MAYO CLINIC LABORATORIES

Test Definition: RB24

Retinol-Binding Protein, 24-Hour, U

Overview

Useful For

Assessing renal tubular injury or dysfunction

Screening for other tubular abnormalities

Detecting chronic asymptomatic renal tubular dysfunction.(2)

Special Instructions

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

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
RBP1	Retinol-Binding Protein, 24-Hour, U	No	Yes
RBPCN	Retinol-Binding Protein Conc	No	Yes
CRT24	Creatinine, 24 HR, U	Yes, (order CTU)	Yes

Method Name

RBP1: Calculation

RBPCN: Immunonephelometry

CRT24: Enzymatic Colorimetric Assay

NY State Available

Yes

Specimen

Specimen Type

Urine

Necessary Information

24-Hour volume is required.

Specimen Required

Container/Tube: Plastic, 5-mL tube

Specimen Volume: 5 mL

Collection Instructions:

1. Collect urine for 24 hours.

2. No preservative.

3. Mix well before taking 5-mL aliquot.

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 a Renal Diagnostics Test Request (T830) 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	No
Refrigerate	Preferred
Frozen	OK
50% Acetic Acid	No
Boric Acid	OK
Diazolidinyl Urea	No
6M Hydrochloric Acid	No
6M Nitric Acid	No
Sodium Carbonate	No
Thymol	No
Toluene	No

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Minimum Volume

1 mL

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	7 days	
	Frozen	7 days	

Clinical & Interpretive

Clinical Information

Retinol-binding protein is a low-molecular-weight protein of 21 kDa that transports retinol (vitamin A alcohol) from the liver to peripheral tissues.(1) Retinol-binding protein is most often found bound to transthyretin, but a small, unbound fraction (<10%) passes freely through glomerular membranes and is reabsorbed by renal proximal tubules cells where it is catabolized. Due to extensive tubular reabsorption, under normal conditions very little of the filtered retinol-binding protein appears in the final excreted urine. Therefore, an increase in the urinary excretion of retinol-binding protein indicates proximal tubule injury and/or impaired proximal tubular function.(1) Measurement of retinol-binding protein in urine is, therefore, a useful aid in the monitoring and/or diagnosis of kidney disease.

Elevated excretion rates can indicate tubular damage associated with renal tubulointerstitial nephritis or tubular toxicity from heavy metal or nephrotoxic drug exposure. Glomerulonephropathies and renal vasculopathies also are often associated with coexisting tubular injury and so may result in elevated retinol-binding protein excretion. Measurement of urinary excretion of alpha-1-microglobulin, another low-molecular-weight protein, is an alternative to the measurement of retinol-binding protein. To date, there are no convincing studies to indicate that one test has better clinical utility than the other.

Urinary excretion of retinol-binding protein can be determined from either a 24-hour collection or from a random urine collection. The 24-hour collection is traditionally considered the gold standard. For random or spot collections, the concentration of retinol-binding protein is divided by the urinary creatinine concentration. This corrected value adjusts retinol-binding protein for variabilities in urine concentration.

Reference Values

Retinol-Binding Protein:

> or =18 years of age: <273 mcg/24 hour

Reference values have not been established for patients who are less than 18 years of age.

Creatinine:

Males > or =18: 930-2955 mg/24 hours

Females > or =18: 603-1783 mg/24 hours

Reference values have not been established for patients who are less than 18 years of age.

Interpretation

Retinol-binding protein above the reference values may be indicative of a proximal tubular dysfunction.

Cautions

Since this is a nephelometric assay, turbidity and particles (eg, cells, crystals) in the specimen can interfere with the test. Therefore, all urine specimens should be centrifuged at ambient temperature prior to assay.

Clinical Reference

1. Kirsztajn GM, Nishida SK, Silva MS, et al: Urinary retinol-binding protein as a prognostic marker in glomerulopathies. Nephron. 2002 Apr;90(4):424-431

2. Norden AG, Scheinman SJ, Deschodt-Lanckman MM, et al: Tubular proteinuria defined by a study of Dent's (CLCN5 mutation) and other tubular diseases. Kidney Int. 2000 Jan;57(1):240-249

3. Lamb EJ, Jones GJD: Kidney function tests. In: Rifai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:470-517

Performance

Method Description

Retinol-Binding Protein:

In an immunochemical reaction, urinary retinol-binding protein forms immune complexes with anti-retinol-binding protein-specific antibodies coated onto polystyrene latex particles. The resulting latex bead-antigen-antibody complexes have enhanced light-scattering ability, which is detected with a nephelometer when a beam of light is passed through the sample. The intensity of the scattered light is proportional to the concentration of retinol-binding protein in the sample. The result is evaluated by comparison with a standard of known retinol-binding protein concentration.(Package insert: Human Urine Retinol Binding Protein Nephelometric Kit for use on the Siemens BNII. The Binding Site Group Ltd; Vol 27, 11/2012)

Creatinine:

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 enables the creatinine concentration to be quantified both precisely and specifically.(Package insert: Creatinine plus ver 2. Roche Diagnostics; V 15.0 03/2019)

PDF Report
No

Specimen Retention Time
7 days

Performing Laboratory Location
Rochester

Fees & Codes

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
83883

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
RB24	Retinol-Binding Protein, 24-Hour, U	96399-1

Result ID	Reporting Name	LOINC®
TM10	Collection Duration	13362-9
VL8	Urine Volume	3167-4
CR_A	Creatinine, 24 HR, U	2162-6
CR_24	Creatinine Concentration, 24 HR, U	20624-3
RBP1	Retinol-Binding Protein, 24-Hour, U	18362-4
RBPCN	Retinol-Binding Protein Conc	96406-4