

## Overview

### Useful For

Biochemical diagnosis and monitoring of intestinal carcinoid syndrome using 24-hour urine specimens

### Special Instructions

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

### Method Name

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

### NY State Available

Yes

## Specimen

### Specimen Type

Urine

### Ordering Guidance

This test is the preferred test for measurement of 5-hydroxyindoleacetic acid concentrations. If a random urine collection is preferred, order HIAAR / 5-Hydroxyindoleacetic Acid, Random, Urine.

### Necessary Information

1. Collection duration and urine volume in milliliters are required.
2. Patient's age and sex are 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)
- Tryptophan containing supplements

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

Limit the following to one 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. 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.
2. Collect a 24-hour urine specimen.

**Additional Information:** See [Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens](#) 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 must occur prior to beginning the collection.

Ambient (no additive)	No
Refrigerate (no additive)	OK
Frozen (no additive)	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 & 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	5-HIAA, 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 [www.mayocliniclabs.com/order-tests/si-unit-conversion.html](http://www.mayocliniclabs.com/order-tests/si-unit-conversion.html)

### Interpretation

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

### Cautions

Intake of food with a high content of serotonin (avocados, dates, eggplant, all fruit [including bananas, cantaloupe, grapefruit, kiwi fruit, 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)
- Tryptophan containing supplements

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

### Clinical Reference

1. Grimaldi F, Fazio N, Attanasio R, et al. Italian Association of Clinical Endocrinologists (AME) position statement: a stepwise clinical approach to the diagnosis of gastroenteropancreatic neuroendocrine neoplasms. *J Endocrinol Invest.* 2014;37(9):875-909. doi:10.1007/s40618-014-0119-0

2. Vinik A, Hughes MS, Feliberti E, et al. Carcinoid tumors. In: Feingold KR, Anawalt B, Boyce A, et al, eds. Endotext [Internet]. MDText.com Inc; 2000. Updated February 5, 2018. Accessed March 17, 2023. Available at [www.ncbi.nlm.nih.gov/books/NBK279162/](http://www.ncbi.nlm.nih.gov/books/NBK279162/)
3. Shah D, Mandot A, Cerejo C, Amarapurkar D, Pal A. The outcome of primary hepatic neuroendocrine tumors: A single-center experience. *J Clin Exp Hepatol*. 2019;9(6):710-715. doi:10.1016/j.jceh.2019.08.002
4. Perry D, Hayek SS. Carcinoid heart disease: A guide for clinicians. *Cardiol Clin*. 2019;37(4):497-503. doi:10.1016/j.ccl.2019.07.014
5. 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;64(9). doi:10.1002/pbc.26477
6. Corcuff JB, Chardon L, El Hajji Ridah I, Brossaud J. Urinary sampling for 5HIAA and metanephrines determination: revisiting the recommendations. *Endocr Connect*. 2017;6(6):R87-R98. doi:10.1530/EC-17-0071

## Performance

### Method Description

5-Hydroxyindoleacetic acid (5-HIAA) is measured by solid phase extraction of an aliquot from a 24-hour urine collection and liquid chromatography tandem mass spectrometry 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, Mattern D, Rinaldo P. 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;8[8]:1082-1088)

### PDF Report

No

### Day(s) Performed

Monday through Friday

### Report Available

2 to 4 days

### Specimen Retention Time

7 days

### Performing Laboratory Location

Rochester

## Fees & Codes

### Fees

- Authorized users can sign in to [Test Prices](#) for detailed fee information.

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- Clients without access to Test Prices can contact [Customer Service](#) 24 hours a day, seven days a week.
  - Prospective clients should contact their account representative. 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. It has not been cleared or approved by the US 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
TM35	Collection Duration	13362-9
VL33	Urine Volume	3167-4