



# Test Definition: FRT4

T4 (Thyroxine), Free, Serum

## Overview

### Useful For

Evaluating suspected thyroid function disorders using free thyroxine measured together with thyroid-stimulating hormone

### Testing Algorithm

For more information see: [Thyroid Function Ordering Algorithm](#)

### Special Instructions

- [Thyroid Function Ordering Algorithm](#)

### Method Name

Electrochemiluminescence Immunoassay

### NY State Available

Yes

## Specimen

### Specimen Type

Serum

### Specimen Required

**Patient Preparation:** For 12 hours before specimen collection do not take multivitamins or dietary supplements containing biotin (vitamin B7), which is commonly found in hair, skin, and nail supplements and multivitamins.

#### Collection Container/Tube:

**Preferred:** Serum gel

**Acceptable:** Red top

**Submission Container/Tube:** Plastic vial

**Specimen Volume:** 1 mL

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

### Forms

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

### Specimen Minimum Volume

0.5 mL

### Reject Due To

Gross	OK
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hemolysis	
Gross lipemia	OK
Gross icterus	OK

**Specimen Stability Information**

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	14 days	
	Ambient	72 hours	
	Frozen	30 days	

**Clinical & Interpretive****Clinical Information**

Free thyroxine (FT4) comprises a small fraction of total thyroxine. FT4 is available to the tissues and is, therefore, the metabolically active fraction.

Elevations in FT4 cause hyperthyroidism, while decreases cause hypothyroidism.

**Reference Values**

Pediatric

0-5 days: 0.9-2.5 ng/dL

6 days-2 months: 0.9-2.2 ng/dL

3-11 months: 0.9-2.0 ng/dL

1-5 years: 1.0-1.8 ng/dL

6-10 years: 1.0-1.7 ng/dL

11-19 years: 1.0-1.6 ng/dL

Adult (> or =20 years): 0.9-1.7 ng/dL

For SI unit Reference Values, see [www.mayocliniclabs.com/order-tests/si-unit-conversion.html](http://www.mayocliniclabs.com/order-tests/si-unit-conversion.html)

**Interpretation**

Elevated values suggest hyperthyroidism or exogenous thyroxine.

Decreased values suggest hypothyroidism.

Free thyroxine (FT4) works well to correct total T4 values for thyroxine-binding globulin alterations but may give misleading values when abnormal binding proteins are present or the patient has other major illnesses (euthyroid sick syndrome).

**Cautions**

Of 26 commonly used pharmaceuticals tested in vitro, only furosemide caused elevated free thyroxine (FT4) findings at the daily therapeutic dosage level.

The test cannot be used in patients receiving treatment with lipid-lowering agents containing dextrothyroxine (D-T4). If the thyroid function is to be checked in such patients, the therapy should first be discontinued for 4 to 6 weeks to allow the physiological state to become re-established.

Binding protein anomalies seen with familial dysalbuminemic hyperthyroxinemia, for example, may cause values which, while characteristic of the condition, deviate from the expected results.

For assays employing antibodies, the possibility exists for interference by human anti-animal antibodies (ie, heterophile antibodies) in the patient sample. Patients who have been regularly exposed to animals or have received immunotherapy or diagnostic procedures utilizing immunoglobulins or immunoglobulin fragments may produce antibodies, eg, human antimouse antibodies (HAMA) that interfere with immunoassays. This may falsely elevate or falsely decrease the results.

Interference due to extremely high titers of antibodies to analyte-specific antibodies, streptavidin or ruthenium can occur.

**Clinical Reference**

1. Melmed S, Polonsky KS, Larsen PR, Kronenberg H. Williams Textbook of Endocrinology. 12th ed. Saunders Company; 2011:348-414
2. Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023

**Performance****Method Description**

In the Roche free thyroxine (FT4) assay, the determination of free thyroxine is made with the aid of a specific anti-T4 antibody labeled with a ruthenium complex. After addition of biotinylated T4 and streptavidin-coated microparticles, the still-free binding sites of the labeled antibody become occupied, with formation of an antibody-hapten complex. The entire complex becomes bound to the solid phase via interaction of biotin and streptavidin. The reaction mixture is aspirated into the measuring cell where the microparticles are magnetically captured onto the surface of the electrode. Unbound substances are then removed with ProCell. Application of a voltage to the electrode then induces chemiluminescent emission which is measured by a photomultiplier. (Package insert: Elecsys FT4 II. Roche Diagnostics; 01/2019)

**PDF Report**

No

**Day(s) Performed**

Monday through Sunday

**Report Available**

Same day/1 to 2 days

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**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**

84439

**LOINC® Information**

Test ID	Test Order Name	Order LOINC® Value
FRT4	T4 (Thyroxine), Free, S	83122-2

Result ID	Test Result Name	Result LOINC® Value
FRT4	T4 (Thyroxine), Free, S	83122-2