Test Definition: APOAB

Apolipoprotein A1 and B, Serum

Overview

Useful For

Assessment of cardiovascular risk

Follow-up studies in individuals with basic lipid measures inconsistent with risk factors or clinical presentation

Definitive studies of cardiac risk factors in individuals with significant family histories of coronary artery disease or other increased risk factors

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
RBAA1	Apolipoprotein B/A1 ratio	No	Yes
APOA1	Apolipoprotein A1, S	Yes	Yes
APOLB	Apolipoprotein B, S	Yes	Yes

Method Name

APOA1, APOLB: Turbidimetric Immunoassay
RBAA1: Calculation

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL Serum
Collection Instructions:
1. Centrifuge and aliquot serum into a plastic vial.
2. Send refrigerate.

Forms

If not ordering electronically, complete, print, and send a Cardiovascular Test Request Form (T724) with the specimen.

Specimen Minimum Volume

Serum: 0.5 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	OK
Gross icterus	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	8 days	
	Ambient	24 hours	
	Frozen	60 days	

Clinical & Interpretive

Clinical Information

Apolipoprotein B (ApoB) is the primary protein component of low-density lipoprotein (LDL). Apolipoprotein A1 (ApoA1) is the primary protein component of high-density lipoprotein (HDL). Elevated ApoB and decreased ApoA1 are associated with increased risk of cardiovascular disease. Multiple studies have reported that ApoB and ApoA1 are more strongly associated with cardiovascular disease than the corresponding lipoprotein cholesterol fraction (see APOA1 / Apolipoprotein A1, Serum and APOLB / Apolipoprotein B, Serum).

Apolipoprotein B is present in all atherogenic lipoproteins including LDL, Lp(a), intermediate-density lipoprotein, and very low-density lipoprotein remnants. ApoA1 is the nucleating protein around which HDL forms during reverse cholesterol transport. The ApoB:ApoA1 ratio represents the balance between atherogenic and antiatherogenic lipoproteins. Several large prospective studies have shown that the ApoB:ApoA1 ratio performs as well, and often better, than traditional lipids as an indicator of risk.(1-3)

Reference Values

Males

Age	Apolipoprotein A (mg/dL)	Apolipoprotein B (mg/dL)	Apolipoprotein B/A1 ratio
<24 months	Not established	Not established	Not established
2-17 years	Low: <115 Borderline low: 115-120 Acceptable: >120	Acceptable: <90 Borderline high: 90-109 High: > or =110	<0.8
> or =18 years	> or =120	Desirable: <90 Above Desirable: 90-99	Lower Risk: <0.7 Average Risk: 0.7-0.9

		Borderline high: 100-119 High: 120-139 Very high: > or =140	Higher Risk: >0.9

Females

Age	Apolipoprotein A (mg/dL)	Apolipoprotein B (mg/dL)	Apolipoprotein B/A1 ratio
<24 months	Not established	Not established	Not established
2-17 years	Low: <115 Borderline low: 115-120 Acceptable: >120	Acceptable: <90 Borderline high: 90-109 High: > or =110	<0.8
> or =18 years	> or =140	Desirable: <90 Above Desirable: 90-99 Borderline high: 100-119 High: 120-139 Very high: > or =140	Lower Risk: <0.6 Average Risk: 0.6-0.8 Higher Risk: >0.8

Interpretation

Elevated apolipoprotein B (ApoB) confers increased risk of atherosclerotic cardiovascular disease, even in the context of acceptable low-density lipoprotein (LDL) cholesterol concentrations.

ApoB values less than 48 mg/dL are considered very low (<2.5th population percentile). Possible causes include aggressive lipid-lowering therapy, malnutrition, hepatobiliary disease, or drug interactions. Decreased ApoB may indicate hypobetalipoproteinemia (HBL). Genetic testing for HBL is available (HYPBG / Hypobetalipoproteinemia Gene Panel, Varies).

Reduced apolipoprotein A1 (ApoA1) confers an increased risk of coronary artery disease. Extremely low ApoA1 (<20 mg/dL) is suggestive of liver disease or a genetic disorder.

Elevated ApoB:ApoA1 ratio confers increased risk of atherosclerotic cardiovascular disease, independently of LDL and high-density lipoprotein cholesterol concentrations.

Cautions

In very rare cases, gammopathy, in particular type IgM (Waldenstrom macroglobulinemia), may cause unreliable results.

Clinical Reference

1. European Association for Cardiovascular Prevention & Rehabilitation, Reiner Z, Catapano AL, et al. ESC/EAS Guidelines for the management of dyslipidaemias: the Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and the European Atherosclerosis Society (EAS). Eur Heart J. 2011;32(14):1769-1818. doi:10.1093/eurheartj/ehr1582. McQueen MJ, Hawken S, Wang X, et al. Lipids, lipoproteins, and apolipoproteins as risk markers of myocardial infarction in 52 countries (the INTERHEART study): a case-control study. Lancet. 2008;372(9634):224-233

3. Thompson A, Danesh J. Associations between apolipoprotein B, apolipoprotein AI, the apolipoprotein B/AI ratio and coronary heart disease: a literature-based meta-analysis of prospective studies. J Intern Med. 2006;259(5):481-492
4. Jacobson TA, Ito MK, Maki KC, et al. National Lipid Association recommendations for patient-centered management of dyslipidemia: Part 1-executive summary. J Clin Lipidol. 2014;8(5):473-488
5. Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents; National Heart, Lung, and Blood Institute. Expert panel on integrated guidelines for cardiovascular health and risk reduction in children and adolescents: summary report. Pediatrics. 2011;128 Suppl 5(Suppl 5):S213-S256. doi:10.1542/peds.2009-2107C
6. Cao J, Donato L, El-Khoury JM, Goldberg A, Meeusen JW, Remaley AT. ADLM Guidance Document on the Measurement and Reporting of Lipids and Lipoproteins. J Appl Lab Med. 2024;9(5):1040-1056

Performance

Method Description

Anti-apolipoprotein B antibodies react with the antigen in the sample to form antigen:antibody complexes which, following agglutination, can be measured turbidimetrically.(Package Insert: Tina-quant Apolipoprotein B. Roche Diagnostics; 08/2025)

Anti-apolipoprotein A-1 antibodies react with the antigen in the sample to form antigen:antibody complexes which, following agglutination, can be measured turbidimetrically.(Package Insert: Tina-quant Apolipoprotein A-1, Roche Diagnostics; 02/2022)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

1 to 3 days

Specimen Retention Time

5 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.

- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

82172 x 2

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
APOAB	Apolipoprotein A1 and B, S	55724-9

Result ID	Test Result Name	Result LOINC® Value
APOLB	Apolipoprotein B, S	1884-6
APOA1	Apolipoprotein A1, S	1869-7
RBAA1	Apolipoprotein B/A1 ratio	1874-7