MAYO CLINIC LABORATORIES

Test Definition: RPTU1

Protein/Creatinine Ratio, Random, Urine

Overview

Useful For

Evaluation of renal disease

Screening for monoclonal gammopathy

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
PTCON	Protein, Total, Random, U	No	Yes
RATO3	Protein/Creatinine Ratio	No	Yes
CRETR	Creatinine, Random, U	No	Yes

Method Name

PTCON: Turbidimetry
CRETR: Colorimetric
RATO3: Calculation

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Patient Preparation: Specimens should be collected before fluorescein is given or not collected until at least 24 hour later.
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Container/Tube: Plastic vial
Specimen Volume: 4 mL
Collection Instructions:
1. Collect a random urine specimen.
2. No preservative.
3. Invert well before taking 4 mL aliquot.
4. Do not over fill aliquot tube, 4 mL at most.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:

-Kidney Transplant Test Request
-Renal Diagnostics Test Request (T830)

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)	14 days	
	Ambient	24 hours	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information
Protein in urine is normally composed of a combination of plasma-derived proteins that have been filtered by glomeruli and have not been reabsorbed by the proximal tubules and proteins secreted by renal tubules or other accessory glands.

Increased amounts of protein in the urine may be due to:
-Glomerular proteinuria: Caused by defects in permselectivity of the glomerular filtration barrier to plasma proteins (eg, glomerulonephritis or nephrotic syndrome)
-Tubular proteinuria: Caused by incomplete tubular reabsorption of proteins (eg, interstitial nephritis)
-Overflow proteinuria: Caused by increased plasma concentration of proteins (eg, multiple myeloma, myoglobinuria)

Reference Values
> or =18 years: <0.18 mg/mg creatinine
Reference values have not been established for patients younger than 18 years of age.

Interpretation
Total protein of greater than 500 mg/24 hours should be evaluated by immunofixation to determine if a monoclonal immunoglobulin light chain is present and, if so, identify it as either kappa or lambda type.

Urinary protein levels may rise to 300 mg/24 hours in healthy individuals after vigorous exercise.

Low-grade proteinuria may be seen in inflammatory or neoplastic processes involving the urinary tract.

In a random urine specimen, a protein:creatinine or protein:osmolality ratio can be used to roughly approximate 24-hour excretion rates. The normal protein-to-osmolality ratio is less than 0.42.(1) For patients younger than 18 years of age, no reference range has been established.

Cautions

False proteinuria may be due to contamination of urine with menstrual blood, prostatic secretions, or semen.

Normal newborn infants may have higher excretion of protein in urine during the first 3 days of life.

The presence of hemoglobin elevates protein concentration.

Protein electrophoresis and immunofixation may be required to characterize and interpret the proteinuria.

Clinical Reference

1. Brunzel N: Chemical examination of urine. In: Fundamentals of Urine and Body Fluids. 4th ed. Saunders; 2018:92-94
2. Wilson DM, Anderson RL: Protein-osmolality ratio for the quantitative assessment of proteinuria from a random urinalysis sample. Am J Clin Pathol. 1993 Oct;100(4):419-424
3. Morgenstern BZ, Butani L, Wollan P, Wilson DM, Larson TS: Validity of protein-osmolality versus protein-creatinine ratios in the estimation of quantitative proteinuria from random samples of urine in children. Am J Kidney Dis. 2003 Apr;41(4):760-766
4. Rinehart BK, Terrone DA, Larmon JE, Perry KG Jr, Martin RW, Martin JN Jr: A 12-hour urine collection accurately assesses proteinuria in hospitalized hypertensive gravida. J Perinatol. 1999 Dec;19(8 Pt 1):556-558
5. Adelberg AM, Miller J, Doerzbacher M, Lambers DS: Correlation of quantitative protein measurements in 8-, 12-, and 24-hour urine samples for diagnosis of preeclampsia. Am J Obstet Gynecol. 2001 Oct;185(4):804-807
6. Robinson RR: Isolated proteinuria in asymptomatic patients. Kidney Int. 1980 Sep;18(3):395-406
7. Dube J, Girouard J, Leclerc P, Douville P: Problems with the estimation of urine protein by automated assays. Clin Biochem. 2005 May;(38):479-485
8. Koumantakis G, Wyndham L: Fluorescein interference with urinary creatinine and protein measurements. Clin Chem. 1991 Oct;37(10 Pt 1):1799
9. Lamb EJ, Jones GRD: Kidney function tests. In: Rifai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:479-517

Performance

Method Description

Protein:
The sample is preincubated in an alkaline solution containing EDTA, which denatures the protein and eliminates interference from magnesium ions. Benzethonium chloride is then added, producing turbidity.(Package insert: Total Protein Urine/CSF. Roche Diagnostics; 05/2024)

Creatinine:
This enzymatic method is based on the conversion of creatinine with the aid of creatininase, creatinase, and sarcosine oxidase to form glycine, formaldehyde, and hydrogen peroxide. Catalyzed by peroxidase the liberated hydrogen peroxide reacts with 4-aminophenazone and HTIB (2,4,6-triiodo03-hydroxybenzoic acid) to form a quinone imine chromogen. The color intensity of the quinone imine chromogen formed is directly proportional to the creatinine concentration in the reaction mixture.(Package insert: Creatinine plus. Roche Diagnostics; 07/2024)

PDF Report

No

Day(s) Performed
Monday through Sunday

Report Available
Same day/1 day

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 has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information
84156
82570

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
RPTU1	Protein/Creatinine Ratio, Random, U	87434-7

Result ID	Test Result Name	Result LOINC® Value
PTCON	Protein, Total, Random, U	2888-6
CRETR	Creatinine, Random, U	2161-8
RATO3	Protein/Creatinine Ratio	2890-2