Lab Dept: Chemistry

Test Name: CK ISOENZYME REFLEX

General Information

Lab Order Codes:	CKRE
Synonyms:	CK-BB; CK-MB; CK-MM; CPK, Creatine Phosphokinase; CK Isoenzyme Electrophoresis
CPT Codes:	82550 – CK, total 82552 – CK isoenzymes (if appropriate)
Test Includes:	CK total enzyme measured in U/L and isoenzyme fractions measured as a percent of the total. The CK total must be greater than or equal to 100 U/L for the isoenzymes determinations to be done and will automatically reflex to the isoenzymes, if appropriate.

Logistics

Test Indications:	Along with aldolase, CK and its MM isoenzyme can be used to diagnose skeletal muscle disease. Determinations of macro forms of CK.
Lab Testing Sections:	Chemistry - Sendouts
Referred to:	Mayo Medical Laboratories (MML Test: CKELR, with possible reflex to CKE)
Phone Numbers:	MIN Lab: 612-813-6280 STP Lab: 651-220-6550
Test Availability:	Daily, 24 hours
Turnaround Time:	1 – 4 days, CK Total performed daily and CK Isoenzymes performed Monday through Saturday.
Special Instructions:	CK-MB isoenzyme electrophoresis determinations are done if the CK, total is ≥100 U/L.

Specimen

Specimen Type:	Blood
Container:	Red top tube

Draw Volume:	6 mL (Minimum: 2.5 mL) blood
Processed Volume:	2 mL (Minimum: 0.75 mL) serum
Collection:	Routine venipuncture
Special Processing:	Lab Staff: Centrifuge specimen, remove serum aliquot into a screw-capped plastic vial. Ship and store at refrigerated temperatures.
Patient Preparation:	None
Sample Rejection:	Specimens other than serum; gross hemolysis; mislabeled or unlabeled specimens

Interpretive

Reference Range:

Total CK

Note: Strenuous exercise or intramuscular injections may cause transient elevations of CK.

Males:

Age:	Range (U/L):
0 – 5 years:	Reference values have not been established for patients under 6 years of age.
6 – 11 years:	150 – 499
12 – 17 years:	94 – 499
≥18 years:	52 – 336

Females:

0 – 5 years:	Reference values have not been established for patients under 6 years of age.
6 – 7 years:	134 - 391
8 – 14 years:	91 – 391
15 – 17 years:	53 – 269
≥18 years:	38 - 176

Isoenzymes	
All ages/both sexes:	
MM	100%
MB	0%
BB	0%

Interpretation:
● Creatine Kinase (CK)-MB appears in serum 4 to 6 hours after the onset of pain in a myocardial infarction, peaks at 18 to 24 hours, and may persist for 72 hours.
● CK-MB may also be elevated in cases of carbon monoxide poisoning, pulmonary embolism, hypothyroidism, crush injuries, and muscular dystrophy.
● Extreme elevations of CK-MB can be associated with skeletal muscle cell turnover as in polymyositis, and to a lesser degree in rhabdomyolysis, as seen in strenuous exercise, particularly in the conditioned athlete.
● CK-BB can be elevated in patients with head injury, in neonates, and in some cancers such as prostate cancer and small cell carcinoma of the lung. It can also be elevated in other malignancies; however, the clinical usefulness of CK-BB as a tumor marker needs further investigation.
● The presence of macro CK can explain an elevation of total CK. It does not rise and fall as rapidly as CK-MM and CK-MB in muscle injury.
● Macro CK type II (mitochondrial CK) is rarely observed. It is only seen in acutely ill patients with malignancies and other severe illnesses with a high associated mortality, such as liver disease and hypoxic injury.

Critical Values: N/A

Limitations: In some patients, the presence of MB is method-dependent. CK-MB values, which exceed 50% of the total CK, probably reflect unusual B subunit synthesis since heart muscle rarely exceeds 30% MB.

Methodology: Total: Photometric, Creatine Phosphate plus ADP
CK Isoenzymes: Electrophoresis with densitometry

References: Mayo Medical Laboratories April 2013

Update: 8/23/2005: Change in methodology, previously listed as Electrophoresis with fluorescent imaging.
4/8/2013: CK Isoenzyme has turned into a true reflex at MML. Total must be greater than or equal to100 U/L or Isoenzyme testing will not be performed.