Cardiac

AFIAS Tn-I Plus

INTENDED USE

AFIAS Tn-I Plus is a fluorescence immunoassay (FIA) for the quantitative determination of cardiac Tn-I (troponin-I) in human whole blood/serum/plasma. It is useful as an aid in management and monitoring of acute myocardial infarction (AMI).

For *in vitro* diagnostic use only.

INTRODUCTION

Cardiac troponins are currently the most sensitive and specific biochemical markers of myocardial necrosis. There are three types of troponin in heart muscle fibers. Those are troponin-C, -I, and -T. Together they contribute to make cardiac muscle fibers contract. The clinical measurement of serum Tn-I has become an important tool in the diagnosis of acute myocardial infarction. Serum Tn-I is a more reliable than creatine kinase as a prognostic marker in people with ischemic chest pain. National and international scientific organizations have suggested the use of troponins, Tn-I and Tn-T, when implementing new diagnostic strategies in patients with acute coronary syndrome.

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 streptavidin 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 Tn-I concentration in the sample.

COMPONENTS

AFIAS Tn-I Plus consists of a 'cartridges'.

- Each sealed aluminum pouch contains two cartridges.
- Each cartridge packaged in an aluminum pouch has three components including cartridge part, detector part and a diluent part.
- The cartridge part contains the membrane called a test strip, which has streptavidin at the test line, and chicken IgY at the control line.
- The detector part has 2 granules containing anti-Tn-I-fluorescence conjugate, biotin-anti-Tn-I conjugate, anti-chicken IgY-fluorescence conjugate and sodium azide in Tris-Cl buffer.
- The diluent part contains Tween-20, and sodium azide in Tris-Cl buffer.

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 test components between different lots or use 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 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 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.
- No Biotin interference was observed in **AFIAS Tn-I Plus** when biotin concentration in the sample was below 5 ng/mL. If a patient has been taking biotin at dosage of more than 0.03 mg a day, it is recommended to test again 24 hours after discontinuation of biotin intake.
- **AFIAS Tn-I Plus** will provide accurate and reliable results subject to the below conditions.
  - **AFIAS Tn-I Plus** should be used only in conjunction with the instrument for AFIAS tests.
  - Have to use recommended anticoagulant.

Recommended anticoagulant
Sodium heparin, Lithium heparin, Sodium citrate

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 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-35

Components of **AFIAS Tn-I Plus**

- 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 Tn-I Plus**.

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 Tn-I Plus Control** REF CFPO-212
- **Boditech Tn-I Plus Calibrator** REF CFPO-213

SAMPLE COLLECTION AND PROCESSING

The sample type for **AFIAS Tn-I Plus** 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 °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 Tn-I Plus** 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 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 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 12 minutes.

INTERPRETATION OF TEST RESULT

- The instrument for AFIAS tests calculates the test result automatically and displays Tn-I concentration of the test sample in terms of ng/mL.
- Working range : 0.01-15.00 ng/mL.
- **Expected Values**
  - In studies performed with the **AFIAS Tn-I Plus** assay involving 125 healthy volunteers in Korea, the upper reference limit (99th percentile) for Tn-I was 0.04 ng/mL. The lowest concentration with a CV less than or equal to 10 % with the **AFIAS Tn-I Plus** assay was 0.04 ng/mL.
  - Due to the release kinetics of Tn-I, a result below the decision limit within the first hours of the onset of symptoms does not rule out myocardial infarction with certainty. If myocardial infarction is still suspected, repeat the test at appropriate intervals.

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 Tn-I Plus.** 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)	0.004 ng/mL
Limit of Detection (LoD)	0.01 ng/mL
Limit of Quantitation (LoQ)	0.03 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 Tn-I Plus** test results did not show any significant cross-reactivity with these biomolecules.

Cross-reactants	Concentration
CK-MB	60 ng/mL
NT-proBNP	1,000 ng/mL
Myoglobin	1,000 ng/mL
D-Dimer	1,000 ng/mL
Myosin	1,000 ng/mL
Cardiac troponin C	250 ng/mL
Skeletal troponin I	250 ng/mL
Tropomyosin	1,000 ng/mL
Cardiac troponin T	125 ng/mL
Actin	1,000 ng/mL

  - Interference

Interferents listed in the following table were added to the test sample at the concentration mentioned below. **AFIAS Tn-I Plus** test results did not show any significant interference with these materials except for EDTA.

Interferents	Concentration
Bilirubin	350 µmol/L
Cholesterol	13 mmol/L
D-glucose	1,000 mg/dL
Hemoglobin	2 g/L
L-Ascorbic acid	350 µmol/L
Triglyceride mixture	500 mg/dL
Sodium Heparin	3,000 U/L
Li Heparin	3,000 U/L
Sodium citrate	2 mg/mL
K_2 EDTA	3.4 µmol/L
K_3 EDTA	3.4 µmol/L

- **Precision**
  - Single site study

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

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

	Single-site study					
Tn-I Plus [ng/mL]	**Repeatability**		**within-laboratory precision**		**Lot to lot precision**	
	AVG [ng/mL]	CV (%)	AVG [ng /mL]	CV (%)	AVG [ng/mL]	CV (%)
0.23	0.25	6.1	0.24	6.6	0.24	7.3
0.94	0.92	8.5	0.91	8.1	0.94	8.1
7.50	8.08	6.7	7.93	6.7	7.71	7.5

  - Multi-site study

Reproducibility

1 Lot of AFIAS Tn-I Plus 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	
Tn-I Plus [ng/mL]	**Reproducibility**	
	AVG [ng/mL]	CV (%)
0.23	0.23	7.6
0.94	0.94	7.5
7.50	7.73	7.6

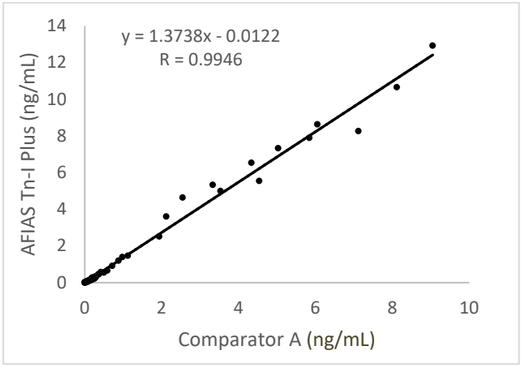
- **Accuracy**

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

Tn-I Plus [ng/mL]	Lot 1	Lot 2	Lot 3	AVG [ng/mL]	Recovery (%)
0.05	0.05	0.05	0.05	0.05	98.6%
0.62	0.63	0.60	0.63	0.62	100.2%
1.52	1.53	1.50	1.54	1.52	100.3%
2.42	2.46	2.39	2.53	2.46	101.7%
3.02	2.94	3.05	2.97	2.99	98.9%
4.01	3.96	4.06	4.06	4.03	100.5%
6.01	6.05	6.11	5.92	6.03	100.3%
12	12.35	12.02	12.34	12.24	102.0%

- **Comparability**

Tn-I concentration of 100 clinical samples were quantified independently with **AFIAS Tn-I Plus (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.



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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

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

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