Tumor

# AFIAS AFP

## INTENDED USE

**AFIAS AFP** is a fluorescence immunoassay (FIA) for the quantitative determination of AFP (Alpha Feto Protein) in human whole blood/serum/plasma. It is useful as an aid in management and monitoring of primary hepatocellular carcinoma and non seminomatous testicular cancer.

For *in vitro* diagnostic use only.

## INTRODUCTION

Alpha-fetoprotein (AFP) is a α1-globulin family of human plasma proteins and a glycoprotein with a molecular weight approximately 70 kDa. AFP is produced primarily in the liver of developing fetus. It can be found in maternal blood and in amniotic fluid since it is secreted into fetal serum. A great increase of AFP concentration in several malignant diseases mostly is primary hepatocellular carcinoma and non-seminomatous testicular cancer. Some 70-90% of patients with primary hepatocellular carcinoma and nonseminomatous testicular cancer have been observed to have high levels of AFP. High concentration of AFP also have been found in a limited number of patients diagnosed with various diseases such as gastrointestinal tract cancer, viral hepatitis, chronic active hepatitis, alcoholic cirrhosis, and adenocarcinomas of lung, pancreas, and gall bladder. Since AFP is well known to be an important prognostic indicator of non-seminomatous testicular cancer, its most definitive role is on monitoring post-treatment clinical status and the post therapeutic evaluation of patients.

## 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 AFIAS tests to show AFP concentration in the sample.

## COMPONENTS

**AFIAS AFP** 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-AFP at the test line, and rabbit IgG at the control line.
- The detector part has a granule containing anti-AFP-fluorescence conjugate, anti-rabbot IgG-fluorescence conjugate, and sodium azide as a preservative in phosphate buffered saline (PBS).
- The diluent part contains sodium azide as a preservative in Tris-HCl buffer.

## WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use only.
- Follow 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 original pouch until just before use. Do not use a cartridge, if the 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 relevant local regulations.
- The cartridge contains sodium azide ($NaN_3$), and they may cause certain health issues like convulsions, low blood pressure and 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.
- No Biotin interference was observed in **AFIAS AFP** when biotin concentration in the sample was up to 3,500 ng/mL. If a patient has been taking biotin at dosage of more than 300 mg a day, it is recommended to collect blood again 24 hours after discontinuation of biotin intake.
- **AFIAS AFP** will provide accurate and reliable results subject to the below conditions.
  - **AFIAS AFP** 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 |
| | 2 - 30°C | 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-27

Components of **AFIAS AFP**

- 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 AFP**. 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 Tumor marker Control** REF CFPO-94
- **Boditech Tumor marker Calibrator** REF CFPO-106
- **Boditech AFP Control** REF CFPO-248
- **Boditech AFP Calibrator** REF CFPO-274

## SAMPLE COLLECTION AND PROCESSING

The sample type for **AFIAS AFP** is human whole blood/serum/plasma.

- It is recommended to test the sample within 24 hours after collection.
- 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 °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 components of the **AFIAS AFP** 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 100 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 15 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 15 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 100 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 15 minutes.

## INTERPRETATION OF TEST RESULT

- The instrument for AFIAS tests calculate the test result automatically and displays AFP concentration of the test sample in terms of ng/mL.
- Working range : 5 - 350 ng/mL
- Reference range: < 7.8 ng/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 **AFIAS AFP**.

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) 0.87 ng/mL
  - Limit of Detection (LoD) 1.95 ng/mL
  - Limit of Quantitation (LoQ) 5.00 ng/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 AFP** test results did not show any significant cross-reactivity with these biomolecules.

| Cross-reactants | Concentration |
|---|---|
| CEA | 500 ng/ml |
| PSA | 400 ng/ml |
| ALP | 200 U/L |
| Albumin | 60 g/L |

- Interference

Interferents listed in the following table were added to the test sample at the concentration mentioned below. **AFIAS AFP** test results did not show any significant interference with these materials.

| Interferents | Concentration |
|---|---|
| Hemoglobin | 10 g/L |
| Bilirubin, unconjugated | 684 µmol/L |
| Triglycerides | 1500 mg/dL |
| Ascorbic acid | 5.25 mg/dL |
| Glucose | 1000 mg/dL |

- **Precision**
  - Single-site study

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

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

| Single-site study | | | | | | |
|---|---|---|---|---|---|---|
| AFP [ng/mL] | Repeatability | | Within-laboratory precision | | Lot to lot precision | |
| | AVG [ng/mL] | CV (%) | AVG [ng/mL] | CV (%) | AVG [ng/mL] | CV (%) |
| 7.5 | 7.38 | 5.50 | 7.40 | 5.46 | 7.43 | 5.49 |
| 20 | 19.91 | 6.10 | 19.93 | 5.82 | 19.77 | 6.02 |
| 200 | 198.4 | 5.48 | 199.8 | 5.80 | 200.20 | 5.79 |

  - Multi-site study

Reproducibility

1 Lot of **AFIAS AFP** 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 | | |
|---|---|---|
| AFP [ng/mL] | Reproducibility | |
| | AVG [ng/mL] | CV (%) |
| 7.5 | 7.58 | 5.14 |
| 20 | 20.25 | 5.78 |
| 200 | 198.82 | 5.94 |

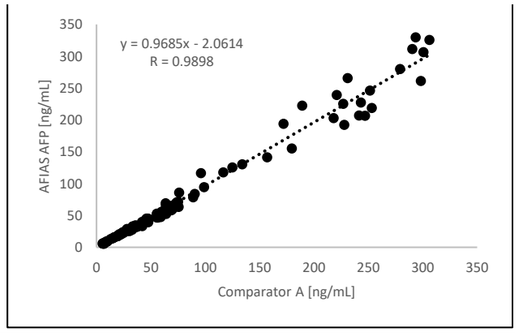
- **Accuracy**

The accuracy was confirmed by testing with 3 different lots of **AFIAS AFP**. The tests were repeated 10 times at each concentration of the control standard.

| AFP [ng/mL] | Lot 1 | Lot 2 | Lot 3 | AVG [ng/mL] | Recovery (%) |
|---|---|---|---|---|---|
| 200.0 | 195.3 | 198.3 | 196.3 | 196.6 | 98 |
| 180.8 | 183.71 | 177.31 | 176.41 | 179.14 | 99 |
| 140.8 | 141.17 | 144.85 | 144.65 | 143.56 | 102 |
| 66.7 | 65.96 | 66.05 | 65.23 | 65.75 | 99 |
| 26.8 | 27.14 | 26.45 | 26.21 | 26.60 | 99 |
| 7.5 | 7.26 | 7.56 | 7.59 | 7.47 | 100 |

- **Comparability**

AFP concentration of 100 clinical samples were quantified independently with **AFIAS AFP (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 follow.




## REFERENCES

1. Tartarinov, Y.S. Detection of embryospecific alpha-globulin in the blood sera of patients with primary liver tumor. Vopr. Med. Khim. 10:90-91 (1964).
2. Mcintire, K.R., Waidmann, T.A., Moertel, C.G. and Go, V.L.W. Serum alpha-fetoprotein in patients with neoplasms of the gastrointestinal tract. Cancer Res. 35:991-996 (1975).
3. Javadpouf, N., Mcintire, K.R. and Waidmann, T.A. Human chorionic gonadotropin (HCG) and alpha-fetoprotein (AFP) in sera and tumor cells of patients with testicular seminoma. Cancer 42:2768-2772. (1978).
4. Chen, D.S. and Sung, J.L. Relationship of Hepatitis B Surface Antigen to serum alpha-fetoprotein in nonmalignant diseases of the lever. Cancer 44:984-992 (1979).
5. Rhoslati,E. and Seppala, M. studies of carcinofetal proteins: Physical and Chemical Properties of Human alpha-fetoprotein. Int. J. Cancer 7:218-225 (1971).
6. Abelev,G.I. Alpha-fetoprotein in oncogenesis and its association with malignant tumors. Adv. Cancer Res. 7:295-358 (1971).
7. Wespic, H.C. Alpha-fetoprotein: its quantification and relationship to neoplastic disease, ppp 115-129 In Alpha-fetoprotein, Laboratory Procedures and Clinical Applications, Kirkpatirck, A. and Nakamuram R (eds.), Masson Publishing, New York (1981) After Radical Prostatectomy. J. Urol. 142:1082-90 (1989).

**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 |

For technical assistance, please contact:
**Boditech Med Inc.'s Technical Services**
Tel: +(82) -33-243-1400
E-mail: TS@boditech.co.kr

**Boditech Med Inc.**
43, Geodudanji 1-gil, Dongnae-myeon, Chuncheon-si,
Gang-won-do, 24398, Republic of Korea
Tel: +(82) -33-243-1400
Fax: +(82) -33-243-9373
www.boditech.co.kr

EC REP **Obelis s.a.**
Bd. Général Wahis 53, 1030 Brussels, Belgium
Tel: +(32) -2-732-59-54
Fax: +(32) -2-732-60-03
E-Mail: mail@obelis.net

CE IVD