

Troponin I (TnI)



A Vital Biomarker for Acute Myocardial Infarction (AMI)

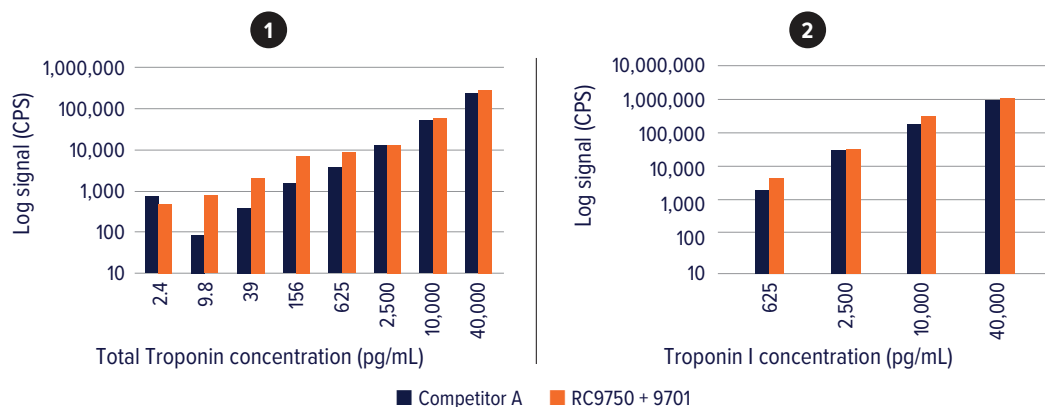
Serum cardiac troponin I (cTnI) stands out with superior specificity and sensitivity when compared to other routinely used biomarkers like creatine kinase (CK-MB), lactate dehydrogenase, and myoglobin. As a result, it plays a pivotal role in the diagnosis of AMI. Current guidelines advocate for serial measurements of cardiac troponin levels, utilizing the 99th percentile as an assay-specific cut-off value for AMI diagnosis. Advancements in assay technologies allow rapid and precise detection of cardiac troponin even at very low concentrations, enabling early exclusion of AMI within just an hour of symptom presentation. Post-infarction, cardiac troponin concentrations remain elevated for several days¹⁻³.

Medix Biochemica offers high sensitivity antibodies that enable Troponin I detection in very low concentration with wide dynamic range

- Troponin I detection from blood
- High sensitivity – 2.4 pg/mL troponin complex spiked in buffer
- In vitro produced by scalable procedures, ideal for assay development and manufacturing

Medix Biochemica mAb vs. manufacturer A in fluorescence immunoassay

The most sensitive Troponin I combination is RC9750 with 9701 which is comparable with the highest sensitive clones offered by another IVD raw material supplier.



Clinical diagnostic tool in myocardial infarction

Available cardiovascular analytes:

- Apolipoprotein
- BNP
- CK-MB
- Copeptin
- Digoxin
- D-Dimer
- FABP3
- Galectin-3
- GDF-15
- Haptoglobin
- Lipoprotein
- Myeloperoxidase
- Myoglobin
- NT-ProBNP
- Renin
- ST2
- Troponin I
- Troponin T

Detection of Troponin complex in spiked buffer samples in FIA with Medix Biochemica antibody pair RC9750 + 9701 (orange) and Manufacturer A antibodies (blue). The Medix Biochemica antibody pair showed similar sensitivity, down to 2.4 pg/ml, compared to Manufacturer A in combination with a wide measurement range. Graph 1 uses Troponin complex with total troponin concentration determined. Graph 2 uses Troponin complex (#550-10) with Troponin I concentration determined.

Pair recommendations

		Detection				
		9701/ RC9701	9703	9705	9707/ RC9707*	RC9750
Capture	9701/ RC9701		■	■	■	■
	9703			■		
	9705	■	■		■	■ ■
	9707/ RC9707*					
	RC9750	■ ■		■	■	

*9707 and RC9707 are not recommended as capture antibodies due to the cross reactivity with skeletal Troponin I (14%).

Troponin antigen recognition by antibodies

		Detection		
		cTnI	cTn I-C	cTn I-T-C
Capture	9701/ RC9701	■	■	
	9703	■	■	
	9705		■	■
	9707/ RC9707*		(■)	(■)
	RC9750		■	■

Kinetic parameters

cTnI antibody	Association rate constant, k_{on}	Dissociation rate constant, k_{off}	Affinity constant, K_A	Dissociation constant, K_D
9701	3.4×10^5 1/Ms	3.0×10^{-4} 1/s	$K_A = 1.1 \times 10^9$ 1/M	$K_D = 1.2 \times 10^{-9}$ M = 1.2 nM
RC9701	2.5×10^5 1/Ms	3.3×10^{-4} 1/s	$K_A = 7.8 \times 10^8$ 1/M	$K_D = 1.3 \times 10^{-9}$ M = 1.3 nM
9703*	1.1×10^6 1/Ms	5.6×10^{-5} 1/s	$K_A = 1.9 \times 10^{10}$ 1/M	$K_D = 5.2 \times 10^{-11}$ M = 0.052 nM
9705	8.4×10^4 1/Ms	1.8×10^{-4} 1/s	$K_A = 4.6 \times 10^8$ 1/M	$K_D = 3.8 \times 10^{-9}$ M = 3.8 nM
9707	1.1×10^6 1/Ms	1.4×10^{-4} 1/s	$K_A = 8.4 \times 10^9$ 1/M	$K_D = 3.6 \times 10^{-10}$ M = 0.36 nM
RC9707	1.7×10^6 1/Ms	2.7×10^{-4} 1/s	$K_A = 6.1 \times 10^9$ 1/M	$K_D = 7.1 \times 10^{-10}$ M = 0.71 nM
RC9750	3.3×10^4 1/Ms	1.1×10^{-4} 1/s	$K_A = 3.1 \times 10^8$ 1/M	$K_D = 6.5 \times 10^{-9}$ M = 6.5 nM

* Affinity constant for 9703 has been determined using cTnI antigen, and for other antibodies cTn I-T-C antigen

Medix Biochemica provides a wide selection of high-quality antibodies and biospecimen materials to support diagnosis of cardiovascular diseases. We also offer a broad range of antibodies related to diagnosis in several other clinical areas.

Products and Ordering

Anti-human cTnI monoclonal antibodies

Product code	Description	Subclass
100129	Anti-h cTnI 9701 SPRN-5	IgG ₁
140000	Anti-h cTnI RC9701 SPRN-5	Human IgG ₁
100181	Anti-h cTnI 9703 SPRN-5	IgG ₁
100125	Anti-h cTnI 9705 SPRN-1	IgG ₁
100180	Anti-h cTnI 9707 SPRN-5	IgG ₁
140020	Anti-h cTnI RC9707 SPRN-5	Human IgG ₁
700050	Anti-h cTnI RC9750 SPRN-5	IgG ₁

Antigens

Product code	Description
610102	Recombinant cTnI, 100 µg
550-11	Native cTnI
550-10	Native cardiac Troponin Complex (cTn ITC)

Related biospecimens

Product code	Description
991-24-PS-TNI	Human Donor Serum
991-58-PS-TNI	Human Donor Plasma

References

- Adamcova M, Popelova-Lencova O, Jirkovsky E et al. (2016). Cardiac troponins-Translational biomarkers in cardiology: Theory and practice of cardiac troponin high-sensitivity assays. *Biofactors* 42:133–148.
- Westermann D, Neumann JT, Sorensen NA & Blankenberg S (2017). High-sensitivity assays for troponin in patients with cardiac disease. *Nat Rev Cardiol* 14: 472–483.
- Neumann JT, Sorensen NA, Schwemer T et al. (2016). Diagnosis of Myocardial Infarction Using a High-Sensitivity Troponin I 1-Hour Algorithm. *JAMA Cardiol* 1:397–404.

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