

## Overview

### Useful For

Assessment of renal tubular injury or dysfunction

Screening for tubular abnormalities

Detecting chronic asymptomatic renal tubular dysfunction

### Profile Information

Test ID	Reporting Name	Available Separately	Always Performed
CTUR	Creatinine Conc	Yes, (order CTU)	Yes
AIMR	Alpha-1-Microglobulin, Random, U	No	Yes

### Method Name

CTUR: Enzymatic Colorimetric Assay

AIMR: Immunonephelometry

### NY State Available

Yes

## Specimen

### Specimen Type

Urine

### Specimen Required

**Container/Tube:** Plastic, 5-mL tube (T465)

**Specimen Volume:** 5 mL

### Collection Instructions:

1. Collect a random urine specimen.
2. No preservative.

### Forms

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

### Specimen Minimum Volume

1 mL

**Reject Due To**

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

**Specimen Stability Information**

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

**Clinical and 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 urinary alpha-1-microglobulin 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 1 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**

<50 years: <13 mg/g creatinine

> or =50 years: <20 mg/g creatinine

**Interpretation**

Alpha-1-microglobulin above the reference values may indicate a proximal tubular dysfunction. As suggested in the literature, 7 mg/g creatinine is an upper reference limit for pediatric patients of 1 month to 15 years of age.

**Cautions**

Since this is a nephelometric assay, turbidity and particles (eg, cells, crystals) in the sample can interfere with the test. Therefore, all urine specimens should be centrifuged at ambient temperature prior to assay.

**Clinical Reference**

1. Akerstrom B, Logdberg L, Berggard T, et al: Alpha-1-microglobulin: a yellow-brown lipocalin. *Biochimica et Biophysica Acta* 2000 Oct 18;1482(1-2):172-184

2. 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 Feb;60(1):65-73

3. Yu H, Yanagisawa Y, Forbes M, et al: Alpha-1-microglobulin: an indicator protein for renal tubular function. *J Clin Pathol* 1983 Mar;36(3):253-259

## Performance

### Method Description

Creatinine is performed by the enzymatic method, which 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: Roche Diagnostics, Indianapolis IN, 2004)

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: Dade Behring N Antisera to Human Alpha-1-microglobulin)

### PDF Report

No

### Day(s) and Time(s) Test Performed

Varies; 8 a.m.-4 p.m.

### Analytic Time

1 day

### Maximum Laboratory Time

7 days

### Specimen Retention Time

7 days

### Performing Laboratory Location

Rochester

## Fees and 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 Regional Manager. For assistance, contact [Customer Service](#).

### Test Classification

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This test has been cleared, approved or is exempt by the U.S. 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
RA1M	Alpha-1-Microglobulin, Random, U	48415-4

Result ID	Test Result Name	Result LOINC Value
CTUR	Creatinine Conc	2161-8
A1M_U	Alpha-1-Microglobulin, Random, U	46723-3
A1M_R	A1M/Creat Ratio	48415-4