MAYO CLINIC LABORATORIES

Test Definition: EAEBV

Epstein-Barr Virus Early Antigen, IgG, Serum

Overview

Useful For

Diagnosis of Epstein Barr virus (EBV) infectious mononucleosis in cases when heterophile antibody test results are negative and EBV-specific serologic testing is inconclusive

Aiding in the diagnosis of type 2 or type 3 nasopharyngeal carcinoma (NPC)

This test is **not useful for** screening patients for NPC.

Method Name

Enzyme-Linked Immunosorbent Assay (ELISA)

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
Heat-activated 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 (IM) 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 (NPC).

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 (VCA) and IgG against the EBV nuclear antigen (EBNA) is useful.

The EBV early antigen (EA) has two forms, including the diffuse (ie, present in cytoplasm and nucleus of infected cells [EA-D]) and restricted (ie, present only in the cytoplasm of infected cells [EA-R]) forms. Generally, IgG antibodies to the EA, specifically the EA-D form, are only detected during active EBV infection, such as in patients with IM.

Additionally, IgG antibodies to EA-D are also found in patients with NPC. Of patients with type 2 or 3 NPC (World Health Organization classification), 94% and 83% respectively, have positive antibody responses to EA. Only 35% of patients with type 1 NPC have a positive response. The specificity of the test is such that 82% to 91% of healthy blood donor controls and patients who do not have NPC have negative responses (9%-18% false-positive results). Although this level of specificity is useful for diagnostic purposes, the false-positive rate indicates that the test is not useful for NPC screening.

Reference Values

Negative
Reference values apply to all ages.

Interpretation

Positive - IgG antibodies specific to EBV early antigen detected.
Equivocal - Recommend follow-up testing in 10-14 days if clinically indicated
Negative - No IgG to EBV early antigen detected.

Do not make a diagnosis based on ZEUS ELISA EBV-EA IgG Test System alone. Interpret test results for anti-EBV-early antigen (EA) in conjunction with the clinical evaluation and the results of other diagnostic procedures. Consider test results for VCA and EBNA when evaluating patient specimens for EBV serological status.

Cautions

This test detects both restricted (R) and diffuse (D) forms the Epstein Barr virus (EBV) early antigen. The test system is not designed to differentiate between antibodies to the R and D components.

False negative results may occur in immunosuppressed patients.

The performance characteristics of this assay have not been established for Burkitt's Lymphoma, nasopharyngeal carcinoma, and lymphoproliferative disorders.

The performance has been established for the aid in the diagnosis of EBV-associated infectious mononucleosis.

Clinical Reference

1. Fields BN, Knipe DM. Epstein-Barr virus. In: Fields BN, Knipe DM, Howley PM, eds. Fields Virology. 4th ed. Lippincott Williams and Wilkins; 2001
2. Lennette ET. Epstein-Barr virus. In: Murray PR, Baron EJ, Pfaller MA, et al, eds. Manual of Clinical Microbiology. 6th ed. ASM Press; 1995:905-910
3. Fugl A, Andersen CL. Epstein-Barr virus and its association with disease - a review of relevance to general practice. BMC Fam Pract. 2019;20(1):62. doi:10.1186/s12875-019-0954-3

Performance

Method Description

The ZEUS ELISA (enzyme-linked immunosorbent assay) EBV -EA (Epstein-Barr virus early antigen) IgG Test System is designed to detect IgG class antibodies to EBV-EA in human sera. Creation of the sensitized wells of the plastic microwell strips occurred using passive adsorption with EBV-EA. The test procedure involves three incubation steps: 1. Test sera (properly diluted) are incubated in antigen coated microwells. 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. 2. Peroxidase conjugated goat anti-human IgG is added to the wells and the plate is incubated. The conjugate will react with IgG antibody immobilized on the solid phase in step 1. The wells are washed to remove unreacted conjugate. 3. 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 insert: EBV-EA IgG Test System. Zeus Scientific, Inc.; 02/16/2022)

PDF Report
No

Day(s) Performed
Tuesday; Thursday

Report Available
Same day/1 to 5 days

Specimen Retention Time
2 weeks

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
86663

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
EAEBV	EBV EA IgG, S	40752-8

Result ID	Test Result Name	Result LOINC® Value
EBVEA	EBVEA IgG, S	40752-8