



ADMA/SDMA

CPT Code **82542***

Order Code **C301**

Specimen Type **Serum**

Tube Type **Tiger Top**

Elevated levels of ADMA may identify:

- Endothelial dysfunction
- Pre-diabetes/diabetes
- Subclinical cardiovascular disease

Elevated levels of SDMA may identify:

- Reduced renal function and progressive kidney failure

Description

One of the earliest manifestations of endothelial dysfunction is nitric oxide (NO) deficiency, which promotes atherosclerosis. Asymmetric dimethylarginine (ADMA) and symmetric dimethylarginine (SDMA), its structural isomer, are metabolites of L-arginine, an amino acid that is catalyzed to L-citrulline and NO by nitric oxide synthase (NOS).^{1,2}

Both ADMA and SDMA have distinct pathophysiologies and manifestations. ADMA is a competitive inhibitor of NOS thereby reducing NO production and promoting endothelial dysfunction. SDMA also interferes with NO production, but does so indirectly by reducing the cellular availability of arginine. ADMA is primarily cleared through enzymatic degradation in the bloodstream and its presence identifies subclinical cardiovascular disease (CVD).¹⁻⁴ Conversely, SDMA is primarily excreted in the urine and identifies reduced renal function.^{5,6}

Clinical Use

ADMA/SDMA may be measured in individuals with multiple risk factors for the development of CVD.

Clinical Significance

Cardiovascular Significance:

- Higher levels of ADMA are associated with a 1.40x increased risk of CVD and coronary heart disease, as well as a 1.60x increased risk of stroke, in a general population.²

- Elevated ADMA levels are associated with the presence of hypertension,⁷ insulin resistance,⁷ and hyperlipidemia.⁸
- Elevated ADMA levels are associated with subclinical atherosclerosis:
 - Increased ADMA concentrations correlate with internal carotid artery bulb intimal media thickness,³ a hemodynamically unstable region vulnerable to NO deficiency⁹ and plaque formation.
 - Elevated ADMA in young adults is associated with increased coronary artery calcification.⁴
- Individuals with established coronary artery disease and elevated ADMA levels have more than twice the risk for adverse events (myocardial infarction, stroke) than those with normal ADMA levels.¹⁰

Renal Significance:

- Elevated SDMA levels positively correlate with reduced renal function, as measured by estimated glomerular filtration rate^{5,6} and cystatin C.^{11,12}

Specimen Type

The ADMA/SDMA test should be performed on a serum specimen, and fasting is recommended, but not required.

Testing Frequency

The frequency of testing is determined by an individual's medical history, but may be monitored in individuals with hyperlipidemia, hypertension, pre-diabetes/diabetes, or those who are at moderate to high risk for developing cardiovascular disease.

Commercial Insurance or Medicare Coverage

Coverage guidelines have not been established or posted by CMS (Medicare & Medicaid). We have reviewed the larger carriers (Aetna, United Healthcare, Cigna, Blues) and information is limited or has not been posted.

RELATIVE RISK

ADMA
(ng/mL)

<100 Low	100-123 Moderate	>123 High
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REFERENCE RANGE

SDMA
(ng/mL)

73 - 135 Low	>135 High
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TEST			Interpretation
ADMA	SDMA		
Low	Low		• Normal endothelial function
Med	High	Low	• Endothelial dysfunction and possible presence of pre-diabetes/diabetes or CVD
Low		High	• Reduced renal function
Med	High	High	• Endothelial dysfunction and possible presence of pre-diabetes/diabetes or CVD • Reduced renal function

Treatment Considerations[†]

These treatment considerations are for educational purposes only. Specific treatment plans should be provided and reviewed by the treating practitioner.

✓ Assess lifestyle habits.

- Consider diet, exercise, and weight reduction efforts, if appropriate.¹³

✓ Assess LDL-C levels.

- If not at an optimal level,⁸ consider lipid-lowering therapies described in the National Cholesterol Education Program/Adult Treatment Panel III (NCEP ATP III) Guidelines.¹⁴

✓ Assess insulin sensitivity.

- If not at an optimal level,⁷ consider insulin-sensitizing therapies described in the American Diabetes Association guidelines for the management of pre-diabetes/diabetes.¹⁵

✓ Assess blood pressure.

- If not at an optimal level, consider initiating, or titrating, antihypertensive therapy.^{1,16}
- Consider L-arginine or L-citrulline supplementation to enhance NO production, and to improve vasodilation and vascular tone.^{1,17}

✓ Assess the presence of coronary artery disease (CAD) with imaging techniques, such as carotid intima-media thickness (CIMT)³ testing or coronary artery calcium (CAC)⁴ scoring.

✓ Assess clotting risk.

- Consider antiplatelet therapy if history of CAD (i.e., myocardial infarction or revascularization) and/or cerebrovascular disease (i.e., transient ischemic attack or stroke).¹

✓ Assess renal function.

- If SDMA levels are not optimal,^{5,6,11,12} consider further assessment and treatment considerations for kidney disease, as outlined in the National Kidney Foundation guidelines.¹⁸

* The CPT codes provided are based on AMA guidelines and are for informational purposes only. CPT coding is the sole responsibility of the billing party. Please direct any questions regarding coding to the payer being billed.

† The treatment considerations are provided for informational purposes only and are not intended as medical advice. A physician's test selection and interpretation, diagnosis, and patient management decisions should be based on his/her education, clinical expertise, and assessment of the patient.

References

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