

A rapid test for the qualitative detection of cardiac Troponin I in whole blood, serum or plasma.
For professional *in vitro* diagnostic use only.

INTENDED USE

The *Rojan* cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) is a rapid chromatographic immunoassay for the qualitative detection of human cardiac Troponin I in whole blood, serum or plasma as an aid in the diagnosis of myocardial infarction (MI).

SUMMARY

Cardiac Troponin I (cTnI) is a protein found in cardiac muscle with a molecular weight of 22.5 kDa.¹ Troponin I is part of a three subunit complex comprising of Troponin T and Troponin C. Along with troponomyosin, this structural complex forms the main component that regulates the calcium sensitive ATPase activity of actomyosin in striated skeletal and cardiac muscle.² After cardiac injury occurs, Troponin I is released into the blood 4-6 hours after the onset of pain. The release pattern of cTnI is similar to CK-MB, but while CK-MB levels return to normal after 72 hours, Troponin I remains elevated for 6-10 days, thus providing for a longer window of detection for cardiac injury. The high specificity of cTnI measurements for the identification of myocardial damage has been demonstrated in conditions such as the perioperative period, after marathon runs, and blunt chest trauma.³ cTnI release has also been documented in cardiac conditions other than acute myocardial infarction (AMI) such as unstable angina, congestive heart failure, and ischemic damage due to coronary artery bypass surgery.⁴ Because of its high specificity and sensitivity in the myocardial tissue, Troponin I has recently become the most preferred biomarker for myocardial infarction.⁵

The cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) is a simple test that utilizes a combination of anti-cTnI antibody coated particles and capture reagent to detect cTnI in whole blood, serum or plasma. The minimum detection level is 0.5 ng/mL.

PRINCIPLE

The cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) is a qualitative, membrane based immunoassay for the detection of cTnI in whole blood, serum or plasma. The membrane is pre-coated with capture reagent on the test line region of the test. During testing, the whole blood, serum or plasma specimen reacts with the particle coated with anti-cTnI antibodies. The mixture migrates upward on the membrane chromatographically by capillary action to react with capture reagent on the membrane and generate a colored line. The presence of this colored line in the 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

The test device contains anti-cTnI antibody coated particles and capture reagent coated on the membrane.

PRECAUTIONS

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

STORAGE AND STABILITY

Store as packaged in the sealed pouch either at room temperature or refrigerated (2-30°C). The test device is stable through the expiration date printed on the sealed pouch. The test device must remain in the sealed pouch until use. **DO NOT FREEZE.** Do not use beyond the expiration date.

SPECIMEN COLLECTION AND PREPARATION

- The cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) can be performed using whole blood (from venipuncture or fingerstick), serum or plasma.
- 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.
- Position the patient's finger so that the drop of blood is just above the specimen well (S) of the test device.
- Allow 3 hanging drops of fingerstick whole blood to fall into the specimen well (S) of the test device, or move the patient's finger so that the hanging drop touches the specimen well (S). Avoid touching the finger directly to the specimen well (S).
- Separate serum or plasma from blood as soon as possible to avoid hemolysis. Use only clear, non-hemolyzed specimens.
- Testing should be performed immediately after specimen collection. 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 3 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 2 days of collection. Do not freeze whole blood specimens. Whole blood collected by fingerstick should be tested immediately.
- 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.
- If specimens are to be shipped, they should be packed in compliance with local regulations covering the transportation of etiologic agents.

MATERIALS

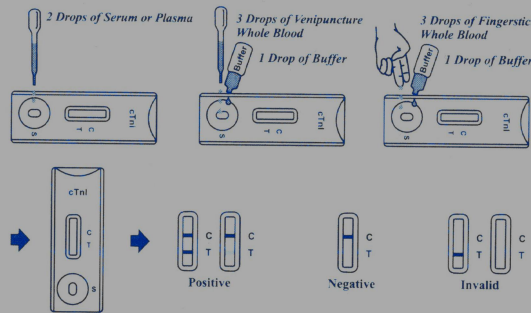
Materials Provided

- Test devices
 - Buffer
 - Droppers
 - Package insert
- Materials Required But Not Provided**
- Specimen collection containers
 - Centrifuge
 - Lancets (for fingerstick whole blood only)
 - Timer

DIRECTIONS FOR USE

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

- Bring the pouch to room temperature before opening it. Remove the test device from the sealed pouch and use it as soon as possible. Best results will be obtained if the test is performed immediately after opening the foil pouch.
- Place the test device on a clean and level surface.
 - For **Serum or Plasma** specimens: Hold the dropper vertically and transfer 2 drops of serum or plasma (approximately 50 µL) to the specimen well (S) of the test device, then start the timer. See illustration below.
 - For **Venipuncture Whole Blood** specimens: Hold the dropper vertically and transfer 3 drops of venipuncture whole blood (approximately 75 µL) to the specimen well (S) of the test device, then add 1 drop of buffer (approximately 40 µL) and start the timer. See illustration below.
 - For **Fingerstick Whole Blood** specimens: Allow 3 hanging drops of fingerstick whole blood specimen (approximately 75 µL) to fall into the center of the specimen well (S) on the test device, then add 1 drop of buffer (approximately 40 µL) and start the timer. See illustration below.
- Wait for the colored line(s) to appear. **Read results at 10 minutes.** Do not interpret results after 20 minutes.



INTERPRETATION OF RESULTS

(Please refer to the illustration above)

POSITIVE: * Two distinct colored lines appear. One colored line should be in the control line region (C) and another apparent colored line should be in the test line region (T).

*NOTE: The intensity of the color in the test line region (T) will vary depending on the concentration of cTnI present in the specimen. Therefore, any shade of color in the test line region (T) should be considered positive.

NEGATIVE: One colored line appears in the control line region (C). No line appears in the test line region (T).

INVALID: Control line (C) 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 device. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

QUALITY CONTROL

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

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

LIMITATIONS

- The cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) is for *in vitro* diagnostic use only. This test should be used for the detection of Troponin I in whole blood, serum or plasma specimens only. Neither the quantitative value nor the rate of increase in cTnI can be determined by this qualitative test.
- The cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) will only indicate the qualitative level of cTnI in the specimen and should not be used as the sole criteria for the diagnosis of myocardial infarction.
- The cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) cannot detect less than 0.5 ng/mL of cTnI in specimens. A negative result at any time does not preclude the possibility of myocardial infarction.
- As with all diagnostic tests, all results must be interpreted together with other clinical information available to the physician.
- 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.

- There is a slight possibility that some whole blood specimens with very high viscosity or which have been stored for more than 2 days may not run properly on the test device. Repeat the test with a serum or plasma specimen from the same patient using a new test device.

EXPECTED VALUES

The cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) has been compared with a leading commercial cTnI EIA test, demonstrating an overall accuracy of 98.5%.

PERFORMANCE CHARACTERISTICS

Sensitivity and Specificity

The cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) has been evaluated with a leading commercial cTnI EIA test using clinical specimens. The results show that the sensitivity of the cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) is 98.5% and the specificity is 98.4% relative to the leading EIA test.

One Step cTnI Test Device vs. EIA

One Step cTnI Test Device	Method		EIA		Total Results
	Results	Positive	Negative		
	Positive	197	8	205	
Negative	3	505	508		
Total Results		200	513	713	

Relative Sensitivity: 98.5% (95.7%-99.7%)* Relative Specificity: 98.4% (97.0%-99.3%)*
Accuracy: 98.5% (97.3%-99.2%)* *95% Confidence Interval

Precision

Intra-Assay

Within-run precision has been determined by using replicates of 10 tests for each of three lots using cTnI specimen levels at 0 ng/mL, 5 ng/mL, 10 ng/mL, 20 ng/mL, and 40 ng/mL. The specimens were correctly identified >99% of the time.

Inter-Assay

Between-run precision has been determined by 3 independent assays on the same five specimens: 0 ng/mL, 5 ng/mL, 10 ng/mL, 20 ng/mL, and 40 ng/mL of Troponin I. Three different lots of the cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) have been tested using these specimens. The specimens were correctly identified >99% of the time.

Cross-Reactivity

Sera containing known amounts of antibodies to cTnI have been tested with 10,000 ng/mL Skeletal Troponin I, 2,000 ng/mL Troponin T, and 20,000 ng/mL Cardiac Myosin. No cross-reactivity was observed, indicating that the cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) has a high degree of specificity for cTnI.

Interfering Substances

The cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) has been tested and no interference was observed in specimens containing 110 mg/mL human albumin, 6 mg/mL bilirubin, 10 mg/mL hemoglobin, 5 mg/mL cholesterol and 15 mg/mL triglycerides.

The following compounds have also been tested using the cTnI One Step Troponin I Test Device (Whole Blood/Serum/Plasma) and no interference was observed at a concentration of 50 µg/mL.

Acetaminophen	Captopril	Flunarizine Hydrochloride	Oxazepam
Acetylsalicylic acid	Chloramphenicol	Furosemide	Pentoxifyline
Anisodamine	Chlorzoxipoxide	Hydrochlorothiazide	Phenobarbital
Ascorbic Acid	Cilazapril	Isoorbide Mononitrate	Quinine
Atenolol	Diclofenac	Labetalol	Ramipril
Atorvastatin Calcium	Digoxin	Metoprolol Tartrate	DL-Tyrosine
Bisoprolol Fumarate	Erythromycin	Moracizine Hydrochloride	Trimethoprim
Caffeine	Felodipine	Nifedipine	Verapamil

BIBLIOGRAPHY

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Index of Symbols

	Attention, see instructions for use		Tests per kit		Manufacturer
	For <i>in vitro</i> diagnostic use only		Use by		Do not reuse
	Store between 2-30°C		Lot Number		

ISO, GMP