| **Thyroglobulin Antibody (Anti-Tg)** | |
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| **Purpose** | This procedure provides instructions for performing ARCHITECT Anti-Tg on the Abbott Architect i1000SR |
| **Policy Statements** | This procedure applies to all personnel responsible for performing testing on the Abbott Architect i1000SR |
| **Principle** | ARCHITECT Anti-Tg is a chemiluminescent microparticle immunoassay (CMIA) for the quantitative determination of the IgG class of thyroglobulin autoantibodies (anti-Tg) in human serum and plasma on the ARCHITECT iSystem. The ARCHITECT Anti-Tg assay is intended for use as an aid in the diagnosis of autoimmune thyroid disease. |
| **Clinical Significance** | Autoimmune thyroiditis was first described by Hashimoto in 1912 and autoimmune thyroid disease with associated goitre is termed Hashimoto’s thyroiditis. The presence of anti-Tg in patients with  this disease was first demonstrated in 1956 by Roitt, et al2 using a precipitin reaction. Unlike autoantibodies to thyroid peroxidase (anti-TPO), autoantibodies to thyroglobulin do not appear to be pathogenic and may simply be indicators of disease. They have been found to be polyclonal in nature and are also heterogeneous with respect to heavy chain subclass.  Thyroglobulin is a glycoprotein of 670,000 daltons, which is comprised of two identical subunits and represents the major protein found in the thyroid. This protein provides 40 tyrosine residues, of the 140 in the molecule, used for iodination during the biosynthesis of thyroxine (T4) and triiodothyronine (T3) and, therefore, is responsible for the accumulation of iodine by the thyroid gland.  Although anti-Tg are found in conjunction with anti-TPO in the majority of cases of Hashimoto’s thyroiditis, Primary Myxedema and Graves’ disease, up to 1% of cases of hypothyroidism are associated with anti-Tg alone. Anti-Tg are associated with cases of mild hypothyroidism or hyperthyroidism, and are frequently found in patients with other autoimmune diseases such as Rheumatoid Arthritis, Pernicious Anemia and Type I Diabetes. Anti-Tg are detected in 30-60% of cases of thyroid carcinoma patients. In such patients, measurement of Tg antigen must take into account the likelihood of the presence of significant levels of anti‑Tg, since measurement and detection of Tg antigen may be influenced by the presence of anti-Tg.  Furthermore, low levels of anti-Tg are also found in up to 20% of asymptomatic individuals, particularly the elderly and more often in women than men, although the clinical significance of these autoantibodies is unclear. |
| **Instrument** | **PRIMARY METHOD: Abbott Architect i1000SR**  Backup Method**:** Mayo Medical Laboratories |
| **Sunquest Test Code** | **PRIMARY METHOD: ATAB**  Backup Method**:** Mayo Medical Laboratories (ATA) |
| **Specimen** | **Preferred Sample Type**: SST (gold, marble), Red no gel  Also Acceptable: Lithium heparin, Sodium heparin, K2EDTA (purple top)  **Preferred Sample Draw Volume**: 1.2 mL whole blood  **Minimum Processed Volume:** 0.2 mL serum or plasma  Note: Minimum volume does not permit repeat analysis or dilution  **Sample Stability**:  8 hours at room temperature  72 hours at 2-8°C  30 days frozen at -20°C  **Processing:**  Centrifuge specimen within eight hours of collection and separate within 8 hours. Aliquot serum/plasma into an appropriately labeled ARCHITECT Sample Cup, then place on top of an appropriately labeled screw-capped round bottom plastic vial (send outs tube).  **Transport**: Place in a screw-capped round bottom plastic vial (sendouts tube) and ship refrigerated to Minneapolis lab.  **Rejection Criteria:**   * Specimens not separated within eight hours of collection. * Mislabeled or unlabeled specimen |
| **Reagents** | |  |  |  |  | | --- | --- | --- | --- | | ***Product Description*** | ***Product Code*** | ***Stability*** | | | ARCHITECT Anti-Tg Reagent | 02K4625 | **Store at:** 2 – 8 °C  **Unopened/Opened:** Manufacturer expiration date.  **On-board:** 30 Days | | ARCHITECT Anti-Tg Calibrator | 02K4601 | **Store at:**  -10°C or colder  **Unopened**: Manufacturer expiration date.  **Opened**: Thaw completely at room temperature for 45-60 minutes. Mix by gentle inversion 10 times. Return to 2–8°C immediately after use. Stable for 30 days when stored and handled as directed. | | Multiassay Diluent | 07D82-50 | Refer to Supply Status on Analyzer | | Pre-Trigger Solution | 06E23-65 | Refer to Supply Status on Analyzer | | Trigger Solution | 06C55-60 | Refer to Supply Status on Analyzer | | Wash Buffer | 06C54-58 | Refer to Supply Status on Analyzer | | Reaction Vessels | 07C15 (-02 or -03) | N/A | |
| **Risk and Safety:** | Follow Children’s Laboratory Safety guidelines when handling patient samples and reagents.  Safety data sheets (MSDS/SDS) available on Children’s intranet. |
| Calibration/ Verification/AMR | |  |  | | --- | --- | | Analytical Measuring Range: | 0.0-1000.0 IU/mL | | Reference Material: | ARCHITECT Anti-Tg Calibrator | | Suggested Calibration Levels | A – 0.0  B – 5.0  C – 62.5  D – 125.0  E – 500.0  F – 1000.0 | | Verification Scheme: | n=6 | | Verification Frequency: | * For each new lot of reagent * After major maintenance or service, if indicated by quality control results * As indicated in laboratory quality control procedures | | AMR | Verification of AMR is accomplished with each calibration at an interval not exceeding every 6 months. | |  | | | |
| **Quality Control** | Bio-Rad Liquichek Specialty Immunoassay Levels 1,2 and 3  **Frequency:** Three levels each day of use.  **Stability:** 30 Days at 2-8°C.  **Preparation**: Allow vials to thaw at room temperature, not more than 1 hour. Do not allow QC to stand at room temperature for longer than 20 minutes after thaw.  **Sunquest Control names:** Level 1 = C-LQSI1, Level 2 = C-LQSI2, Level 3= C-LQSI3  **Acceptable ranges:**   * Ranges are current in Sunquest and the instrument. Refer to the Quality Control in Chemistry procedure for QC exception codes. * If a control value is outside the confidence interval, the determination must be repeated. If the repeat determination confirms the deviation, a new reference curve should be established. * Do not release patient results until the cause of deviation has been identified and corrected. Document ALL troubleshooting actions in Sunquest or in the Architect i1000SR Instrument Maintenance Log notes under the current day's maintenance log. * When a new lot of assayed control is received, validate the manufacturer’s insert range by running the new lot in parallel with the current lot for a recommended 20 days, and confirming that the results obtained are within the stated range. |
| **Interferences** | Tg concentrations >2,000 ng/mL may lead to falsely elevated anti-Tg concentrations. |
| **Reference Range** | 0.0-12.5 IU/mL |
| **Critical Values** | None specified |
| **Limitations** | Technical range 3.00-20000 IU/,mL  Some specimens may not dilute linearly because of the heterogeneity of the autoantibodies with respect to physiochemical properties.  Anti-Tg values determined by different methodologies vary significantly and cannot be directly compared with one another. Some patients might show to be antibody-positive by some methods and antibody-negative by others. Comparing anti-Tg antibodies values from different methods might lead to erroneous clinical interpretation.  When serial samples are being evaluated, the same sample type should be used throughout the study.  Specimens from patients who have received preparations of mouse monoclonal antibodies for diagnosis or therapy may contain human ant mouse antibodies (HAMA). Such specimens may show either falsely elevated or depressed values when tested with assay kits that employ mouse monoclonal antibodies. Assay results that are not consistent with other clinical observations may require additional information for diagnosis.  Heterophilic antibodies in human serum can react with reagent immunoglobulins, interfering with in vitro immunoassays. Patients routinely exposed to animals or to animal serum products can  be prone to this interference, and anomalous values may be observed. Additional information may be required for diagnosis. |
| **Dilution** | Specimens with an anti-Tg value exceeding 1000.00 IU/mL are flagged with the code “> 1000.00” and may be diluted using either the Automated Dilution Protocol or the Manual Dilution Procedure.  **Automated Dilution Protocol**  The system performs a 1:10 dilution of the specimen and automatically calculates the concentration of the specimen before dilution and reports the result. Specimens with an anti‑Tg value exceeding 10000.00 IU/mL by automated dilution are flagged as “>10000.00”. These specimens should be diluted using the Manual Dilution Procedure.  **Manual Dilution Procedure**  Recommended and maximum dilution is 1:20   1. To ensure integrity of the Anti-Tg calibrator A, place 450 uL in a clean cup. 2. To make the 1:20 dilution, add exactly 20.0 uL patient serum/plasma to 380ul ARCHITECT Anti-Tg Calibrator A 3. The operator must enter the dilution factor in the Patient order screen. The system will use this dilution factor to automatically calculate the dilution result. For detailed information on ordering dilutions, refer to the [ARCHITECT System Operations Manual](https://starnet.childrenshc.org/References/labsop/chem/operator/abbott-architect-operations-manual.pdf), Section 5. 4. Record your manual dilution on the log |
| **Result Reporting** | * Results between 3.0 and 1000 IU/mL without error messages will autofile * If there is not enough specimen to repeat, report as > 1000 IU/mL and append the code   “-UNQ” (Unable to Quantitate Further). If there is not enough to repeat after the 1:10 dilution report as >10,000 IU/ml and append the code “-UNQ” to the result.   * Result below 3.0 IU/mL report as < 3.0 IU/mL * Results above 20000 IU/mL report as >20000 IU/mL |
| **Specimen Storage** | Promptly stopper tested specimen and store upright in specimen rack. Every 8 hours remove specimens to refrigerator/freezer storage. Samples are retained 14 days in specimen storage freezer. |
| **References** | 1. Abbott Architect Anti-Tg Calibrator Package Insert Abbott Laboratories, Abbott Park, IL 60064. Revised April 2015. 2. Abbott Architect Anti-Tg Reagent Package Insert Abbott Laboratories, Abbott Park, IL 60064. Revised February 2015 3. [CALIPER Reference Intervals](https://app3.ccb.sickkids.ca/caliper/caliperlogin), Accessed 4/20/2018 |
| **Historical Record** | |  |  |  |  | | --- | --- | --- | --- | | **Version** | **Written/Revised By** | **Effective Date** | **Summary of Revisions** | | 1 | Stephen Gripentrog/Erin Bartos | May 15, 2018 | New Procedure | |  |  |  |  | |  |  |  |  | |