



## DIAGNOSTIC AUTOMATION, INC.

23961 Craftsman Road, Suite E/F, Calabasas, CA 91302

Tel: (818) 591-3030 Fax: (818) 591-8383

[onestep@rapidtest.com](mailto:onestep@rapidtest.com)

[technicalsupport@rapidtest.com](mailto:technicalsupport@rapidtest.com)

[www.rapidtest.com](http://www.rapidtest.com)

IVD



See external label



2°C-8°C



Σ=96 tests

REF

Cat # 1414-11

# EBV-VCA IgA

Cat # 1414-11

## NAME AND INTENDED USE

The **Diagnostic Automation** Epstein-Barr Virus-Viral Capsid Antigen (EBV-VCA) IgA Enzyme-linked Immunosorbent Assay (ELISA), is intended for the detection of IgA antibody to Epstein-Barr virus in human sera and plasma.

## SUMMARY AND EXPLANATION OF THE TEST

Detection of the Epstein-Barr virus was first described in 1964 by Epstein, Achong, and Barr using electron microscopic studies of cultured lymphoblasts derived from patients with Burkitt's lymphoma<sup>1</sup>. EBV is classified as a member of the herpes-virus family based upon its characteristic morphology<sup>2,3</sup>.

EBV infection may demonstrate a wide spectrum of clinical symptoms. The majority of primary EBV infections are transmitted via saliva, occur during childhood, and are subclinical<sup>4</sup>. In the U.S., 50% of the population demonstrate EBV antibodies before the age of 5 years; 80% by adulthood. Transfusion-associated EBV infections have also been reported<sup>3</sup>. In young adults, EBV infection may be clinically manifested as Infectious Mononucleosis (IM) with typical symptoms of sore throat, fever, and lymphadenopathy<sup>3</sup>. College students and military personnel are often cited as a high morbidity incidence population for IM<sup>3</sup>.

Following primary EBV infection, it is postulated that the B lymphocyte may continue to harbor the EBV genome and establish a latent infection that may extend through life<sup>4</sup>. Reactivation of EBV infection or enhanced EBV activation has been documented in immunodeficient or immunosuppressed patients, i.e., organ transplant patients, individuals with malignancies, pregnant women, and persons of advanced age<sup>4</sup>.

Epstein-Barr virus has also been associated in the pathogenesis of two human cancers, Burkitt's lymphoma and nasopharyngeal carcinoma (NPC). Documentation by means of DNA hybridization studies demonstrates the presence of the EBV genome on biopsy specimens taken from individuals with these carcinomas<sup>3</sup>.

Burkitt's lymphoma is primarily observed in Sub-Saharan Africa, especially in African children, and in New Guinea. Malarial infections are usually diagnosed in Burkitt's lymphoma patients and are suggested to be a co-factor<sup>5,6</sup>. Nasopharyngeal carcinoma is observed in Asia, most notably in Southern China, and may have genetic or environmental influences as the co-factor<sup>5,6</sup>.

Serological studies have shown that the clinical onset of NPC is preceded by the appearance of a high antibody titer of IgA to viral capsid antigens and early antigens. The titers increase with the total tumor burden and the antibodies decline with the response to therapy. In patients with confirmed clinical remission elevation of IgA serological titers is highly significant for prediction of relapse<sup>7,8,9</sup>.

## PRINCIPLE OF THE TEST

Purified EBV-VCA antigen is coated on the surface of microwells. Diluted patient serum is added to wells, and the EBV-VCA IgA specific antibody, if present, binds to the antigen. All unbound materials are washed away. After adding enzyme conjugate, it binds to the antibody-antigen complex. Excess enzyme conjugate is washed off, and TMB Chromogenic substrate is added. The enzyme conjugate catalytic reaction is stopped at a specific time. The intensity of the color generated is proportional to the amount of IgA specific antibody in the sample. The results are read by a microwell reader compared in a parallel manner with calibrator and controls.

## MATERIALS PROVIDED

- |  |                   |
|--|-------------------|
| 1. Microwell strips: EBV-VCA antigen coated wells.       | (12 x 8 wells)    |
| 2. Absorbent Solution: Black Cap.                        | 1 vial (22 ml)    |
| 3. Washing concentrate 10x : White Cap.                  | 1 bottle (100 ml) |
| 4. TMB Chromogenic Substrate: Amber bottle.              | 1 vial (15 ml)    |
| 5. Enzyme conjugate: Red color solution.                 | 1 vial (12 ml)    |
| 6. Negative control: Range stated on label. Natural Cap. | 1 vial (150 µl)   |
| 7. Cut-off calibrator: Yellow Cap. IgA Index = 1         | 1 vial (150 µl)   |
| 8. Positive control: Range stated on label. Red Cap.     | 1 vial (150 µl)   |
| 9. Stop solution: 2 N HCl.                               | 1 vial (12 ml)    |

## STORAGE AND STABILITY

1. Store the kit at 2 - 8° C.
2. Always keep microwells tightly sealed in pouch with desiccants. We recommend you use up all wells within 4 weeks after initial opening of the pouch.
3. The reagents are stable until expiration of the kit.
4. Do not expose test reagents to heat, sun, or strong light during storage or usage.

## WARNINGS AND PRECAUTIONS

1. Potential biohazardous materials:  
The calibrator and controls contain human source components which have been tested and found nonreactive for Hepatitis B surface antigen as well as HIV antibody with FDA licensed reagents. However, as there is no test method that can offer complete assurance that HIV, Hepatitis B virus, or other infectious agents are absent, these reagents should be handled at the Biosafety Level 2, as recommended in the Centers for Disease Control / National Institutes of Health manual, "Biosafety in Microbiological and Biomedical Laboratories." 1984

2. Do not pipette by mouth. Do not smoke, eat, or drink in the areas in which specimens or kit reagents are handled.
3. The components in this kit are intended for use as an integral unit. The components of different lots should not be mixed.
4. This product contains components preserved with sodium azide. Sodium azide may react with lead and copper plumbing to form explosive metal azide. On disposal, flush with a large volume of water.

## SPECIMEN COLLECTION AND HANDLING

1. Collect blood specimens and separate the serum.
2. Specimens may be refrigerated at 2 - 8° C for up to seven days or frozen for up to six months. Avoid repetitive freezing and thawing of serum sample.

## PREPARATION FOR ASSAY

1. Prepare 1x washing buffer.  
Prepare washing buffer by adding distilled or deionized water to 10x wash concentrate to make a final volume of 1 liter.
2. Bring all specimens and kit reagents to room temperature (20 - 25° C) and gently mix.

## ASSAY PROCEDURE

1. Place the desired number of coated strips into the holder.
2. Prepare 1:20 dilutions by adding 10 µl of the samples, negative control, positive control, and calibrator to 200 µl of absorbent solution. Mix well.
3. Dispense 100 µl of diluted sera, calibrator, and controls into the appropriate wells. For the reagent blank, dispense 100 µl of absorbent solution in 1A well position. Tap the holder to remove air bubbles from the liquid and mix well. Incubate for 30 minutes at room temperature.
4. Remove liquid from all wells. Repeat washing three times with washing buffer.
5. Dispense 100 µl of enzyme conjugate to each well and incubate for 30 minutes at room temperature.
6. Remove enzyme conjugate from all wells. Repeat washing three times with washing buffer.
7. Dispense 100 µl of TMB Chromogenic Substrate to each well and incubate for 30 minutes at room temperature.
8. Add 100 µl of 2 N HCl to stop reaction.

Make sure there are no air bubbles in each well before reading.

9. Read O.D. at 450 nm with a microwell reader.

## CALCULATION OF RESULTS

1. Calculate the mean of duplicate calibrator value  $x_c$ .
2. Calculate the mean of duplicate positive control, negative control, and patient samples.
3. Calculate the EBV-VCA IgA Index of each determination by dividing the mean values of each sample by calibrator mean value,  $x_c$ .

Example of typical results:

Calibrator O.D. = 0.718, 0.704  $x_c = 0.711$

Cut-off calibrator EBV-VCA IgA Index = 1.0

Patient sample O.D. = 0.991, 0.956  $x_s = 0.974$

EBV-VCA IgA Index =  $0.974 / 0.711 = 1.37$

## QUALITY CONTROL

The test run may be considered valid provided the following criteria are met:

1. The O.D. value of the reagent blank against air from a microwell reader should be less than 0.150.
2. If the O.D. value of the Calibrator is lower than 0.250, the test is not valid and must be repeated.
3. The EBV-VCA IgA Index for Negative and Positive Control should be in the range stated on the labels.

## INTERPRETATION

Negative: EBV-VCA IgA Index of 0.90 or less is seronegative for IgA antibody to EBV-VCA virus.

Equivocal: EBV-VCA IgA Index of 0.91 - 0.99 are equivocal. Sample should be retested.

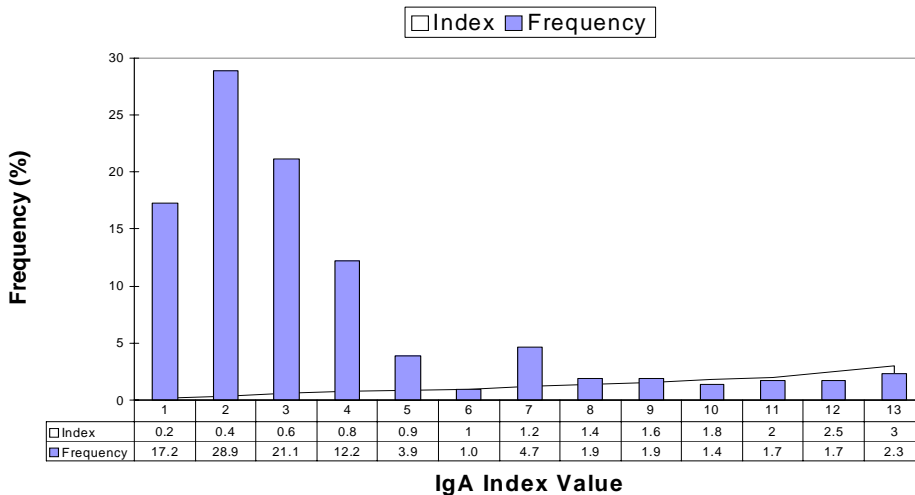
Positive: EBV-VCA IgA Index of 1.00 or greater.

## PERFORMANCE CHARACTERISTICS

### Histogram:

516 random samples are determined with DIAGNOSTIC AUTOMATION Microwell ELISA EBV VCA IgA. The test results are computed as IgA Index using a chosen reference serum as IgA Index 1. The distribution of frequency versus IgA Index value is presented as following:

**Histogram of EBV VCA IgA Index Total samples n = 516**



## Validation of cut off value:

84% (435 samples) have IgA index below 1.

Mean value = 0.406                      SD = 0.216

IgA index 1 (cut off value) = Mean value + 2.75 x SD

16% (81 samples) have IgA index greater than 1.

Mean value = 1.717                      SD = 0.665

P / N ratio = Mean of POSITIVE / Mean of NEGATIVE

= 1.717 / 0.406

= 4.23

## Precision:

The precision of the assay was evaluated by testing three different sera of eight replicates over a period of one week. The intra-assay and inter-assay C.V. are summarized below:

	Negative	Low positive	Positive
Intra-assay	10.2%	8.5%	7.5%
Inter-assay	12.1%	9.7%	8.4%

## LIMITATIONS OF THE ASSAY

The results of these assays should be used in conjunction with information available from clinical evaluation and other diagnostic procedures.

## REFERENCES

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9. Dardari R; Khyatti M; et al. Antibodies to the Epstein-Barr virus transactivator protein as a valuable biomarker in young patients with nasopharyngeal carcinoma *Int J Cancer* 2000 Apr 1; 86(1): 71-5.

## Summary of Assay Procedure

Step	(20-25°C Room temp.)	Volume	Incubation time
1	Sample dilution 1:20 = 10µl / 200 µl		
2	Diluted samples, calibrator & controls	100 µl	30 minutes
3	Washing buffer (3 times)	350 µl	
4	Enzyme conjugate	100 µl	30 minutes
5	Washing buffer (3 times)	350 µl	
6	TMB Chromogenic Substrate	100 µl	30 minutes
7	Stop solution	100 µl	
8	Reading OD 450 nm		

<b>Date Adopted</b>	<b>Reference No.</b>
<b>2003-08-12</b>	<b>DA-EBV-VCA IgA-2008</b>



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Tel: (818) 591-3030 Fax: (818) 591-8383

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