

Epstein-Barr-Virus EBV

Interpretation of the parameters VCA, EBNA

Introduction

The **Epstein-Barr Virus**, EBV, also known as **Human Herpesvirus 4**, HHV4, is a species of human pathogenic, enveloped, double-stranded DNA virus of the Herpesviridae family. The name goes back to the first description by Michael Anthony Epstein and Yvonne M. Barr in 1964.

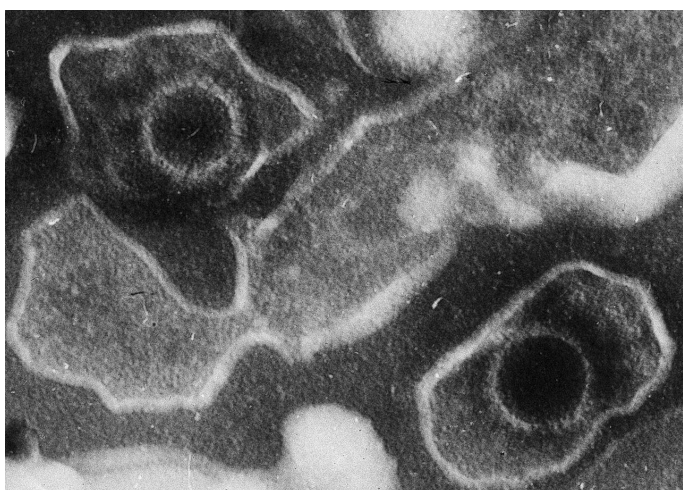


Fig. 1 EBV virions, imaged by TEM with preparation-related deformations.

Liza Gross (https://commons.wikimedia.org/wiki/File:Epstein_Barr_Virus_-_virions_EM_101371_journal.pbio.0030430.g001-L.JPG), „Epstein Barr Virus virions EM 101371 journal.pbio.0030430.g001-L“, <https://creativecommons.org/licenses/by/2.5/legalcode>

Synonyms

- Epstein-Barr-Virus
- Glandular fever
- Infectious mononucleosis
- Mononucleosis infectiosa
- Pfeiffer disease
- kissing disease
- Human gammaherpesvirus 4
- HHV4
- anti-EBV VCA125

Transmission paths

Droplet infection, contact or smear infection, rarely through transplantations or blood infusions. Transmission through sexual contact conceivable.

Clinical picture

EBV is the causative agent of glandular fever (infectious mononucleosis). Symptoms: fever, angina, tonsillitis, swelling of the lymph nodes and spleen for several weeks. In the blood count, increased levels of stimulated, monocyte-altered lymphocytes and moderate liver involvement. Mostly asymptomatic course in small children. About half of all children are infected by the age of five. Infection in puberty usually runs its course symptomatically.

More than 90% of the population becomes infected with EBV during their lifetime. The virus persists in B lymphocytes for life. Reactivation and chronic febrile courses occur. Courses with life-threatening complications such as shortness of breath, rupture of the spleen or blood cell deficiency or extremely long courses with chronic fatigue syndrome are known. Participation of the virus in the development of various types of cancer cannot be ruled out.

The chronic infection is associated with malignancies in certain regions of the world: Burkitt's lymphoma (Africa), nasopharyngeal carcinoma (Southeast Asia), primary B-cell lymphoma and Hodddkin's lymphoma. Also associated is oral hairy cell leukoplakia in severely immunosuppressed individuals.

Method and test parameters

CLIA - ChemiLuminescent ImmunoAssay

The EBV diagnosis consists of the following parameters:

Epstein-Barr-Virus

- Epstein-Barr-Virus VCA IgG-Ab CLIA
- Epstein-Barr-Virus VCA IgM-Ab CLIA
- Epstein-Barr-Virus EBNA-1 IgG-Ab CLIA
- Epstein-Barr-Virus EA IgG-Ab CLIA

VCA

VCA stands for Virus Capsid Antigen.

The IgM antibodies have reached the maximum concentration about 3 weeks after the appearance of the symptoms and are no longer detectable after 1-3 months after the infection has healed.

The IgG Ab reach the highest concentration about 6 weeks after the onset of symptoms. A high concentration of VCA-IgG is maintained for life.

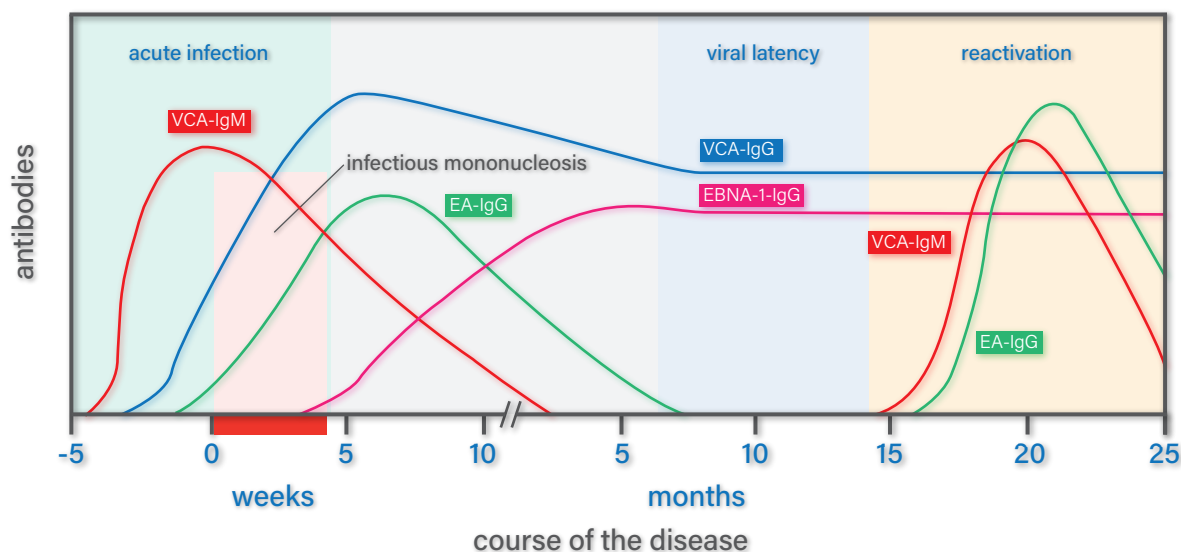
EBNA-1

EBNA-1 stands for nuclear antigen 1. About 6 to 8 weeks after the primary infection, IgG antibodies against EBNA-1 are formed. The appearance of these antibodies indicates the transition from the active phase of the virus to the latent phase. A positive EBNA-1-IgG-Ab finding therefore enables the exclusion of an acute primary EBV infection.

EA

EA stands for "**Early Antigen**". IgG antibodies against EA appear somewhat later in the acute phase than VCA Ab. The titers drop to an undetectable level after 3-6 months. The measurement supports the differentiation between the individual stages of the disease.

Course of the specific antibody formation of an EBV infection



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Fig. 2 Antibody formation in EBV infection over time.

Interpretation of the measured parameters

An **acute** primary EBV infection is characterized by the presence first of **IgM** and then of **IgG** antibodies against **VCA**.

In the case of a **previous** EBV infection, stable titers of **IgG** antibodies against **VCA** and **EBNA-1** can be seen with the simultaneous absence of **IgM** and **EA** antibodies.

Upon **reactivation**, the antibodies **VCA-IgM**, **VCA-IgG**, **EBNA-1** and **EA** are present. A quantitative pathogen direct detection using PCR is recommended.

Confirmation by PCR

Direct molecular-biological detection of pathogens in pharyngeal rinsing water or stool by means of PCR is recommended to check or if reactivations are suspected (e.g. in the case of immunosuppression).

Specific T cell reactivity in the **EliSpot**

An alternative highly sensitive method for monitoring virus activity is the **EliSpot** test. The cellular immune response in the form of spec. T-lymphocytes against EBV are measured here as a marker for active virus replication.

Unspec. immune stimulation by EBV

Acute EBV infections cause non-specific stimulation of the entire immune system. False-positive detections of other antibodies are possible, so if the clinical symptoms are unclear, the EBV status must always be clarified as part of the differential diagnosis.

Liver values

EBV is one of the hepatitis pathogens. If the liver is involved, an increased concentration of transaminases (GPT higher than GOT) and often also bilirubin is typical. If an infection is suspected, a check of the liver values is recommended in addition to infection serology.

Free blood collection kits for doctor's practices

Prepaid blood collection kits can be ordered free of charge on Tel. +49 (0) 33203 879 420 or Email info@europarclabor.com

Lab order form download

<https://www.europarclabor.com/downloads>

Material

1 ml serum/plasma

Transport to the laboratory is not time-critical and can be sent by post.

Prices

A statement in the private medical sector (GOÄ number 4391) is given with the following costs for self-payers:

EBV-VCA-IgG CLIA	(factor 1,15)	20,11 €
EBV-VCA-IgM CLIA	(factor 1,15)	20,11 €
EBV-EBNA-1-IgG CLIA	(factor 1,15)	20,11 €
EBV-EA-IgG CLIA	(factor 1,15)	20,11 €

Contact person and advice

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Medical management: **Dr. med. Anton Waldherr**