

Overview

Useful For

Determining whether a B-cell or plasma cell population is polyclonal or monoclonal in bone marrow 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 a previous neoplastic specimen

Special Instructions

- [Hematopathology Patient Information](#)

Method Name

Polymerase Chain Reaction (PCR)

NY State Available

Yes

Specimen

Specimen Type

Bone Marrow

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: 2 mL

Collection Instructions:

1. Invert several times to mix bone marrow.
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

Specimen Type	Temperature	Time	Special Container
Bone Marrow	Ambient (preferred)	7 days	
	Refrigerated	7 days	

Clinical & Interpretive

Clinical Information

The immunoglobulin (Ig) 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 or 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 identical Ig gene rearrangement profiles.

Reactive B-cell or plasma cell expansions are polyclonal, with each clone containing relatively few cells and no single 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.

Results will be characterized as positive, negative, or indeterminate for a clonal B-cell population.

The interpretation of the presence or absence of a predominant immunoglobulin (Ig) 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 Ig 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 (Ig) 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% to 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 Ig 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

limitations in the diagnosis and management of lymphoproliferative diseases and related disorders. Clin Chim Acta. 1991 Apr;198(1-2):93-174

2. Coad JE, Olson DJ, Lander TA, McGlennen RC: Molecular assessment of clonality in lymphoproliferative disorders: I. Immunoglobulin gene rearrangements. Mol Diagn. 1996 December;1(4):335-355

3. Kokovic I, Novakovic BJ, Novakovic S: Diagnostic value of immunoglobulin k light chain gene rearrangement analysis in B-cell lymphomas. Int J Oncol. 2015 Mar;46(3):953-962. doi: 10.3892/ijo.2014.2790

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 immunoglobulin (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; Bone marrow: 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 population(s); 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 population(s)

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
BCGBM	Immunoglobulin Gene Rearrange, BM	61113-7

Result ID	Reporting Name	LOINC®
19894	Final Diagnosis:	22637-3
608949	Signing Pathologist	19139-5