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**Lab Dept:** Flow and Immunology

**Test Name:** T CELL RECEPTOR EXCISION CIRCLES (TREC) ANALYSIS

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***General Information***

**Lab Order Codes:** TREC

**Synonyms:** Acquired Immune Deficiency Syndrome(AIDS), BMT, DiGeorge Syndrome, HAART, SCID, T Cell Function, T Cell Receptor, Thymic Function, Human Immunodeficiency Virus(HIV), Immunodeficiency Panel.

**CPT Codes:** 81479 - Unlisted molecular pathology

**Test Includes:** CD3 T Cells (CD3TC); CD4 T Cells (CD4TC); CD8 T Cells (CD8TC); TREC Copies (TRECC); Interpretation (INT53); and Reviewed By (RB60)

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***Logistics***

**Test Indications:** This assay is useful for evaluating thymic function in patients with cellular or combined primary immunodeficiencies, or receiving immunotherapy or cancer vaccines. Measuring T-Cell output or reconstitution (thymopoiesis) following hematopoietic cell transplantation or highly active antiretroviral therapy. Assessing T- Cell recovery following thymus transplants for DiGeorge Syndrome.

**Lab Testing Sections:** Flow and Immunology - Sendouts

**Referred to:** Mayo Medical Laboratory (MML Code: TREC)

**Phone Numbers:** MIN Lab: 612-813-6280

STP Lab: 651-220-6550

**Test Availability:** Restricted Draw Times: Monday – Thursday, and before 10AM Friday

**Turnaround Time:** 5 - 7 days

**Special Instructions:** See [Test Availability](#)  
It is recommended that specimens arrive within 24 hours of draw. Specimens arriving on weekends may be cancelled. For serial monitoring, it is recommended to perform specimen draw at the same time of day.

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***Specimen***

**Specimen Type:** Whole blood

<b>Container:</b>	Lavender top (EDTA) tube
<b>Draw Volume:</b>	Adults: 10 mL (Minimum: 10 mL) blood  Pediatrics: Preferred volume >1 year = 5 mL (Minimum: 1 mL) blood Preferred volume <1year = 3 mL (Minimum: 1 mL) blood
<b>Processed Volume:</b>	Same as Draw Volume
<b>Collection:</b>	Routine venipuncture, <b>no butterfly needle collections</b>
<b>Special Processing:</b>	Lab Staff: <b>Note:</b> Restricted Draw Times: Monday – Thursday, and before 10AM Friday  <b>Specimen must remain in original collection container.</b> Do Not centrifuge or aliquot.  It is recommended that specimens be drawn and packaged as close to shipping time as possible. Specimens must arrive at MML within 24 hours of collection. Specimens must arrive Monday-Thursday and by 4PM on Friday.  Store and ship at room temperature.
<b>Patient Preparation:</b>	None
<b>Sample Rejection:</b>	Mislabeled or unlabeled specimens; gross hemolysis; lipemic specimens; specimens not arriving at ambient temps (20-25 degrees C)

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### ***Interpretive***

**Reference Range:** The appropriate age-related reference values will be provided on the report.

**Interpretation:** T-cell receptor excision circles (TREC) generally show an inverse correlation with age, though there can be substantial variations in TREC copies relative to T-cell count within a given age group.

Following hematopoietic cell transplantation (HCT), highly active antiretroviral therapy (HAART), thymic transplants, etc, TREC typically increases from absent or very low levels (below age-matched reference range) to baseline levels or exceeds baseline levels, showing evidence of thymic rebound, which is consistent with recovery of thymic output and T-cell reconstitution.

When a patient is being monitored for thymic recovery posttransplant treatment, this assay recommends that a pretransplant (prior to myeloablative or nonmyeloablative conditioning) or a pretreatment baseline specimen be provided so that appropriate comparisons can be made between the pre- and posttransplant treatment specimens. Since there is substantial variability between individuals in TREC copies, the best comparison is made to the patient's own baseline specimen rather than the reference range (which provides a guideline for TREC copies for age-

matched healthy controls).

A consultative report will be generated for each patient

**Critical Values:**

N/A

**Limitations:**

While indicative of thymic function and T-cell recovery, T-cell receptor excision circle (TREC) results cannot be taken as a direct measure of thymic output because TREC are diluted by peripheral T cell division and intracellular degradation. In addition, the longevity of naive T cells in the periphery precludes TREC from being regarded as recent thymic emigrants. The assay provides a quantitative measure of TREC, ie, TREC copies per million CD3 T cells; however, this number should be regarded as a relative, rather than absolute, number because of the caveats explained above.

The TREC assay should not be ordered on adults over age 60 due to physiological decline in thymic function in the sixth and seventh decades of life.

Assay results are dependent on the patient's T-cell counts and in patients with profound lymphopenia it may be impossible to perform the assay if there are insufficient numbers of cells.

Temperature and time are critical to the performance of the assay. Temperatures that exceed or drop below 20 to 25 degrees C can dramatically affect the assay. High temperatures can cause substantial hemolysis that will interfere with the methodology used to perform the assay. Transportation delays may result in significant TREC degradation.

Timing and consistency in timing of blood collection are critical when serially monitoring patients for lymphocyte subsets. See Clinical Information.

**Methodology:**

Real- Time Quantitative Polymerase Chain Reaction (PCR)

**References:**

[Mayo Medical Laboratories](#) March 2018