BIO TECHNOLOGY boditech

Hormone

ichroma™ FSH

INTENDED USE

ichroma™ FSH is a fluorescence immunoassay (FIA) for the quantitative determination of FSH (follicle stimulating hormone) in human 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.

The detector antibodies in buffer bind to antigens in the sample, forming antigen-antibody complexes, and migrate onto nitrocellulose matrix to be captured by the other immobilized antibodies on a test strip.

More antigens in the sample will form more antigen-antibody complexes which lead to stronger fluorescence signal by detector antibodies, which is processed by the instrument for ichroma™ tests to show FSH concentration in the sample.

COMPONENTS

ichroma™ FSH consists of 'cartridges', 'detector tubes', 'detector diluent.

- The cartridge contains the membrane called a test strip which has anti-FSH at the test line, and chicken IgY at the control line. All cartridges are individually sealed in an aluminum foil pouch containing a desiccant, and they are further packaged in a box.
- The detector tube has a granule containing anti-chicken IgY-fluorescence conjugate, anti-FSH-fluorescence conjugate and sodium azide as a preservative in phosphate buffered saline (PBS). All detector tubes are packed in a pouch.
- The detector diluent contains tween-20 as a detergent and sodium azide as a preservative in phosphate buffered saline (PBS) and it is pre-dispensed in a vial. The detector diluent is packed in a box.

WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use only.
- Follow the instructions and procedures described in this 'Instructions for use'.
- Use only fresh samples and avoid direct sunlight.
- Lot numbers of all the test components (cartridge, detector tube, detector diluent and ID chip) 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 incorrect test result(s).
- Do not reuse cartridge or detector tube. A cartridge should be used for testing one sample only. A detector tube should be used for processing of one sample only.
- The cartridge should remain sealed in its original pouch until just before use. Do not use the cartridge, if pouch is damaged or has already been opened.
- Frozen sample should be thawed only once. For shipping, samples must be packed in accordance with local regulations. Sample with severe hemolysis and/or hyperlipidemia must not be used.
- If test components and/or sample are stored in a refrigerator, then allow cartridge, detector tube, detector diluent and sample to be at room temperature for approximately 30 minutes before use.
- The instrument for ichroma™ tests may generate slight vibration during use.
- Used cartridges, detector tubes, detector diluent and pipette tips should be handled carefully and discarded by an appropriate measure in accordance with relevant local regulations.
- The detector tube and the detector diluent contain sodium azide (NaN_3), and it may cause certain health issues like convulsions, low blood pressure, low heart rate, loss of consciousness, lung injury and respiratory failure. Avoid contact with skin, eyes, and clothing. In case of contact, rinse immediately with running water.
- **ichroma™ FSH** will provide accurate and reliable results subject to the below conditions.
  - **ichroma™ FSH** should be used only in conjunction with

the instrument for ichroma™ tests.
- Have to use recommended anticoagulant.

Recommended anticoagulant
K_2 EDTA, K_3 EDTA, Sodium heparin

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(s) due to the non-responsiveness of the antigens to the antibodies which is the most common if the epitope is masked by some unknown components, so therefore not being able to be detected or captured by the antibodies. The instability or degradation of the antigens with time and/or temperature may also cause the false negative as it makes antigens 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 in conjunction with clinical symptoms and other relevant test results.

STORAGE AND STABILITY

	Storage condition		
Component	Storage Temperature	Shelf life	Note
Cartridge	2 - 30°C	20 months	Disposable
Detector tube	2 - 30°C	20 months	Unopened
Detector diluent	2 - 30°C	20 months	Unopened
	2 - 30°C	3 months	Opened

- After the cartridge pouch is opened, the test should be performed immediately.

MATERIALS SUPPLIED

REF CFPC-35

Components of **ichroma™ FSH**

- Cartridge box:
  - Cartridge 25
  - Detector tube 25
  - Detector diluent 1
  - ID chip 1
  - Instructions for use 1

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately with **ichroma™ FSH**.

Please contact our sales division for more information.

- Instrument for ichroma™ tests
  - **ichroma™** Reader REF FR203
  - **ichroma™ II** REF FPRR021
  - **ichroma™ III** REF FPRR037
  - **ichroma™ M3** REF FPRR035
- **Printer** REF FPRR007
- **Boditech Hormone Control** REF CFPO-95
- **Boditech FSH Control** REF CFPO-230

SAMPLE COLLECTION AND PROCESSING

The sample type for **ichroma™ FSH** is human serum/plasma.

- It is recommended to test the sample within 24 hours after collection when collected sample is stored at room temperature.
- The samples (serum, plasma) should be separated from the clot by centrifugation within 3 hours after the collection of whole blood.
- The samples (serum, plasma) may be stored for a week at 2-8°C prior to being tested. If testing will be delayed more than a week, samples (serum, plasma) should be frozen at -20°C.
- The samples (serum, plasma) stored frozen at -20°C for 3 months showed no performance difference.
- However, the whole blood sample should not be kept in a freezer in any case.
- As a repeated freeze-thaw cycle may affect the test result, do not refreeze previously frozen samples.

TEST SETUP

- Check the contents of ichroma™ FSH: Sealed cartridges, detector tubes, a detector diluent, an ID chip and an instructions for use.
- Ensure that the lot number of the cartridge matches that of the detector tube, the detector diluent as well as an ID chip.
- If the sealed cartridge, the detector tube and the detector diluent have been stored in a refrigerator, place them on a clean and flat surface at room temperature for at least 30 minutes before testing.
- Turn on the instrument for ichroma™ tests.
- Insert the ID chip into the 'ID chip port'.

※ **Please refer to the 'Instrument for ichroma™ tests operation manual' for complete information and operating instructions.**

TEST PROCEDURE

▶ **ichroma™ Reader, ichroma™ II, ichroma™ M3**

Multi test mode

1) Take 150 µL of detector diluent using a pipette and dispense it to the detector tube containing a granule. When the granule form is completely dissolved in the tube, it becomes detection buffer.

(The detection buffer must be used immediately. Do not exceed 30 seconds.)
2) Take 150 µL of sample (serum/plasma/control) using a pipette and dispense it to the detector tube.
3) Close the lid of the detector tube and mix the sample thoroughly by shaking it about 10 times.
(The detection buffer must be used immediately. Do not exceed 30 seconds.)
4) Take 75 µL of the sample mixture and dispense it into the sample well of the cartridge.
5) Leave the cartridge at room temperature for 15 minutes.
⚠ *Scan the sample-loaded cartridge immediately when the incubation time is over. If not, it will cause inaccurate 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 is marked on the cartridge especially for this purpose.
7) Press the 'Select' or tap the 'Start' button on the instrument for ichroma™ tests to start the scanning process.
(ichroma™ M3 will start the test automatically after inserting.)
8) The 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.

Single test mode

1) The test procedure is same with the 'Multi test mode 1) – 4)'.
2) Insert the sample-loaded cartridge into the 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 is marked on the cartridge especially for this purpose.
3) Press the 'Select' or tap the 'Start' button on the instrument for ichroma™ tests.
(ichroma™ M3 will start the test automatically after inserting.)
4) The cartridge goes inside the instrument for ichroma™ tests and will automatically start scanning the sample-loaded cartridge after 15 minutes.
5) Read the test result on the display screen of the instrument for ichroma™ tests.

▶ **ichroma™ III**

1) The test procedure is same with the 'Single test mode'.

INTERPRETATION OF TEST RESULT

- The instrument for ichroma™ tests calculates the test result automatically and displays FSH concentration of the test sample in terms of mIU/mL.
- Reference range

Type		mIU/mL
Males		1.27–19.26
Females	Follicular phase	3.85–8.78
	Mid-cycle	4.54–22.51
	Luteal phase	1.79–5.12
	Postmenopausal	16.74–113.59

- Working range: 1-100 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.
- Quality control tests should also be performed whenever there is any question concerning the validity of the test results.
- Control materials are provided on demand with **ichroma™ FSH**. For more information regarding obtaining the control materials, contact Boditech Med Inc.'s Sales Division for assistance.
(Please refer to the instructions for use of control material.)

PERFORMANCE CHARACTERISTICS

- Analytical sensitivity
  - Limit of Blank (LoB) 0.286 mIU/mL
  - Limit of Detection (LoD) 0.533 mIU/mL
  - Limit of Quantitation (LoQ) 1.000 mIU/mL

- **Analytical Specificity**
  - Cross reactivity
  Biomolecules listed in the following table were added to the test sample(s) at concentrations much higher than their normal physiological levels in the blood. **ichroma™ FSH** test results did not show any significant cross-reactivity with these biomolecules.

Cross-reactants	Concentration
hCG	500,000 mIU/mL
LH	1,000 mIU/mL
PRL	1,000 ng/mL
TSH	2,000 µIU/mL

  - Interference
  Interferents listed in the following table were added to the test sample at the same concentration mentioned below. **ichroma™ FSH** test results did not show any significant interference with these materials.

Interferents	Concentration
Ascorbic acid	298 µmol/L
Bilirubin [unconjugated]	684 µmol/L
Glucose	1000 mg/dL
Hemoglobin	10 g/L
Total cholesterol	400 mg/dL
Triglycerides, total	1500 mg/dL

Acetaminophen	1030 µmol/L
Ibuprofen	1060 µmol/L
Acetylsalicylic acid	167 µmol/L
Caffeine	556 µmol/L
Heparin	330 µmol/L
EDTA	3.39 µmol/L

■ **Precision**

- Single-site study

Repeatability (within-run precision)
Within-laboratory precision (Total precision)
Lot to lot precision

3 Lots of **ichroma™ FSH** were tested for 20 days. Each standard material was tested 2 times per day. For each test, each material was duplicated.

Single-site study						
FSH [mIU/mL]	Repeatability		Within-laboratory precision		Lot to lot precision	
	AVG [mIU/mL]	CV (%)	AVG [mIU/mL]	CV (%)	AVG [mIU/mL]	CV (%)
5	4.93	6.46	4.96	6.26	4.98	5.98
20	20.53	4.37	20.49	4.08	20.25	5.15
60	60.41	5.57	60.24	5.82	60.39	5.57

- Multi-site study

Reproducibility

1 Lot of ichroma™ FSH was tested for 5 days in 3 different sites (1 person per 1 site, 1 instrument per 1 site). Each standard material was tested 1 time per and 5 replicates per day.

Multi-site study		
FSH [mIU/mL]	Reproducibility	
	AVG [mIU/mL]	CV (%)
5	5.05	5.17
20	19.92	6.02
60	60.83	6.11

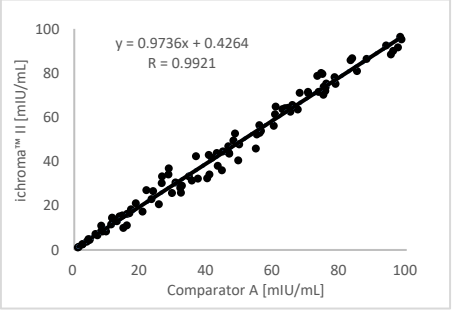
■ **Accuracy**

The accuracy was confirmed by testing with 3 different lots of ichroma™ FSH. The tests were repeated 10 times at each concentration of the control standard.

FSH [mIU/mL]	Lot 1	Lot 2	Lot 3	AVG [mIU/mL]	Recovery (%)
1	1.00	0.99	1.01	1.00	99.9%
2	2.07	1.98	2.01	2.02	101.0%
3	3.06	3.11	3.08	3.08	102.7%
4	3.84	3.96	4.14	3.98	99.4%
5	4.86	5.02	5.09	4.99	99.8%
10	9.97	9.63	9.84	9.81	98.1%
20	19.25	20.44	20.48	20.06	100.3%
50	49.24	49.45	49.82	49.50	99.0%
100	96.97	96.42	97.73	97.04	97.0%

■ **Comparability**

FSH concentrations of 100 clinical samples were quantified independently with **ichroma™ FSH** (**ichroma™ II**) and **Comparator A** as per prescribed test procedures. Test results were compared, and their comparability was investigated with linear regression and correlation coefficient (R). The regression equation and correlation coefficient are as follows.



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hormones in the early menopausal transition: relationship to ethnicity, body size, and menopausal status. J Clin Endocrinol Metab. 2003 Apr;88(4):1516-22.

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

For technical assistance; please contact:
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