MAYO CLINIC LABORATORIES

Test Definition: SEBV

Epstein-Barr Virus (EBV) Antibody Profile, Serum

Overview

Useful For

Diagnosing infectious mononucleosis when a mononucleosis screening procedure is negative and infectious mononucleosis or a complication of Epstein-Barr virus infection is suspected

This assay is **not intended for** viral isolation or identification.

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
EBVM	EBV VCA IgM Ab, S	No	Yes
EBVG	EBV VCA IgG Ab, S	No	Yes
EBVNA	EBNA Ab, S	No	Yes

Method Name

Multiplex Flow Immunoassay (MFI) or Enzyme-Linked Immunosorbent Assay (ELISA)

NY State Available

No

Specimen

Specimen Type

Serum

Specimen Required

Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Specimen Minimum Volume

0.6 mL

Reject Due To

Gross	Reject

hemolysis	
Gross lipemia	Reject
Gross icterus	Reject
Heat-inactivated specimen	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	14 days	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

Epstein-Barr virus (EBV), a member of the herpesvirus group, is the etiologic agent of infectious mononucleosis. EBV infections are difficult to diagnose in the laboratory since the virus does not grow in standard cell cultures. The majority of infections can be recognized, however, by testing the patient's serum for heterophile antibodies (rapid latex slide agglutination test, eg, MONOS / Infectious Mononucleosis, Rapid Test, Serum), which usually appear within the first 3 weeks of illness but then decline rapidly within a few weeks. The heterophile antibody, however, fails to develop in about 10% of adults, more frequently in children, and almost uniformly in infants with primary EBV infections. Most of these heterophile antibody-negative cases of infectious mononucleosis-like infections are due to cytomegalovirus, but in a series of 43 cases, EBV was the cause in 7. In cases where EBV is suspected but the heterophile antibody is not detected, an evaluation of the EBV-specific antibody profile (eg, EBV viral capsid antigen [VCA] IgM, EBV VCA IgG, and EBV nuclear antigen [EBNA]) may be useful.

Infection with EBV usually occurs early in life. For several weeks to months after acute onset of the infection, it is spread by upper respiratory secretions that contain the virus. Among the clinical disorders due to EBV infection, infectious mononucleosis is the most common. Other disorders due to EBV infection have been recognized for several years, including African-type Burkitt lymphoma and nasopharyngeal carcinoma. EBV infection may also cause lymphoproliferative syndromes, especially in patients who have undergone kidney or bone marrow transplantation and in those who have AIDS.

Reference Values

Epstein-Barr Virus (EBV) VIRAL CAPSID ANTIGEN (VCA) IgM ANTIBODY:
Negative

Epstein-Barr Virus (EBV) VIRAL CAPSID ANTIGEN (VCA) IgG ANTIBODY:
Negative

EPSTEIN-BARR NUCLEAR ANTIGEN (EBNA) ANTIBODIES:
Negative

Interpretation

The test has 3 components: viral capsid antigen (VCA) IgG, VCA IgM, and Epstein-Barr nuclear antigen (EBNA). Presence of VCA IgM antibodies indicates recent primary infection with Epstein-Barr virus (EBV). The presence of VCA IgG antibodies indicates infection sometime in the past. Antibodies to EBNA develop 6 to 8 weeks after primary infection and are detectable for life. Over 90% of the normal adult population has IgG class antibodies to VCA and EBNA. Few patients who have been infected with EBV will fail to develop antibodies to the EBNA (approximately 5%-10%).

Table. Possible Results

VCA IgG	VCA IgM	EBNA IgG	Interpretation
-	-	-	No previous exposure
+	+	-	Recent infection
+	-	+	Past infection
+	-	-	See note*
+	+	+	Past infection

*Results indicate infection with EBV at some time (VCA IgG positive). However, the time of the infection cannot be predicted (ie, recent or past) since antibodies to EBNA usually develop after primary infection (recent) or, alternatively, approximately 5% to 10% of patients with EBV never develop antibodies to EBNA (past).

Cautions

Specimens collected too early during the course of the disease may not contain detectable antibody to Epstein-Barr virus (EBV). Another specimen collected 1 to 2 weeks later may be required.

Test results should be evaluated in relation to patient symptoms, clinical history, and other laboratory findings.

The timing of the appearance of IgG antibodies to viral capsid antigen (VCA) or Epstein-Barr nuclear antigen (EBNA) or IgM antibodies to VCA is subject to variations among individuals and serological assays.

This assay's performance characteristics with immunosuppressed individuals, newborns, cord blood, or matrices other than human serum have not been established.

Assay performance characteristics have not been established for the diagnosis of nasopharyngeal carcinoma, Burkitt lymphoma, and other EBV-associated lymphomas.

Anti-VCA-specific IgG may compete with IgM for binding sites, leading to false-negative results. Rheumatoid factor (RF), in the presence of specific IgG, may contribute to false-positive results. The absorbent in the VCA IgM diluent is intended to neutralize the effects of RF and specific IgG. Studies have shown that the absorbent was able to neutralize up to 98% of the activity in a specimen known to contain 3328 IU/mL of RF activity.

Testing for VCA IgM should not be performed as a screening procedure on the general population. The predictive value of positive or negative results depends on the pretest likelihood of Epstein-Barr-associated disease being present. Testing should only be performed when clinical evidence suggests the diagnosis of this syndrome.

Clinical Reference

1. Knipe DM, Howley PM, Griffin DE, et al, eds. Fields' Virology. 5th ed. Lippincott Williams and Wilkins; 2007
2. Linde A, Falk KI. Epstein-Barr virus. In: Manual of Clinical Microbiology. Barron EJ, Jorgensen JH, Landry ML, eds. 9th ed. ASM Press; 2007:1564-1573
3. Johannsen EC, Kaye KM. Epstein-Barr virus (infectious mononucleosis, Epstein-Barr virus-associated malignant diseases, and other diseases). In: Bennett JE, Dolin R, Blaser MJ, eds. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 9th ed. Elsevier; 2020:1872-1890

Performance

Method Description

Testing is performed on the BioPlex 2200 System. For the detection of viral capsid antigen (VCA)-IgG antibody and Epstein-Barr nuclear antigen (EBNA) antibody, an aliquot of the patient serum, sample diluent, and bead reagent are combined in a reaction vessel. After washing, antihuman-IgG antibody conjugated to phycoerythrin (PE) is added to the beads and incubated. Another wash step removes excess conjugate, and beads are subsequently resuspended in wash buffer. The bead mixture passes through a detector where the identity of each bead is determined by the bead's dye fluorescence. In addition, the amount of antibody captured by the antigen is measured by the fluorescence of the bound PE.

For the detection of VCA-IgM antibody, the patient sample is combined with diluent containing antihuman IgG and bead reagent. The antihuman IgG is incorporated in the mix because any anti-VCA-specific IgG present may compete with the IgM for binding sites, leading to false-negative VCA-IgM results. After a wash cycle, antihuman-IgM antibody conjugated to PE is added. Detection of anti-VCA-specific IgM is performed as described above for the VCA IgG assay.(Package inserts: BioPlex 2200 System EBV IgG and EBV IgM, Bio-Rad Laboratories Clinical Diagnostics Group, Hercules CA, 2012)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

Same day/1 to 2 days

Specimen Retention Time

14 days

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 has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

86664-EBNA
86665 x 2-VCA, IgG and IgM

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
SEBV	EBV Ab Profile, S	87554-2

Result ID	Test Result Name	Result LOINC® Value
EBVG	EBV VCA IgG Ab, S	24114-1
EBVM	EBV VCA IgM Ab, S	24115-8
EBNA	EBNA Ab, S	22296-8
INT73	Interpretation	69048-7