HBV Core antigen / HBcAg ELISA Kit

Enzyme Immunoassay for the quantification of HBV Core antigen (HBcAg) in purified virus or unpurified viral supernatant.

Catalog number: ARG82006

Package: 96 wells

TABLE OF CONTENTS

SECTION **Page**

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INTRODUCTION

Hepatitis B is an infectious disease caused by the hepatitis B virus (HBV) that affects the liver. It can cause both acute and chronic infections. Many people have no symptoms during the initial infection. The virus is transmitted by exposure to infectious blood or body fluids. Infection around the time of birth or from contact with other people's blood during childhood is the most frequent method by which hepatitis B is acquired in areas where the disease is common. In areas where the disease is rare, intravenous drug use and sexual intercourse are the most frequent routes of infection. The infection can be diagnosed 30 to 60 days after exposure. The diagnosis is usually confirmed by testing the blood for parts of the virus and for antibodies against the virus. It is one of five main hepatitis viruses: A, B, C, D, and E.

HBcAg is an antigen that can be found on the surface of the nucleocapsid core (the inner most layer of the hepatitis B virus). While both HBcAg and HBeAg are made from the same open reading frame, HBcAg is not secreted. HBcAg is considered "particulate" and it does not circulate in the blood. However, it is readily detected in hepatocytes after biopsy. The presence of both HBcAg and HBeAg proteins together act as a marker of viral replication, and antibodies to these antigens are a marker of declining replication. HBcAg is an indicator of active viral replication; this means the person infected with Hepatitis B can likely transmit the virus on to another person (i.e. the person is infectious). [Modified from Wikipedia and hepatitisc.uw.edu: HBcAg & Hepatitis B]

PRINCIPLE OF THE ASSAY

This assay employs the quantitative sandwich enzyme immunoassay technique developed for detection and quantitation of the HBV core protein. A monoclonal antibody specific for HBV core antigen (HBVcAg) has been pre-coated onto a microtiter plate. Standards or samples are pipetted into the wells and any HBV core antigen present is bound by the immobilized antibody. After washing away any unbound substances, a FITC-conjugated antibody specific for HBV core antigen is added to each well and incubate. Following a washing to remove unbound substances, a HRP-conjugated mouse anti-FITC antibody is added to each microplate well and incubated. After washing away any unbound antibody-enzyme reagent, a substrate solution (TMB) is added to the wells and color develops in proportion to the amount of HBV core antigen bound in the initial step. The color development is stopped by the addition of acid and the intensity of the color is measured at a wavelength of 450nm ±2nm. The concentration of HBV core antigen in the sample is then determined by comparing the O.D of samples to the standard curve.

MATERIALS PROVIDED & STORAGE INFORMATION

Upon receipt, the Standard should be aliquoted and stored at ≤ -20°C to avoid repeated freeze-thaw cycles. Store the other components at 4 °C. Use the kit before expiration date.

Component	Quantity	Storage information
antibody-coated microplate	12 strips X 8 wells	4°C
Standard (10 µg/ml)	100 µl	-20°C
10X Wash Buffer	100 ml	4°C
1000X FITC-conjugated-HBV core antigen Antibody concentrate	20 µl	4°C
1000X HRP-conjugated-FITC Antibody concentrate	20 µl	4°C
Triton X-100 Solution (5%)	15 ml (Ready-to-use)	4°C
Assay Diluent	50 ml (Ready-to-use)	4°C
TMB substrate	12 ml (Ready-to-use)	4°C (Protect from light)
STOP solution	12 ml (Ready-to-use)	4°C

MATERIALS REQUIRED BUT NOT PROVIDED

- Microplate reader capable of measuring absorbance at 450nm (optional: read at 620 nm as reference wave length)
- Pipettes and pipette tips
- Multichannel micropipette reservoir
- Deionized or distilled water.
- Microplate shaker.
- Automated microplate washer (optional)

TECHNICAL HINTS AND PRECAUTIONS

- Wear protective gloves, clothing, eye, and face protection especially while handling blood or body fluid samples.
- Store Standard at -20°C and other kit components at 4°C at all times.
- Upon receipt, the Standard should be aliquoted and stored at ≤ -20°C to avoid repeated freeze-thaw cycles.
- If crystals are observed in the 10X Wash buffer, warm to RT or 37°C until the crystals are completely dissolved.
- Ensure complete reconstitution and dilution of reagents prior to use.
- All reagents should be mixed by gentle inversion or swirling prior to use. Do not induce foaming.
- Before using the kit, spin tubes and bring down all components to the bottom of tubes.
- It is highly recommended that the standards and samples be assayed in duplicates.
- Change pipette tips between the addition of different reagent or samples.

SAMPLE COLLECTION & STORAGE INFORMATION

The sample collection and storage conditions listed below are intended as general guidelines. Sample stability has not been evaluated.

1. (Optional) Dilute HBV sample in culture medium. Include culture medium as a negative control.

2. Transfer 225 µl of each sample to a microcentrifuge tube containing 25 µl of Triton X-100 Solution, Vortex to mix well.

3. Incubate the tube for 30 minutes at 37°C.

Note: For samples that contain anti-HBV core antigen (HBVcAg) antibody, to release HBV core antigen from the virion and to inactivate antibody. The sample should be incubated at 56°C for 30 min before assay to inactivate anti-HBVcAg antibodies.

REAGENT PREPARATION

- 1X Wash buffer: Dilute 10X Wash buffer into distilled water to yield 1X Wash buffer, mix well. Storage at 2-8°C.
- 1X FITC-conjugated-HBV core antigen Antibody working solution: Dilute the antibody immediately before use; dilute the 1000X FITC-conjugated-HBV core antigen Antibody concentrate into Assay Diluent to yield 1X FITC-conjugated HBV core antigen antibody working solution. (E.g.: 10 µl of the FITC-conjugated-HBV core antigen Antibody concentrate (1000X) + 9.990 ml of Assay Diluent.) Do not store diluted solutions.

- 1X HRP-conjugated-FITC Antibody working solution: Dilute the antibody immediately before use; dilute the 1000X HRP-conjugated-FITC Antibody concentrate into Assay Diluent to yield 1X HRP-conjugated-FITC Antibody working solution. (E.g.: 10 µl of the HRP-conjugated-FITC Antibody concentrate (1000X) + 9.990 ml of Assay Diluent.) Do not store diluted solutions.
- Human HBV core antigen standard:

1. Prepare a series dilution of Human HBV core antigen standards with Assay Diluent. The Assay Diluent serves as zero standard (0 ng/ml), and the rest of the standard serial dilution can be diluted with Assay Diluent as according to the suggested concentration table below:

Standard No	Human HBV core antigen (ng/ml)	Assay Diluent (µl)	Standards (µl)
S1	100	990	10 (10 µg/ml stock)
S2	50	500	500 (S1)
S3	25	500	500 (S2)
S4	12.5	500	500 (S3)
S5	6.25	500	500 (S4)
S6	3.125	500	500 (S5)
S7	1.5625	500	500 (S6)
S0	0	500	0

2. Transfer 225µL of each dilution to a microcentrifuge tube containing 25 µl of Triton X-100 Solution. Perform the assay as described in Assay Instructions.

Note: Upon receipt, the Standard should be aliquoted and stored at ≤ -20°C to avoid repeated freeze-thaw cycles.

ASSAY PROCEDURE

All materials should be equilibrated to room temperature (18- 25°C) before use, each vial should be mixed thoroughly without foaming prior to use. Warm Substrate Solution to room temperature (RT) before use. Standards, samples and controls should be assayed in duplicates.

1. Remove excess microplate strips from the plate frame, return them to the bag containing the desiccant pack, and reseal it.
2. Add **100 µl of inactivated sample or HBVcAg standard** into the appropriate wells in the antibody coated plate. Cover the plate and incubate for **2 hour at 37°C** on a microplate shaker.
3. Aspirate each well and wash, repeating the process 4 times for a total **5 washes**. Wash by filling each well with **1× Wash Buffer (250 µl)** using a squirt bottle, manifold dispenser, or autowasher. Complete removal of liquid at each is essential to good performance. After the last wash, remove any remaining Wash Buffer by aspirating, decanting or blotting against clean paper towels.
4. Add **100 µl** of the 1:1000 **diluted 1X FITC-conjugated-HBV core antigen antibody working solution** to each well, cover the plate and incubate for **1 hour at RT** on a microplate shaker.
5. Aspirate each well and **wash** as step 3.
6. Add **100 µl** of the 1:1000 **diluted 1X HRP-conjugated-FITC antibody working solution** to all wells, cover the plate and incubate for **1 hour at RT** on a microplate shaker.
7. **Warm TMB substrate solution to RT** before next wash step. Aspirate each well and **wash** as step 3. Proceed immediately to the next step.
8. Add **100 µl** of **TMB substrate solution** into each well. Incubate for **5-20 mins**

at RT on microplate shaker. Avoid exposure to light.

Note: Watch plate carefully; if color changes rapidly, the reaction may need to be stopped sooner to prevent saturation.

9. Add 100 µl of Stop Solution to each well and shake lightly to ensure homogeneous mixing.
10. Read the OD with a microplate reader at 450nm immediately.

CALCULATION OF RESULTS

1. Calculate the average absorbance values for each set of standards, controls and samples.

2. Using linear graph paper, construct a standard curve by plotting the mean absorbance obtained from each standard against its concentration with absorbance value on the vertical (Y) axis and concentration on the horizontal (X) axis.

3. Using the mean absorbance value for each sample determine the corresponding concentration from the standard curve.

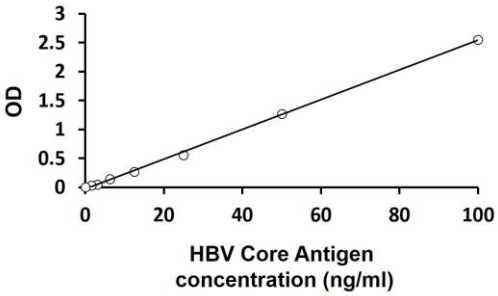
4. Automated method: The results in the IFU have been calculated automatically using a 4 PL (4 Parameter Logistics) curve fit. 4 Parameter Logistics is the preferred method. Other data reduction functions may give slightly different results.

5. arigo provides GainData®, an in-house development ELISA data calculator, for ELISA data result analysis. Please refer our GainData® website for details. (https://www.arigobio.com/elisa-analysis)

6. If the samples have been diluted, the concentration read from the standard curve must be further converted by the appropriate dilution factor according to the sample preparation procedure as described above.

EXAMPLE OF TYPICAL STANDARD CURVE

The following data is for demonstration only and cannot be used in place of data generations at the time of assay.



QUALITY ASSURANCE

Sensitivity

1 ng/ml

Assay Range

1.56- 100 ng/ml

Intra-assay and Inter-assay precision

The CV values of intra-assay precision was 4-5% and inter-assay precision was 8%.