

## Overview

### Useful For

Biochemical diagnosis and monitoring of intestinal carcinoid syndrome

### Special Instructions

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

### Method Name

LiquidChromatography-TandemMassSpectrometry(LC-MS/MS)

### NY State Available

Yes

## Specimen

### Specimen Type

Urine

### Necessary Information

24-hour volume is required.

### Specimen Required

#### Patient Preparation:

1. Some medications could interfere with test results. The ordering provider should decide if any medications should be stopped and when they should be restarted. If clinically feasible, discontinue the following medications at least 48 hours prior to, as well as during, specimen collection:

-Acetaminophen (Tylenol or generic versions)

-Aspirin

-Antihistamines

-Cough syrups

-Cold and flu medications

2. For 48 hours prior to, as well as during, the urine collection, the patient should:

Limit the following to 1 serving per day:

-Fruits

-Vegetables

-Nuts

-Caffeinated beverages or foods

**Supplies:** Urine Tubes, 10 mL (T068)

**Container/Tube:** Plastic, 10-mL urine tube

**Specimen Volume:** 5 mL

**Collection Instructions:**

1. Collect a 24-hour urine specimen.
2. Add 25 mL of 50% acetic acid as preservative at start of collection. Use 15 mL of 50% acetic acid for children <5 years old.

**Additional Information:** See [Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens](#) in Special Instructions for multiple collections.

**Forms**

[If not ordering electronically, complete, print, and send an Oncology Test Request](#) (T729) 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
Refrigerate	OK
Frozen	OK
50% Acetic Acid	Preferred
Boric Acid	OK
Diazolidinyl Urea	No
6M Hydrochloric Acid	OK
6M Nitric Acid	OK
Sodium Carbonate	OK
Thymol	OK
Toluene	OK

**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)	56 days	
	Frozen	365 days	

## Clinical and Interpretive

### Clinical Information

5-Hydroxyindoleacetic acid (5-HIAA) is the major metabolite of serotonin and is excreted in the urine. Intestinal carcinoid tumors, along with neuroendocrine tumors, can produce excess amounts of 5-HIAA and serotonin, especially in individuals with carcinoid syndrome. Carcinoid syndrome is characterized by carcinoid tumors, flushing, heart disease, and hepatomegaly.

Measurement of 5-HIAA in a 24-hour urine specimen can diagnose carcinoid disease with a high specificity.

### Reference Values

Age	5HIAA, mg/24 hour 99th percentile cutoff	
	Female	Male
< or =23 months	< or =2.7	< or =2.3
24-35 months	< or =3.0	< or =2.6
3 years	< or =3.2	< or =2.9
4 years	< or =3.4	< or =3.2
5 years	< or =3.6	< or =3.6
6 years	< or =3.8	< or =3.9
7 years	< or =4.0	< or =4.2
8 years	< or =4.2	< or =4.5
9 years	< or =4.5	< or =4.8
10 years	< or =4.7	< or =5.1
11 years	< or =4.9	< or =5.3
12 years	< or =5.2	< or =5.6
13 years	< or =5.4	< or =5.8
14 years	< or =5.6	< or =6.1
15 years	< or =5.7	< or =6.3
16 years	< or =5.9	< or =6.4
17 years	< or =6.0	< or =6.6
18 years	< or =6.0	< or =6.7
19 years	< or =6.1	< or =6.8

20 years	< or =6.1	< or =6.9
21 years	< or =6.2	< or =6.9
22 years	< or =6.2	< or =7.0
23 years	< or =6.2	< or =7.0
24 years	< or =6.3	< or =7.1
25 years	< or =6.3	< or =7.2
26 years	< or =6.3	< or =7.2
27 years	< or =6.4	< or =7.3
28 years	< or =6.4	< or =7.4
29 years	< or =6.5	< or =7.5
30 years	< or =6.6	< or =7.5
31 years	< or =6.6	< or =7.6
32 years	< or =6.7	< or =7.7
33 years	< or =6.8	< or =7.7
34 years	< or =6.8	< or =7.8
35 years	< or =6.9	< or =7.9
36 years	< or =6.9	< or =7.9
37 years	< or =7.0	< or =8.0
38 years	< or =7.0	< or =8.1
39 years	< or =7.0	< or =8.2
40 years	< or =7.1	< or =8.2
41 years	< or =7.1	< or =8.3
42 years	< or =7.2	< or =8.4
43 years	< or =7.3	< or =8.5
44 years	< or =7.4	< or =8.6
45 years	< or =7.4	< or =8.7
46 years	< or =7.5	< or =8.8
47 years	< or =7.6	< or =8.9
48 years	< or =7.6	< or =9.0
49 years	< or =7.7	< or =9.1
50 years	< or =7.7	< or =9.2
51 years	< or =7.8	< or =9.3
52 years	< or =7.8	< or =9.4
53 years	< or =7.9	< or =9.5
54 years	< or =8.0	< or =9.6
55 years	< or =8.1	< or =9.7
56 years	< or =8.1	< or =9.7
57 years	< or =8.2	< or =9.8
58 years	< or =8.3	< or =9.8

59 years	< or =8.3	< or =9.8
60 years	< or =8.3	< or =9.9
61 years	< or =8.3	< or =9.9
62 years	< or =8.4	< or =9.9
63 years	< or =8.4	< or =10.0
64 years	< or =8.4	< or =10.0
65 years	< or =8.4	< or =10.0
66 years	< or =8.5	< or =10.1
67 years	< or =8.5	< or =10.1
68 years	< or =8.5	< or =10.1
69 years	< or =8.5	< or =10.2
70 years	< or =8.5	< or =10.2
71 years	< or =8.6	< or =10.2
72 years	< or =8.6	< or =10.2
73 years	< or =8.5	< or =10.1
74 years	< or =8.5	< or =10.1
75 years	< or =8.6	< or =10.1
76 years	< or =8.6	< or =10.0
77 years	< or =8.6	< or =10.0
78 years	< or =8.6	< or =10.0
79 years	< or =8.6	< or =10.0
80 years	< or =8.7	< or =9.9
81 years	< or =8.7	< or =9.9
82 years	< or =8.7	< or =9.9
83 years	< or =8.7	< or =9.9
84 years	< or =8.7	< or =9.9
85 years	< or =8.6	< or =9.8
86 years	< or =8.5	< or =9.8
87 years	< or =8.4	< or =9.7
88 years	< or =8.3	< or =9.7
89 years	< or =8.1	< or =9.5
90 years	< or =7.9	< or =9.4
91 years	< or =7.6	< or =9.2
92 years	< or =7.4	< or =9.0
93 years	< or =7.1	< or =8.8
94 years	< or =7.0	< or =8.7
= 95 years	< or =6.9	< or =8.6

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

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## Interpretation

Elevated excretion of 5-hydroxyindoleacetic acid is a probable indicator of the presence of a serotonin-producing tumor, if pharmacological and dietary artifacts have been ruled out.

## Cautions

Intake of food with a high content of serotonin (avocados, dates, eggplant, all fruit [including bananas, cantaloupe, grapefruit, kiwifruit, melons, pineapple, plantains, plums], all nuts [including hickory nuts, butternuts, pecans, walnuts], and tomatoes and tomato products) within 48 hours of the urine collection could result in falsely elevated 5-hydroxyindoleacetic acid (5-HIAA) excretion.

Numerous drugs affect the excretion of 5-HIAA by different mechanisms, including increased serotonin synthesis, metabolism, and release and inhibition of uptake. The following medications can interfere with 5-HIAA results.

-Acetaminophen (Tylenol or generic versions)

-Aspirin

-Antihistamines

-Cough syrups

-Cold and flu medications

Patient should also avoid caffeinated beverages such as tea and coffee or caffeinated foods for 48 hours before and during specimen collection.

## Clinical Reference

1. de Herder W: Biochemistry of neuroendocrine tumours. *Best Pract Res Clin Endocrinol Metab* 2007 Mar;21(1):33-41

2. Mashige F, Matsushima Y, Kanazawa H, et al: Acidic catecholamine metabolites and 5-hydroxyindoleacetic acid in urine: the influence of diet. *Ann Clin Biochem*. 1996;33:43-49

3. Vinik A, Feliberti E, Perry RR: Carcinoid Tumors. In: De Groot LJ, Beck-Peccoz P, Chrousos G, eds. *Endotext*. . MDTText.com Inc; 2000. Available at [www.ncbi.nlm.nih.gov/books/NBK279162/](http://www.ncbi.nlm.nih.gov/books/NBK279162/)

4. Shah D, Mandot A, Cerejo C, et al: The outcome of primary hepatic neuroendocrine tumors: A single-center experience. *J Clin Exp Hepatol*. 2019 Nov-Dec;9(6):710-715. doi: 10.1016/j.jceh.2019.08.002

5. Perry D, Hayek SS: Carcinoid heart disease: A guide for clinicians. *Cardiol Clin*. 2019 Nov;37(4):497-503. doi: 10.1016/j.ccl.2019.07.014

6. Degnan AJ, Tocchio S, Kurtom W, Tadros SS: Pediatric neuroendocrine carcinoid tumors: Management, pathology, and imaging findings in a pediatric referral center. *Pediatr Blood Cancer*. 2017 Sep;64(9). doi: 10.1002/pbc.26477

## Performance

### Method Description

5-Hydroxyindoleacetic acid (5-HIAA) is measured by solid phase extraction (SPE) of an aliquot from a 24-hour urine

collection and liquid chromatography/tandem mass spectrometry (LC-MS/MS) analysis. 5-HIAA is quantitated using a custom synthesized stable isotope labeled internal standard (d6-5-HIAA) from calibration over a concentration range 0.5 to 150 mg/L. (Kroll CA, Magera MJ, Helgeson JK, et al: A liquid chromatography-tandem mass spectrometry method for the determination of 5-hydroxyindole-3-acetic acid in urine. Clin Chem 2002;48:2049-2051, Calanchini M, Tadman M, Krogh J, Fabbri A, Grossman A, Shine B: Measurement of urinary 5-HIAA: correlation between spot versus 24-h urine collection. Endocr Connect 2019 Aug 1;8(8):1082-1088)

**PDF Report**

No

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

Monday through Thursday; 11 a.m.

Friday; 2 p.m.

**Analytic Time**

2 days (not reported on Saturday or Sunday)

**Maximum Laboratory Time**

4 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**

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**

83497

**LOINC® Information**

Test ID	Test Order Name	Order LOINC Value
HIAA	5-Hydroxyindoleacetic Acid, U	1695-6

Result ID	Test Result Name	Result LOINC Value
9248	5-Hydroxyindoleacetic Acid, U	1695-6



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Result ID	Test Result Name	Result LOINC Value
TM35	Collection Duration	13362-9
VL33	Urine Volume	3167-4