

Creatine Kinase / Assay

The determination of creatine kinase activity is based on three consecutive enzyme reactions.

In the first creatine kinase catalyzed reaction, creatinine and ATP are formed. The formed ATP phosphorylates D-glucose to D-glucose-6-phosphate via hexokinase. In the last indicator reaction catalyzed by glucose-6-phosphate dehydrogenase, D-glucose-6-phosphate is oxidized to 6-phosphogluconate while reducing NADP^+ to NADPH. In the UV region, we measure the increase in NADPH production, which is proportional to creatine kinase activity.

The catalytic activity of the CK-MB isoenzyme can be determined by a similar technique, but the reaction mixture must contain an additional *antibody against the M subunit*. Each subunit of creatine kinase performs a separate catalytic activity. Hence, in this technique, the activity of the isoenzyme CK-MM is completely inhibited, but the activity of CK-MB is halved. After the addition of the antibodies against M subunit, the initial catalyst concentration of CK-MB is simply calculated as twice the CK activity. When serum isoenzyme CK-BB is elevated (due to a breach in the blood brain barrier, most commonly caused by a transient ischemic attack), levels of released CK-MB determined by this technique are falsely high (often higher than the total CK activity).

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