

## Overview

### Useful For

Biochemical diagnosis and monitoring of intestinal carcinoid syndrome using random urine specimens

### Method Name

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

### NY State Available

Yes

## Specimen

### Specimen Type

Urine

### Ordering Guidance

This test uses a random urine collection to assess 5-hydroxyindoleacetic acid concentrations. If a 24-hour urine collection is preferred, order HIAA / 5-Hydroxyindoleacetic Acid, 24 Hour, Urine.

### Necessary Information

**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 specimen collection:

- Acetaminophen (Tylenol or generic versions)
- Tryptophan containing supplements

2. For 48 hours prior to 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. Collect a random urine specimen.
2. Store and send refrigerate

### 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 random urine specimen can diagnose carcinoid disease with a high specificity.

### Reference Values

5-HIAA, mg/g creatinine 99th percentile cutoff		
Age	Female	Male
< or =23 months	< or =17.53	< or =16.42
24-35 months	< or =17.07	< or =15.96
3 years	< or =16.70	< or =15.60
4 years	< or =16.03	< or =14.93
5 years	< or =15.26	< or =14.17
6 years	< or =14.40	< or =13.34
7 years	< or =13.47	< or =12.43
8 years	< or =12.52	< or =11.52
9 years	< or =11.58	< or =10.63
10 years	< or =10.67	< or =9.79
11 years	< or =9.81	< or =9.00
12 years	< or =9.02	< or =8.29
13 years	< or =8.32	< or =7.65

14 years	< or =7.70	< or =7.08
15 years	< or =7.16	< or =6.59
16 years	< or =6.72	< or =6.15
17 years	< or =6.36	< or =5.78
18 years	< or =6.08	< or =5.45
19 years	< or =5.88	< or =5.17
20 years	< or =5.73	< or =4.93
21 years	< or =5.64	< or =4.73
22 years	< or =5.59	< or =4.55
23 years	< or =5.57	< or =4.40
24 years	< or =5.57	< or =4.28
25 years	< or =5.58	< or =4.19
26 years	< or =5.61	< or =4.11
27 years	< or =5.64	< or =4.06
28 years	< or =5.67	< or =4.03
29 years	< or =5.70	< or =4.02
30 years	< or =5.72	< or =4.01
31 years	< or =5.75	< or =4.02
32 years	< or =5.77	< or =4.03
33 years	< or =5.78	< or =4.05
34 years	< or =5.79	< or =4.06
35 years	< or =5.80	< or =4.08
36 years	< or =5.80	< or =4.09
37 years	< or =5.80	< or =4.11
38 years	< or =5.80	< or =4.12
39 years	< or =5.81	< or =4.14
40 years	< or =5.82	< or =4.17
41 years	< or =5.85	< or =4.22
42 years	< or =5.89	< or =4.27
43 years	< or =5.95	< or =4.35
44 years	< or =6.04	< or =4.43
45 years	< or =6.14	< or =4.53
46 years	< or =6.26	< or =4.63
47 years	< or =6.40	< or =4.75
48 years	< or =6.55	< or =4.86
49 years	< or =6.71	< or =4.99
50 years	< or =6.86	< or =5.11
51 years	< or =7.01	< or =5.24
52 years	< or =7.15	< or =5.37
53 years	< or =7.29	< or =5.51
54 years	< or =7.41	< or =5.64
55 years	< or =7.52	< or =5.78
56 years	< or =7.62	< or =5.91

57 years	< or =7.71	< or =6.05
58 years	< or =7.80	< or =6.17
59 years	< or =7.88	< or =6.29
60 years	< or =7.95	< or =6.41
61 years	< or =8.02	< or =6.51
62 years	< or =8.09	< or =6.60
63 years	< or =8.15	< or =6.69
64 years	< or =8.21	< or =6.76
65 years	< or =8.28	< or =6.82
66 years	< or =8.34	< or =6.88
67 years	< or =8.40	< or =6.93
68 years	< or =8.46	< or =6.97
69 years	< or =8.52	< or =7.00
70 years	< or =8.58	< or =7.03
71 years	< or =8.65	< or =7.06
72 years	< or =8.71	< or =7.08
73 years	< or =8.77	< or =7.10
74 years	< or =8.82	< or =7.11
75 years	< or =8.86	< or =7.11
76 years	< or =8.90	< or =7.11
77 years	< or =8.92	< or =7.10
78 years	< or =8.93	< or =7.09
79 years	< or =8.93	< or =7.07
80 years	< or =8.92	< or =7.05
81 years	< or =8.90	< or =7.02
82 years	< or =8.88	< or =7.00
83 years	< or =8.86	< or =6.98
84 years	< or =8.85	< or =6.97
85 years	< or =8.84	< or =6.95
86 years	< or =8.84	< or =6.94
87 years	< or =8.84	< or =6.94
88 years	< or =8.84	< or =6.94
>or= 89 years	< or =8.85	< or =6.93

### 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, 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)
- 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 May 5, 2021. Available at [www.ncbi.nlm.nih.gov/books/NBK279162/](http://www.ncbi.nlm.nih.gov/books/NBK279162/)
3. 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
4. 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
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 Sep;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 random 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, 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) Performed

Monday through Friday

#### Report Available

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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.
- 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**

83497

**LOINC® Information**

Test ID	Test Order Name	Order LOINC® Value
HIAAR	5-HIAA, Random, U	11145-0

Result ID	Test Result Name	Result LOINC® Value
616090	5-HIAA, Random, U	11145-0