MAYO CLINIC LABORATORIES

Test Definition: EBVQN

Epstein-Barr Virus DNA Detection and Quantification, Plasma

Overview

Useful For

Diagnosis of Epstein-Barr virus (EBV)-associated infectious mononucleosis in individuals with equivocal or discordant EBV serologic marker test results

Diagnosis of post-transplant lymphoproliferative disorders (PTLD), especially in EBV-seronegative organ transplant recipients receiving antilymphocyte globulin for induction immunosuppression and OKT-3 treatment for early organ rejection

Monitoring progression of EBV-associated PTLD in organ transplant recipients

This test **should not be used** to screen asymptomatic patients.

Highlights

This assay detects and quantifies the level of Epstein-Barr virus (EBV) DNA present in the plasma of organ transplant recipients who are at risk of developing EBV-associated post-transplant lymphoproliferative disorder and in individuals with infectious mononucleosis. The assay is calibrated to the First World Health Organization International Standard for EBV for nucleic acid amplification techniques.

Method Name

Real-Time Polymerase Chain Reaction (RT-PCR)

NY State Available

Yes

Specimen

Specimen Type

Plasma EDTA

Shipping Instructions

1. Ship specimen frozen on dry ice only.
2. If shipment will be delayed for more than 24 hours, freeze plasma at -20 to -80 degrees C (up to 84 days) until shipment on dry ice.

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube: Lavender top (EDTA)
Submission Container/Tube: Plastic vial

Specimen Volume: 1.5 mL

Collection Instructions:

1. Centrifuge blood collection tube per manufacturer's instructions (eg, centrifuge within 2 hours of collection for BD Vacutainer tubes).
2. Aliquot plasma into plastic vial.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:

-Microbiology Test Request (T244)

-General Request (T239)

-Renal Diagnostics Test Request (T830)

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Plasma EDTA	Frozen (preferred)	84 days	
	Refrigerated	6 days	

Clinical & Interpretive

Clinical Information

Primary infection with Epstein-Barr virus (EBV), a DNA virus in the *Herpesviridae* family, may cause infectious mononucleosis resulting in a benign lymphoproliferative condition characterized by fever, fatigue, sore throat, and lymphadenopathy. Infection occurs early in life, and by 10 years of age, 70% to 90% of children have been infected with this virus. Usually, infection in children is asymptomatic or mild and may be associated with minor illnesses, such as upper respiratory tract infection, pharyngitis, tonsillitis, bronchitis, and otitis media.

The target cell for EBV infection is the B lymphocyte. Immunocompromised individuals lacking antibody to EBV are at risk for acute EBV infection that may cause lymphoproliferative disorders in organ transplant recipients (post-transplant lymphoproliferative disorders: PTLD) and AIDS-related lymphoma. The incidence of PTLD ranges from 1% for kidney transplant recipients to as high as 9% for heart/lung transplants and 12% for pancreas transplant patients.

EBV DNA can be detected in the blood of patients with this viral infection. Increasing serial levels of EBV DNA in plasma

have been shown to correlate highly with subsequent (in 3-4 months) development of PTLD in susceptible patients. Organ transplant recipients (at risk for primary EBV infection) who are seronegative for EBV (most often children) and receive antilymphocyte globulin for induction immunosuppression and OKT-3 treatment for early organ rejection are at the highest risk for developing PTLD when compared to immunologically normal individuals with prior EBV infection.

Reference Values

Undetected

Interpretation

The quantification range of this assay is 35 to 100,000,000 IU/mL (1.54 log to 8.00 log IU/mL), with a limit of detection (95% detection rate) at 19 IU/mL.

Increasing levels of Epstein-Barr virus (EBV) DNA in serial plasma specimens of a given organ transplant recipient may indicate possible development of post-transplant lymphoproliferative disorder (PTLD).

An "Undetected" result indicates that EBV DNA is not detected in the plasma specimen (see Cautions). If clinically indicated, repeat testing in 1 to 2 months is recommended.

A result of "<35 IU/mL" indicates that the EBV DNA level present in the plasma specimen is below 35 IU/mL (1.54 log IU/mL), and the assay cannot accurately quantify the EBV DNA present below this level.

A quantitative value (reported in IU/mL and log IU/mL) indicates the EBV DNA level (ie, viral load) present in the plasma specimen.

A result of ">100,000,000 IU/mL" indicates that the EBV DNA level present in the plasma specimen is above 100,000,000 IU/mL (8.00 log IU/mL), and this assay cannot accurately quantify the EBV DNA present above this level.

An "Inconclusive" result indicates that the presence or absence of EBV DNA in the plasma specimen could not be determined with certainty after repeat testing in the laboratory, possibly due to polymerase chain reaction inhibition or presence of interfering substance. Submission of a new specimen for testing is recommended if clinically indicated.

Cautions

Serial determination of plasma specimens from organ transplant recipients may be necessary to monitor increasing (risk of development of post-transplant lymphoproliferative disorders) or decreasing (treatment efficacy) levels of Epstein-Barr virus (EBV) DNA.

Nonsymptomatic EBV viremia or viral shedding may occasionally occur in healthy individuals. Therefore, this test should be used only for patients with a clinical history and symptoms consistent with EBV infection. Test results must be interpreted in the context of patient's clinical history, signs, and symptoms.

Due to potential differences in assay performance, serial monitoring of a patient's EBV viral load should be performed using the same exact assay. On average, this assay quantifies EBV DNA in plasma 3-fold (about 0.48 log IU/mL) higher than the laboratory-developed quantitative EBV DNA assay previously performed at Mayo Clinic Laboratories due to differences in the specimen extraction method and design in the amplification primers and probes for the viral target sequences.

Clinical Reference

1. San-Juan R, Comoli P, Caillard S, et al: Epstein-Barr virus-related post-transplant lymphoproliferative disorder in solid organ transplant recipients. Clin Microbiol Infect. 2014 Sep;20(Suppl 7):109-118. doi: 10.1111/1469-0691.12534
2. Jiang SY, Yang JW, Shao JB, Liao XL, Lu ZH, Jiang H: Real-time polymerase chain reaction for diagnosing infectious mononucleosis in pediatric patients: A systematic review and meta-analysis. J Med Virol. 2016 May;88(5):871-876. doi: 10.1002/jmv.24402
3. Allen UD, Preiksaitis JK, AST Infectious Diseases Community of Practice: Post-transplant lymphoproliferative disorders, Epstein-Barr virus infection, and disease in solid organ transplantation: Guidelines from the American Society of Transplantation Infectious Diseases Community of Practice. Clin Transplant. 2019 Sep;33(9):e13652. doi: 10.1111/ctr.13652
4. Kimura H, Kwong YL: EBV Viral Loads in diagnosis, monitoring, and response assessment. Front Oncol. 2019 Feb 12;9:62. doi: 10.3389/fonc.2019.00062

Performance

Method Description

The cobas Epstein-Barr virus (EBV) assay is a US Food and Drug Administration-approved, in vitro nucleic acid amplification test for the quantification of EBV DNA in human EDTA-plasma using the cobas 6800 or 8800 system for fully automated viral nucleic acid extraction (generic silica-based capture technique) and automated amplification and detection of the viral RNA. This dual-target polymerase chain reaction (PCR) assay amplifies 2 highly-conserved target regions within the EBV genome (*EBNA-1* and *BMRF* gene regions) for real-time detection and quantification by 2 target-specific TaqMan probes. A non-EBV armored DNA quantitation standard (DNA-QS) is introduced into each specimen during sample preparation to serve as internal control for nucleic acid extraction and PCR amplification and detection processes. Fluorescent reporter dye-labeled TaqMan probes hybridized to the complementary EBV target sequences and DNA-QS sequence undergo hydrolysis during PCR amplification step to generate fluorescent signal detected in 3 different dye channels. Concentration of the EBV DNA in a patient's plasma sample is determined by a ratio of the intensity of the fluorescent dye from the cleaved EBV target sequence probes to that of the DNA-QS target probe detected throughout the PCR process.(Package insert: cobas EBV-Quantitative nucleic acid test for use on the cobas 6800/8800 Systems. Roche Molecular Systems, Inc; Rev 1.0, 08/2020)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

1 to 3 days

Specimen Retention Time

30 days

Test Definition: EBVQN

Epstein-Barr Virus DNA Detection and Quantification, Plasma

Performing Laboratory Location
Rochester

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

87799

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
EBVQN	EBV DNA Detect/Quant, P	43730-1

Result ID	Test Result Name	Result LOINC® Value
615297	EBV DNA Detect/Quant, P	43730-1