MAYO CLINIC LABORATORIES

Test Definition: RT3

T3 (Triiodothyronine), Reverse, Serum

Overview

Useful For

Aiding in the diagnosis of the sick euthyroid syndrome

Method Name

Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

Portions of this test are covered by patents held by Quest Diagnostics.

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)

Collection Container/Tube:

Preferred: Red top

Acceptable: Serum gel

Submission Container/Tube: Plastic vial

Specimen Volume: 0.8 mL Serum

Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send Renal Diagnostics Test Request (T830) with the specimen.

Specimen Minimum Volume

Serum: 0.4 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)	28 days	
	Ambient	28 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Reverse triiodothyronine (rT3) differs from triiodothyronine (T3) in the positions of the iodine atoms attached to the aromatic rings. The majority of rT3 found in the circulation is formed by peripheral deiodination (removal of an iodine atom) of T4 (thyroxine). rT3 is believed to be metabolically inactive.

The rT3 level tends to follow the T4 level: low in hypothyroidism and high in hyperthyroidism. Additionally, increased levels of rT3 have been observed in starvation, anorexia nervosa, severe trauma and hemorrhagic shock, hepatic dysfunction, postoperative states, severe infection, and in burn patients (ie, sick euthyroid syndrome). This appears to be the result of a switchover in deiodination functions with the conversion of T4 to rT3 being favored over the production of T3.

Reference Values

10-24 ng/dL

Interpretation

In hospitalized or sick patients with low triiodothyronine (T3) values, elevated reverse triiodothyronine (rT3) values are consistent with sick euthyroid syndrome. Also, the finding on an elevated rT3 level in a critically ill patient helps exclude a diagnosis of hypothyroidism.

The rT3 concentration is high in patients on medications such as propylthiouracil, ipodate, propranolol, amiodarone, dexamethasone, and the anesthetic agent halothane. Dilantin decreases rT3 concentration due to the displacement from thyroxine-binding globulin, which causes increased rT3 clearance.

To convert from ng/dL to nmol/L, multiply the ng/dL result by 0.01536.

Cautions

Generally, reverse triiodothyronine tests are not necessary since triiodothyronine should not be ordered in hospitalized or sick patients.

Clinical Reference

1. Bowerbank SL, Carlin MG, Dean JR. A direct comparison of liquid chromatography-mass spectrometry with clinical routine testing immunoassay methods for the detection and quantification of thyroid hormones in blood serum. Anal Bioanal Chem. 2019;411(13):2839-2853
2. Moore WT, Eastman RC: Diagnostic Endocrinology. Mosby; 1990:182-183

Performance

Method Description

Reverse T3-carbon 13 is added to serum samples as an internal standard. Reverse T3 (RT3) and RT3-carbon 13 are dissociated with a protein precipitation and then extracted from the specimens using a solid phase extraction. The eluate is dried down under nitrogen, reconstituted with mobile phase and analyzed by liquid chromatography tandem mass spectrometry using multiple reaction monitoring in the positive mode.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

2 to 6 days

Specimen Retention Time

14 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

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

84482

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
RT3	T3 (Triiodothyronine), Reverse, S	3052-8

Result ID	Test Result Name	Result LOINC® Value
9405	T3(Triiodothyronine),Reverse,S	3052-8