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## Overview

### Useful For

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

This test is **not useful for** determination of plasma renin concentration.

### Special Instructions

- [Renin-Aldosterone Studies](#)

### Method Name

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

Portions of this test are covered by patents held by Quest Diagnostics

### NY State Available

Yes

## Specimen

### Specimen Type

Plasma EDTA

### Specimen Required

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

**Collection Container/Tube:** Chilled, lavender top (EDTA)

**Submission Container/Tube:** Plastic vial

**Specimen Volume:** 2 mL

### Collection Instructions:

1. Draw blood in a chilled syringe from a patient in a seated position; place specimen in a chilled, lavender-top (EDTA) tube; and mix.

2. Alternatively, draw blood directly in a chilled, EDTA tube.
3. Immediately place EDTA tube into an ice-water bath until thoroughly cooled.
4. Refrigerate specimen during centrifugation and immediately transfer plasma to plastic vial. (If a refrigerated centrifuge is unavailable, chill the centrifuge carriers. Centrifuge specimen for less than or equal to 5 minutes, then promptly transfer plasma.)
5. Immediately freeze plasma.

**Additional Information:** See [Renin-Aldosterone Studies](#) for further information.

### Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:

[-General Request](#) (T239)

[-Cardiovascular Test Request](#) (T724)

### Reject Due To

Gross hemolysis	Reject
Gross lipemia	OK
Gross icterus	OK

### Specimen Minimum Volume

1.15 mL

### Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Plasma EDTA	Frozen (preferred)	14 days	

### Clinical & Interpretive

#### Clinical Information

The renal juxtaglomerular apparatus generates renin, an enzyme that converts angiotensinogen to angiotensin I. The inactive angiotensin I is enzymatically converted to the active octapeptide angiotensin II, a potent vasopressor responsible for hypertension of renal origin. Angiotensin II also stimulates the zona glomerulosa of the adrenal cortex to release aldosterone.

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Renin secretion by the kidney is stimulated by a fall in glomerular blood pressure, by decreased sodium concentration at the macula densa at the distal tubule, or by stimulation of sympathetic outflow to the kidney, such as in renal vascular diseases.

**Reference Values**

0-2 years: 4.6 ng/mL/hour (mean)\* Range: 1.4-7.8 ng/mL/hour

3-5 years: 2.5 ng/mL/hour (mean)\* Range: 1.5-3.5 ng/mL/hour

6-8 years: 1.4 ng/mL/hour (mean)\* Range: 0.8-2.0 ng/mL/hour

9-11 years: 1.9 ng/mL/hour (mean)\* Range: 0.9-2.9 ng/mL/hour

12-17 years: 1.8 ng/mL/hour (mean)\* Range: 1.2-2.4 ng/mL/hour

Mean data not standardized as to time of day or diet. Infants were supine, children sitting.

Na-depleted, upright (peripheral vein specimen)

18-39 years: 10.8 ng/mL/hour (mean)

2.9-24.0 ng/mL/hour (range)

> or =40 years: 5.9 ng/mL/hour (mean)

2.9-10.8 ng/mL/hour (range)

Na-replete, upright (peripheral vein specimen)

18-39 years: 1.9 ng/mL/hour (mean)

< or =0.6-4.3 ng/mL/hour (range)

> or =40 years: 1.0 ng/mL/hour (mean)

< or =0.6-3.0 ng/mL/hour (range)

\*Stalker HP, Holland NH, Kotchen JM, Kotchen TA: Plasma renin activity in healthy children. J Pediatr. 1976 Aug;89(2):256-258

**Interpretation**

A high ratio of serum aldosterone (SA) in ng/dL to plasma renin activity (PRA) in ng/mL per hour, is a positive screening

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test result, a finding that warrants further testing. A SA:PRA ratio  $>$  or  $=20$  and SA of  $>$  or  $=15$  ng/dL indicates probable primary aldosteronism.

Kidney disease, such as unilateral renal artery stenosis, results in elevated renin and aldosterone levels. Kidney venous catheterization may be helpful. A positive test is a renal venous renin ratio (affected:normal) above 1.5.

See [Renin-Aldosterone Studies](#).

### Cautions

Angiotensin converting enzyme (ACE) inhibitors have the potential to falsely elevate plasma renin activity (PRA). Therefore, in a patient treated with an ACE-inhibitor, the findings of a detectable PRA level or a low serum aldosterone 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 Jul-Aug;7(4):207-214
2. Young WF Jr: Pheochromocytoma and primary aldosteronism: diagnostic approaches. *Endocrinol Metab Clin North Am*. 1997 Dec;26(4):801-827

### Performance

#### Method Description

The renin in plasma is allowed to act on the plasma's endogenous substrate, angiotensinogen, producing angiotensin I. This is measured by mass spectrometry. Renin activity is expressed in nanograms of angiotensin produced per milliliter of plasma per hour of incubation.(Fredline VF, Kovacs EM, Taylor PJ, Johnson AG: Measurement of plasma renin activity with use of HPL celectrospray-tandem mass spectrometry. *Clin Chem*. 1999 May;45[5]:659-664)

#### PDF Report

No

#### Specimen Retention Time

14 days

#### Performing Laboratory Location

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Rochester

**Fees & Codes****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**

84244

**LOINC® Information**

Test ID	Test Order Name	Order LOINC Value
PRA	Renin Activity, P	2915-7

Result ID	Reporting Name	LOINC®
8060	Renin Activity, P	2915-7