Overview

Useful For
Determining whether a B-cell or plasma cell population is polyclonal or monoclonal using peripheral blood specimens
Identifying neoplastic cells as having B-cell or plasma cell differentiation
Monitoring for a persistent neoplasm by detecting an immunoglobulin gene rearrangement profile similar to one from a previous neoplastic specimen

Special Instructions
- [Hematopathology Patient Information](#)

Method Name
Polymerase Chain Reaction (PCR)

NY State Available
Yes

Specimen

Specimen Type
Whole blood

Shipping Instructions
Specimen must arrive within 7 days (168 hours) of collection.

Specimen Required

Container/Tube:
- **Preferred:** Lavender top (EDTA)
- **Acceptable:** Yellow top (ACD)

Specimen Volume: 4 mL

Collection Instructions:
1. Invert several times to mix blood.
2. Send specimen in original tube. **Do not aliquot.**

Forms
1. [Hematopathology Patient Information](#) (T676) in Special Instructions
2. If not ordering electronically, complete, print, and send a [Hematopathology/Cytogenetics Test Request](#) (T726) with the specimen.

Reject Due To
- Gross hemolysis **Reject**
- Moderately to severely clotted **Reject**

Specimen Minimum Volume
1 mL
Specimen Stability Information

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole blood</td>
<td>Ambient (preferred)</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refrigerated</td>
<td>7 days</td>
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</tbody>
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Clinical & Interpretive

Clinical Information
The immunoglobulin genes (heavy, kappa, and lambda) are comprised of numerous, discontinuous coding segments. As B cells develop, the segments are rearranged such that each mature B cell and plasma cell has a unique rearrangement profile. Other cell types usually retain the unrearranged gene structures. Clonal expansion of any B cell or plasma cell will result in a population of cells that all contain an identical immunoglobulin gene rearrangement profile. Reactive B-cell or plasma cell expansions are polyclonal, with each clone containing relatively few cells and no one clone predominating. Conversely, neoplastic clones are generally large such that the clonal cells are the predominant B cells or plasma cells present.

In the appropriate clinical and pathologic setting, detection of a prominent Ig gene rearrangement profile may be equated to the presence of a neoplastic B-cell or plasma cell clone.

Reference Values
An interpretive report will be provided.

Interpretation
An interpretive report will be provided.

The interpretation of the presence or absence of a predominant immunoglobulin gene rearrangement profile is sometimes subjective. These results must always be interpreted in the context of other clinicopathologic information to determine the significance of the result.

The detection of a clonal immunoglobulin gene rearrangement by this test is not synonymous with the presence of a B-cell or plasma cell neoplasm.

Cautions
This test is neither 100% sensitive nor 100% specific.
False-negative results may occur if the immunoglobulin gene has numerous point alterations introduced during expansion in a follicle center (somatic hypermutation) such that none of the polymerase chain reaction (PCR) primers will bind. False-negative results will also occur if the clonal cells have not rearranged the Ig genes being evaluated or are present below the sensitivity level of the assay (sensitivity is quite variable but the assay requires that at least 1%-5% of the nucleated cells present be clonal). False-positive results are rare but may occur if a predominant clone (or small number of clones) is produced or sampled from a polyclonal expansion.

The test does not provide information regarding:
- The differentiation of the clonal cell population (neoplastic cells other than B cells or plasma cells may occasionally have immunoglobulin gene rearrangements)
- Whether a prominent clone is physiologic or neoplastic

Clinical Reference
1. van Dongen JJ, Wolvers-Tettero IL: Analysis of immunoglobulin and T-cell receptor genes. Part II: Possibilities and
Test Definition: BCGR
Immunoglobulin Gene Rearrange, B


Performance

Method Description
Genomic DNA is extracted from all specimens. In the polymerase chain reaction (PCR) assay, a total of 34 upstream and 5 downstream primers are used (Invivoscribe IGH and IGK gene clonality reagents). The primers are designed to amplify fragments from all theoretical rearrangements of the Ig heavy and Ig kappa light chain genes. Each unique rearrangement should produce PCR fragments of unique sizes. The primers cannot amplify anything if the Ig genes are not rearranged because the distance is too great. The primers are labeled with a fluorescent tag so that the PCR product can be detected. The PCR fragments are analyzed by capillary gel electrophoresis using a genetic analyzer for fragment size and amount. (Unpublished Mayo method)

PDF Report
No

Specimen Retention Time
DNA: 3 months; Blood: 2 weeks

Performing Laboratory Location
Rochester

Fees & Codes

Test Classification
This test was developed using an analyte specific reagent. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
81261-IGH (Immunoglobulin heavy chain locus) (eg, leukemias and lymphomas B-cell), gene rearrangement analysis to detect abnormal clonal populations; amplified methodology (eg. polymerase chain reaction)
81264-IGK (Immunoglobulin kappa light chain locus) (eg, leukemia and lymphoma, B-Cell) gene rearrangement analysis, evaluation to detect abnormal clonal populations