**i-CROMA™ CK-MB**

**INTENDED USE**

*i-CROMA™ CK-MB* along with *i-CROMA™ Reader* is a fluorescence immunoassay that measures concentration of Creatine Kinase Isoenzyme-MB (CK-MB) in human whole blood/serum/plasma.

**INTRODUCTION**

Creatine Kinase (CK), also known as Creatine Phosphokinase or Phospho-creatinine, is an enzyme expressed by various tissues and cell types. Disruption of cell membranes due to hypoxia or other injury releases CK from the cellular cytosol into the systemic circulation. CK is a dimeric enzyme consisting of two subunits, which can be either B- (brain type) or M- (muscle type). These subunits associate to form three isoenzymic forms: CK-BB, CK-MM, and CK-MB. These isoenzymes are expressed at different levels in various human tissues. Though CK-MM is the most abundant CK isoenzyme in the cardiac muscles, CK-MB constitutes about 20% of the total CK in the cardiac muscle tissue. Elevated levels of total CK is not specific to the myocardial tissue and may be observed in patients with skeletal muscle injury and certain other disorders but as CK-MB is more specific to myocardial tissue, CK-MB levels along with total CK can be considered as an important diagnostic indicator of myocardial infarction. The concentration of CK-MB in the healthy adult is below 7.0ng/ml but it shows great increases in several malignant diseases, mostly primary coronary syndrome, myocardial injury and infarction. CK-MB has been found to be more sensitive and early indicator of myocardial injury because it has a lower basal level and a much narrower normal range. Medical literature commonly reveals that following an acute myocardial infarction, CK-MB levels become elevated in 4 to 9 hours after the onset of chest pain, attain peak at 10 to 24 hours, and return to normal within 2 to 3 days. Use of CK-MB level as a percentage of total CK in the diagnosis of myocardial infarction is the most important clinical application of CK measurements in clinical chemistry.

**PRINCIPLE**

*i-CROMA™ CK-MB* is based on an immunoassay system using antigen-antibody reaction and fluorescence technology. When a test sample and the detection buffer are mixed thoroughly and then loaded in to the sample well on the test cartridge, the complexes of antibody (anti-CK-MB) – antigen (CK-MB) - antibody (anti-CK-MB) produce fluorescence on the membrane of the test cartridge. Thus, more the CK-MB in the test sample, more the complexes that get accumulated on the test cartridge membrane.

*i-CROMA™ Reader* scans the intensity of fluorescence on the test cartridge membrane, and then displays CK-MB concentration on the LCD screen of the reader.

**COMPONENTS AND REAGENTS**

*i-CROMA™ CK-MB* consists of a Test Cartridge, an ID Chip and a Detection Buffer Vial.

- The test cartridge contains a test strip; on the membrane of which, murine antibodies against human CK-MB and streptavidin have been immobilized.
- Each test cartridge is individually sealed with a desiccant in an aluminum foil pouch. 25 sealed test cartridges are packed in a box which also contains an ID chip.
- The detection buffer; pre-dispensed in a vial contains fluorescent-labeled anti-CK-MB antibodies, fluorescent biotin-labeled bovine serum albumin (BSA), bovine serum albumin (BSA) as a stabilizer and sodium azide in phosphate buffered saline (PBS) as a preservative.
- 4 mL detection buffer is dispensed in a vial which is further packed in a Styrofoam box provided with ice packs for the purpose of shipment.

**WARNINGS AND PRECAUTIONS**

- For in vitro diagnostic use only.
- Carefully follow the instructions and procedure described in this insert.
- Do not use the test cartridge if its lot number printed on the aluminum foil pouch does not agree with that on the ID chip.
- Do not interchange materials from different product lots; nor use the product beyond the expiration date. Use of a test cartridge beyond the expiration date may offer misleading test results.
- A sample mixing tube should be used for one specimen only. Please discard it after single use.
- The test cartridge should remain sealed in its original pouch until just prior to use. Do not use the test cartridge should the pouch be damaged or the seal broken. Discard it after single use.
- Used test cartridges and sample mixing tubes are potentially infectious. Therefore the used materials should be handled carefully by appropriate method.
- Do not eat the dehumidifying agent (Silica gel) placed inside the test cartridge pouch.
- Do not smoke, eat or drink in the area where test samples or test reagents are handled.
- *i-CROMA™ CK-MB* is compatible only with *i-CROMA™ Reader*.
- *i-CROMA™ CK-MB* as well as the *i-CROMA™ Reader* should be used away from vibration and/or magnetic field. During normal usage, *i-CROMA™ Reader* may produce minor vibrations, which should be regarded as normal.
- Sodium azide is not likely to be a human health hazard in the quantity present in the *i-CROMA™ CK-MB* detection buffer. Generally, exposure to larger quantities of sodium azide may cause certain health issues like convulsions, low blood pressure and heart rate, loss of consciousness, lung injury and respiratory failure.

**STORAGE AND STABILITY**

- The detection buffer dispensed in the vial is stable for up to 20 months if stored at 2-8°C.
- *i-CROMA™ CK-MB* test cartridge is stable for up to 20 months (while sealed in the aluminum foil pouch) if stored at 4-30°C.
- If stored in a refrigerator, allow a minimum of 30 minutes for the test cartridges and detection buffer vials to attain room temperature prior to performing the test.
- Do not remove the test cartridge from the aluminum foil pouch until just prior to use. The test cartridge should be used immediately once removed from the pouch.
- After the test cartridge pouch and the detection buffer vial are opened, *i-CROMA™ CK-MB* test should be performed within 30 minutes.

**LIMITATIONS OF THE TEST SYSTEM**

*i-CROMA™ CK-MB* provides accurate and reliable results subject to the following constraints:

- Use *i-CROMA™ CK-MB* only with *i-CROMA™ Reader*.
- Always use freshly collected and/or processed blood sample.
- *i-CROMA™ CK-MB* is meant for single use only. Do not reuse.
- False positive results may occur due to cross-reactions of some components of blood sample with the antibodies and/or non-specific adhesion of some components of blood that have similar epitopes to capture and detect the antibodies.
- In case of false negative results, the most common factor is non-responsiveness of the antigen to the antibodies due to its epitopes being masked by some unknown components such that the antigen cannot be detected by the antibodies.
- The effectiveness of the test is highly dependent on storage of the test kits and test samples at optimal conditions.
MATERIALS SUPPLIED

**REF**: CFPC-33

Components of i-CHROMA™ CK-MB

- **Test Cartridge Box**: 1
  - Sealed Test Cartridges: 25
  - ID Chip: 1
  - Package Insert: 1
  - Sample Mixing Tubes: 25
- **Detection Buffer Vial**: 1
  - The vial containing 4 ml detection buffer is delivered separately from the test cartridge box. It is further packed in a styrofoam box provided with ice packs for the purpose of shipment.

MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from i-CHROMA™ CK-MB. Please contact our sales division for more information.

- i-CHROMA™ Reader (**REF**: FR-203)
- i-CHROMA™ CK-MB Control
- Thermal Printer

TEST SETUP

1. Check the contents of i-CHROMA™ CK-MB: 1 ID Chip, 25 Sealed Test Cartridges, 1 Vial pre-filled with 4 ml Detection Buffer.
2. Check and ensure that the lot number of the test cartridge matches with that of the ID chip.
3. Keep the i-CHROMA™ CK-MB test cartridge and detection buffer vial at room temperature for at least 30 minutes before use. Place the test cartridge on a clean, dust-free and flat surface.
4. Turn on the power supply of the i-CHROMA™ Reader.
5. Insert the ID Chip into the ID chip port of the i-CHROMA™ Reader.
6. Press the ‘Select’ button on the i-CHROMA™ Reader. (Please refer to the ‘i-CHROMA™ Reader Operation Manual’ for complete information and operating instructions.)

SAMPLE COLLECTION AND PROCESSING

The test can be performed on either whole blood or serum or plasma.

- For obtaining the serum sample, collect the blood in a tube without an anticoagulant and allow it to clot. Separate the serum from the clot as soon as possible to avoid hemolysis.
- For obtaining the plasma sample, collect the blood in a tube treated with EDTA or heparin. Use of anticoagulants other than EDTA and heparin has not been evaluated for the purpose of this test.
- If the test cannot be performed within an hour after preparation of the test samples, the serum/plasma should be stored at -20°C.

TEST PROCEDURE

1. Transfer 75 µL of whole blood/serum/plasma to an empty sample mixing tube using a transfer pipette. Add 150 µL detection buffer to it.
2. Mix the sample thoroughly with the detection buffer with the help of the pipette and/or vigorous shaking.
3. Pipette out 75 µL of the above sample mixture and load it into the sample well on the test cartridge.
4. Leave the sample-loaded test cartridge at room temperature for 12 minutes.
5. For scanning the sample-loaded test cartridge, insert it into the test cartridge holder of the i-CHROMA™ Reader. Ensure proper orientation of the test cartridge before pushing it all the way inside the test cartridge holder of the i-CHROMA™ Reader. An arrow has been marked on the test cartridge especially for this purpose.
6. To start scanning, press the ‘Select’ button.
7. i-CHROMA™ Reader will automatically start scanning the sample-loaded test cartridge immediately.
8. Read the test result on the display screen of the i-CHROMA™ Reader.

INTERPRETATION OF TEST RESULT

- i-CHROMA™ Reader calculates the test result automatically and displays CK-MB concentration in ng/mL on the LCD screen.
- The cut-off (reference value) of i-CHROMA™ CK-MB is 7.00 ng/mL.
- If the test result is above 7.00 ng/mL of CK-MB, please consult the physician immediately for detail investigation further.
- The working range of i-CHROMA™ CK-MB is 3-100 ng/mL.
- i-CHROMA™ CK-MB test is meant only as a screening tool. In case of a positive result (above 7.00 ng/mL), consult the physician to discuss the test result. The physician may decide whether to run more tests further.

QUALITY CONTROL

- Control tests should be performed as a part of the good testing practice to confirm the expected quality control results and validity of the assay as well as to ensure accuracy of the test results with clinical samples.
- A quality control test should be performed at regular intervals. Before testing the clinical sample using a new test, control standards should be tested to confirm the test procedure, and to verify whether the test produces the expected quality control results. Quality control tests should also be performed whenever there is any question concerning the validity of the results obtained.
- Control standards are not provided with i-CHROMA™ CK-MB. For more information regarding obtaining the control standards, contact Boditech Med Inc.’s Technical Services for assistance.
- **Internal Control**: i-CHROMA™ CK-MB has an in-built quality control indicator that satisfies the routine quality control requirements. This internal control test is performed each time a clinical sample is tested. A valid control indicates that the cartridge was inserted and read properly by the i-CHROMA™ Reader. An invalid result from the internal control leads to display an error message on the i-CHROMA™ Reader indicating that the test should be repeated.

PERFORMANCE CHARACTERISTICS

1. **Specificity/Interference**: Biomolecules such as heparin, protein kinase A (PKA), autoantibodies, free and binary or ternary troponin complex were added to the test samples at levels much higher than their normal physiological levels. There was neither any significant interference from these biomolecules with the i-CHROMA™ CK-MB test measurements nor any significant assay cross-reactivity with these biomolecules.
2. **Precision**: For testing intra-assay precision, one person tested three different lots of i-CHROMA™ CK-MB, ten times at each concentration. For testing inter-assay precision under the same conditions, three persons tested three different lots of i-CHROMA™ CK-MB, three times at each concentration of the control standard.

Intra-assay precision of i-CHROMA™ CK-MB

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<th>Serum/Plasma</th>
<th>Whole Blood</th>
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<td>Mean</td>
<td>SD</td>
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### Inter-assay precision of i-CHROMA™ CK-MB

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<th>Whole Blood</th>
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<tbody>
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### 3. Comparability (Correlation): CK-MB concentrations of 100 clinical samples were quantified independently with i-CHROMA™ CK-MB and VIDAS multiparametric immunoassay testing system (BioMerieux Inc., USA). Results of both the test methods were analyzed and their compatibility was investigated with linear regression and coefficient of correlation (R). The coefficient of correlation between the two methods was found to be 0.9847.

![Graph showing comparison between i-Chroma CK-MB and VIDAS CK-MB](image)

### REFERENCES


### Note: Please refer to the table below to identify various symbols

- **i-Chroma**: Read instructions for use
- **LOT**: Batch code
- **REF**: Catalog number
- **Caution**: Manufacturer
- **Authorised representative the European Community**: In vitro diagnostic medical device
- **Do Not Reuse**: Temperature limitation
- **EC CE**: This product fulfills the requirements of the Directive 98/79/EC on in vitro diagnostic medical devices

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