Hormone

AFIAS FSH

INTENDED USE

AFIAS FSH is a fluorescence immunoassay (FIA) for the quantitative determination of follicle-stimulating hormone (FSH) in human whole blood/serum/plasma. It is useful as an aid in management and monitoring 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 FSH 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 the detector antibodies, which is processed by the instrument for AFIAS tests to show FSH concentration in the sample.

COMPONENTS

AFIAS FSH consists of 'cartridges'.

- Each sealed aluminum pouch contains two cartridges.
- Each cartridge packaged in an aluminum pouch has three components including a cartridge part, a detector part, and a diluent part.
- The cartridge part contains the membrane called a test strip which has anti-FSH at the test lines, and Chicken IgY at the control line.
- The detector part has a granule containing anti-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).
- The diluent part contains tween 20 as a surfactant and sodium azide as a preservative in phosphate buffer saline (PBS).

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 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 cartridges. A cartridge should be used for testing one sample only.
- The cartridge should remain sealed in its aluminum 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 refrigerator, then allow cartridge and sample to be at room temperature for approximately 30 minutes before use.
- The instrument for AFIAS tests may generate slight vibration during use.
- Used cartridges and pipette tips should be handled carefully and discarded by an appropriate method in accordance with local regulations.
- This cartridge contains 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.
- **AFIAS FSH** will provide accurate and reliable results subject to the below conditions.
  - **AFIAS FSH** should be used only in conjunction with the instrument for AFIAS tests.
  - Have to use recommended anticoagulant

Recommended anticoagulant
K_2 EDTA, K_3 EDTA, Sodium heparin

LIMITATIONS 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 false negative result as it makes the 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	Unopened
		1 month	Resealed

- Return an unused cartridge to the spare cartridge zipper bag containing the desiccant pack. Reseal along entire edge of zip-seal.

MATERIALS SUPPLIED

REF SMFP-5

Components of **AFIAS FSH**

- Cartridge box:
  - Cartridge 24
  - Pipette tip (zipper bag) 24
  - Spare cartridge zipper bag 1
  - ID chip 1
  - Instructions for use 1

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately with **AFIAS FSH.** Please contact our sales division for more information.

- **Instrument for AFIAS tests**
  - **AFIAS-1** REF FPRR019
  - **AFIAS-3** REF FPRR040
  - **AFIAS-6** REF FPRR020
  - **AFIAS-10** REF FPRR038
- **Boditech Hormone Control** REF CFPO-95
- **Boditech Hormone Calibrator** REF CFPO-107
- **Boditech FSH Control** REF CFPO-230
- **Boditech FSH Calibrator** REF CFPO-256

SAMPLE COLLECTION AND PROCESSING

The sample type for **AFIAS FSH** is human whole blood/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 (whole blood, 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℃ 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 components of the **AFIAS FSH** as described below. : Cartridges, pipette tips, an ID chip, a spare cartridge zipper bag and an instructions for use.
- Ensure that the lot number of the cartridge matches that of the ID chip.
- If the sealed cartridge has 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 AFIAS tests.
- Empty the tip box.
- Insert the ID chip into the 'ID chip port'.

※ **Please refer to the instrument for AFIAS tests operation manual for complete information and operating instructions.**

TEST PROCEDURE

▶ **AFIAS-1, AFIAS-3, AFIAS-6**

General mode

1) Insert a cartridge into the cartridge holder.
2) Insert a tip into the tip hole of the cartridge.
3) Select the 'General mode' in the instrument for AFIAS tests.
4) Take 150 µL of the sample (whole blood/serum/plasma/control) using a pipette and dispense it into the sample well of the cartridge.
5) Tap the 'Start' button on the screen.
6) The test result will be displayed on the screen after 12 minutes.

▶ **AFIAS-10**

Normal mode

1) Insert a cartridge into the cartridge holder.
2) Insert a tip into the tip hole of the cartridge.
3) Tap the 'Load' button of the bay that holds the cartridge with the tip to read the barcode of the cartridge and please confirm the item name written on the cartridge.
4) Insert the sample tube into the tube rack.
5) Insert the tube rack into the loading part of the sampling station.
6) Tap the 'Start' button on the screen.
7) The test result will be displayed on the screen after 12 minutes.

Emergency mode – General tip

1) The test procedure is same with the 'Normal mode 1) – 3)'.
2) Convert the 'Emergency mode' in AFIAS-10.
3) Select the tip type (general tip) on the screen.
4) Select the sample type (whole blood/serum/plasma) on the screen.
5) Take 150 µL of the sample using a pipette and dispense it into the sample well of the cartridge.
6) Tap the 'Start' button on the screen.
7) The test result will be displayed on the screen after 12 minutes.

INTERPRETATION OF TEST RESULT

- The instrument for AFIAS tests calculates the test result automatically and displays FSH concentration of the test sample in terms of mIU/mL.
- Working range: 1-100 mIU/mL
- Reference range

Stage		AVG (mIU/mL)	Range (mIU/mL)
Females	Follicular Phase	5.97	3.00-11.25
	Mid-Cycle	11.07	6.00-21.18
	Luteal Phase	2.90	1.00-9.70
	Postmenopausal	60.49	22.46-100.00
Males		4.90	1.00-10.71

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 **AFIAS 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) 0.309 mIU/mL
  - Limit of Detection (LoD) 0.758 mIU/mL
  - Limit of Quantification (LoQ) 1 mIU/mL
- **Analytical specificity**
  - **Cross-reactivity**
    Biomolecules such as below the ones in the table were added to the test sample(s) at concentrations much higher than their normal physiological levels in the blood. **AFIAS 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 concentration mentioned below. **AFIAS FSH** test results did not show any significant interference with these materials.

Interferents	Concentration
Ascorbic acid	300 µmol/L
Bilirubin	300 µmol/L
Glucose	220 mg/dL
Hemoglobin	200 g/L
Total cholesterol	220 mg/dL
Triglycerides	250 mg/dL

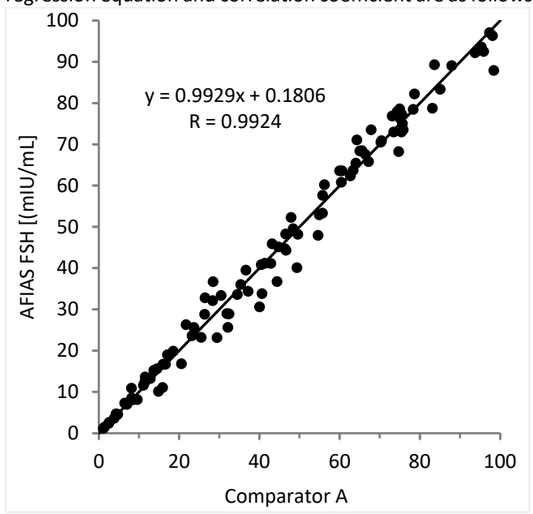
- **Precision**
  - Single-site study
    Repeatability (within-run precision)
    Within-laboratory precision (Total precision)
    Lot to lot precision
    3 Lots of **AFIAS FSH** were tested for 21 days. Each standard material was tested 2 times per day. For each test, each material was duplicated.
  - **Between persons**
    Three different persons tested **AFIAS FSH** ten times at each concentration of the control standard.
  - **Between sites**
    Three different persons tested **AFIAS FSH** at three different sites; ten times at each concentration of the control standard.
  - **Between readers**
    Three different persons tested **AFIAS FSH** with three different readers, five times at each concentration of the control standard.

Conc.	Repeatability (within-run)		Total precision (within-laboratory precision)	
[mIU/mL]	AVG	CV (%)	AVG	CV (%)
5	5.02	5.9	4.98	6.1
20	20.13	5.7	20.03	5.5
60	59.72	5.2	60.06	5.2
Conc.	Lot to lot precision		Between-person	
[mIU/mL]	AVG	CV (%)	AVG	CV (%)
5	5.00	5.9	4.97	5.5
20	19.96	5.8	20.05	5.3
60	59.93	5.6	60.38	5.5
Conc.	Between-site		Between-reader	
[mIU/mL]	AVG	CV (%)	AVG	CV (%)
5	5.04	6.3	5.08	4.8
20	19.97	6.0	19.73	5.1
60	60.04	5.4	60.26	4.5

- **Accuracy**
  The accuracy was confirmed by testing with 3 different lots of **AFIAS 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	1.01	1.00	1.02	1.01	101.1%
2	1.93	1.99	1.93	1.95	97.6%
3	3.04	3.03	3.11	3.06	102.0%
4	4.04	3.90	3.93	3.96	98.9%
5	4.96	5.05	4.99	5.00	99.9%
10	10.10	9.96	9.80	9.95	99.5%
20	19.97	20.21	20.33	20.17	100.8%
50	49.83	50.42	49.27	49.84	99.7%
100	97.23	95.81	95.03	96.02	96.0%

- **Comparability**
  FSH concentration of 100 clinical samples were quantified independently with **AFIAS FSH (AFIAS-6)** 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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Note: Please refer to the table below to identify various symbols.

Σ	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

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