

ADMA (Asymmetric Dimethylarginine)

Analyte: Asymmetric Dimethyl Arginine

Specimen Type: Serum, EDTA Plasma

Optimum Volume: 1 mL

Stability:

2-8 Degrees C	-20 Degrees C	-70 Degrees C
6 days	N.A.	3 years

Reporting Units: umol/L or ng/mL

Method: ELISA

Biological or Clinical Significance:

Asymmetric dimethylarginine (ADMA) is an endogenous inhibitor of NO synthase. It is formed during proteolysis of methylated proteins and removed by renal excretion or metabolic degradation by the enzyme dimethylarginine dimethylaminohydrolase (DDAH). Several cell types, including human endothelial and tubular cells, are capable of synthesizing and metabolizing ADMA. Elevated ADMA concentrations in the blood are found in numerous diseases associated with endothelial dysfunction. For example, elevated ADMA levels in blood of dialysis patients correlate significantly with the degree of arteriosclerosis and cardiovascular risk. Furthermore, elevated ADMA levels are found in patients with hypercholesterolemia, hypertension, arteriosclerosis, chronic renal failure, and chronic heart failure, and they are associated with restrictions in endothelial vasodilatation.

During the last years, the important clinical relevance of the regulation of vascular tone and structure by nitric oxide (NO) has been shown. Moreover, there were reports that human endothelial cells produce ADMA as well as nitric oxide, which points to an endogenous endothelial NO-regulation by ADMA. Therefore it was assumed that hypertension, arteriosclerosis, and immunological dysfunction in patients with chronic renal failure are connected to a dysfunction of L-arginine/NO-metabolism and to ADMA accumulation. The reasons for the deregulation of L-arginine/NO-metabolism could only partially be elucidated. Certainly, there are multiple factors involved in L-arginine/NO-metabolism regulation, such as elevation of free superoxide radicals (O₂⁻), ADMA accumulation, and reduced NO-synthase activity.

Prospective clinical studies of the last years demonstrate the increased importance of ADMA as a novel cardiovascular risk factor.

Principle of Test Method:

The ADMA assay is a competitive enzyme linked immunoassay.

References:

1. Böger RH, Sullivan LM, Schwedhelm E, Wang TJ, Maas R, Benjamin EJ, Schulze F, Xanthakis V, Benndorf RA, Vasani RS. Plasma asymmetric dimethylarginine and incidence of cardiovascular disease and death in the community. *Circulation*. 2009; 119:1592-1600
2. Schwedhelm E, Xanthakis V, Maas R, Sullivan LM, Schulze F, Riederer U, Benndorf RA, Böger RH, Vasani RS. Asymmetric dimethylarginine reference intervals determined with liquid chromatography-tandem mass spectrometry: results from the Framingham offspring cohort. *Clin Chem*. 2009; 55:1539-1545.