

Thyroid Peroxidase IgG ELISA Kit

Quantitative assay for thyroid peroxidase IgG antibodies

Product Code: GD049

For *in vitro* Diagnostic Use



1. Materials Included in the Kit

- **Microplate:** 96 wells in 12 X 8 break-apart strips, pre-coated with recombinant human TPO, with holder in a foil bag with desiccant
- **Reagent 1: Sample Diluent** 10mM Tris-buffered saline, pH 7.2 with antimicrobial agent, 50ml, (blue), ready to use
- **Reagent 2: Wash Buffer** 100mM Tris-buffered saline with detergent, pH 7.2, 100 ml, **concentrate** (x10)
- **Reagent 3: Conjugate** rabbit anti-human IgG conjugated to horseradish peroxidase in protein stabilising solution and antimicrobial agent, 12 ml, (red), ready to use
- **Reagent 4: TMB Substrate** aqueous solution of TMB and hydrogen peroxide, 12 ml, ready to use
- **Reagent 5: Stop Solution** 0.25M sulphuric acid, 12 ml, ready to use
- **Standards:** 0, 33, 100, 330, 1000, 3000 U/ml, 1ml of 10mM Tris-buffered saline containing human serum antibodies to TPO, ready to use
- **Positive Control:** 1ml of 10mM Tris-buffered saline containing human serum antibodies to TPO, ready to use
- **Negative Control:** 1ml of 10mM Tris-buffered saline containing normal human serum, ready to use.
- **Instructions for use**

17. Method Summary

- Dilute sera 1:100 with Sample Diluent (**Reagent 1**)
- Dispense 100µl of each Standard, Control and diluted sample into the microplate wells
- Incubate for **30 minutes** at room temperature.
- *Wash the wells three times*
- Dispense 100µl of Conjugate (**Reagent 3**) into each well
- Incubate at room temperature for **15 minutes**
- *Wash the wells four times*
- Add 100µl of TMB Substrate (**Reagent 4**) to each well
- Incubate at room temperature for **15 minutes**
- Add 100µl Stop Solution (**Reagent 5**) to each well
- Read the optical density at 450nm

18. Further Reading

Rapoport B and McLachlan SM. Thyroid peroxidase autoantibodies. In 'Autoantibodies', JB Peter and Y Shoenfeld, eds., Elsevier Science B.V., Amsterdam, The Netherlands, 1996, p816.

Prentice LM *et al.* Geographical distribution of subclinical autoimmune thyroid disease in Britain: a study using highly sensitive direct assays for autoantibodies to thyroglobulin and thyroid peroxidase. *Acta Endocrinol* 123: 493, 1990.

Kaufman KD *et al.* Generation of recombinant, enzymatically active human thyroid peroxidase and its recognition by antibodies in the sera of patients with Hashimoto's thyroiditis. *J Clin Invest* 84: 394, 1989.

Czarnocka B *et al.* Purification of the human thyroid peroxidase and identification as the microsomal antigen involved in autoimmune thyroid diseases. *FEBS Lett* 109:147, 1985.

Wall JR and Kuroki, T. Immunologic Factors and Thyroid disease. *Medical Clinics of North America* 69: 913, 1985.

Davies TF and DeBernado, E. Thyroid autoantibodies and disease. In 'Autoimmune Endocrine Disease', TF Davies, ed., Wiley, New York, NY, 1983, p127.

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11. Assay Procedure Continued...

10. Read the optical density (OD) of each well at 450nm in a microplate reader within 10 minutes. A 620nm filter may be used as a reference wavelength.

12. Quality Control

Quality control data is supplied on the lot-specific QC certificate included in the kit.

Controls are intended to monitor for substantial reagent failure.

Any well positive by spectrophotometer but without visible colour should be cleaned on the underside and re-read. If OD-values below zero are observed, the wavelengths used should be verified, the reader re-blanked to air and the measurements repeated.

13. Interpretation of Results

Plot the OD of each standard against its concentration and draw the best-fit curve through the points. Read the unknowns off this curve. Values below 75 U/ml are considered normal. Values above 75 U/ml are consistent with the presence of autoimmune thyroid disease.

Values above 3000 U/ml should be repeated at a higher dilution.

14. Limitations of the Procedure

1. Results for this assay should be used in conjunction with clinical findings and other serological tests.
2. Not all Hashimoto's patients are positive for TPO antibodies.

15. Performance Characteristics

The ability of the TPO IgG ELISA to detect autoantibodies to TPO was evaluated using samples supplied by External Quality Assessment Programs. All patients with clinically defined autoimmune thyroid disease had elevated anti-TPO IgG (range 102 - >3000 U/ml). In contrast, only 1 of 80 healthy controls had anti-TPO IgG above 75 U/ml.

16. Reproducibility

Within Assay Precision

Within assay precision was determined by testing 3 samples, including a low, moderate and high specimen 12 times within a single assay run.

Mean U/ml	SD	CV%
95.1	1.9	2.0
289.5	8.5	2.9
939.5	87.8	9.3

Between Assay Precision

Between assay precision was evaluated by testing 3 samples on five independent occasions.

Mean U/ml	SD	CV%
237.0	10.3	4.4
551.0	30.2	5.5
2983.8	379.0	12.7

2. Other Equipment Required

Test tubes for dilution • graduated cylinder for preparing wash buffer • precision pipettes and disposable tips to deliver 10µl, 100µl, 1ml • EIA microplate washer or multi-channel pipette or wash bottle • distilled or de-ionised water • absorbent paper • EIA microplate reader with 450nm and optional 620nm reference filter. Alternatively, a suitable, self-validated automated system may be used.

Instrumentation, whether manual or automated, should meet the following criteria: pipettes with better than 3% imprecision with no carry over between pipetting steps; microplate washers should remove 99% of fluid; automated machines should minimise time between washing and adding the next reagent.

3. Intended Use

The Thyroid Peroxidase IgG kit is a rapid ELISA method for the detection of IgG antibodies to human thyroid peroxidase. It is intended as an aid to diagnosis of autoimmune thyroid disease. The components of the kit are for *in vitro* diagnostic use only.

4. Explanation of the Test

Thyroid peroxidase (TPO) is the major enzyme involved in the multiple steps of thyroid hormone synthesis. Autoantibodies to TPO are associated with both Hashimoto's thyroiditis and Graves' disease. The presence of anti-TPO autoantibodies unequivocally confirms autoimmune thyroiditis and they are frequently the presenting indication of underlying disease. The detection of anti-TPO autoantibodies is evidence against goiter or hypothyroidism of non-autoimmune nature.

The kit is calibrated against the NIBSC standard 66/387.

5. Principle of the Test

Diluted serum samples are incubated with TPO immobilised on microtitre wells. After washing away unbound serum components, rabbit anti-human IgG conjugated to horseradish peroxidase is added to the wells, and this binds to surface-bound antibodies in the second incubation. Unbound conjugate is removed by washing, and a solution containing 3,3',5,5'-tetramethylbenzidine (TMB) and enzyme substrate is added to trace specific antibody binding. Addition of Stop Solution terminates the reaction and provides the appropriate pH for colour development. The optical densities of the standards, controls and samples are measured using a microplate reader at 450nm.

6. Safety Precautions

1. All reagents in this kit are for *in vitro* diagnostic use only.
2. Only experienced laboratory personnel should use this test. The test protocol must be followed strictly.
3. CAUTION: the device contains material of human and animal origin and should be handled as a potential transmitter of diseases. All human source material used in the preparation of standards and control for this product have been tested and found negative by ELISA for antibodies to HIV, HbsAg and HCV. No test method, however, can offer complete assurance that infectious agents are absent. Therefore, all reagents containing human material should be handled as if potentially infectious. Operators should wear gloves and protective clothing when handling any patient sera or serum based products.
4. Reagents of this kit contain antimicrobial agents and the Substrate solution contains 3,3',5,5'-tetramethylbenzidine. Avoid contact with the skin and eyes. Rinse immediately with plenty of water if any contact occurs.
5. The Stop Solution contains 0.25M sulphuric acid. Avoid contact with skin and eyes. Rinse immediately with plenty of water if contact occurs.
6. Any liquid that has been brought into contact with potentially infectious material has to be discarded in a container with a disinfectant. Dispose of plates and specimens as clinical waste. Any unused reagents should be flushed away with copious amounts of water. Disposal must be performed in accordance with local legislation.

7. Technical Precautions

1. Strips and solutions should not be used if the foil bag is damaged or liquids have leaked.
2. Allow all reagents and the microplate to reach room temperature before use. Ensure that the microplate foil bag containing any unused strips is well sealed and contains the desiccant to avoid moisture. Store at 2 - 8°C after use.
3. Include the Positive Control in every test run to monitor for reagent stability and correct assay performance.
4. Strictly observe the indicated incubation times and temperature.
5. When automating, consider excess volumes required for setting up the instrument and dead volume of robot pipette
6. Ensure that no cross-contamination occurs between wells. Keep all pipettes and other equipment used for Conjugate completely separate from the TMB Substrate reagent.
7. When pipetting Conjugate or TMB Substrate, aliquots for the required numbers of wells should be taken to avoid multiple entry of pipette tips into the reagent bottles. Never pour unused reagents back into the original bottles.
8. Do not allow microwells to dry between incubation steps.
9. Strictly follow the described wash procedure. Insufficient washing may cause high background signal.
10. Avoid direct sunlight and exposure to heat sources during all incubation steps.
11. Replace colour-coded caps on their correct vials to avoid cross-contamination
12. It is important to dispense all samples and positive control into the wells without delay. Therefore ensure that all samples are ready to dispense.

8. Shelf Life and Storage Conditions

On arrival, store the kit at 2 - 8°C. Once opened the kit is stable for 3 months (or until its expiry date if less than 3 months). Do not use kits beyond their expiry date. Do not freeze any kit component. The diluted Wash Buffer has a shelf life of 3 months if stored in a closed bottle at 2 - 8°C.

9. Specimen Collection and Storage

Serum and plasma samples may be used and should be stored at -20°C for long-term storage. Frozen samples must be mixed well after thawing and prior to testing. Repeated freezing and thawing can affect results. Addition of preservatives to the serum sample may adversely affect the results. Microbially contaminated, heat-treated or specimens containing particulate matter should not be used. Grossly haemolysed, icteric or lipaemic specimens should be avoided.

10. Preparation of Reagents

Dilute the Wash Buffer (**Reagent 2**) 1:9 in distilled water to make sufficient buffer for the assay run e.g. add 50ml wash buffer concentrate to 450ml water.

11. Assay Procedure

1. Dilute patient samples 1:100 in Sample Diluent (**Reagent 1**) (e.g. 5µl serum plus 0.5ml diluent).
2. Assemble the number of strips required for the assay.
3. Dispense 100 µl of each Standard, the Negative and Positive Controls and the diluted patient samples into appropriate wells.
4. Incubate for **30 minutes** at room temperature.
5. After 30 minutes, decant or aspirate the well contents and wash the wells 3 times using automated washing or the manual wash procedure (see below). Careful washing is the key to good results. **Do not allow the wells to dry out.**

Manual Wash Procedure

Empty the wells by inversion. Using a multi-channel pipette or wash bottle, fill the wells with Wash Buffer. Empty by inversion and blot the wells on absorbent paper. Repeat this wash process 2 more times.

6. Dispense 100µl of Conjugate (**Reagent 3**) into each well. Incubate the wells for **15 minutes** at room temperature.
7. After 15 minutes, discard the well contents and carefully wash the wells 4 times with Wash Buffer. Ensure that the wells are empty but do not allow to dry out.
8. Using a repeating dispenser, rapidly dispense 100µl of TMB Substrate (**Reagent 4**) into each well. Incubate the plate for **15 minutes**.
9. Add 100µl of Stop Solution (**Reagent 5**) to each well. To allow equal reaction times, the Stop Solution should be added to the wells in the same order as the TMB Substrate.