases and infections) as sTfR is minimally affected by proinflammatory cytokines found in ACD patients, which provides an advantage over serum ferritin in the evaluation of iron status and erythropoiesis.(1,2)

Reference Values

0.63-2.64 mg/L

It is reported that African Americans may have slightly higher values.

Interpretation

Soluble transferrin receptor (sTfR) concentrations are inversely related to iron status; sTfR elevates in response to iron deficiency and decreases in response to iron repletion.

Cautions

The soluble transferrin receptor (sTfR) immunoassay should not be used for the routine clinical evaluation of patients for iron status when ferritin immunoassay (FERR1 / Ferritin, Serum) would be appropriate, such as in the absence of confounding pathologies (inflammation, infection, chronic disease, or malignancy).

Soluble transferrin receptor assays are not standardized, therefore results from different assays should not be used interchangeably.(3)

Patients with hemolysis and recent blood loss may have falsely elevated sTfR concentrations.

Race-based differences in sTfR have been observed with Black subjects having 9% higher values compared to non-Black subjects.(4)

Altitude-based differences in sTfR have been observed with subjects residing at high altitude having concentrations 9% higher than those nearer to sea level.(4)

Clinical Reference

1. Vazquez-Lopez MA, Lopez-Ruzafa E, Ibanez-Alcalde M, Martín-Gonzalez M, Bonillo-Perales A, Lendinez-Molinos F. The usefulness of reticulocyte haemoglobin content, serum transferrin receptor and the sTfR-ferritin index to identify iron deficiency in healthy children aged 1-16 years. Eur J Pediatr. 2019;178(1):41-49
2. Mast AE, Blinder MA, Gronowski AM, Chumley C, Scott MG. Clinical utility of the soluble transferrin receptor and comparison with serum ferritin in several populations. Clin Chem. 1998;44(1):45-51
3. Bohn MK, Berman M, Ali S, et al. Evaluation of a new soluble transferrin receptor assay and comparison to three measurement procedures. Clin Biochem. 2025;135:110862. doi:10.1016/j.clinbiochem.2024.110862
4. Allen J, Backstrom KR, Cooper JA, et al. Measurement of soluble transferrin receptor in serum of healthy adults. Clin Chem. 1998;44(1):35-39

Performance

Method Description

The Access sTfR (soluble transferrin receptor) assay is a paramagnetic particle, chemiluminescent immunoassay for the quantitative determination of sTfR levels in human serum using the Access Immunoassay Systems. The Access sTfR assay is a sequential two-step immunoenzymatic ("sandwich") assay. A sample is added to a reaction vessel along with paramagnetic particles coated with anti-sTfR antibody. During incubation, the sTfR antigen in the sample binds to the immobilized anti-sTfR antibody on the solid phase. Alkaline phosphatase-conjugated anti-sTfR antibody is then added and reacts with a different antigenic site on the sTfR molecule. After incubation, materials bound to the solid phase are held in a magnetic field while unbound materials are washed away. Then, chemiluminescent substrate is added to the vessel, and light generated by the reaction is measured with a luminometer. The light production is directly proportional to the concentration of analyte in the sample. Analyte concentration is automatically determined from a stored calibration.(Package insert: Access sTfR. Beckman Coulter; 01/2025)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

1 to 3 days

Specimen Retention Time

1 week

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

84238

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
STFR1	Soluble Transferrin Receptor (sTfR)	30248-9

Result ID	Test Result Name	Result LOINC® Value
STFR1	Soluble Transferrin Receptor (sTfR)	30248-9