Test Definition: 23BPT

2,3-Dinor 11 Beta-Prostaglandin F2 Alpha, 24 Hour, Urine

Overview

Useful For

Screening for mast cell activation disorders including systemic mastocytosis using 24-hour urine specimens

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
T23BP	2,3-dinor 11B-Prostaglandin F2a	No	Yes
CRT24	Creatinine, 24 HR, U	No	Yes

Special Instructions

- Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens

Highlights

2,3-Dinor-11beta-prostaglandin F2 alpha (2,3 BPG) is elevated in the urine of patients with systemic mastocytosis (SM).

This test should be used as a screening test for SM.

When 2,3 BPG is used in combination with urinary leukotriene E4 and N-methylhistamine, the sensitivity for SM detection increases to 90%.

Method Name

T23BP: Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)
CRT24: Enzymatic Colorimetric Assay

NY State Available

Yes

Specimen

Specimen Type

Urine

Ordering Guidance

A 24-hour urine collection is the preferred specimen type, but a random specimen is also acceptable for 2,3-dinor 11beta-prostaglandin F2 alpha; order 23BPR / 2,3-Dinor 11 Beta-Prostaglandin F2 Alpha, Random, Urine.

If the total volume provided is less than 300 mL or the specimen does not meet the 24-hour urine requirements, this test will be canceled and 23BPR ordered and performed.

Necessary Information

Specimen volume (in milliliters) and duration (in hours) are required.

Specimen Required

Patient Preparation: Patients taking aspirin or nonsteroidal anti-inflammatory drugs (NSAIDs) may have decreased concentrations of prostaglandin F2 alpha. If medically feasible, for 2 weeks before specimen collection, patient should **not** take aspirin and for 72 hours before specimen collection, patient should **not** take NSAIDs.
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Container/Tube: Plastic, 5-mL tube
Specimen Volume: 5 mL
Collection Instructions:
1. Collect urine refrigerate for 24 hours.
2. No preservative preferred.
Additional Information: See Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens for multiple collections.

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 additive)	No
Refrigerate (no additive)	Preferred
Frozen (no additive)	OK
50% Acetic Acid	No
Boric Acid	OK
Diazolidinyl Urea	No
6M Hydrochloric Acid	No
6M Nitric Acid	No
Sodium Carbonate	OK
Toluene	No

Specimen Minimum Volume

3 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)	28 days	
	Ambient	72 hours	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

2,3-Dinor-11beta-prostaglandin F2 alpha (2,3 BPG) is the most abundant metabolic product of prostaglandins released by activated mast cells. Systemic mastocytosis (SM) is a disease in which clonally derived mast cells accumulate in peripheral tissues. Degranulation of these mast cells releases large amounts of histamines, prostaglandins, leukotrienes, and tryptase.

The World Health Organization diagnostic criteria for SM require the presence of elevated mast cell counts on a bone marrow biopsy and one of the following minor criteria:
-Abnormal mast cell morphology
-*KIT* Asp816Val variant
-CD25-positive mast cells
-Serum tryptase greater than 20 ng/mL

Alternatively, SM diagnosis can be made with the presence of 3 minor criteria in the absence of abnormal bone marrow studies.

Measurement of mast cell mediators in blood or urine is less invasive and is advised for the initial evaluation of suspected cases. Elevated levels of serum tryptase, urinary N-methylhistamine, 2,3 BPG, or leukotriene E4 are consistent with the diagnosis of systemic mast cell disease.

Reference Values

<1802 pg/mg creatinine

Interpretation

Elevated urinary 2,3-dinor-11beta-prostaglandin F2 alpha (2,3 BPG) concentrations greater than 1820 pg/mg creatinine are consistent with the diagnosis of systemic mast cell disease when combined with clinical signs and symptoms. Pharmacological treatment with aspirin or non-steroidal anti-inflammatory drugs (NSAIDs) has been shown to decrease production of 2,3 BPG.

Urinary 2,3 BPG has been shown to improve sensitivity in the screening of mastocytosis when used in conjunction with urinary leukotriene E4, and urinary N-methylhistamine. An internal study showed when all three urine markers are measured; sensitivity for systemic mastocytosis detection is 90%.

Cautions

Elevated levels of 2,3-dinor-11beta-prostaglandin F2 alpha (2,3 BPG) in urine are not specific for systemic mast cell disease and may be found in patients with angioedema, diffuse urticaria, or myeloproliferative diseases in the absence

of diffuse mast cell proliferation.

Systemic mast cell disease is a heterogeneous disease, and some patients may not have elevated 2,3 BPG in urine.

Patients taking aspirin or non-steroidal anti-inflammatory drugs (NSAIDs) may have decreased concentrations of prostaglandin F2 alpha if dosage has not been discontinued for 2 weeks or 72 hours, respectively.

Clinical Reference

1. Gotlib J, Pardanani A, Akin C, et al. International Working Group-Myeloproliferative Neoplasms Research and Treatment (IWG-MRT) and European Competence Network on Mastocytosis (ECNM) consensus response criteria in advanced systemic mastocytosis. Blood. 2013;121(13):2393-2401. doi:10.1182/blood-2012-09-458521
2. Butterfield JH. Increased leukotriene E4 excretion in systemic mastocytosis. Prostaglandins Other Lipid Mediat. 2010;92(1-4):73-76. doi:10.1016/j.prostaglandins.2010.03.003
3. Roberts LJ 2nd, Sweetman BJ, Lewis RA, Austen KF, Oates JA. Increased production of prostaglandin D2 in patients with systemic mastocytosis. N Engl J Med. 1980;303(24):1400-1404. doi:10.1056/NEJM198012113032405
4. Metcalfe DD. Mastocytosis syndromes. In: Middleton E Jr, Reed CE, Ellis EF, et al. eds. Allergy Principles and Practice. Vol II. 4th ed. Mosby Yearbook Inc; 1993:1537-1551
5. Butterfield J, Weiler CR. The utility of measuring urinary metabolites of mast cell mediators in systemic mastocytosis and mast cell activation syndrome. J Allergy Clin Immunol Pract. 2020;8(8):2533-2541

Performance

Method Description

2,3-Dinor 11beta-prostaglandin F2 alpha:
2,3-Dinor-11beta-prostaglandin F2 alpha (2,3 BPG) is quantified in urine by liquid chromatography tandem mass spectrometry (LC-MS/MS). Deuterium-labeled 2,3-dinor-11beta-prostaglandin F2 alpha (d9-2,3 BPG) and reagent are added to all controls and specimens, which are then liquid/liquid extracted. The extractant is evaporated and samples and controls then reconstituted. Chromatographic separation is achieved with an analytical column. This eluent is transferred to an API 5000 MS/MS. The ratios of the integrated peak heights of 2,3 BPG and d9-2,3 BPG internal standard are used to calculate the concentration of the analyte. All 2,3 BPG concentrations are normalized to urine creatinine levels.(Unpublished Mayo method)

Creatinine:
All 2,3 BPG concentrations are normalized to urine creatinine levels measured using a Roche cobas enzymatic method. The enzymatic method is based on the determination of sarcosine from creatinine with the aid of creatininase, creatinase, and sarcosine oxidase. The liberated hydrogen peroxide is measured via a modified Trinder reaction using a colorimetric indicator. Optimization of the buffer system and the colorimetric indicator enable the creatinine concentration to be quantified both precisely and specifically.(Package insert: Creatinine plus ver 2. Roche Diagnostics; V15.0, 03/2019)

PDF Report

No

Test Definition: 23BPT

2,3-Dinor 11 Beta-Prostaglandin F2 Alpha, 24 Hour, Urine

Day(s) Performed
Tuesday, Thursday

Report Available
3 to 8 days

Specimen Retention Time
14 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

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 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
84150

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
23BPT	2,3-dinor 11B-Prostaglandin F2a, U	94381-1

Result ID	Test Result Name	Result LOINC® Value
CR_A	Creatinine, 24 HR, U	2162-6
CR_24	Creatinine Concentration, 24 HR, U	20624-3
TM27	Collection Duration (h)	13362-9
VL69	Urine Volume (mL)	3167-4
603460	2,3-dinor 11B-Prostaglandin F2a	94381-1