BIO TECHNOLOGY boditech

Cardiac

ichroma™ Tn-I

INTENDED USE

ichroma™ Tn-I is a fluorescence immunoassay (FIA) for the quantitative determination of cardiac Tn-I (Troponin-I) in human 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 troponins in heart muscle fibers. Those are troponin-C, troponin-I, and troponin-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 antibody 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 Tn-I concentration in the sample.

COMPONENTS

ichroma™ Tn-I consists of 'cartridges' and 'detector buffer vial'.

- The cartridge contains, the membrane called a test strip which has anti-Tn-I at the test line, and streptavidin at the control line. All cartridges are individually sealed in an aluminum foil pouch containing a desiccant, and they are further packaged in a cartridge box.
- The detector buffer vial contains anti-Tn-I-fluorescence conjugate, biotin-BSA-fluorescence conjugate, and sodium azide as a preservative in phosphate buffered saline (PBS). It is pre-dispensed in a vial. The detector buffer vial is further packed in a styrofoam box with ice-pack for the shipment.

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 buffer vial, and ID chip) must match with each others.
- 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 or sample mixing tubes. A cartridge should be used for testing one sample only. A sample mixing 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 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, detector buffer vial 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 sample mixing tube and pipette tips should be handled carefully and discarded by an appropriate method in accordance with relevant local regulations.
- The detector buffer vial 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 **ichroma™ Tn-I** when biotin concentration in the sample was below 20 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.
- **ichroma™ Tn-I** will provide accurate and reliable results subject to the below conditions.
  - **ichroma™ Tn-I** should be used only in conjunction with the instrument for ichroma™ 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	Disposable
Detector buffer vial	2 - 8°C	20 months	Disposable

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

MATERIALS SUPPLIED

REF 13011

Components of **ichroma™ Tn-I**

- Cartridge box:
  - Cartridge 25
  - ID chip 1
  - Instructions for use 1
  - Sample mixing tubes 25
- Detector buffer vial 1

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately with **ichroma™ Tn-I**.

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**
  - **ichroma™ 50 PLUS** REF **FPRR036**
- **Printer** REF **FPRR007**
- **Boditech Cardiac Control** REF **CFPO-98**
- **Boditech Tn-I Control** REF **CFPO-241**

SAMPLE COLLECTION AND PROCESSING

The sample type for **ichroma™ Tn-I** is human serum/plasma.

- It is recommended to test sample within 8 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 day 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 4 months showed no performance difference.
- As a repeated freeze-thaw cycle may affect the test result, do not refreeze previously frozen samples.

TEST SETUP

- Check the contents of **ichroma™ Tn-I**: Sealed cartridges, a detector vial, sample mixing tubes, an ID chip and an instructions for use.
- Ensure that the lot number of the cartridges matches that of the detector vial as well as an ID chip.
- If the sealed cartridge, the sample mixing tubes and the detector vial 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 75 µL of detector buffer using a pipette and dispense it to the sample mixing tube.
2) Take 75 µL of sample (serum/plasma/control) using a pipette and dispense it to the sample mixing tube.
3) Close the lid of the detector tube and mix the sample thoroughly by shaking it about 10 times.
   (The sample mixture 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 12 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 12 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'.

▸ **ichroma™-50 PLUS**

1) Insert the tip array in the tip station.
2) Insert the detector tube in the reagent station and cover the reagent station to hold the detector tubes in place.
3) Open the lid of the detector diluent and insert the detector diluent in the diluent station.
4) Insert the cartridge magazine with the cartridges into the magazine station.
5) Insert the sample tube into the blood collection tube rack and load the blood collection tube rack into the sampling station (loading part).
6) Tap the button located in the upper side of the No. of test cartridge region to select the ID chip that you want to use.
7) When the selected cartridge slot is activated, set the number of the detector tube by tapping.
8) Set the number of pipette tips by tapping.
9) Tap the 'Start' button on the left upper of the main screen to start test.

INTERPRETATION OF TEST RESULT

- The instrument for ichroma™ tests calculates the test result automatically and displays Tn-I concentration of the test sample in terms of ng/mL.
- **Result**
  - Alternate When selecting the alternate result unit, μg/L, the conversion factor used by the ichroma system is 1.0. The conversion formula to change to the alternate result unit is ng/mL x 1.0 = μg/L
  - Working range: 0.10 - 50 ng/mL
- **Expected Values**
  - In studies performed with the **ichroma™ Tn-I** assay involving 124 healthy volunteers in Korea, the upper reference limit (99th percentile) for Tn-I was 0.11 ng/mL. The lowest concentration with a CV less than or equal to 10% with the **ichroma™ Tn-I** assay was 0.50 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.
  - A cut-off of 0.3 ng/mL Tn-I is recommended for diagnosis of AMI, as this yields optimal performance of 91 % of sensitivity and 92.1 % of specificity. However, laboratories should establish their own diagnostic cutoff concentration based on the clinical practice at their perspective institutions.

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™ Tn-I**. For more information regarding 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) 0.07 ng/mL
  - Limit of Detection (LoD) 0.10 ng/mL
  - Limit of Quantitation (LoQ) 0.30 ng/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™ Tn-I** test results did not show any significant cross-reactivity with these biomolecules.

Cross-reactants	Concentration
CK-MB	1,000 ng/mL
NT-proBNP	1,000 ng/mL
Myoglobin	1,000 ng/mL
D-Dimer	1,000 ng/mL

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

Interferents	Concentration
L-Ascorbic acid	175 μmol/L
Bilirubin (unconjugated)	684 μmol/L
Cholesterol	10.3 mmol/L
D-glucose	55.5 mmol/L
Hemoglobin	10 g/L
Triglyceride mixture	16.94 mmol/L
Heparin	330 U/dL
Sodium citrate	2 mg/mL

- **Precision**
  - Single site study

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

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

Tn-I [ng/mL]	Repeatability		Within-laboratory precision		Lot to lot precision	
	AVG [ng/mL]	CV (%)	AVG [ng/mL]	CV (%)	AVG [ng/mL]	CV (%)
1.56	1.55	6.8	1.54	6.1	1.56	5.7
3.13	3.18	5.4	3.12	5.6	3.12	5.7
6.25	6.34	5.7	6.27	6.0	6.27	6.1

  - Multi-site study

    1 Lot of **ichroma™ Tn-I** 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.

Tn-I [ng/mL]	Reproducibility	
	AVG [ng/mL]	CV (%)
1.56	1.56	5.8
3.13	3.14	6.1
6.25	6.23	6.1

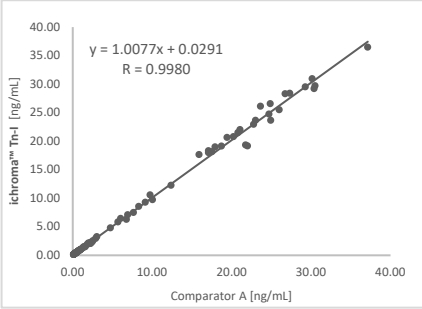
- **Accuracy**

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

Tn-I [ng/mL]	Lot 1	Lot 2	Lot 3	AVG [ng/mL]	Recovery (%)
0.38	0.38	0.38	0.38	0.38	-
2.78	2.86	2.76	2.65	2.75	99.2
5.00	4.74	4.90	4.94	4.86	97.2
7.50	7.13	7.28	7.17	7.19	95.9
15.00	14.65	14.29	14.77	14.57	97.1
25.00	24.83	25.04	25.38	25.08	100.3

- **Comparability**

  Tn-I concentrations of 100 samples were quantified independently with **ichroma™ Tn-I (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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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:
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

 **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