MAYO CLINIC LABORATORIES

Test Definition: EBVAB

Epstein-Barr Virus Antibody Profile, Serum

Overview

Useful For

Diagnosis of Epstein-Barr virus (EBV) infectious mononucleosis or other EBV related infections

Identification of prior EBV infection as part of pre-immunosuppression screening

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

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
MEBV	EBV VCA IgM, S	No	Yes
GEBV	EBV VCA IgG, S	No	Yes
NAEBV	EBV NA IgG, S	No	Yes
INTEB	Interpretation	No	Yes

Method Name

MEBV, GEBV, NAEBV: Enzyme-Linked Immunosorbent Assay (ELISA)
INTEB: Technical Interpretation

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL Serum
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Kidney Transplant Test Request

-Infectious Disease Serology Test Request (T916)

Specimen Minimum Volume

Serum: 0.4 mL

Reject Due To

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

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Frozen (preferred)	14 days	
	Refrigerated	48 hours	

Clinical & Interpretive

Clinical Information

Epstein-Barr virus (EBV), a member of the herpesvirus group, is the etiologic agent of infectious mononucleosis. Infection with EBV usually occurs early in life. For several weeks to months after acute onset of the infection, EBV is spread by upper respiratory secretions that contain the virus. Among the EBV-associated clinical manifestations, infectious mononucleosis is the most common. EBV infection can be severe in immunosuppressed patients who may develop lymphoproliferative syndromes, especially in patients with advanced HIV and in patients who have undergone kidney or bone marrow transplantation. Other, rare manifestations include African-type Burkitt lymphoma and nasopharyngeal carcinoma.

Epstein-Barr virus does not grow in standard cell cultures and molecular testing is the primary means of diagnosis and monitoring response to therapy in immunosuppressed patients. Serologic testing for EBV remains important for diagnosis of infectious mononucleosis in otherwise healthy individuals and for pre-transplant or pre-immunosuppression screening purposes.

The majority of infections in healthy individuals can be identified by testing patient sera for heterophile antibodies using a rapid latex slide agglutination test (MONOS / Infectious Mononucleosis, Rapid Test, Serum). Heterophile antibodies usually appear within the first 3 weeks of illness but decline rapidly within thereafter. However, heterophile antibodies fail to develop in about 10% of adults and in more than 75% of infants and young children under the age of 4. In cases where EBV is suspected but the heterophile antibody is not detected or if confirmation is needed, or if patients are undergoing pre-immunosuppression screening, evaluation of EBV-specific antibodies, including assessment for IgM and IgG against the EBV viral capsid antigen and IgG against the EBV nuclear antigen is useful.

Reference Values

EPSTEIN-BARR VIRUS VIRAL CAPSID ANTIGEN (VCA) IgM ANTIBODY:
Negative

EPSTEIN-BARR VIRUS VIRAL CAPSID ANTIGEN (VCA) IgG ANTIBODY:
Negative

EPSTEIN-BARR VIRUS NUCLEAR ANTIGEN (EBNA) IgG ANTIBODY:
Negative

Interpretation

The profile has 3 components: viral capsid antigen (VCA) IgG, VCA IgM, and Epstein-Barr nuclear antigen (EBNA).

Presence of VCA IgM antibodies suggests an acute or recent primary infection with Epstein-Barr virus (EBV).

Presence of VCA IgG antibodies indicates infection sometime in the recent or remote past.

Antibodies to EBNA develop 6 to 8 weeks after primary infection and are detectable for life.

Refer to table below for interpretation of EBV antibody results.

VCA IgM result	VCA IgG result	EBNA IgG result	Interpretation
Negative	Positive	Negative	Results suggest recent EBV infection. The detection of only anti-VCA IgG should be interpreted with caution in immunocompromised patients, as this population may demonstrate diminishing or undetectable levels of anti-EBNA IgG antibodies.
Positive	Positive	Negative	Results suggest recent EBV infection.
Positive	Negative	Negative	
Positive	Equivocal	Equivocal	Results suggest recent EBV infection. Recommend follow-up testing in 10 to 14 days if clinically indicated.
Positive	Equivocal	Negative	
Positive	Positive	Equivocal	
Positive	Negative	Equivocal	
Positive	Positive	Positive	Results may suggest recent EBV recovery or reactivation.
Positive	Equivocal	Positive	
Positive	Negative	Positive	
Negative	Negative	Negative	Results suggest no prior exposure to EBV. However, a second serum specimen should be tested in 10 to 14 days if clinically indicated.
Negative	Positive	Positive	Results suggest past EBV infection.
Negative	Negative	Positive	
Negative	Equivocal	Positive	
Negative	Positive	Equivocal	Detection of anti-VCA IgG only should be interpreted with caution in immunocompromised patients, as this population

			may demonstrate diminishing or undetectable levels of anti-EBNA IgG antibodies. Recommend follow-up testing in 10 to 14 days if clinically indicated.
Equivocal	Negative	Positive	Results suggest past EBV infection. Recommend follow-up testing in 10 to 14 days if clinically indicated.
Equivocal	Equivocal	Positive	
			Results with unclear clinical significance
Negative	Negative	Equivocal	Recommend follow-up testing in 10 to 14 days if clinically indicated.
Negative	Equivocal	Negative	
Negative	Equivocal	Equivocal	
Equivocal	Negative	Negative	
Equivocal	Negative	Equivocal	
Equivocal	Equivocal	Negative	
Equivocal	Equivocal	Equivocal	
Equivocal	Positive	Negative	
Equivocal	Positive	Equivocal	
Equivocal	Positive	Positive	

Cautions

Specimens collected too early during the course of the disease may not contain detectable antibodies 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 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. Manual of Clinical Microbiology. . In: 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

The ZEUS ELISA (enzyme-linked immunosorbent assay) EBV (Epstein Barr virus) VCA (viral capture antigen) IgM, VCA IgG, and EBNA-1 (Epstein Barr nuclear antigen-1) IgG Test Systems are designed to detect IgM, IgG, IgG class antibodies to EBNA in human sera. Creation of the sensitized wells of the plastic microwell strips occurred using passive adsorption with EBV antigen. The test procedure involves three incubation steps. Test sera are diluted with the sample diluent provided. The IgM sample diluent contains antihuman IgG that precipitates and removes IgG and rheumatoid factor from the sample leaving IgM free to react with the immobilized antigen. During sample incubation any antigen specific antibody in the sample will bind to the immobilized antigen. The plate is washed to remove unbound antibody and other serum components. Peroxidase conjugated goat ant-human IgM or IgG is added to the wells and the plate is incubated. The conjugate will react with IgM or IgG antibody immobilized on the solid phase. The wells are washed to remove unbound conjugate. The microwells containing immobilized peroxidase conjugate are incubated with peroxidase substrate solution. Hydrolysis of the substrate by peroxidase produces a color change. After a period of time the reaction is stopped and the color intensity of the solution is measured photometrically. The color intensity of the solution depends upon the antibody concentration in the original test sample.(Package inserts: EBV-VCA IgM Test System. Zeus Scientific, Inc.; 12/13/2017; EBV-VCA IgG Test System. Zeus Scientific, Inc.; 12/19/2017; EBNA-1 IgG Test System. Zeus Scientific, Inc.; 12/19/2017)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

Same day/1 to 2 days

Specimen Retention Time

14 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

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
EBVAB	EBV Ab Profile, S	87554-2

Result ID	Test Result Name	Result LOINC® Value
GEBV	EBV VCA IgG, S	24114-1
INTEB	Interpretation	69048-7
MEBV	EBV VCA IgM, S	24115-8
NAEBV	EBV NA IgG, S	5156-5