Test Definition: BCGBM

Immunoglobulin Gene Rearrange, BM

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

Genomic DNA Extracted Followed by Polymerase Chain Reaction (PCR)

NY State Available

Yes

Specimen

Specimen Type

Bone Marrow

Shipping Instructions

Specimen must arrive within168 hours of collection.

Specimen Required

Container/Tube:

Preferred: EDTA (lavender top)

Acceptable: ACD (yellow top)

Specimen Volume:2 mL

Collection Instructions:

1. Invert several times to mix bone marrow.

2. Send specimen in original tube.

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.

Specimen Minimum Volume

1 mL

Reject Due To

Gross hemolysis	Reject
Moderately to severely clotted	Reject

Specimen Stability Information

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

Clinical and 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 and plasma cell has a unique rearrangement profile. Other cell types usually retain the nonrearranged gene structures. Clonal expansion of any B-cell or plasma cell will result in a population of cells that all contain an identical Ig gene rearrangement profile.

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.

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 mutations introduced during expansion in a follicle center (somatic hypermutation) such that none of the PCR primers will bind. False-negatives 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 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 April;198(1-2):93-174

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

Performance

Method Description

Genomic DNA is extracted from all specimens.

In the PCR assay, a total of 34 upstream and 5 downstream primers are used (InVivoScribe IGH and IGK Gene Clonality Analyte Specific 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 the Applied Biosystems (ABI) 3130XL machine for fragment size and amount.(van Dongen JJ, Langerak AW, Bruggemann M, et al: Design and standardization of PCR primers and protocols for detection of clonal immunoglobulin and T-cell receptor gene recombinations in suspect lymphoproliferations: report of the BIOMED-2 Concerted Action BMH4-CT98-3936. Leukemia 2003 December;17[12]:2257-2317; van Dongen JJ, Wolvers-Tettero IL: Analysis of immunoglobulin and T-cell receptor genes. Part 1: basic and technical aspects. Clin Chim Acta 1991 April;198[1-2]:1-92; package insert: IGH Gene Clonality Assay-ABI Fluorescence Detection and IGK Gene Clonality Assay-ABI Fluorescence Detection. InVivoScribe Technologies, San Diego, CA 2004; Gene Images AlkPhos Direct Labeling and Detection system. Amersham Biosciences, UK Limited)

PDF Report

No

Day(s) and Time(s) Test Performed

Monday through Friday

Analytic Time

5 days

Maximum Laboratory Time

7 days

Specimen Retention Time

Remaining DNA retained 3 months

Performing Laboratory Location

Rochester

Fees and Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

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 U.S. 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	Test Result Name	Result LOINC Value
19894	Final Diagnosis:	34574-4