BIO TECHNOLOGY boditech

Infection

ichroma™ HBsAg

INTENDED USE

ichroma™ HBsAg is a fluorescence Immunoassay (FIA) for the qualitative determination of HBsAg in human whole blood/serum/plasma. It is useful as an aid in management and monitoring of Hepatitis B virus infection.

For *in vitro* diagnostic use only.

INTRODUCTION

The hepatitis B virus (HBV) is responsible for hepatic lesions, as in fulminant acute hepatitis or chronic hepatitis that can result in cirrhosis and hepatocellular carcinoma. Detection of the Hepatitis B virus surface antigen (HBsAg) in serum or plasma indicates an infection caused by the hepatitis B virus. It is the first marker to appear during the course of the disease.[1] Clinical and biological symptoms appear two to three weeks after the initial infection with HBV. Presence of HBsAg can be as short as a few days or as long as several years. If HBsAg persists for more than six months, the hepatitis is classified as 'chronic'. Due to existence of numerous asymptomatic chronic carriers, screening for HBsAg is required for each blood donation and for each pregnancy to enable the newborns of the carrier mother to receive prophylactic treatment.[2),3)]

PRINCIPLE

The test uses a sandwich immunodetection method; Dried detector antibody in cartridge binds to antigen in sample, forming antigen-antibody complexes, and migrates onto nitrocellulose matrix to be captured by the other immobilized-antibody on test strip.

The more antigen in sample forms the more antigen-antibody complex and leads to stronger intensity of fluorescence signal on detector antibody, which is processed by instrument for ichroma™ tests to show 'HBsAg positive' in sample.

COMPONENTS

ichroma™ HBsAg consists of 'Cartridges', 'Dried detection Buffer Tubes', 'Diluent vial' and an 'ID chip'.

- The cartridge contains a test strip, the membrane which has anti human HBsAg and recombinant HBsAg at the each test lines, while chicken IgY at the control line.
- Each cartridge is individually sealed in an aluminum foil pouch containing a desiccant. 25 sealed cartridges are packed in a box which also contains an ID chip.
- The dried detection buffer contains detection buffer and granulated ball. There are contain anti human HBsAg-fluorescence conjugate, anti chicken IgY- fluorescence conjugate, bovine serum albumin (BSA) as a stabilizer and sodium azide in phosphate buffered saline (PBS) as a preservative.
- The dried detection buffer is pre-dispensed in a tube. 25 detection buffer tubes are packed in an aluminum foil pouch.
- The diluent contains a detergent and bovine serum albumin (BSA) as a stabilizer and sodium azide in PBS as a preservative. The diluent is dispensed in a vial.

WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use only.
- Carefully follow the instructions and procedures described in this 'Instruction for use'.
- Use only fresh samples and avoid direct sunlight.
- Lot numbers of all the test components (cartridge, ID chip and detection buffer, diluent) must match each other.
- Do not interchange the test components between different lots or use the test components after the expiration date, either of which might yield misleading of test result(s).
- Do not reuse. A detection buffer tube should be used for processing one sample only. So should a cartridge.
- The cartridge should remain sealed in its original pouch before use. Do not use the cartridge, if is damaged or already opened.
- Frozen sample should be thawed only once. For shipping, samples must be packed in accordance with the regulations. Sample with severe hemolytic and hyperlipidemia cannot be used and should be recollected.
- Just before use, allow the cartridge, detection buffer and sample to be at room temperature for approximately 30 minutes.
- **ichroma™ HBsAg** as well as the instrument for ichroma™ tests should be used away from vibration and/or magnetic field. During normal usage, it can be noted that instrument for ichroma™ tests may produce minor vibration.
- Used detection buffer tubes, pipette tips and cartridges should be handled carefully and discarded by an appropriate method in accordance with relevant local regulations.
- An exposure to larger quantities of sodium azide may cause certain health issues like convulsions, low blood pressure and heart rate, loss of consciousness, lung injury and respiratory failure.
- **ichroma™ HBsAg** will provide accurate and reliable results subject to the following conditions.
  - Use **ichroma™ HBsAg** should be used only in conjunction with instrument for ichroma™ tests.
  - Any anticoagulants other than **EDTA, heparin, sodium citrate** should be avoided.

STORAGE AND STABILITY

- The cartridge is stable for 20 months (while sealed in an aluminum foil pouch) if stored at 4-30 °C.
- The dried detection buffer pre-dispensed in a tube is stable for 20 months if stored at 2-8 °C.
- The diluent dispensed in a vial is stable for 20 months if stored at 2-8 °C.
- After the cartridge pouch is opened, the test should be performed immediately.

LIMITATION OF THE TEST SYSTEM

- The test may yield false positive result(s) due to the cross-reactions and/or non-specific adhesion of certain sample components to the capture/detector antibodies.
- The test may yield false negative result. The non-responsiveness of the antigen to the antibodies is most common where the epitope is masked by some unknown components, so as not to be detected or captured by the antibodies. The instability or degradation of the antigen with time and/or temperature may cause the false negative as it makes antigen unrecognizable by the antibodies.
- Other factors may interfere with the test and cause erroneous results, such as technical/procedural errors, degradation of the test components/reagents or presence of interfering substances in the test samples.
- Any clinical diagnosis based on the test result must be supported by a comprehensive judgment of the concerned physician including clinical symptoms and other relevant test results.

MATERIALS SUPPLIED

REF CFPC-29

Components of **ichroma™ HBsAg**

- Cartridge Box:
  - Cartridges 25
  - ID Chip 1
  - Instruction For Use 1
- Aluminum Pouch containing Detection Buffer Tubes
  - Detection Buffer tubes (Dried) 25
- Dilution Buffer Vial Pouch
  - Diluent Vial 1

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from **ichroma™ HBsAg**. Please contact our sales division for more information.

- Instrument for ichroma™ tests
  - **ichroma™ II** REF FPRR021
- **ichroma™ Printer** REF FPRR007
- **Boditech HBsAg Control** REF CFPO-142

SAMPLE COLLECTION AND PROCESSING

The sample type for **ichroma™ HBsAg** is human whole blood/serum/plasma.

- It is recommended to test the sample within 24 hours after collection.
- The serum or plasma should be separated from the clot by centrifugation within 3 hours after the collection of whole blood.
- Samples may be stored for up to a week at 2-8 °C prior to being tested. If testing will be delayed more than a week, samples should be frozen at -20 °C.
- Samples stored frozen at -20 °C for 2 months showed no performance difference.
- However, the whole blood sample should not be kept in a freezer in any case.
- Once the sample was frozen, it should be thawed one time and only for test, because repeated freezing and thawing can result in the changed test values.
- Samples containing precipitates must be clarified by centrifugation.

TEST SETUP

- **ichroma™ HBsAg** should be performed at environment temperature 25 ± 3℃.
- Check the contents of **ichroma™ HBsAg**: Sealed Cartridge, Detection Buffer Tubes, Diluent Vial and ID Chip.
- Ensure that the lot number of the cartridge matches that of the ID chip as well as the detection buffer.
- Keep the sealed cartridge (if stored in refrigerator) and the detection buffer tube at room temperature for at least 30 minutes just prior to the test. Place the cartridge on a clean, dust-free and flat surface.
- Turn on the Instrument for ichroma™ tests.
- Insert the ID Chip into the ID chip port of the Instrument for ichroma™ tests**.**
- Press the 'Select' button on the Instrument for ichroma™ tests. (Please refer to the 'Instrument for ichroma™ tests Operation Manual' for complete information and operating instructions.)

TEST PROCEDURE

1) Open the diluent vial and transfer 75 µL of diluent buffer using a transfer pipette to the detection buffer tube.
2) Transfer 75 µL of sample (whole blood/serum/plasma/control) using a transfer pipette to the detection buffer tube.
3) Mix well by pipetting 10-20 times. (The sample mixture must be used immediately.)
4) Pipette out 75 µL of a sample mixture and dispense it into the sample well on the cartridge.
5) Leave the sample-loaded cartridge at room temperature for 12 minutes.
   ⚠ *Scan the sample-loaded cartridge immediately when the incubation time is over. If not, it will cause inexact test result.*
6) To scan the sample-loaded cartridge, insert it into the cartridge holder of the instrument for ichroma™ tests. Ensure proper orientation of the cartridge before pushing it all the way inside the cartridge holder. An arrow has been marked on the cartridge especially for this purpose.
7) Tab the 'Start' icon on the screen.
8) Instrument for ichroma™ tests will start scanning the sample-loaded cartridge immediately.
9) Read the test result on the display screen of the instrument for ichroma™ tests.

INTERPRETATION OF TEST RESULT

- Instrument for ichroma™ tests calculates the test result automatically and displays "Positive"/"Negative"/ "Indeterminate".
- Ancillary value is served in the form of a cut-off index (COI).

Cut-off index (COI)	Result	Note
≤ 0.90	Negative for HBsAg	No need to additional test.
> 0.90, < 1.0	Indeterminate.	Need to retest.
≥ 1.0	Positive for HBsAg	Need to confirmation test.

QUALITY CONTROL

- Quality control tests are a part of the good testing practice to confirm the expected results and validity of the assay and should be performed at regular intervals.
- The control tests should be performed immediately after opening a new test lot to ensure the test performance is not altered.
- Quality control tests should also be performed whenever there is any question concerning the validity of the test results.
- Control materials are not provided with **ichroma™ HBsAg**. For more information regarding obtaining the control materials, contact Boditech Med Inc.'s Sales Division for assistance. (Please refer to the instruction for use of control material.)

PERFORMANCE CHARACTERISTICS

- **Analytical Sensitivity**

- Cut-off

ichroma™ HBsAg decides between positive and negative through COI calculated by ichroma™ II algorism.

Cutoff Index (COI)	Result
COI ≥ 1.0	Positive
0.90 < COI < 1.0	Indeterminate
COI ≤ 0.90	Negative

- Seroconversion panel

Seroconversion panel	Roche Cobas e411 Roche Elecsys HBsAg II		ichroma™ HBsAg		Total samples
	Positive	Negative	Positive	Negative	
HBV 6285	6	10	6	10	16
HBV 11005	3	10	3	10	13
HBV 6293	3	4	3	4	7
HBV 6273	2	4	2	4	6
HBV 6287	2	9	2	9	11
HBV 11002	2	4	2	4	6

HBV 11004	3	5	3	5	8
HBV 11059	5	4	5	4	9
HBV 11064	2	7	2	7	9
HBV 9072	7	10	7	10	17
Total	35	67	35	67	102

- **Analytical Specificity**

- Cross-reactivity
There was no significant cross reactivity from these material with the **ichroma™ HBsAg** test.

Clinical category	ichroma™ HBsAg results		
	Number of samples	Negative	Positive
CMV	19	19	0
EBV	20	20	0
HAV	28	28	0
HCV	10	10	0
HSV	19	19	0
Rubella	20	20	0
VZV	20	20	0
Syphilis	17	17	0
ANA	23	23	0
RF	23	23	0
Samples of pregnant women	39	39	0
Total	238	238	0

- Interference
There was no significant interference from these material with the **ichroma™ HBsAg** test.

Materials	Concentration
Heparin	100,000 U/L
EDTA	5 µM
Sodium citrate	0.085 M
Bilirubin	500 µM
Hemoglobin	2 g/L
Triglycerides	1.5 mg/mL
Cholesterol	20 mM
Albumin	60 mg/mL

- **Precision**

- Between LOT
One person tested three different lots of **ichroma™ HBsAg**, ten times at each concentration of the control standard.
- Between person
Three different persons tested same LOT of **ichroma™ HBsAg**, five times at each concentration of the control standard.
- Between day
One person tested one LOT of **ichroma™ HBsAg** during three days, five times at each concentration of the control standard.
- Between site
One person tested one LOT of **ichroma™ HBsAg** in three different space, five times at each concentration of the control standard.

HBsAg Cal	Between LOT		Between person		Between day		Between site	
	Positive /Number of tests	Positive rate	Positive /Number of tests	Positive rate	Positive /Number of tests	Positive rate	Positive /Number of tests	Positive rate
Negative	0/10	0 %	0/5	0 %	0/5	0 %	0/5	0 %
High	10/10	100 %	5/5	100 %	5/5	100 %	5/5	100 %
Mid	10/10	100 %	5/5	100 %	5/5	100 %	5/5	100 %
Low	10/10	100 %	5/5	100 %	5/5	100 %	5/5	100 %

- **Comparability with reference product**

Test product	Sample group	Negative	Positive	Number of samples
	Number of samples	106	61	167
Roche Elecsys HBsAg II	Negative	106	0	106
	Positive	0	61	61
ichroma™ HBsAg	Negative	106	0	106
	Positive	0	61	61
Compatibility (%)		100	100	

REFERENCES

1. Performance evaluation of immunoassay detection of HBsAg mutants and their clinical significance in the high risk groups. Jung-in Choi et al., Lab Med Online., 2013, 3:88-96
2. Centers for Disease Control and Prevention. Recommendations of the Immunization Practices Advisory Committee Prevention of Perinatal Transmission of Hepatitis B virus: Prenatal Screening of all Pregnant Women for Hepatitis B Surface Antigen. MMWR, 1988; 37:341-355
3. Centers for Disease Control and Prevention. Hepatitis B virus: A comprehensive strategy for eliminating transmission in the united states through universal childhood vaccination: recommendations of the immunization practices advisory committee (ACIP), MMWR, 1991; 40:1-19

Note: Please refer to the table below to identify various symbols.

	Sufficient for <n> tests
	Read instruction for use
	Use by Date
	Batch code
	Catalog number
	Caution
	Manufacturer
	In vitro diagnostic medical device
	Temperature limit
	Do not reuse

For technical assistance; please contact:
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