Test Definition: RBR

Retinol-Binding Protein, Random, Urine

Overview

Useful For

Assessing renal tubular injury or dysfunction using random urine collections

Screening for other tubular abnormalities

Detecting chronic asymptomatic renal tubular dysfunction.(2)

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
CRETR	Creatinine, Random, U	Yes, (Order RCTUR)	Yes
RBPR	Retinol-Binding Protein, Random, U	No	Yes

Method Name

CRETR: Enzymatic Colorimetric Assay

RBPR: Immunonephelometry

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Container/Tube: Plastic, 5-mL tube

Specimen Volume: 5 mL

Collection Instructions:

1. Collect a random urine specimen.
2. No preservative.

Forms

If not ordering electronically, complete, print, and send a Renal Diagnostics Test Request (T830) with the specimen.

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)	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

> or =18 years: <190 mcg/g creatinine
Reference values have not been established for patients that are less than 18 years.

Interpretation

Retinol-binding protein values 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 testing.

Clinical Reference

1. Kirsztajn GM, Nishida SK, Silva MS, Ajzen H, Moura LA, Bereira AB. Urinary retinol-binding protein as a prognostic marker in glomerulopathies. Nephron. 2002;90(4):424-431. doi:10.1159/000054730
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;57(1):240-249. doi:10.1046/j.1523-1755.2000.00847.x
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

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; V16.0 02/2022)

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; V27 11/2012)

PDF Report

No

Day(s) Performed

Monday, Wednesday, Friday

Report Available

1 to 4 days

Specimen Retention Time

7 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

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

83883-Retinol -Binding Protein, Random, U

82570-Creatinine, Random, U

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
RBR	Retinol-Binding Protein, Random, U	96401-5

Result ID	Test Result Name	Result LOINC® Value
RBO1	Retinol-Binding Protein, Random, U	33782-4
RBPCR	RBP/Creat Ratio	96402-3
CRETR	Creatinine, Random, U	2161-8