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ANGIOTENSIN CONVERTING ENZYME (ACE) INFORMATION SHEET

GENERAL

Angiotensin converting enzyme (ACE) is an enzyme catalysing the conversion of Angiotensin I (10 amino acids) to Angiotensin II by removal of a C-terminal His-Leu dipeptide. It is a dipeptidyl carboxypeptidase of MW 140-170,000 which has 2 active sites and requires zinc for activity. The EC number is 3.4.15.1.
ACE is found on all endothelial cells and play a vital role in maintaining blood pressure control as part of the renin-angiotensin-aldosterone system. There is also a testicular form with 1 active site. ACE also has kininase activity, breaking down bradykinin. ACE is produced by monocytes under influence from CD4 lymphocytes, such as may be found as epithelioid cells in granuloma.

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Raised levels of serum ACE are found in the serum of 60 - 70% of patients with active sarcoid. The serum levels are related to the level of the activity of disease, the amount of granulomata and CXR changes. Serum ACE levels above the normal range are about 75% sensitive for detecting clinically verified sarcoid in the lungs or eyes, however levels are rarely elevated in early sub-acute sarcoidosis. A serum ACE result within the reference interval makes a diagnosis of sarcoidosis less likely. ACE levels fall with remission of disease activity and rise with reactivation and may be used to monitor treatment.

ACE levels in active sarcoid average 1.5 x the upper limit of normal controls, with levels 3-4 x the upper limit occurring with extensive sarcoidosis involving glandular, hepatic, cutaneous and pulmonary tissues.
Increased concentrations may also be present in other granulomatous conditions such as asbestosis (20% of cases), silicosis (45%), coccidiomycosis and tuberculosis (especially miliary TB, 90%), as well as hyperthyroidism (60%), Gaucher's disease (80%), alcoholic liver disease (30%) and diabetics (25%). ACE may also be elevated with chronic renal failure.

ACE levels are also affected by genotypic variation creating a background variation which can affect interpretation. Genetic testing to establish expected values is not routinely available currently. High levels of ACE activity have also been described in patients with an inherited mutation giving ACE hyperactivity producing results more than 5 times the upper reference limit.
Serum ACE levels are reduced by treatment with ACE inhibitors or corticosteroids.

Note that ACE assays are not standardised and results from the same laboratory should be used to monitor a patient over time.

FURTHER INFORMATION

Review article: Studdy PR, Bird R. Ann Clin Biochem, 1989;26:13-18. Serum angiotensin converting enzyme in sarcoidosis - its value in present clinical practice.

Stouten K et al. Extreme elevation of serum angiotensin converting enzyme (ACE) activity: always consider familial ACE hyperactivity. Ann Clin Biochem 2014;51:289-93.