Hormone

ichroma™ FSH Plus

INTENDED USE

ichroma™ FSH Plus is a fluorescence Immunoassay (FIA) for the quantitative determination of FSH in human whole blood/serum /plasma. It is useful as an aid in management and monitoring of concentration of FSH.

For *in vitro* diagnostic use only.

INTRODUCTION

Follicle-stimulating hormone (FSH) is synthesized and secreted by gonadotrophs of the anterior pituitary gland. The alpha subunits of LH, FSH, TSH, and hCG are identical, and contain 92 amino acids. FSH has a beta subunit of 118 amino acids (FSHB), which confers its specific biologic action and is responsible for interaction with the FSH-receptor. FSH regulates the development, growth, pubertal maturation, and reproductive processes of the body. FSH and Luteinizing hormone (LH) act synergistically in reproduction.

The most common reason for high serum FSH concentration is in a female who is undergoing or has recently undergone menopause. High levels of Follicle-Stimulating Hormone indicate that the normal restricting feedback from the gonad is absent, leading to an unrestricted pituitary FSH production. If high FSH levels occur during the reproductive years, it is abnormal. Conditions with high FSH levels include: Premature menopause also known as Premature Ovarian Failure, Poor ovarian reserve also known as Premature Ovarian Aging, Gonadal digenesis, Turner syndrome, Castration, Swyer syndrome, Certain forms of Congenital adrenal hyperplasia (CAH), Testicular failure.

Most of these conditions are associated with subfertility and/or infertility. Therefore high FSH levels are an indication of subfertility and/or infertility.

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 FSH concentration in the sample.

COMPONENTS

ichroma™ FSH Plus consists of 'Cartridges', 'Detectors', 'Diluent', 'Capillary tubes' and an 'ID chip'.

- The cartridge contains a test strip, the membrane which has anti human FSH 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 and 25 sealed capillary tubes.
- The detector contains anti human FSH-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.

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 and 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™ FSH 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™ FSH Plus** will provide accurate and reliable results subject to the following conditions.
  - Use **ichroma™ FSH Plus** should be used only in conjunction with instrument for ichroma™ tests.
  - Any anticoagulants other than **EDTA, Sodium citrate, 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 and the 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-70

Components of **ichroma™ FSH Plus**

- Cartridge Box:
  - Cartridges 25
  - 35 µL Capillary tube 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

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from **ichroma™ FSH 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™ FSH 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.
- Fingertip blood samples should be collected as follows:
  - Position the hand with the palm facing upwards. Blood should be normally drawn from the middle or ring finger of the non-dominant hand. Apply intermittent pressure towards its tip.
  - Wipe the fingertip clean with an alcohol pad.
  - Allow the finger to dry completely because blood will not form a drop if the puncture site is moist and because the residual alcohol at the fingertip may dilute the blood sample and affect the test result.
  - Hold the finger and puncture the fingertip by firmly pressing a new sterile lancet against it at an off-center position.
  - Wipe away the first drop of blood with a sterile gauze pad or cotton ball.
  - Massage the finger towards its tip to form a new drop of blood. Blood will flow easily if the finger is held lower than the elbow.
  - Hold the handle of a capillary tube and touch the mouth of the capillary to the drop of blood.
  - Let the blood fill the capillary tube completely.
  - It may be sometimes necessary to massage the finger again for an additional drop of blood for filling the capillary tube.

TEST SETUP

- Check the contents of **ichroma™ FSH Plus**: Sealed Cartridge, Detectors, Diluent, Capillary tubes and ID Chip.
- Ensure that the lot number of the cartridge matches that of the ID chip as well as the buffer box.
- 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 35 µL of sample (Human whole blood/ serum/ plasma/control) to the detector tube.
   If the test use whole blood, transfer the fingertip blood (collected in a capillary tube) to the detector tube.
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 FSH concentration of the test sample in terms of mIU/mL.
- The cut-off (reference range)

Stage		Range(mIU/mL)
Females	Follicular Phase	3 - 11
	Mid-Cycle	6 - 21
	Luteal Phase	1 - 9
	Postmenopausal	22 - 153
Males		1 - 11

- Working range : 0.1-110 mIU/mL

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™ FSH 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)	0.02 mIU/mL	0.01 mIU/mL
Limit of Detection (LOD)	0.05 mIU/mL	0.03 mIU/mL
Limit of Quantitation (LOQ)	0.1 mIU/mL	0.1 mIU/mL

- **Analytical specificity**

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

Cross-reactivity material	Cross reactivity (%)
TSH (500uIU/ml)	0.8
LH (1000mIU/ml)	0.01
hCG (500,000mIU/ml)	0.06

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

Interference material	Interference (%)
D-glucose (60mM/L)	< 2
L-Ascorbic acid (0.2mM/L)	< 3.5
Bilirubin (0.4mM/L)	< 2
Hemoglobin (2g/L)	< 3
Cholesterol (13mM/L)	< 4
Triglyceride (10mg/mL)	< 4.1

- **Precision**

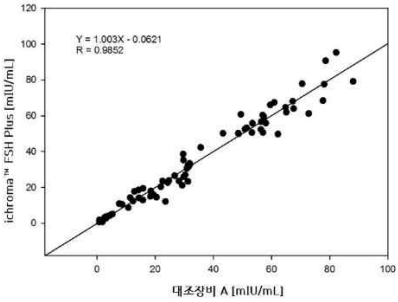
- Between Lot
  One person tested three different lots of **ichroma™ FSH Plus,** twenty times at each concentration of the control standard.
- Between person
  Three different persons tested **ichroma™ FSH Plus,** three times at each concentration of the control standard.
- Between day
  One person tested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

Conc. (mIU/mL)	Whole blood type							
	between Lot		between person		between day		between site	
	mean	CV (%)	mean	CV (%)	mean	CV (%)	mean	CV (%)
1	1	5.4	1.02	5.35	0.97	6.66	1.02	6.41
10	10.12	6.18	10	4.96	9.92	6.55	9.97	3.71
50	48.86	5.14	47.86	5.13	50.4	4.48	49.6	6.74
	Serum/Plasma type							
Conc. (mIU/mL)	between Lot		between person		between day		between site	
	mean	CV (%)	mean	CV (%)	mean	CV (%)	mean	CV (%)
1	0.99	7.71	1.02	7.24	1.01	5.99	0.99	5.02
10	9.74	5.99	9.81	5.33	9.98	5.76	10.09	5.15
50	48.85	4.46	49.98	4.83	49.83	4.69	49.38	4.99

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

FSH [mIU/mL]	Whole blood type					
	Lot1		Lot2		Lot3	
	AVG	Recovery	AVG	Recovery	AVG	Recovery
75	72.64	97%	73.52	98%	73.55	98%
50	50.43	101%	50.42	101%	51.22	102%
25	25.46	102%	24.71	99%	25.07	100%
12.5	12.8	102%	12.75	102%	13.12	105%
1.25	1.32	105%	1.3	104%	1.3	104%
	Serum/Plasma type					
FSH [mIU/mL]	Lot1		Lot2		Lot3	
	AVG	Recovery	AVG	Recovery	AVG	Recovery
75	73.14	98%	73.18	98%	73.4	98%
50	50.18	100%	50.45	101%	49.91	100%
25	24.73	99%	24.97	100%	25.24	101%
12.5	13.04	104%	12.97	104%	13.01	104%
1.25	1.27	102%	1.27	102%	1.29	103%

- **Comparability:** FSH concentrations of 100 serum samples were quantified independently with **ichroma™ FSH Plus** and VIDAS 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 = 1.003X – 0.0621 and R = 0.9852 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
LOT	Batch code
REF	Catalog number
	Caution
	Manufacturer
EC REP	Authorized representative of the European Community
IVD	In vitro diagnostic medical device
	Temperature limit
	Do not reuse
CE	This product fulfills the requirements of the Directive 98/79/EC on in vitro diagnostic medical devices

For technical assistance; please contact:
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