Test Definition: BCGET

Immunoglobulin Gene Rearrangement, Tissue

Overview

Useful For

Determining whether a B cell or plasma cell population is polyclonal or monoclonal using paraffin-embedded 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 that from a previous neoplastic specimen

Method Name

Polymerase Chain Reaction (PCR)

NY State Available

No

Specimen

Specimen Type

Tissue, Paraffin

Specimen Required

Submit only 1 of the following specimens

Preferred:
Specimen Type: Tissue block
Collection Instructions: Submit a formalin-fixed, paraffin-embedded tissue or bone marrow aspirate clot block.

Acceptable:
Specimen Type: Tissue slides
Slides: 1 Hematoxylin and eosin-stained and 4 to 10 unstained
Container/Tube: Transport in plastic slide holders.
Collection Instructions: Send 1 hematoxylin and eosin-stained slide and 4 to 10 unstained, nonbaked slides with 10-micron thick (preferred) or 5-micron thick sections from a formalin-fixed, paraffin-embedded tissue block or bone marrow aspirate clot block.

Specimen Minimum Volume

See Specimen Required

Reject Due To

Bone marrow biopsies	Reject
Paraffin shavings	Reject
Decalcified tissue	Reject
Tissue that has not been formalin fixed/paraffin-embedded	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Tissue, Paraffin	Ambient (preferred)		
	Refrigerated		

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 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 an identical immunoglobulin 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 immunoglobulin 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 and include whether the specimen was positive, negative, or indeterminate for a clonal B-cell population.

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 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 gene has numerous point alterations introduced during expansion in a follicle center (somatic hypermutation) such that none of the polymerase chain reaction primers will bind. False-negative results will also occur if the clonal cells have not rearranged the immunoglobulin 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. Liu H, Bench AJ, Bacon CM, et al. A practical strategy for the routine use of BIOMED-2 PCR assays for detection of B- and T-cell clonality in diagnostic haematopathology. Br J Haematol. 2007;138(1):31-43
2. Van Krieken JH, Langerak AW, Macintyre EA, et al. Improved reliability of lymphoma diagnostics via PCR-based clonality testing: report of the BIOMED-2 Concerted Action BHM4-CT98-3936. Leukemia. 2007;21(2):201-206
3. Bruggemann M, White H, Gaulard P, et al. Powerful strategy for polymerase chain reaction-based clonality assessment in T-cell malignancies Report of the BIOMED-2 Concerted Action BHM4 CT98-3936. Leukemia. 2007;21(2):215-221
4. 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;198(1-2):93-174
5. Coad JE, Olson DJ, Lander TA, et al. Molecular assessment of clonality in lymphoproliferative disorders: I. Immunoglobulin gene rearrangements. Mol Diagn. 1996;1(4):335-355
6. Kokovic I, Novakovic BJ, Novakovic S. Diagnostic value of immunoglobulin k light chain gene rearrangement analysis in B-cell lymphomas. Int J Oncol. 2015;46(3):953-962. doi:10.3892/ijo.2014.2790
7. Wang J, Zhao S, Niu T, et al. Prognostic relevance of immunoglobulin heavy chain rearrangement and immunoglobulin kappa light chain rearrangement in patients with diffuse large B cell lymphoma. Oncologist. 2025;30(3):oyaf016. doi:10.1093/oncolo/oyaf016

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. The primers are designed to amplify fragments from all theoretical rearrangements of the immunoglobulin heavy and kappa light chain genes. Each unique rearrangement should produce PCR fragments of unique sizes. The primers cannot amplify anything if the immunoglobulin 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 3500xL machine for fragment size and amount.(Langerak AW, Groenen PJTA, Bruggemann M, et al. EuroClonality/BIOMED-2 guidelines for interpretation and reporting of Ig/TCR clonality testing in suspected lymphoproliferations. Leukemia. 2012;26(10):2159-2171)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
1 to 8 days

Specimen Retention Time
DNA: 1 year; Tissue: 3 months

Performing Laboratory Location
Mayo Clinic Jacksonville Clinical Lab

Fees & 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 account representative. 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 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

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
BCGET	Immunoglobulin Gene Rearrange, Ts	61113-7

Result ID	Test Result Name	Result LOINC® Value
38342	Final Diagnosis:	22637-3
610556	Signing Pathologist	19139-5