Test Definition: ALU

Aluminum, 24 Hr, U

Overview

Useful For

Monitoring aluminum exposure

Preferred matrix for assessment of exposure in patients with normal renal function since rapidly filtered by kidneys

Monitoring metallic prosthetic implant wear

This test is **not an acceptable substitute** for serum aluminum measurements and is **not recommended** for routine aluminum screening.

Special Instructions

- Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens
- Trace Metals Analysis Specimen Collection and Transport

Method Name

Dynamic Reaction Cell-Inductively Coupled Plasma-Mass Spectrometry (DRC-ICP-MS)

NY State Available

Yes

Specimen

Specimen Type

Urine

Advisory Information

The recommended test for routine aluminum screening is AL / Aluminum, Serum.

Necessary Information

24-Hour volume is required.

Specimen Required

Patient Preparation: High concentrations of gadolinium and iodine are known to interfere with most metals tests. If either gadolinium- or iodine-containing contrast media has been administered, a specimen should not be collected for 96 hours.

Supplies: Urine Tubes, 10 mL (T068)

Collection Container/Tube: Clean, plastic urine container with no metal cap or glued insert

Submission Container/Tube: Plastic urine tube or clean, plastic aliquot container with no metal cap or glued insert

Specimen Volume: 10 mL

Collection Instructions:

1. Collect urine for 24 hours.

2. Refrigerate specimen within 4 hours of completion of 24-hour collection.

3. See Trace Metals Analysis Specimen Collection and Transport in Special Instructions for complete instructions.

Additional Information: See Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens in Special Instructions for multiple collections.

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	OK
Refrigerate	Preferred
Frozen	OK
50% Acetic Acid	OK
Boric Acid	No
Diazolidinyl Urea	No
6M Hydrochloric Acid	OK
6M Nitric Acid	OK
Sodium Carbonate	No
Thymol	No
Toluene	No

Specimen Minimum Volume

0.3 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)	28 days	
	Ambient	28 days	
	Frozen	28 days	

Clinical and Interpretive

Clinical Information

Under normal physiologic conditions, the usual daily dietary intake of aluminum (5-10 mg) is completely eliminated.

Excretion is accomplished by avid filtration of aluminum from the blood by the glomeruli of the kidney. Patients in renal failure (RF) lose the ability to clear aluminum and are candidates for aluminum toxicity. Many factors increase the incidence of aluminum toxicity in RF patients:

-Aluminum-laden dialysis water can expose dialysis patients to aluminum.

-Aluminum-laden albumin can expose patients to an aluminum burden they cannot eliminate.

-The dialysis process is not highly effective at eliminating aluminum.

-Aluminum-based phosphate binder gels are administered orally to minimize phosphate accumulation; a small fraction of this aluminum may be absorbed and accumulated.

If it is not removed by renal filtration, aluminum accumulates in the blood where it binds to proteins such as albumin and is rapidly distributed through the body. Aluminum overload leads to accumulation of aluminum at 2 sites: brain and bone. Brain deposition has been implicated as a cause of dialysis dementia. In bone, aluminum replaces calcium at the mineralization front, disrupting normal osteoid formation.

Urine aluminum concentrations are likely to be increased above the reference range in patients with metallic joint prosthesis. Prosthetic devices produced by Zimmer Company and Johnson and Johnson typically are made of aluminum, vanadium, and titanium. This list of products is incomplete, and these products change occasionally; see prosthesis product information for each device for composition details.

Reference Values

0-17 years: not established

> or =18 years: <10 mcg/24 hours

Interpretation

Daily excretion greater than 10 mcg/24 hours indicates exposure to excessive amounts of aluminum. In renal failure, the ability of the kidney to excrete aluminum decreases, while the exposure to aluminum increases (aluminum-laden dialysis water, aluminum-laden albumin, and aluminum-laden phosphate binders).

Patients receiving chelation therapy with desferrioxamine (for iron- or aluminum-overload states) also excrete considerably more aluminum in their urine than normal.

Prosthesis wear is known to result in increased circulating concentration of metal ions.(1,2) Modest increase (10-20 mcg/24 hours) in urine aluminum concentration is likely to be associated with a prosthetic device in good condition. Urine concentrations above 50 mcg/ 24 hours in a patient with an aluminum-based implant and not undergoing dialysis, suggests significant prosthesis wear. Increased urine trace element concentrations in the absence of corroborating clinical information do not independently predict prosthesis wear or failure.

Cautions

Falsely increased results may be obtained if the specimen is collected in nonacid-washed polypropylene collection vessels or if metal caps are used to seal the container.

Clinical Reference

1. O'Shea S, Johnson DW: Review article: addressing risk factors in chronic kidney disease mineral and bone disorder: can we influence patient-level outcomes? Nephrology 2009;14:416-427

2. Meyer-Baron M, Schuper M, Knapp G, van Thriel C: Occupational aluminum exposure: evidence in support of its neurobehavioral impact. Neurotoxicology 2007;28:1068-1078

3. Nader R, Horwath AR, Wittwer CT: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. Sixth Edition. St. Louis: Elsevier 2018

Performance

Method Description

Aluminum in serum and urine is analyzed by inductively coupled plasma-mass spectrometry in dynamic reaction cell mode using lithium (Li), gallium (Ga), and rhodium (Rh) as internal standards, and a salt matrix calibration.(Unpublished Mayo method)

PDF Report

No

Day(s) and Time(s) Test Performed

Thursday; Continuously

Analytic Time

1 day

Maximum Laboratory Time

7 days

Specimen Retention Time

14 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

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information

82108

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
ALU	Aluminum, 24 Hr, U	26707-0

Test Definition: ALU

Aluminum, 24 Hr, U

Result ID	Test Result Name	Result LOINC Value
8828	Aluminum, 24 Hr, U	26707-0
TM15	Collection Duration	13362-9
VL13	Urine Volume	3167-4