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Infection

AFIAS PCT

INTENDED USE

AFIAS PCT is a fluorescence Immunoassay (FIA) for the quantitative determination of Procalcitonin (PCT) in human whole blood/serum/plasma. It is useful as an aid in management and monitoring of bacterial infection and sepsis.

For *in vitro* diagnostic use only.

INTRODUCTION

Identifying sepsis is a daily challenge in intensive care unit of every hospital. Early assessment of sepsis is vital for determination of the appropriate treatment since various therapeutic strategies are known to improve survival of patients with sepsis.

In healthy people, the concentration of plasma PCT is below 0.1 ng/mL. The level of PCT rises rapidly after a bacterial infection with systemic consequences. It can also be elevated by other situation such as major surgery, severe burns, or in neonates. However, it returns to baseline rapidly. Viral infections, bacterial colonization, localized infections, allergic disorders, autoimmune diseases, and transplant rejection do not usually induce a significant PCT response (values <0.5 ng/mL). Therefore, by evaluating PCT concentrations, the physicians are able to engage in the risk assessment for progression to severe sepsis and septic shock.

PRINCIPLE

The test uses a sandwich immunodetection method; the detector antibody in buffer binds to antigen in sample, forming antigen-antibody complexes, and migrates onto nitrocellulose matrix to be captured by the other immobilized-antibody on test strip.

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

COMPONENTS

AFIAS PCT consists of 'cartridges'.

- Each cartridge packaged in an aluminum pouch has two components, including a detector part and cartridge part.
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- The cartridge part contains the membrane called a test strip which has anti human PCT at the test line, while chicken IgY at the control line.
- The detector part contains anti human PCT-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) and it is pre-dispensed in vial. The detector diluent is packed in a box.

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.
- For shipping of samples, it must be packed and shipped in accordance with the regulations.
- 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 disposed by an appropriate method in accordance with relevant local regulations.
- Detection buffer contain 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.
- **AFIAS PCT** will provide accurate and reliable results subject to the below conditions.
  - **AFIAS PCT** should be used only in conjunction with the instrument for AFIAS tests.
  - Have to use recommended anticoagulant.

Recommended anticoagulant
K_2EDTA, K_3EDTA, Lithium heparin, Sodium-Heparin, Sodium Citrate

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 antigen to the antibodies which is the most common if where 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 antigen with time and/or temperature may also cause false negative result 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 in conjunction with clinical symptoms and other relevant test results.

STORAGE AND STABILITY

Component	Storage condition: Storage Temperature	Shelf life	Note
Cartridge	2 - 8 °C	20 months	Unopened
	2 - 8 °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-7

Components of **AFIAS PCT**

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

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from **AFIAS PCT**. 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 PCT Control** REF CFPO-97
  - **Boditech PCT Calibrator** REF CFPO-109

SAMPLE COLLECTION AND PROCESSING

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

- It is recommended to test the sample within 24 hours after collection.
- Take precautions on the collected sample because it's reported the concentration is rapidly changed when the sample for PCT test is kept at room temperature or refrigerated.
- It is recommended to test the sample immediately after collection.
- The samples 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 6 hours at room temperature and 24 hours at 2-8°C prior to testing. If testing will be delayed more than 24 hours , 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.
- 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 PCT** as described below: Cartridge, pipette tip, ID chip, a Spare Cartridge Zipper bag and an instructions for use.
- 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 each instrument for AFIAS tests 'Operation Manual' for complete information and operating instructions.

TEST PROCEDURE

▶ **AFIAS-6, AFIAS-1, AFIAS-3**

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 200 µL of the sample (whole blood/serum/plasma/ control) using pipette and dispense it into the sample well of the cartridge.
5) Tap the 'Start' button on the screen.
6) The test results 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 200 µL of the sample with 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 calculate the test result automatically and displays PCT concentration of the test sample in terms of ng/mL.
- The cut-off (reference value) : 0.5 ng/mL
  - **AFIAS PCT** test should be considered as a screening tool only. In case of a positive result (above 0.5 ng/mL), consult a physician to discuss the test result. The physician may decide further course of action.
  - Test result of ≥ 2 ng/mL may reflect severe sepsis.

Diagnosis of bacterial infection/sepsis	
[ng/mL]	state
PCT < 0.5	Local bacterial infection is possible
0.5 < PCT < 2	Infection is possible
2 < PCT < 10	Infection (sepsis) is likely, unless other cause are known
PCT > 10	Severe bacterial sepsis or septic shock

- Working range : 0.1-100 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 not provided with **AFIAS PCT**. 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)	0.04 ng/mL
Limit of Detection (LoD)	0.06 ng/mL
Limit of Quantification (LoQ)	0.10 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 PCT** test results did not show any significant cross-reactivity with these biomolecules.

No.	Cross-reactivity material	Conc.
1	CEA	500 µg /mL
2	AFP	300 µg /mL
3	ALT	500 µg /mL
4	Troponin I	500 ng/mL
5	Pro-BNP	100 ng/mL
6	Pro-GRP	100 ng/mL
7	Pro-ANP	100 ng/mL

[Interference]

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

No.	Interference materials	Conc.
1	Bilirubin(unconjugated)	0.3 mmol/L
2	Cholesterol	6 mmol/L
3	Glucose	60 mmol/L
4	Ascorbic acid	300 µmol/L
5	Triglyceride, total	20 mmol/L
6	K2EDTA	4.0 µmol/L
7	K3EDTA	4.0 µmol/L
8	Li-Heparin	400 µmol/L
9	Sodium-Heparin	400 µmol/L
10	Sodium Citrate	4.0 mol/L
11	Biotin	3500 ng/ml

- **Precision**
  - Single-site study

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

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

Reproducibility

1 Lot of **AFIAS PCT** 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.

Conc. [ng/ml]	Single-site study			
	Repeatability		Within-laboratory precision	
	Mean [ng/ml]	CV (%)	Mean [ng/ml]	CV (%)
0.5	0.50	3.9	0.50	4.0
12.5	12.43	3.8	12.43	4.1
50.0	49.22	4.0	49.64	4.0
Conc. [ng/ml]	Single-site study		Multi-site study	
	Lot to lot precision		Reproducibility	
	Mean [ng/ml]	CV (%)	Mean [ng/ml]	CV (%)
0.5	0.50	4.0	0.51	6.2
12.5	12.53	4.2	12.52	5.5
50.0	49.9	4.1	49.79	6.1

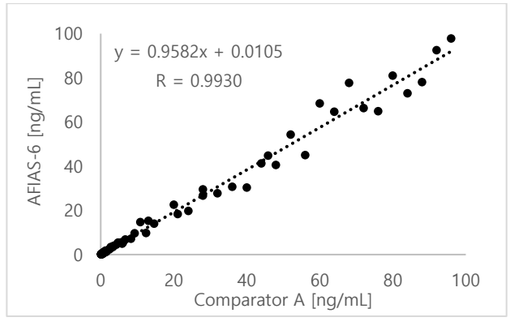
- **Accuracy**

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

Expected value [ng/mL]	Lot 1	Lot 2	Lot 3	AVG	Recovery (%)
50	50.18	49.35	49.44	49.65	99.3
20	19.68	20.15	19.88	19.90	99.5
10	10.03	10.05	9.97	10.02	100.2
5	4.97	5.04	4.97	4.99	99.9
2	1.99	2.00	2.01	2.00	100
0.5	0.50	0.50	0.49	0.50	99.5

- **Comparability**

PCT concentration of 100 clinical samples were quantified independently with AFIAS PCT 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

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