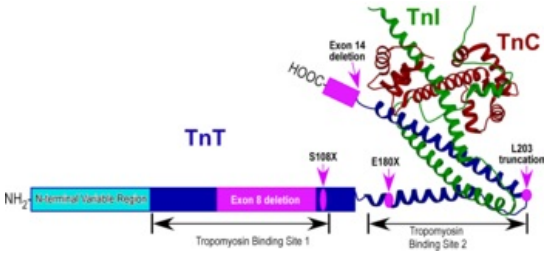
Troponins

This article has been translated from WikiSkripta; ready for the **editor's review**.

Troponin T (TnT) and **troponin I** (TnI) are used as cardiomarkers. TnT and occur are found in skeletal muscle and myocardium. **Cardiac isoforms** (cTnT and cTnI) have a unique amino acid composition and are therfore **specific** to the myocardium. In most cases, the cardiac isoforms TnT and TnI are contained in the contractile apparatus and are released due to proteolytic degredation. Only 6–8% cTnT and 2.8–8.3% cTnI from the unbound cytosolic component.

Troponin cTnT is not normally present in the blood. The course of cTnT release is *biophasic*. the increase in troponin after an acute myocardial infarction occurs **within 3–8 hours** and the first peak is reached 12–18 hours after myocardial injury. It is induced by tge rapid release of the free *cytoplasmic fraction of cTnT*. The initial peak is followed by another peak in 3–4 days, which corresponds to a slower leaching of cTnT *bound in the troponin-tropomyosin complex* in the necrotic bearing. It drops to **undetectable levels** within **7–10 days.**



Troponin structure

With early resumption of coronary artery blood flow, the maximum rise is about 14 hours, followed by a later second, significantly lower peak. The length of the increase depends on the size of the heart attack. For **grater heart attacks,** cTnT can be detected **for up to 21 days**. A disadvantage of cTnT is its **non-specific increase** in patients with **renal insufficiency.**

The onset of elevated **cTnI** levels, which is characterized by high specificity, occurs similarly to cTnT about **3 hours** after the onset of ischemia. Elevated levels persist for 5-10 days. Compared to cTnT, no second maximum (smaller cytosolic fraction) is usually observed for cTnI.

Troponin C (TnC) is not suitable for the diagnosis of acute coronary lesions because it is identical in heart and skeletal muscle.

Troponins are determined by sensitive immunochemical methods.

Rapid test for cTnT

Acute myocardial infarction requires rapid diagnosis, which may include the use of biochemical tests to determine myoglobin and troponins, which can be performed at the patient's bedside.

We will describe a rapid test for the determination of cardiac troponin T, based on GLORIA technology (**G**old **L**abelled **O**ptically **R**ead **I**mmuno **A**ssay) by Roche. It uses two different *monoclonal antibodies* against cTnT – one is *labeled with biotin*, the other *with colloidal gold*.

Preforming the test

The patient's blood is applied to *an application zone* containing labeled antibodies, which form a sandwich complex with the troponin molecules in the sample (if present) in *the reaction zone .* Before entering the detection zone, the erythrocytes are separated using glass fibers and only the plasma containing the immunocomplexes proceeds. In *the detection zone* there is a *signal strip* with anchored sterptavidin (protein with high affinity for biotin) and another *control strip* with immobilized troponin. An excess of gold-labeled antibodies bind to the control strip. The color of the control strip confirms that the test is functional and the test is valid. The troponin sandwich immunocomplex is captured by streptavidin, which is indicated by the second colored band. In a positive test, therefore, 2 stripes develop - in the area of the control and signal lines, in the case of a negative result, we observe only the colored control line.

Kategorie:Vložené články