MAYO CLINIC LABORATORIES

Test Definition: A124

Alpha-1-Microglobulin, 24 Hour, Urine

Overview

Useful For

Assessment of renal tubular injury or dysfunction using 24-hour urine collections

Screening for tubular abnormalities

Detecting chronic asymptomatic renal tubular dysfunction(2)

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
AIM	Alpha-1-Microglobulin, 24 HR, U	No	Yes
A1MCR	A1M/Creat Ratio	No	Yes
A1MC	Alpha-1-Microglobulin Concentration	No	Yes
CRT24	Creatinine, 24 HR, U	Yes, (Order CTU)	Yes

Special Instructions

- Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens

Method Name

AIM, A1MCR: Calculation

A1MC: Immunonephelometry

CRT24: Enzymatic Colorimetric Assay

NY State Available

Yes

Specimen

Specimen Type

Urine

Necessary Information

24-Hour volume (in milliliters) is required.

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)

Container/Tube: Plastic, 5-mL tube
Specimen Volume: 4 mL
Collection Instructions:
1. Collect urine for 24 hours.
2. No added preservative preferred.
3. Mix well before taking 4-mL aliquot.
Additional Information: For multiple collections see Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens

Forms

If not ordering electronically, complete, print, and send a Renal Diagnostics Test Request (T830) with the specimen.

Urine Preservative Collection Options

Note: The addition of preservative or application of temperature controls **must occur within 4 hours of completion** of the collection.

Ambient (no additive)	OK
Refrigerate (no additive)	Preferred
Frozen (no additive)	OK
50% Acetic Acid	OK
Boric Acid	OK
Diazolidinyl Urea	No
6M Hydrochloric Acid	No
6M Nitric Acid	No
Sodium Carbonate	No
Toluene	No

Specimen Minimum Volume

1 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	7 days	
	Ambient	7 days	
	Frozen	7 days	

Clinical & Interpretive

Clinical Information

Alpha-1-microglobulin is a low-molecular-weight protein of 26 kDa and a member of the lipocalin protein superfamily.(1) It is synthesized in the liver, freely filtered by glomeruli, and reabsorbed by renal proximal tubules cells where it is catabolized.(1) Due to extensive tubular reabsorption, under normal conditions very little filtered alpha-1-microglobulin appears in the final excreted urine. Therefore, an increase in the urinary concentration of alpha-1-microglobulin indicates proximal tubule injury and/or impaired proximal tubular function.

Elevated excretion rates can indicate tubular damage associated with renal tubulointerstitial nephritis or tubular toxicity from heavy metal or nephrotoxic drug exposure. Glomerulonephropathies and renal vasculopathies also are often associated with coexisting tubular injury and so may result in elevated excretion. Elevated alpha-1-microglobulin in patients with urinary tract infections may indicate renal involvement (pyelonephritis).

Measurement of urinary excretion of retinol-binding protein, another low-molecular-weight protein, is an alternative to the measurement of alpha-1-microglobulin. To date, there are no convincing studies to indicate that one test has better clinical utility than the other.

Urinary excretion of alpha-1-microglobulin can be determined from either a 24-hour collection or from a random urine collection. The 24-hour collection is traditionally considered the gold standard. For random or spot collections, the concentration of alpha-1-microglobulin is divided by the urinary creatinine concentration. This corrected value adjusts alpha-1-microglobulin for variabilities in urine concentration.

Reference Values

Alpha-1-Microglobulin/Creatinine Ratio
Not applicable

Alpha-1-Microglobulin Concentration
> or =18 years: <23 mg/24 hours

Reference values have not been established for patients who are less than 18 years of age.

Creatinine
Normal values mg per 24 hours:
Males: 930-2955 mg/24 hours
Females: 603-1783 mg/24 hours

Reference values have not been established for patients who are less than 18 years of age.

For SI unit Reference Values, see https://www.mayocliniclabs.com/order-tests/si-unit-conversion.html

Interpretation

Alpha-1-microglobulin above the reference values may be indicative of a proximal tubular dysfunction.

Cautions

Turbidity and particles (eg, cells, crystals) in the specimen can interfere with nephelometric assays.

Clinical Reference

1. Akerstrom B, Logdberg L, Berggard T, Osmark P, Lindqvist A. Alpha(1)-microglobulin: a yellow-brown lipocalin. Biochim Biophys Acta. 2000;1482(1-2):172-184
2. Yu H, Yanagisawa Y, Forbes M, Cooper EH, Crockson RA, MacLennan RC. Alpha-1-microglobulin: an indicator protein for renal tubular function. J Clin Pathol. 1983;36(3):253-259
3. Hjorth L, Helin I, Grubb A. Age-related reference limits for urine levels of albumin, orosomucoid, immunoglobulin G, and protein HC in children. Scand J Clin Lab Invest. 2000;60(1):65-73
4. Pagana K, Pagana T, Papana T, eds. Mosby's Diagnostic and Laboratory Test Reference. Mosby; 2020:632

Performance

Method Description

Alpha-1-Microglobulin:
In an immunochemical reaction, alpha-1-microglobulin present in the urine sample forms immune complexes with anti-alpha-1-microglobulin specific antibodies. These complexes scatter a beam of light passed through the sample. The intensity of the scattered light is proportional to the concentration of alpha-1-microglobulin in the sample. The result is evaluated by comparison with a standard of known concentration.(Package insert: N Alpha-1-Microglobulin. Siemens Healthcare Diagnostics Inc; V5, 08/2018)

Creatinine:
The enzymatic method is based on the determination of sarcosine from creatinine with the aid of creatininase, creatinase, and sarcosine oxidase. The liberated hydrogen peroxide is measured via a modified Trinder reaction using a colorimetric indicator. Optimization of the buffer system and the colorimetric indicator enables the creatinine concentration to be quantified both precisely and specifically.(Package insert: Creatinine plus ver 2. Roche Diagnostics; V 16.0, 02/2022)

PDF Report

No

Day(s) Performed

Monday, Wednesday, Friday

Report Available

1 to 4 days

Specimen Retention Time

7 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

83883

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
A124	Alpha-1-Microglobulin, 24 HR, U	99075-4

Result ID	Test Result Name	Result LOINC® Value
CR_A	Creatinine, 24 HR, U	2162-6
CR_24	Creatinine Concentration, 24 HR, U	20624-3
TM27	Collection Duration (h)	13362-9
VL69	Urine Volume (mL)	3167-4
AIM	Alpha-1-Microglobulin, 24 HR, U	48414-7
A1MC	Alpha-1-Microglobulin Concentration	99076-2
A1MCR	A1M/Creat Ratio	99075-4