



Chuangxingwell



MYO/CKMB/cTnI Combo Rapid Test Kit



A rapid test for the diagnosis of myocardial infarction (MI) to detect Myoglobin, CK-MB and cardiac Troponin I (cTnI) qualitatively in whole blood, serum or plasma. For professional in vitro diagnostic use only.

INTENDED USE

MYO/CKMB/cTnI Combo Rapid Test Kit is a rapid chromatographic immunoassay for the qualitative detection of human Myoglobin, CK-MB and cardiac Troponin I (cTnI) in whole blood, serum or plasma as an aid in the diagnosis of myocardial infarction (MI).

SUMMARY AND EXPLANATION OF THE TEST

Myoglobin (MYO), Creatine Kinase MB (CK-MB) and cardiac Troponin I (cTnI) are proteins released into the bloodstream after cardiac injury. Myoglobin is a heme-protein normally found in skeletal and cardiac muscle with a molecular weight of 17.8 kDa. When muscle cells are damaged, Myoglobin is released into the blood rapidly due to its relatively small size. The level of Myoglobin increases measurably above baseline within two to four hours post-infarct, peaking at nine to 12 hours, and returning to baseline within 24-36 hours. CK-MB is an enzyme also present in the cardiac muscle, with a molecular weight of 87.0 kDa. Creatine Kinase is a dimeric molecule formed from two subunits designated as "M" and "B", which combine to form three different isoenzymes, CK-MM, CK-BB and CK-MB. CK-MB is the isoenzyme of Creatine Kinase most involved in the metabolism of cardiac muscle tissue. The release of CK-MB into the blood following an MI can be detected within three to eight hours after the onset of symptoms. It peaks within nine to 30 hours, and returns to baseline levels within 48 to 72 hours. Cardiac Troponin I is a protein found in cardiac muscle, with a molecular weight of 22.5 kDa. Troponin I is part of a three subunit complex comprised of Troponin T and Troponin C. Along with tropomyosin, this structural complex forms the main component that regulates the calcium sensitive ATPase activity of actomyosin in striated skeletal and cardiac muscle. After cardiac injury occurs, Troponin I is released into the blood four to six hours after the onset of pain. The release pattern of Troponin I is similar to CK-MB, but while CK-MB levels return to normal after 72 hours, Troponin I remains elevated for six to 10 days, thus providing for a longer window of detection for cardiac injury.

MYO/CKMB/cTnI Combo Rapid Test Kit is a simple test that utilizes a combination of antibody-coated particles and capture reagents to qualitatively detect Myoglobin, CK-MB and cardiac Troponin I (cTnI) in whole blood, serum or plasma. The minimum detection level is 50 ng/mL Myoglobin, 5 ng/mL CK-MB and 0.5 ng/mL Troponin I.

BIOLOGICAL PRINCIPLES

MYO/CKMB/cTnI Combo Rapid Test Kit is a qualitative, membrane based immunoassay for the detection of Myoglobin, CK-MB and cardiac Troponin I (cTnI) in whole blood, serum or plasma. The membrane is pre-coated with specific capture antibodies in each of the test line regions of the test. During testing, the whole blood, serum or plasma specimen reacts with the particle coated with specific antibodies. The mixture migrates upward on the membrane chromatographically by capillary action to react with specific capture reagents on the membrane and generate a colored line. The presence of this colored line in the specific test line region indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a colored line will always appear in the control line region indicating that proper volume of specimen has been added and membrane wicking has occurred.

REAGENTS/MATERIALS PROVIDED

The maximum number of tests obtained from this test kit is listed on the outer box.

- Test Cassettes: The test contains anti-Myoglobin antibody conjugated colloid gold particles, anti-CK-MB antibody conjugated colloid gold particles, anti-Troponin I antibody conjugated colloid gold particles, and capture reagents coated on the membrane. Each cassette is packaged in a foil pouch.
- Buffer: A buffered solution containing ProClin 300 as a preservative. The Buffer is supplied in a dropper vial ready for use.
- Droppers
- Package insert

MATERIALS NOT PROVIDED

- Specimen collection containers
- Centrifuge
- Timer

For fingerstick whole blood

- Lancets
- Heparinized capillary tubes and dispensing bulb

PRECAUTIONS

1. For in vitro diagnostic use only. Do not use after expiration date.
2. Do not eat, drink or smoke in the area where the specimens or kits are handled.
3. Do not use test if pouch is damaged.
4. Handle all specimens as if they contain infectious agents. Observe established precautions against microbiological hazards throughout all procedures and follow the standard procedures for proper disposal of specimens.
5. Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are assayed.
6. The used test should be discarded according to local regulations.
7. Humidity and temperature can adversely affect results.

SHELF LIFE AND STORAGE

Store the test kit at 2~30°C with a valid period of 24 months. The test is stable through the expiration date printed on the sealed pouch. The test must remain in the sealed pouch until use. Use the test kit within 1 hour once the foil pouch is opened.

DO NOT FREEZE. Do not use after the expiration date.

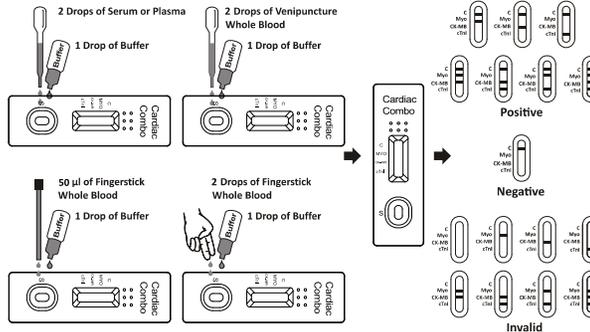
SPECIMEN COLLECTION AND PREPARATION

1. MYO/CKMB/cTnI Combo Rapid Test Kit can be performed using whole blood (from venipuncture or fingerstick), serum or plasma.
 2. To collect **Fingerstick Whole Blood specimens**:
 - Wash the patient's hand with soap and warm water or clean with an alcohol swab. Allow to dry.
 - Massage the hand without touching the puncture site by rubbing down the hand towards the fingertip of the middle or ring finger.
 - Puncture the skin with a sterile lancet. Wipe away the first sign of blood.
 - Gently rub the hand from wrist to palm to finger to form a rounded drop of blood over the puncture site.
- Add the Fingerstick Whole Blood specimen to the test by using **a capillary tube**:
- Touch the end of the capillary tube to the blood until filled to approximately 50 µL. Avoid air bubbles.
 - Place the bulb onto the top end of the capillary tube, then squeeze the bulb to dispense the whole blood to the specimen area of the Test Cassette.
- Add the Fingerstick Whole Blood specimen to the test by using **hanging drops**:
- Position the patient's finger so that the drop of blood is just above the specimen area of the Test Cassette.
 - Allow two hanging drops of fingerstick whole blood to fall into the center of the specimen area on the Test Cassette, or move the patient's finger so that the hanging drop touches the center of the specimen area. Avoid touching the finger directly to the specimen area.
3. Separate serum or plasma from blood as soon as possible to avoid hemolysis. Use only clear non-hemolyzed specimens.
 4. Testing should be performed immediately after the specimens have been collected. Do not leave the specimens at room temperature for prolonged periods. Serum and plasma specimens may be stored at 2-8°C for up to two days. For long term storage, specimens should be kept below -20°C. Whole blood collected by venipuncture should be stored at 2-8°C if the test is to be run within two days of collection. Do not freeze whole blood specimens. Whole blood collected by fingerstick should be tested immediately.
 5. Bring specimens to room temperature prior to testing. Frozen specimens must be completely thawed and mixed well prior to testing. Specimens should not be frozen and thawed repeatedly.
 6. If specimens are to be shipped, they should be packed in compliance with local regulations covering the transportation of etiologic agents.

TEST PROCEDURE

Allow the test, specimen, Buffer and/or controls to reach room temperature (15-30°C) prior to testing.

1. Remove the Test Cassette from the sealed pouch and use it as soon as possible. Best results will be obtained if the assay is performed within one hour. Place the Test Cassette on a clean and level surface.
 - For **Serum or Plasma** specimen: Hold the dropper vertically and **transfer 2 drops of serum or plasma** (approximately 50 µL) to the specimen area and **add 1 drop of Buffer** (approximately 40 µL) then start the timer. See illustration below.
 - For **Venipuncture Whole Blood** specimen: Hold the dropper vertically and **transfer 2 drops of whole blood** (approximately 50 µL) to the specimen well (S) of the Test Cassette, then **add 1 drop of Buffer** (approximately 40 µL) then start the timer. See illustration below.
 - For **Fingerstick Whole Blood** specimen: To use a capillary tube: Fill the capillary tube and **transfer approximately 50 µL of fingerstick whole blood specimen** to the specimen well (S) of the Test Cassette and **add 1 drop of Buffer** (approximately 40 µL) then start the timer. See illustration below.
3. The results should be read at 10 minutes. Do not interpret the result after 20 minutes.



INTERPRETATION OF RESULTS

(Please refer to the illustration above.)

POSITIVE: A colored line in the control line region (C) and the presence of one or more colored lines in the test line regions indicates a positive result. This indicates that the concentration of Myoglobin, CK-MB and/or cardiac Troponin I is above the minimum detection level. *NOTE: The intensity of the color in the test line region(s) will vary depending on the concentration of Myoglobin, CK-MB and/or cardiac Troponin I present in the specimen. Therefore, any shade of color in the test line regions should be considered positive.

NEGATIVE: One colored line appears in the control line region (C). No line appears in the test line region (T). This indicates that the concentration of Myoglobin, CK-MB and cardiac Troponin I are below the minimum detection levels.

INVALID: Control line fails to appear. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test with a new test. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

QUALITY CONTROL

Internal procedural controls are included in the test. A colored line appearing in the control line region (C) is considered an internal procedural control. It confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique.

External controls are not supplied with this kit; however, it is recommended that positive and negative external controls be tested as a good laboratory practice to confirm the test procedure and to verify proper test performance.

If the expected control reactions are not observed, repeat the control tests as the first step in determining the root cause of the failure. If control failures are repeated please contact your local distributor.

EXPECTED VALUES

MYO/CKMB/cTnI Combo Rapid Test Kit was compared with a leading commercial Myoglobin ELISA, CK-MB ELISA, cTnI ELISA test, demonstrating an overall accuracy of 97.5% with Myoglobin, 99.1% with cardiac Troponin I (cTnI), 99.4% with CK-MB.

LIMITATIONS OF THE PROCEDURE

1. MYO/CKMB/cTnI Combo Rapid Test Kit is for in vitro diagnostic use only. This test should be used for the detection of Myoglobin, CK-MB, and cardiac Troponin I (cTnI) in whole blood, serum or plasma specimens only. Neither the quantitative value nor the rate of increase in Myoglobin, CK-MB and cardiac Troponin I can be determined by this qualitative test.
2. MYO/CKMB/cTnI Combo Rapid Test Kit will only indicate the qualitative level of Myoglobin, CK-MB and Troponin I in the specimen and should not be used as the sole criteria for the diagnosis of myocardial infarction.
3. MYO/CKMB/cTnI Combo Rapid Test Kit cannot detect less than 50 ng/mL Myoglobin, 5 ng/mL CK-MB and 0.5 ng/mL cardiac Troponin I (cTnI) in specimens. A negative result at any time does not preclude the possibility of myocardial infarction.
4. As with all diagnostic tests, all results must be interpreted together with other clinical information available to the physician.
5. Some specimens containing unusually high titers of heterophile antibodies or rheumatoid factor (RF) may affect expected results. Even if the test results are positive, further clinical evaluation should be considered with other clinical information available to the physician.
6. There is a slight possibility that some whole blood specimens with very high viscosity or which have been stored for more than two days may not run properly on the Test Cassette. Repeat the test with a serum or plasma specimen from the same patient using a new Test Cassette.

SPECIFIC PERFORMANCE CHARACTERISTICS

Sensitivity and Specificity

MYO/CKMB/cTnI Combo Rapid Test Kit was evaluated with a leading commercial Myoglobin/CK-MB/cTnI EIA test using clinical specimens. The results show that relative to leading EIA tests, MYO/CKMB/cTnI Combo Rapid Test Kit shows 99.9% sensitivity and 97.2% specificity for Myoglobin, 99.4% sensitivity and 99.0% specificity for cardiac Troponin I (cTnI), and 99.9% sensitivity and 99.4% specificity for CK-MB.

Myoglobin Rapid Test vs. EIA

Method	EIA		Total Result	
	Results	Positive		Negative
Myoglobin	Positive	54	11	65
	Negative	0	379	379
Total Result		54	390	444

Sensitivity: 99.9% (95% CI*: 94.6%~100.0%);

Specificity: 97.2% (95% CI*: 95.0%~98.6%);

Correlation: 97.5% (95% CI*: 95.6%~98.8%).

*Confidence Intervals

CK-MB Rapid Test Kit vs. EIA

Method	EIA		Total Result	
	Results	Positive		Negative
CK-MB	Positive	62	3	65
	Negative	0	468	468
Total Result		62	471	533

Sensitivity: 99.9% (95% CI*: 95.3%~100.0%);

Specificity: 99.4% (95% CI*: 98.1%~99.9%);

Correlation: 99.4% (95% CI*: 98.4%~99.9%).

*Confidence Intervals

Cardiac Troponin I Rapid Test vs. EIA

Method	EIA		Total Result	
	Results	Positive		Negative
Cardiac Troponin I	Positive	172	5	177
	Negative	1	472	473
Total Result		173	477	650

Sensitivity: 99.4% (95% CI*: 96.8%~99.9%);

Specificity: 99.0% (95% CI*: 97.6%~99.7%);

Correlation: 99.1% (95% CI*: 98.0%~99.7%).

*Confidence Intervals

REPRODUCIBILITY**Intra-Assay Precision**

Within-run precision was determined by using 15 replicates of below 15 specimens: Myoglobin specimen levels at 0 ng/mL, 50 ng/mL, 100 ng/mL, 200 ng/mL and 400 ng/mL, CK-MB specimen levels at 0 ng/mL, 5 ng/mL, 10 ng/mL, 20 ng/mL and 40 ng/mL and cardiac Troponin I (cTnI) specimen levels at 0 ng/mL, 1.0 ng/mL, 5.0 ng/mL, 10 ng/mL and 40 ng/mL. The specimens were correctly identified > 99% of the time.

Inter-Assay Precision

Between-run precision was determined by 3 independent assays on the same 15 specimens: 0 ng/mL, 50 ng/mL, 100 ng/mL, 200 ng/mL and 400 ng/mL of Myoglobin, 0 ng/mL, 5 ng/mL, 10 ng/mL, 20 ng/mL, and 40 ng/mL of CK-MB and 0 ng/mL, 1.0 ng/mL, 5 ng/mL, 10 ng/mL and 40 ng/mL of cardiac Troponin I (cTnI). Three different lots of MYO/CKMB/cTnI Combo Rapid Test Kit were tested using these specimens. The specimens were correctly identified > 99% of the time.

CROSSREACTIVITY

MYO/CKMB/cTnI Combo Rapid Test Kit were tested by Skeletal Troponin I, Troponin T, Cardiac Myosin, CK-MM, CK-BB, HBsAg, HBsAb, HBeAg, HBeAb, HBcAb, syphilis, anti-HIV, anti-*H. pylori*, Mononucleosis, anti-CMV, anti-Rubella and anti-Toxoplasmosis positive specimens. The results showed no crossreactivity.

TESTS FOR INTERFERING SUBSTANCES

The following potentially interfering substances were added to Myoglobin, CK-MB and/or cardiac Troponin I (cTnI) negative and positive specimens, respectively.

Acetaminophen 20 mg/dL	Bilirubin 1,000 mg/dL	Albumin 10,500 mg/dL
Acetylsalicylic Acid 20 mg/dL	Cholesterol 800 mg/dL	Hemoglobin 1,000 mg/dL
Ascorbic Acid 20 mg/dL	Caffeine 20 mg/dL	Oxalic Acid 600 mg/dL
Creatin 200 mg/dL	Gentisic Acid 20 mg/dL	Triglycerides 1,600 mg/dL

None of the substances at the concentration tested interfered in the assay.

REFERENCES

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SYMBOL USAGE

You may see one or more of these symbols on the labeling/packaging of this product:

Key guide to symbols

	Caution		In Vitro Diagnostic Medical Device
	Manufacturer		Date of Manufacture
	CE Marking		Do Not Re-use
	Keep Dry		Keep Away From Sunlight
	Batch Code		Do Not Use if Package is Damaged
	Catalogue Number		Contains Sufficient for <n> Tests
	Use-By Date		Temperature Limit
	Authorized representative in the European Community		

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