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**Lab Dept:** Urine/Stool

**Test Name:** CATECHOLAMINE FRACTIONATION, TIMED URINE

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***General Information***

**Lab Order Codes:** UCAT

**Synonyms:** Catecholamine Fractionation, Urinary, Free, Catecholamines, Total Urine

**CPT Codes:** 82384 – Catecholamines; fractionated

**Test Includes:** Includes unconjugated epinephrine, norepinephrine, and dopamine.

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***Logistics***

**Test Indications:** Useful as an auxiliary test to fractionated plasma and urine metanephrine measurements in the diagnosis of pheochromocytoma and paraganglioma.

Useful also as an auxiliary test to urine vanillylmandelic acid (VMA) and homovanillic acid (HVA) determination in the diagnosis and follow-up of patients with neuroblastoma and related tumors.

**Lab Testing Sections:** Urine/Stool - Sendouts

**Referred to:** Mayo Clinic Laboratories (MML Test: CATU)

**Phone Numbers:** MIN Lab: 612-813-6280

STP Lab: 651-220-6550

**Test Availability:** Daily, 24 hours

**Turnaround Time:** 2 – 4 days, test set up Monday – Saturday

**Special Instructions:**

A urine collection container must be obtained from the laboratory.

Specimen preservation throughout the collection period is required, with the additive added to the container before the start of the collection to achieve a pH of between 2.0 and 4.0. Mayo Clinic Labs will assess pH suitability; there is no requirement to measure or adjust pH prior to transport to Mayo.

See Mayo's Urine Preservation Guide for options and consult the Sendouts lab department for option. [MCL - Urine Preservative Chart - MC1235-87 \(mayocliniclabs.com\)](#)

Submit the entire 24-hour urine collection to the lab.

Refrigerate specimen during and after collection.

**Note:** Starting and ending times of collection are required for a timed urine collection and must be documented electronically or on the proper request form.

See reference lab's test catalog for further ordering guidance [CATU - Overview: Catecholamine Fractionation, Free, 24 Hour, Urine \(mayocliniclabs.com\)](#)

See [Patient Preparation](#)

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***Specimen*****Specimen Type:**

Urine, timed collection

**Container:**

Plastic leakproof container, with an acceptable preservative added prior to collection. [See Special Instructions](#). Urine GUARD® collection container is preferred for a timed urine sample.

**Draw Volume:**

Submit an entire 24-hour urine collection

**Processed Volume:**

2 mL (Minimum: 1.5 mL) from a well-mixed 24 hour urine collection

**Collection:**

For timed urine collections, empty the bladder, discard the voided sample, and note the start time. Collect all urine voided for the specified time period. At the end of the period, note the finishing time; add the last voided sample to the container by emptying the bladder. Bring the refrigerated container to the lab. Make sure all specimens submitted to the laboratory are properly labeled with the patient's name, medical record number and date of birth.

**Special Processing:**

Lab Staff: [See Special Instructions](#) for Preservative information:

Once the refrigerated specimen comes to the lab. Mix the specimen well, record the total specimen volume on the specimen and aliquot 2 mL of urine to 5-mL Sarstedt Tube (Mayo T914). Mark the specimen label as a 24-hr urine and write total volume of collection.

Forward specimen promptly at refrigerated temperature.

Total volume of collection is required on request form and specimen for processing.

Specimen stable for 28 days refrigerated (preferred) or frozen.

**Patient Preparation:**

- This assay is of greatest value when the specimen is collected during a hypertensive episode.
- Discontinue any epinephrine, norepinephrine, or dopamine injections/infusions at last 12 hours before specimen collection, unless drug monitoring is the goal.
- Discontinue drugs that release or hinder metabolism of epinephrine, norepinephrine, or dopamine for at least 1 week before obtaining the specimen ([See Limitations](#) for details). If this is not possible for medical reasons, contact the lab to discuss whether a shorter drug-withdrawal period may be acceptable.
- Do not perform the test on patients withdrawing from legal or illegal drugs known to cause rebound serum catecholamine release during withdrawal. ([See Limitations](#) for details)
- A 24-hour specimen is required on the request form for processing.

**Sample Rejection:**

Incorrect preservative used; specimens at ambient temperatures without preservative; mislabeled or unlabeled specimens.

Mayo Clinic Labs will assess pH suitability; there is no requirement to measure or adjust pH prior to transport to Mayo.

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***Interpretive***

**Reference Range:**

<b>Age</b>	<b>Epinephrine</b>
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<1 year	0.0 – 2.5 mcg/24 hours
1 year	0.0 – 3.5 mcg/24 hours
2 – 3 years	0.0 – 6.0 mcg/24 hours
4 – 9 years	0.2 – 10.0 mcg/24 hours
10 – 15 years	0.5 – 20.0 mcg/24 hours
≥16 years	0.0 – 20.9 mcg/24 hours
<b>Age</b>	<b>Norepinephrine</b>
<1 year	0 – 10 mcg/24 hours
1 year	1 – 17 mcg/24 hours
2 – 3 years	4 – 29 mcg/24 hours
4 – 6 years	8 – 45 mcg/24 hours
7 – 9 years	13 – 65 mcg/24 hours
≥10 years	15 – 80 mcg/24 hours
<b>Age</b>	<b>Dopamine</b>
<1 year	0 – 85 mcg/24 hours
1 year	10 – 140 mcg/24 hours
2 – 3 years	40 – 260 mcg/24 hours
≥4 years	65 – 400 mcg/24 hours

**Critical Values:**

N/A

**Limitations:**

Many alterations in physiologic and pathologic states can profoundly affect catecholamine concentrations.

Any environmental factors that may increase endogenous catecholamine production should be avoided. These include noise, stress, discomfort, body position, and the consumption of food, caffeinated beverages, and nicotine. Caffeine and nicotine effects are short, a few minutes to hours only.

Other substances and drugs that may affect the results include:

Substances that result in increased release or diminished metabolism of endogenous catecholamines:

- Monamine oxidase inhibitors (MOIs - a class of anti-depressants with marked effects on catecholamine levels, particularly if the patient consumes tyrosine rich foods, such as nuts, bananas, or cheese)
- Catecholamine reuptake inhibitors including cocaine and synthetic cocaine derivatives, such as many local anesthetics, which also can be anti-arrhythmic drugs (e.g., lidocaine)
- Some anesthetic gases, particularly halothane
- Withdrawal from sedative drugs, medical or recreational, in particular alcohol, benzodiazepines (e.g., Valium), opioids, and some central acting antihypertensive drugs, particularly Clonidine, but, generally not cannabis or other hallucinogens such as lysergic acid diethylamide (LSD), mescal, or peyote
- Vasodilating drugs (e.g., calcium antagonists, alpha-blockers)
- Tricyclic antidepressants usually exert a negligible effect

Substances that reduce or increase plasma volume acutely (e.g., diuretics, radiographic contrast media, synthetic antidiuretic hormone[e.g., desmopressin 1-deamino-8-d-arginine vasopressin, DDAVP])

Historically, a third category of potentially interfering substances was represented by molecules that are either similar in chemical structure, antibody epitopes, or chromatographic migration pattern to the catecholamines, or have metabolites that can be mistaken for the catecholamines. Our current high-pressure liquid chromatography (HPLC)- based assay is not subject to any significant direct interference of this kind.

In most cases, the following drugs do not cause problems with the current assay that cannot be resolved: acetaminophen, allopurinol, amphetamines and its derivatives (methamphetamine, methylphenidate [Ritalin], fenfluramine, methylenedioxymethamphetamine [MDMA] [ecstasy]), atropine, beta blockers (atenolol, labetalol, metoprolol, sotalol), buspirone, butalbital, carbamazepine, clorazepate, chlorthalidone, chlorpromazine, chlorothiazide, chlorthalidone, clonidine, codeine, diazepam, digoxin, dimethindene, diphenhydramine, diphenoxylate, dobutamine, doxycycline, ephedrine and pseudoephedrine, fludrocortisone, flurazepam, guanethidine, hydralazine, hydrochlorothiazide, hydroflumethiazide, indomethacin, insulin, isoprenaline, isosorbide dinitrate, L-Dopa, methenamine mandelate (mandelic acid), methyl dopa, methylprednisolone, nitrofurantoin, nitroglycerine, oxazepam, pentazocine, phenacetin, phenformin, phenobarbital, phenytoin, prednisone, probenecid, progesterone, propoxyphene, propranolol, quinidine, spironolactone, tetracycline, thyroxine, and tripeleminamine.

On occasion, when an interference cannot be resolved, an interference comment will be reported.

The variability associated with age, gender, and renal failure is uncertain.

**Methodology:**

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

**References:**

[Mayo Clinic Laboratories](#) (November 2023)

**Updates:**

7/12/2010: Units update from ug/24 hours to mcg/24 hours.

1/31/2023: Acceptable preservation methods updated.

11/1/2023: Edited acceptable preservation method; refrigeration alone is no longer acceptable. Added specimen stability. Edited required volume. Added guidance regarding pH assessment.