

Overview

Useful For

Investigation of primary aldosteronism (eg, adrenal adenoma/carcinoma and adrenal cortical hyperplasia) and secondary aldosteronism (eg, renovascular disease, salt depletion, potassium loading, cardiac failure with ascites, pregnancy, Bartter syndrome) in conjunction with urine sodium levels

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
ALDU	Aldosterone, U	Yes	Yes
NAU	Sodium, 24 HR, U	Yes	Yes

Special Instructions

- [Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens](#)
- [Renin-Aldosterone Studies](#)

Method Name

ALDU: Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

NAU: Potentiometric, Indirect Ion-Selective Electrode (ISE)

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Patient Preparation: If patient is taking spironolactone (Aldactone), it should be discontinued for 4 to 6 weeks before specimen collection.

Supplies: Aliquot Tube, 5 mL (T465)

Container/Tube: 2 Plastic, 5-mL tubes

Specimen Volume: 10 mL

Collection Instructions:

- Collect urine for 24 hours.
- Add 25 mL of 50% acetic acid as preservative at start of collection. Use 15 mL of 50% acetic acid for children under the age of 5 years. This preservative is intended to achieve a pH of between approximately 2 and 4.
- Place 5 mL of well mixed, 24-hour urine in plastic, 5-mL tube and label as Aldosterone.

4. Place 5 mL of well mixed, 24-hour urine in plastic, 5-mL tube and label as Sodium.

Additional Information:

1. **24-Hour volume is required.**

2. See [Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens](#) and [Renin-Aldosterone Studies](#) for more detailed instructions in Special Instructions.

Urine Preservative Collection Options

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

Specimen Minimum Volume

Aldosterone: 1 mL/Sodium: 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)	14 days	
	Frozen	14 days	
	Ambient	7 days	

Clinical & Interpretive

Clinical Information

Aldosterone stimulates sodium transport across cell membranes, particularly in the distal renal tubule where sodium is exchanged for hydrogen and potassium. Secondly, aldosterone is important in the maintenance of blood pressure and blood volume.

Aldosterone is the major mineralocorticoid and is produced by the adrenal cortex. The renin-angiotensin system is the primary regulator of the synthesis and secretion of aldosterone. Likewise, increased concentrations of potassium in the plasma may directly stimulate adrenal production of the hormone. Under physiologic conditions, pituitary

adrenocorticotrophic hormone can stimulate aldosterone secretion.

Urinary aldosterone levels are inversely correlated with urinary sodium excretion. Normal individuals will show a suppression of urinary aldosterone with adequate sodium repletion.

Primary hyperaldosteronism, which may be caused by aldosterone-secreting adrenal adenoma/carcinomas or adrenal cortical hyperplasia, is characterized by hypertension accompanied by increased aldosterone levels, hypernatremia, and hypokalemia. Secondary hyperaldosteronism (eg, in response to renovascular disease, salt depletion, potassium loading, cardiac failure with ascites, pregnancy, Bartter's syndrome) is characterized by increased aldosterone levels and increased plasma rennin activity.

Reference Values

ALDOSTERONE

0-30 days: 0.7-11.0 mcg/24 hours*

1-11 months: 0.7-22.0 mcg/24 hours*

> or =1 year: 2.0-20.0 mcg/24 hours

*Loeuille GA, Racadot A, Vasseur P, Vandewalle B: Blood and urinary aldosterone levels in normal neonates, infants and children. *Pediatric* 1981;36:335-344

SODIUM

41-227 mmol/24 hours

If the 24-hour urinary sodium excretion is >200 mmol, the urinary aldosterone excretion should be <10 mcg.

Interpretation

Under normal circumstances, if the 24-hour urinary sodium excretion is greater than 200 mEq, the urinary aldosterone excretion should be less than 10 mcg/24 hours.

Urinary aldosterone excretion greater than 12 mcg/24 hours as part of an aldosterone suppression test is consistent with hyperaldosteronism.

Twenty-four hour urinary sodium excretion should exceed 200 mEq to document adequate sodium repletion.

See [Renin-Aldosterone Studies](#) in Special Instructions.

Note: Advice on stimulation or suppression tests is available from Mayo Clinic's Division of Endocrinology; call 800-533-1710.

Cautions

The plasma renin activity (PRA) cannot be interpreted if the patient is being treated with spironolactone (Aldactone). Spironolactone (Aldactone) should be discontinued for 4 to 6 weeks before testing.

Angiotensin converting enzyme (ACE) inhibitors have the potential to "falsely elevate" PRA. Therefore, in a patient treated with an ACE-inhibitor, the findings of a detectable PRA level or a low sodium aldosterone (SA)/PRA ratio do not exclude the diagnosis of primary aldosteronism. In addition, a strong predictor for primary aldosteronism is a PRA level undetectably low in a patient taking an ACE-inhibitor.

Clinical Reference

1. Young WF Jr: Primary aldosteronism: A common and curable form of hypertension. *Cardiol Rev.* 1999;7:207-214
2. Young WF Jr: Pheochromocytoma and primary aldosteronism: diagnostic approaches. *Endocrinol Metab Clin North Am.* 1977;26:801-827
3. Fredline VF, Taylor PJ, Dodds HM, Johnson AG: A reference method for the analysis of aldosterone in blood by high-performance liquid chromatography-atmospheric pressure chemical ionization-tandem mass spectrometry. *AnalBiochem* 1997 Oct 15;252(2):308-313
4. Carey RM, Padia SH: Primary mineralocorticoid excess disorders and hypertension. In: Jameson JL, De Groot LJ, de Kretser DM, Giudice LC, et al: eds. *Endocrinology: Adult and Pediatric.* 7th ed. WB Saunders; 2016:1871-1891

Performance

Method Description

Sodium is performed by indirect ion-selective electrode (ISE).(Package insert: ISE indirect Na, K, Cl for Gen.2. Roche Diagnostics; V 14.0. 02/2018)

Aldosterone is performed by liquid chromatography-tandem mass spectrometry (LC-MS/MS).

Samples are spiked with deuterated internal standard and are hydrolyzed overnight with acid. Samples are then neutralized and extracted by solid phase extraction (SPE). The extracts are dried, reconstituted, and analyzed by liquid chromatography - tandem mass spectrometry.(Taylor RL, Singh RJ: Validation of liquid chromatography-tandem mass spectrometry method for analysis of urinary conjugated metanephrine and normetanephrine for screening of pheochromocytoma. *Clin Chem.* 2002 Mar; 48[3]:533-539; Wurth R, Tirosh A, Kamilaris CDC, et al. Volumetric modeling of adrenal gland size in primary bilateral macronodular adrenocortical hyperplasia. *J Endocr Soc.* 2020 Oct 29;5(1):bvaa162)

PDF Report

No

Day(s) Performed

Aldosterone: Monday, Thursday

Sodium: Monday through Sunday

Report Available

2 to 7 days

Specimen Retention Time

See Individual Unit Codes

Performing Laboratory Location

Rochester

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 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 US Food and Drug Administration.

CPT Code Information

82088-Aldosterone
84300-Sodium

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
ALDNA	Aldosterone with Sodium, Urine	94871-1

Result ID	Test Result Name	Result LOINC® Value
8556	Aldosterone, U	1765-7
TM47	Collection Duration	13362-9
VL45	Urine Volume	3167-4
NA_24	Sodium, 24 HR, U	2956-1
TM11	Collection Duration	13362-9
VL9	Urine Volume	3167-4
NACN	Sodium Concentration	21525-1