MAYO CLINIC LABORATORIES

Test Definition: PBLI

Plasma Cell Assessment, Blood

Overview

Useful For

Detecting peripheral blood involvement by plasma cell proliferative disorders

Establishing the diagnosis of and determining prognosis for plasma cell proliferative disorders

Testing Algorithm

The following algorithms are available:

-Amyloidosis: Laboratory Approach to Diagnosis

-Multiple Myeloma: Laboratory Screening

Special Instructions

- Amyloidosis: Laboratory Approach to Diagnosis
- Multiple Myeloma: Laboratory Screening

Method Name

Flow Cytometry

NY State Available

Yes

Specimen

Specimen Type

Whole blood

Shipping Instructions

Specimen must arrive within 3 days of collection.

Necessary Information

Date and time of collection are required.

Specimen Required

Container/Tube:

Preferred: Green top (sodium heparin)

Acceptable: Lavender top (EDTA)

Specimen Volume: 10 mL

Collection Instructions:

1. Do not centrifuge.

2. Send whole blood specimen in original tube. **Do not aliquot.**

Forms

If not ordering electronically, complete, print, and send a Hematopathology/Cytogenetics Test Request (T726) with the specimen.

Specimen Minimum Volume

4 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole blood	Ambient (preferred)	72 hours	
	Refrigerated	72 hours	

Clinical & Interpretive

Clinical Information

Plasma cell proliferative disorders are a group of hematologic neoplasms, all of which are derived from clonal plasma cells. These disorders exhibit a wide range of biologic activity ranging from monoclonal gammopathy of uncertain significance, a usually indolent disorder with a low rate of disease progression, to multiple myeloma, a disease that most often is aggressive with poor long-term survival. Detecting plasma cell immunoglobulin light chain restriction (ie, the presence of either predominately kappa or predominately lambda light chains) is an important element in assessing plasma cell clonality and, hence, establishing the diagnosis. Furthermore, a greater degree of peripheral blood involvement by these disorders is associated with more aggressive disease types and, therefore, is an adverse prognostic indicator.

Flow cytometric immunophenotyping (FCIP) is a recognized method for detecting plasma cell immunoglobulin light chain restriction. However, shortcomings of the traditionally performed technique include relative insensitivity and consistent underestimation of the number of clonal plasma cells present. Both shortcomings are likely attributable to limitations of the instruments and antibodies used, as well as the presence of intraclonal phenotypic heterogeneity, which creates difficulties in accurately detecting and enumerating all clonal plasma cells. For this reason, the FCIP plasma cell clonality assessment previously performed in this laboratory was supplemented with a slide-based immunofluorescence technique.

However, recent advances in flow cytometry have led to the development of more powerful instruments and antibody reagents that allow for the use of greater antibody combinations and increased resolution of the data. With these tools, the ability of FCIP to detect and enumerate plasma cell clones has been greatly enhanced, allowing the discontinuation of the supplemental, labor-intensive, slide-based plasma cell evaluation in peripheral blood specimens.

Reference Values

An interpretive report will be provided.

Interpretation

In normal peripheral blood specimens, no clonal plasma cells are present (polytypic or too few to detect).

Plasma cells are CD38 and CD138 positive.

Normal (polyclonal, nonneoplastic) plasma cells are typically CD19-positive, whereas neoplastic (clonal) plasma cells typically are CD19-negative. CD19 expression is especially helpful in distinguishing clonal from nonclonal plasma cells when few analyzable cells are present.

CD45 may be expressed by both normal and neoplastic plasma cells. In some plasma cell proliferative disorders, there are both CD45-positive and CD45-negative subsets within the clonal cell population.

The evaluation of these antigens aids in the identification of abnormal plasma cells; however, they will not be reported independently.

Cautions

No significant cautionary statements

Clinical Reference

1. Chakraborty R, Muchtar E, Kumar SK, et al. Risk stratification in myeloma by detection of circulating plasma cells prior to autologous stem cell transplantation in the novel agent era. Blood Cancer J. 2016;6(12):e512. doi:10.1038/bcj.2016.117
2. Chakraborty R, Muchtar E, Kumar SK, et al. Serial measurements of circulating plasma cells before and after induction therapy have an independent prognostic impact in patients with multiple myeloma undergoing upfront autologous transplantation. Haematologica. 2017;102(8):1439-1445
3. Evans LA, Jevremovic D, Nandakumar B, et al. Utilizing multiparametric flow cytometry in the diagnosis of patients with primary plasma cell leukemia. Am J Hematol. 2020;95(6):637-642. doi:10.1002/ajh.25773
4. Gonsalves WI, Jevremovic D, Nandakumar B, et al. Enhancing the R-ISS classification of newly diagnosed multiple myeloma by quantifying circulating clonal plasma cells. Am J Hematol. 2020;95(3):310-315. doi:10.1002/ajh.25709
5. Ravi P, Kumar SK, Roeker L, et al. Revised diagnostic criteria for plasma cell leukemia: results of a Mayo Clinic study with comparison of outcomes to multiple myeloma. Blood Cancer J. 2018;8(12):116

Performance

Method Description

The plasma cell immunoglobulin light chain restriction assessment is performed by 6-color flow cytometry using a single assay tube containing antibodies to kappa and lambda immunoglobulin light chains, CD19, CD38, CD45, and CD138. CD38 and CD138 are used to gate on the plasma cells and anti-kappa and anti-lambda are used to identify cytoplasmic immunoglobulin light chains. The flow cytometric screen will report the presence or absence of a detectable plasma cell population with immunoglobulin light chain restriction (clonality).(Unpublished Mayo method)

PDF Report

No

Day(s) Performed
Monday through Saturday

Report Available
1 to 2 days

Specimen Retention Time
Not retained

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Main Campus

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
88184-Flow cytometry, cell surface, cytoplasmic
88185 x 5-Each additional marker
88187-Flow cytometry, interpretation; 2 to 8 markers

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
PBLI	Plasma Cell Assessment, B	86900-8

Result ID	Test Result Name	Result LOINC® Value
30388	Blood Plasma Cell Light Chain	86900-8
26838	# Monotypic PCs per 150,000 events	19099-1
26839	PC Event Interpretation	69052-9