# Test Definition: 3MT

3-Methoxytyramine, 24h, U

## Overview

### Useful For

A first- and second-order screening test for the presumptive diagnosis of catecholamine-secreting pheochromocytomas and paragangliomas

Testing in conjunction or as an alternative to plasma metanephrines (PMET / Metanephrines, Fractionated, Free, Plasma) or plasma catecholamine (CATP / Catecholamine Fractionation, Free, Plasma) testing

### 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

### Necessary Information

**24-Hour volume is required.**

### Specimen Required

**Patient Preparation:** Tricyclic antidepressants, labetalol, and sotalol medications may elevate levels of catecholamines producing results that cannot be interpreted. If clinically feasible, it is optimal to discontinue these medications at least 1 week before collection. Levodopa (Sinemet) medication will cause false-positive results. For advice on assessing the risk of removing patients from these medications and alternatives, consider consultation with a specialist in endocrinology or hypertension.

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

**Submission Container/Tube:** Plastic urine tube

**Specimen Volume:** 10 mL

**Collection Instructions:**

1. Complete 24-hour urine collections are preferred, especially for patients with episodic hypertension; ideally the collection should begin at the onset of a "spell."

2. Collect urine for 24 hours.

3. Add 10 g (pediatric: 3 g) of boric acid or 25 mL (pediatric: 15 mL) of 50% acetic acid as preservative at start of collection.

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

## Specimen Minimum Volume

2 mL

## Reject Due To

| | |
|---|---|
| Gross hemolysis | OK |
| Gross icterus | OK |

## Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---|---|---|---|
| Urine | Refrigerated (preferred) | 28 days | |
| | Frozen | 90 days | |
| | Ambient | 28 days | |

# Clinical and Interpretive

## Clinical Information

Pheochromocytoma is a rare, though potentially lethal, tumor of chromaffin cells of the adrenal medulla that

produces episodes of hypertension with palpitations, severe headaches, and sweating (spells). Patients with pheochromocytoma may also be asymptomatic and present with sustained hypertension or an incidentally discovered adrenal mass.

Pheochromocytomas and other tumors derived from neural crest cells (eg, paragangliomas and neuroblastomas) secrete catecholamines (epinephrine, norepinephrine, and dopamine). Dopamine secreting tumors are rarer than norepinephrine and epinephrine secreting tumors.

3-Methoxytyramine (3MT), metanephrine, and normetanephrine are the metabolites of dopamine, epinephrine, and norepinephrine, respectively. These metabolites are further metabolized to vanillylmandelic acid. Pheochromocytoma cells also have the ability to oxymethylate catecholamines into metanephrines that are secreted into circulation.

This test may be used as the first test for low-suspicion cases and also as a confirmatory study in patients with less than a 2-fold elevation in plasma free fractionated catecholamines. This is highly desirable, as the very low population incidence rate of pheochromocytoma (<1:100,000 population per year) will otherwise result in large numbers of unnecessary, costly, and sometimes risky imaging procedures.

## Reference Values

Males: < or =306 mcg/24 hours

Females: < or =242 mcg/24 hours

## Interpretation

Further clinical investigation (eg, radiographic studies) and genetic studies are warranted in patients whose 3-methoxytyramine (3MT) levels are elevated and there is a very high clinical index of suspicion.

Increased 3MT levels are found in patients with pheochromocytoma and dopamine-secreting tumors.

3MT levels of 306 mcg/24 hours or less in males and 242 mcg/24 hours or less in females can be detected in non-pheochromocytoma hypertensive patients.

## Cautions

This test utilizes a liquid chromatography/tandem mass spectrometry (LC-MS/MS) method and is not affected by the interfering substances that affected older spectrophotometric (Pisano reaction) methods (ie, diatrizoate, chlorpromazine, hydrazine derivatives, imipramine, monoamine oxidase [MAO] inhibitors, methyldopa, phenacetin, ephedrine, or epinephrine) or acetaminophen in high-performance liquid chromatography (HPLC) methods.

This method is not subject to the known interference of acetaminophen (seen with the plasma metanephrine HPLC-electrochemical detection method).

## Clinical Reference

1. van Duinen N, Corssmit EPM, de Jong WHA, et al: Plasma levels of free metanephrines and 3-methoxytyramine indicate a higher number of biochemically active HNPGL than 24-h urinary excretion rates of catecholamines and metabolites Euroupean J Endocrinol 2013;169:377-382 doi: 10.1530/EJE-13-0529

2. van Duinen N, Steenvoorden D, Kema IP, et al: Increased urinary excretion of 3-methoxytyramine in patients with head and neck paragangliomas. J Clin Endocrinol Metab 2010 Jan:95(1):209-214 doi: 10.1210/jc.2009-1632

3. Kantorovich V, Pacak K; Interest of urinary dosage of 3- methoxytyramine in the diagnosis of pheochromocytoma and paraganglioma: report of 28 cases. Ann Clin Biol 2011;69(5):555-559 doi: 10.1684 /abc.2011.0612

4. Muskiet FA, Thomasson CG, Gerding AM, et al: Determination of catecholamines and their 3-o-methylated

metabolites in urine by mass fragmentography with use of deuterated internal standards. Clin Chem 1979 Mar;25(3):453-460

5. Shen Y, Cheng L: Biochemical Diagnosis of Pheochromocytoma and Paraganglioma. In: Mariani-Costantini R, eds. Paraganglioma: A Multidisciplinary Approach [Internet]. Codon Publications; 2019. Accessed: April 2020. Available at www.ncbi.nlm.nih.gov/books/NBK543224/

## Performance

### Method Description

Urinary 3-methoxytyramine (3MT) is determined by reverse-phase liquid chromatography-tandem mass spectrometry (LC-MS/MS) stable isotope dilution analysis.(Unpublished Mayo method)

### PDF Report

No

### Day(s) Performed

Monday through Friday

### Report Available

3 to 5 days

### Specimen Retention Time

2 weeks

### 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

82542

### LOINC® Information

| Test ID | Test Order Name | Order LOINC Value |
|---|---|---|
| 3MT | 3-Methoxytyramine, 24h, U | 32618-1 |

# Test Definition: 3MT

3-Methoxytyramine, 24h, U

| Result ID | Test Result Name | Result LOINC Value |
|---|---|---|
| 65157 | 3-Methoxytyramine, U | 32618-1 |
| TM120 | Collection Duration | 13362-9 |
| VL120 | Urine Volume | 3167-4 |