MAYO CLINIC LABORATORIES

# Test Definition: TPO

Thyroperoxidase Antibodies, Serum

## Overview

### Useful For

Aiding in the diagnosis of thyroid autoimmune disorders

Differentiating thyroid autoimmune disorders from nonautoimmune goiter or hypothyroidism

As a diagnostic tool in deciding whether to treat a patient who has subclinical hypothyroidism

### Testing Algorithm

For information see Thyroid Function Ordering Algorithm.

### Special Instructions

- Thyroid Function Ordering Algorithm

### Method Name

Chemiluminometric Immunoassay

### NY State Available

Yes

## Specimen

### Specimen Type

Serum Red

### Specimen Required

**Patient Preparation:** For 12 hours before specimen collection, patient **should not** take multivitamins or dietary supplements (eg, hair, skin, and nail supplements) containing biotin (vitamin B7).
**Supplies:** Sarstedt 5 mL Aliquot Tube (T914)
**Collection Container/Tube:** Red top
**Submission Container/Tube:** Plastic vial
**Specimen Volume:** 0.6 mL serum
**Collection Instructions:** Within 2 hours of collection, centrifuge and aliquot serum into plastic vial.

### Specimen Minimum Volume

Serum: 0.5 mL

### Reject Due To

| | |
|---|---|
| Gross | Reject |

| | |
|---|---|
| hemolysis | |
| Gross lipemia | OK |

### Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---|---|---|---|
| Serum Red | Refrigerated (preferred) | 7 days | |
| | Ambient | 7 days | |
| | Frozen | 30 days | |

## Clinical & Interpretive

### Clinical Information

Thyroperoxidase (TPO) is an enzyme involved in thyroid hormone synthesis, catalyzing the oxidation of iodide on tyrosine residues in thyroglobulin for the synthesis of triiodothyronine and thyroxine (tetraiodothyronine). TPO is a membrane-associated hemo-glycoprotein expressed only in thyrocytes and is one of the most important thyroid gland antigens.

Disorders of the thyroid gland are frequently caused by autoimmune mechanisms with the production of autoantibodies. Anti-TPO antibodies activate complement and are thought to be significantly involved in thyroid dysfunction and the pathogenesis of hypothyroidism.

The determination of TPO antibody levels is the most sensitive test for detecting autoimmune thyroid disease (eg, Hashimoto thyroiditis, idiopathic myxedema, and Graves disease), and detectable concentrations of anti-TPO antibodies are observed in most patients with these disorders. The highest TPO antibody levels are observed in patients suffering from Hashimoto thyroiditis. In this disease, the prevalence of TPO antibodies is about 90% of cases, confirming the autoimmune origin of the disease. These autoantibodies also frequently occur (60%-80%) in the course of Graves disease.

In patients with subclinical hypothyroidism, the presence of TPO antibodies is associated with an increased risk of developing overt hypothyroidism. Many clinical endocrinologists use the TPO antibody test as a diagnostic tool in deciding whether to treat a patient with subclinical hypothyroidism, and Mayo Clinic Laboratories endorses this practice.

For more information, see Thyroid Function Ordering Algorithm.

### Reference Values

<9.0 IU/mL

Reference values apply to all ages.

### Interpretation

Values above 9.0 IU/mL are generally associated with autoimmune thyroiditis, but elevations are also seen in other autoimmune diseases.

In patients with subclinical hypothyroidism, the presence of thyroperoxidase (TPO) antibodies predicts a higher risk of

developing overt hypothyroidism, 4.3% per year versus 2.1% per year in antibody-negative individuals. Furthermore, it raises the concern that such patients may be at increased risk of developing other autoimmune diseases, such as adrenal insufficiency and type 1 diabetes.

The frequency of detectable anti-TPO observed in nonimmune thyroid disease is similar to the 10% to 12% observed in a healthy population with normal thyroid function.

There is a good association between the presence of autoantibodies against TPO and histological thyroiditis. However, in view of the extensive regenerative capacity of the thyroid under the influence of thyrotropin, chronic thyroid disease may be present for years before the clinical manifestation of hypothyroidism becomes evident, if ever.

### Cautions

Moderately increased levels of thyroperoxidase antibodies may be found in patients with a non-thyroid autoimmune disease such as pernicious anemia, type I diabetes, or other disorders that activate the immune system.

Some patients who have been exposed to animal antigens, either in the environment or as part of treatment or imaging procedure, may have circulating anti-animal antibodies present. These antibodies may interfere with the assay reagents to produce unreliable results.

### Clinical Reference

1. Feldt-Rasmussen U. Analytical and clinical performance goals for testing autoantibodies to thyroperoxidase, thyroglobulin, and thyrotropin receptor. Clin Chem. 1996;42(1):160-163
2. Gharib H, Tuttle RM, Baskin HJ, et al. Consensus Statement #1: Subclinical thyroid dysfunction: a joint statement on management from the American Association of Clinical Endocrinologists, the American Thyroid Association, and the Endocrine Society. Thyroid. 2005;15(1):24-28. doi:10.1089/thy.2005.15.24
3. Frohlich E, Wahl R. Thyroid Autoimmunity: Role of Anti-thyroid Antibodies in Thyroid and Extra-Thyroidal Diseases. Front Immunol. 2017;8:521. Published 2017 May 9. doi:10.3389/fimmu.2017.00521
4. Freedman DB, Halsall D, Marshall WJ, Ellervik C. Thyroid disorders. In: Rifai N, Horvath AR, Wittwer CT: eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:1572-1616

## Performance

### Method Description

The Access TPO (thyroperoxidase) antibody assay is a sequential 2-step immunoenzymatic (sandwich) assay. A sample is added to a reaction vessel with paramagnetic particles coated with thyroperoxidase protein. The serum TPO antibody binds to thyroperoxidase. After incubation in a reaction vessel, materials bound to the solid phase are held in a magnetic field while unbound materials are washed away. Protein A-alkaline phosphatase conjugate is added and binds to the TPO antibody. After the second incubation, materials bound to the solid phase are held in a magnetic field while unbound materials are washed away. The chemiluminescent substrate Lumi-Phos 530 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 TPO antibody in the sample. The amount of analyte in the sample is determined from a stored, multipoint calibration curve. The analyte in the calibrator is traceable to international standard WHO 66/387.(Package insert: TPO Antibody, Thyroperoxidase Antibody. Beckman Coulter, Inc; 06/2020)

### PDF Report
No

### Day(s) Performed
Monday through Saturday

### Report Available
1 to 3 days

### Specimen Retention Time
2 weeks

### 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 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
86376

### LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---|---|---|
| TPO | Thyroperoxidase Ab, S | 8099-4 |

| Result ID | Test Result Name | Result LOINC® Value |
|---|---|---|
| TPO | Thyroperoxidase Ab, S | 8099-4 |