

Creatin kinase

Creatine kinase (CK , EC 2.7.3.2) is a predominantly **cytoplasmic enzyme** that catalyzes the phosphorylation of **creatine to creatine phosphate by ATP**. In the absence of ATP, the reaction proceeds in the opposite direction. CK is mainly localised in **skeletal muscle, myocardium** and **brain tissue**. It consists of *two subunits* , which could be two types - **M** (*muscle*) and **B** (*brain*), each with a relative molecular weight of around 40,000.

There are *three creatine kinase isoenzymes* and they are distinguished by the different representation of the subunits:

- **CK-BB** (CK-1, brain isoenzyme);
- **CK-MB** (CK-2, myocardial isoenzyme)
- **CK-MM** (CK-3, muscle isoenzyme)

In **skeletal muscle**, **CK-MM** predominates, but the **CK-MB** isoenzyme is also present. In the **brain**, we find the **CK-BB** isoenzyme, which we do not detect in the blood if the blood-brain barrier is intact. **CK-MB** is typical for the **myocardium**, but cardiac muscle also contains **CK-MM**.

The catalytic concentration of total CK **increases** within 3-6 hours from the onset of myocardial **ischemia**. Due to insufficient cardiospecificity, its determination in acute myocardial infarction is of **limited importance**. The total CK value is influenced by **various factors** (age, gender, muscle mass and physical activity).

The investigation of the **CK-MB isoenzyme** has greater diagnostic value even though CK-MB is not fully cardiospecific. The **increase** can also be caused by **skeletal muscle damage** (trauma, muscular dystrophy, intramuscular injection, resuscitation, defibrillation), extreme exercise and **chronic renal insufficiency**.

CK-MB can be determined as *enzyme activity* , which captures only **active enzyme molecules**, or **immunochemically** as protein *in the form of mass concentration* . In this case, we are talking about CK-MB mass , which is clearly preferred today. **Determination of CK-MB mass** is *more specific and sensitive* , as it also detects **partially degraded molecules** that have already lost their enzyme function.

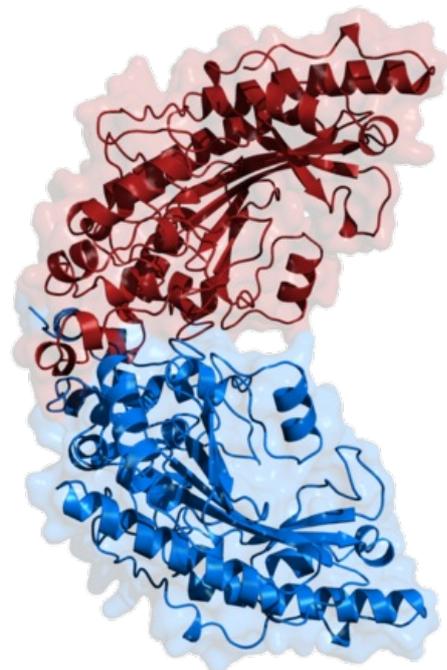
According to the current recommendations, determination of CK-MB mass is acceptable only in case of **unavailability of determination of cardiospecific troponins**.

Furthermore, CK-MB mass is used to detect **reinfarction** at a time when a high cTn concentration still persists.

Links

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Creatin kinase structure