Hormone

ichroma™ β-HCG Plus

INTENDED USE

ichroma™ β-HCG Plus is a fluorescence Immunoassay (FIA) for the quantitative determination of β-HCG in human whole blood/serum /plasma. It is useful as an aid in management and monitoring of beta human chorionic gonadotropin (β-hCG) level in human

For *in vitro* diagnostic use only.

INTRODUCTION

Beta human chorionic gonadotropin (β-hCG) is a glycoprotein hormone secreted by the developing placenta shortly after implantation. β-hCG can be detected in the urine and serum of pregnant women as early as 6 to 15 days after conception. The concentration of hCG increases to 50 mIU/ml one week post implantation and reaches to about 100 mIU/ml at the time of the first missed menstrual period and the peak at 100,000-200,000 mIU/ml at the first trimester.

PRINCIPLE

The test uses a sandwich immunodetection method; Dried antibodies in the detector tube, once diluted with the diluent, bind with antigens in the sample to form antigen-antibody complexes. These complexes then migrate through the nitrocellulose matrix and are captured by another sets of immobilized antibodies on the test line.

The more antigens in the sample, the more antigen-antibody complexes, which leads to a stronger fluorescence signal. This signal then is interpreted by the reader to display the β-HCG concentration in the sample.

COMPONENTS

ichroma™ β-HCG Plus consists of 'Cartridges', 'Detectors', 'Diluent', 'Sample diluent' and an 'ID chip'.

- The cartridge contains a test strip, the membrane which has anti human β-HCG at the test line, with 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 detector contains anti human β-HCG-fluorescence conjugate, anti chicken IgY-fluorescence conjugate, bovine serum albumin (BSA) as a stabilizer and sodium azide as a preservative in phosphate buffered saline (PBS).
- Each detector contains 2 granules. 25 tubes of detector are packed in a pouch and packed in a box with 5 ml of diluent.
- The sample diluent pre-dispensed in a tube contains sodium azide in phosphate buffered saline (PBS). 25 sample diluent tub es are packed in a box.

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, detector, diluent and sample diluent) should agree.
- Do not interchange test components between different lots or use test components after the expiration date, either of which might yield misleading of test result(s).
- Do not reuse. A detector 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 applicable local requirement. A Sample with severe hemolytic and hyperlipidemia cannot be used and should be recollected.
- Just before use, allow the cartridge, the detector and the sample reach the room temperature by leaving them in the room for approximately 30 minutes at the least.
- **ichroma™ β-HCG Plus** 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 detectors, 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™ β-HCG Plus** will provide accurate and reliable results subject to the following conditions.
  - Use **ichroma™ β-HCG Plus** should be used only in conjunction with instrument for ichroma™ tests.
  - Any anticoagulants other than **EDTA, Sodium heparin** should be avoided.

STORAGE AND STABILITY

- The cartridge is stable for 20 months (while sealed in the original aluminum foil pouch) if stored at 4-30 °C.
- The detector, diluent and sample diluent are 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-66

Components of **ichroma™ β-HCG Plus**

- Cartridge Box:
  - Cartridges 25
  - ID Chip 1
  - Instruction For Use 1
- Buffer Box
  - ✓ For ichorma™ II
  - Detectors (Capped with plastic lid) 25
  - Diluent 1

✓ For AFIAS-50
- Detectors (Sealed with aluminum foil) 25
- Diluent 1

▪ Sample Diluent Box:
- Sample Diluent Tubes 25

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from **ichroma™ β-HCG Plus**. Please contact our sales division for more information.

- Instrument for ichroma™ tests
  - **ichroma™ II** REF FPRR021
  - **AFIAS-50** REF FPRR022
- **Boditech Hormone Control** REF CFPO-95

SAMPLE COLLECTION AND PROCESSING

The sample type for **ichroma™ β-HCG Plus** 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. If longer storage is required, e.g. if the test could not be performed within 24 hours, serum or plasma should be immediately frozen below -20 °C. The freezing storage of sample up to 3 months does not affect the quality of results.
- However, the whole blood sample should not be kept in a freezer in any case.
- Once the sample was frozen, it should be thawed only once and only for test, because repeated freezing and thawing can result in the change of test values.

TEST SETUP

- Check the contents of **ichroma™ β-HCG Plus**: Sealed Cartridge, Detectors, Diluent, Sample diluents and ID Chip.
- Ensure that the lot number of the cartridge matches that of the ID chip as well as the buffer box and sample .
- Keep the sealed cartridge (if stored in refrigerator) and the buffer box 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

▶ **ichroma™ II**

1) Transfer 150 µL of diluent using a pipette to a tube containing detector granules.
2) Transfer 10 µL of sample (Human whole blood/ serum/ plasma/control) to the detector tube.

Using sample diluent
2) Transfer 10 µL (Human serum/plasma/whole blood /control) of sample using a pipette to a sample diluent tube.
2-1) Transfer 10 µL of dilution sample using a transfer pipette to a detector tube.

** When the concentration of a sample is higher than 5,000 mIU/mL, it can be diluted with a sample diluent provided.

3) Close the lid of the detector tube and mix the sample thoroughly by shaking it about 20 times.
4) Pipette out 75 µL of a sample mixture and load 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) Press 'Select' button on the instrument for ichroma™ tests to start the scanning process.
8) Instrument for ichroma™ tests should start scanning the sample-loaded cartridge immediately.
9) Read the test result on the display screen of the instrument for ichroma™ tests.

(Please refer to the ichroma™ II operation manual for complete information and operation instructions.)

▶ **AFIAS-50**

1) Insert the tip array in the tip station.
2) Insert the detector array in the Reagent station and cover the reagent station.
3) Open the diluent and insert the diluent in the diluent station.
4) Open the cover of the magazine station and pull and lift the cartridge magazine.
5) Insert the cartridges in the cartridge magazine individually.
6) Insert the cartridge loaded cartridge magazine into the magazine station and close the cover of the magazine station.
7) Insert the sample tube into the blood collection tube rack and load the blood collection tube rack into the sampling station (loading part).
8) Tap the button located in the upper side of the No. of test cartridge region to select ID chip what you want to use.
9) When the selected cartridge slot is activated, set the number of test cartridge by tapping.
10) Tap the button located in the upper side of the No. of reagent region to select ID chip what you want to use.
11) When the selected slot is activated, set the number of Detector by tapping.
12) Set the number of pipette tips by tapping.
13) Tap the 'START' button on the left upper of the main screen to start test.

(Please refer to the AFIAS-50 operation manual for complete information and operation instructions.)

INTERPRETATION OF TEST RESULT

- Instrument for ichroma™ tests calculates the test result automatically and displays β-HCG concentration of the test sample in terms of mIU/mL.
- The cut-off (reference value): 5 mIU/mL
- Total ß-HCG level during pregnant stage

pregnant women (weeks since LMP*)	Total βhCG level [mIU/mL] range
3	5 - 50
4	5 - 426
5	18 - 7,340
6	1,080 – 56,500
7 - 8	7,650 – 229,000
9 - 12	25,700 – 288,000
13 - 16	13,300 – 254,000
17 - 24	4,060 – 165,400
25 - 40	3,640 – 117,000

* LMP is the last menstrual periods date from the first day of your last period

- Working range : 2 - 5,000 mIU/mL
- In case of the test is performed with sample dilution procedure, please follow the below equation to obtain correct result. [Final Sample Concentration = Reported Concentration x 50]

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™ β-HCG Plus**. 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**

Sample Type	Whole Blood	Serum/Plasma
Limit of Blank (LOB)	0.2 mIU/mL	0. 1 mIU/mL
Limit of Detection (LOD)	0.5 mIU/mL	0.4 mIU/mL
Limit of Quantitation (LOQ)	2 mIU/mL	1.8 mIU/mL

- **Analytical specificity**

- Cross-reactivity
  There was no significant cross-reactivity from these materials with the **ichroma™ β-HCG Plus** test measurements.

Cross-reactivity material	Cross reactivity (%)
TSH (500uIU/ml)	0.8
FSH (1,000mIU/ml)	0.03
LH (1,000mIU/ml)	0.5

- Interference
  There was no significant interference from these materials with the **ichroma™ β-HCG Plus** test measurements.

Interference material	Interference (%)
D-glucose (60mM/L)	< 2.5
L-Ascorbic acid (0.2mM/L)	< 3.0
Bilirubin (0.4mM/L)	< 2.5
Hemoglobin (2g/L)	< 3.5
Cholesterol (13mM/L)	< 2.5
Triglyceride (10mg/mL)	< 4.0

- **Precision**

- Between Lot
  One person tested three different lots of **ichroma™ β-HCG Plus,** twenty times at each concentration of the control standard.
- Between person
  Three different persons tested **ichroma™ β-HCG Plus,** three times at each concentration of the control standard.
- Between day
  One person tested **ichroma™ β-HCG Plus** during five days, three times at each concentration of the control standard.
- Between site
  One person tested **ichroma™ β-HCG Plus** at three different sites, three times at each concentration of the control standard.

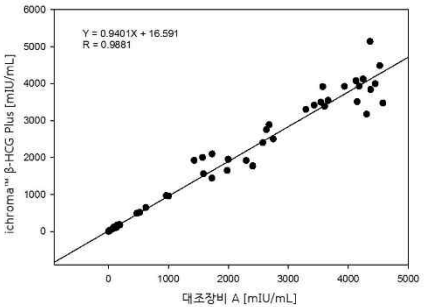
Whole blood type								
Conc. (mIU/mL)	between Lot		between person		between day		between site	
	AVG	CV (%)	AVG	CV (%)	AVG	CV (%)	AVG	CV (%)
5	4.89	4.78	5.04	4.55	5.01	4.34	5	4.5
800	785.94	3.44	792.89	4.99	785.88	4.43	779.38	2.47
2500	2454.94	4.14	2485.2	5.45	2453.95	4.88	2487.85	5.32

Serum/Plasma type								
Conc. (mIU/mL)	between Lot		between person		between day		between site	
	AVG	CV (%)	AVG	CV (%)	AVG	CV (%)	AVG	CV (%)
5	5	3.71	4.98	4.81	5.04	3.36	4.96	5.03
800	801.26	5.18	814.94	4.03	778.18	3.99	796.16	3.27
2500	2462.38	4.99	2541.03	4.65	2515.84	4.45	2507.54	4.13

- **Accuracy**
  The accuracy was confirmed by 3 different lots testing ten times each different concentration.

Whole blood type						
β-HCG [mIU/mL]	Lot 1		Lot 2		Lot 3	
	AVG	Recovery	AVG	Recovery	AVG	Recovery
2000	1972.44	99%	1984.84	99%	1980.65	99%
1000	973.37	97%	1008.38	101%	996.52	100%
500	499.39	100%	493.16	99%	501.57	100%
50	49.8	100%	50.17	100%	49.03	98%
5	4.97	99%	5.01	100%	5.11	102%
Serum/Plasma type						
β-HCG [mIU/mL]	Lot 1		Lot 2		Lot 3	
	AVG	Recovery	AVG	Recovery	AVG	Recovery
2000	1945.16	97%	1999.98	100%	1945.48	97%
1000	996.93	100%	1012.67	101%	1002.8	100%
500	496.26	99%	499.81	100%	512.99	103%
50	49.35	99%	49.21	98%	49.18	98%
5	4.98	100%	4.99	100%	4.99	100%

- **Comparability:** β-HCG concentrations of 100 serum samples were quantified independently with **ichroma™ β-HCG Plus** and Beckman Coulter Access II System as per prescribed test procedures. Test results were compared and their comparability was investigated with linear regression and coefficient of correlation (R). Linear regression and coefficient of correlation between the two tests were Y = 0.9401X + 16.591 and R = 0.9881 respectively.



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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
	Authorized representative of the European Community
	In vitro diagnostic medical device
	Temperature limit
	Do not reuse
	This product fulfills the requirements of the Directive 98/79/EC on in vitro diagnostic medical devices

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