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Thyroid Peroxidase IgG ELISA

Catalog No. BQ069G (96 tests)

INTENDED USE

The Thyroid Peroxidase (TPO) IgG ELISA test system is an enzyme linked immunosorbent assay (ELISA) for the detection of IgG class antibodies to Thyroid Peroxidase in human serum or plasma

SUMMARY AND EXPLANATION

Thyroid peroxidase (TPO), is the major autoantigen (933 amino acid residue) in the thyroid microsomal antigen (TMA) particle. The purification and preparation of this antigen has made testing for TMA antibodies obsolete. Assays for TPO antibodies include ELISA, precipitation of radiolabeled TPO-bound autoantibodies with protein A, competition for TPO binding to immobilized anti-TPO murine monoclonal antibodies, autoantibody capture by TPO-coated beads and chemiluminescence. All tests correlate well with detection of TMA. ELISA using TPO recombinant antigen is the most popular assay. Detection of TPO antibodies is strong evidence against a goiter or non-autoimmune causes of hypothyroidism. The annual risk for the development of hypothyroidism is 3% to 4% per year if TPO antibodies are present and TSH is elevated. TPO antibodies are present in 8-9% normal controls, 57-74% patients with Graves disease, 99-100% of Hashimoto disease or idiopathic myxedema, 19% with differentiated thyroid cancer, no patients with subacute thyroiditis and 11% of those with other miscellaneous non-autoimmune thyroid diseases. The prevalence of positive TPO antibodies is higher in elderly (mean age 80 years) women (10%) compared to elderly men (2%). Autoantibody concentration in centenarians also decreases. Studies of TPO epitopes in each domain, A and B, and detection of their specific autoantibodies suggest that the epitope-specific TPO antibodies ratio (A/B) does not change over time in individual patients and that TPO epitope autoantibody patterns may be inherited. Determine the optical density of each well within 30 minutes, using a microplate reader set to 450 nm. If wavelength correction is available, set to 540 nm or 570 nm. If wavelength correction is not available, subtract readings at 540 nm or 570 nm from the readings at 450 nm. This subtraction will correct for optical imperfections in the plate. Readings made directly at 450 nm without correction may be higher and less accurate.

PRINCIPLE OF THE TEST

Diluted patient serum is added to wells coated with purified TPO recombinant antigen. TPO IgG specific antibody, if present, binds to the antigen. All unbound materials are washed away and the enzyme conjugate is added to bind to the antibody-antigen complex, if present. Excess enzyme conjugate is washed off and substrate is added. The plate is incubated to allow the hydrolysis of the substrate by the enzyme. The intensity of the color generated is proportional to the amount of IgG specific antibody in the sample.

| MATERIALS PROVIDED | | 96 tests |
|--------------------|---|----------|
| 1. | Microwell coated with TPO recombinant Ag | 12x8x1 |
| 2. | Sample Diluent: 1 bottle (ready to use) | 22 ml |
| 3. | Calibrator: 1 Vial (ready to use) | 1.5ml |
| 4. | Positive Control: 1 vial (ready to use) | 1.5ml |
| 5. | Negative Control: 1 vial (ready to use) | 1.5ml |
| 6. | Enzyme conjugate: 1 bottle (ready to use) | 12ml |
| 7. | TMB Substrate: 1 bottle (ready to use) | 12ml |
| 8. | Stop Solution: 1 bottle (ready to use) | 12ml |
| 9. | Wash concentrate 20X: 1 bottle | 25ml |

MATERIALS NOT PROVIDED

1. Distilled or deionized water
2. Precision pipettes. Disposable pipette tips
3. ELISA reader capable of reading absorbance at 450nm
4. Absorbance paper or paper towel

STORAGE AND STABILITY

1. Store the kit at 2-8°C.
2. Keep microwells sealed in a dry bag with desiccants.
3. The reagents are stable until expiration of the kit.
4. Do not expose test reagents to heat, sun or strong light during storage or usage.

WARNINGS AND PRECAUTIONS

1. Potential biohazardous materials:
The calibrator and controls contain human source components which have been tested and found non-reactive for hepatitis B surface antigen as well as HIV antibody with FDA licensed reagents. However, there is no test method that can offer complete assurance that HIV, Hepatitis B virus or other infectious agents are absent. These reagents should be handled at the Biosafety Level 2, as recommended in the Centers for Disease Control/National Institutes of Health manual, "Biosafety in Microbiological and Biomedical Laboratories" 1984.
2. Optimal results will be obtained by strict adherence to the test protocol. Precise pipetting as well as following the exact time and temperature requirements is essential.
3. Do not pipette by mouth. Do not smoke, eat, or drink in the areas in which specimens or kit reagents are handled.
4. The components in this kit are intended for use as an integral unit. The components of different lots should not be mixed.
5. This product contains components preserved with sodium azide. Sodium azide may react with lead and copper plumbing to form explosive metal azide. On disposal, flush with a large volume of water.

SPECIMEN COLLECTION AND HANDLING

1. Collect blood specimens and separate the serum.
2. Specimens may be refrigerated at 2-8° C for up to seven days or frozen for up to six months. Avoid repetitive freezing and thawing of serum sample.

REAGENT PREPARATION

Prepare 1X Wash buffer by adding the contents of the bottle (25 ml, 20X) to 475 ml of distilled or deionized water. Store at room temperature (18-26°C).

PREPARATION FOR ASSAY

Bring all specimens and kit reagents to room temperature (18-26°C) and gently mix.

ASSAY PROCEDURE

1. Place the desired number of coated strips into the holder.
2. Negative control, positive control, and calibrator are ready to use. Prepare 1:21 dilution of test samples, by adding 10 µl of the sample to 200 µl of sample diluent. Mix well.
3. Dispense 100 µl of diluted sera, calibrator and controls into the appropriate wells. For the reagent blank, dispense 100µl sample diluent in 1A well position. Tap the holder to remove air bubbles from the liquid and mix well. Incubate for 20 minutes at room temperature.
4. Remove liquid from all wells. Wash wells three times with 300 µl of 1X wash buffer. Blot on absorbance paper or paper towel.
5. Dispense 100 µl of enzyme conjugate to each well and incubate for 20 minutes at room temperature.
6. Remove enzyme conjugate from all wells. Wash wells three times with 300 µl of 1X wash buffer. Blot on absorbance paper or paper towel
7. Dispense 100 µl of TMB substrate and incubate for 10 minutes at room temperature.
8. Add 100 µl of stop solution.
9. Read O.D. at 450 nm using ELISA reader within 15 min. A dual wavelength is recommended with reference filter of 600-650 nm.

CALCULATION OF RESULTS

1. Check Calibrator Factor (CF) value on the calibrator bottle. This value might vary from lot to lot. Make sure you check the value on every kit.
2. Calculate cut-off value: Calibrator OD x Calibrator Factor (CF).
3. Calculate the Ab (Antibody) Index of each determination by dividing the mean values of each sample by cut-off value.

Example of typical results:

Calibrator mean OD = 0.8

Calibrator Factor (CF) = 0.5

Cut-off Value = 0.8 x 0.5= 0.400

Positive control O.D. = 1.2

Ab Index = 1.2 / 0.4 = 3

Patient sample O.D. = 1.6

Ab Index = 1.6 / 0.4 = 4.0

QUALITY CONTROL

The test run may be considered valid provided the following criteria are met:

1. The O.D. of the Calibrator should be greater than 0.250.
2. The Ab index for Negative control should be less than 0.9.
3. The Ab Index for Positive control should be greater than 1.2.

INTERPRETATION

The following is intended as a guide to interpretation of TPO IgG test results; each laboratory is encouraged to establish its own criteria for test interpretation based on sample populations encountered.

Antibody Index Interpretation

<0.9 No detectable IgG antibody to TPO antigen

0.9-1.1 Borderline positive. Follow-up testing is recommended if clinically indicated.

>1.1 Detectable IgG antibody to TPO antigen.

LIMITATIONS OF THE TEST

1. The test results obtained using this kit serve only as an aid to diagnosis and should be interpreted in relation to the patient's history, physical findings and other diagnostic procedures.
2. Lipemic or hemolyzed samples may cause erroneous results.

PERFORMANCE CHARACTERISTICS

1. Sensitivity and Specificity

134 patient sera were tested by this ELISA and a reference ELISA method. 39 were positive and 92 were negative by both methods (98% agreement). The results are summarized below:

| | TPO IgG ELISA | | |
|-----------------------|---------------|----|-------|
| | + | - | Total |
| Reference ELISA kit + | 39 | 1 | 40 |
| - | 2 | 92 | 94 |
| Total | 41 | 93 | 134 |

2. Precision

Intra-Assay Study

| Serum | No. of Replicates | Mean | Standard Deviation | Coefficient of Variation % |
|-------|-------------------|------|--------------------|----------------------------|
| 1 | 16 | 1.75 | 0.1 | 5.7 |
| 2 | 16 | 0.92 | 0.07 | 7.6 |
| 3 | 16 | 0.19 | 0.02 | 10.5 |

Inter-Assay Study

| Serum | No. of Replicates | Mean | Standard Deviation | Coefficient of Variation % |
|-------|-------------------|------|--------------------|----------------------------|
| 1 | 10 | 2.12 | 0.17 | 8.0 |
| 2 | 10 | 1.05 | 0.09 | 8.6 |
| 3 | 10 | 0.21 | 0.03 | 14.2 |