

## Overview

### Useful For

Identifying monoclonal gammopathies using random urine specimens

### Profile Information

Test ID	Reporting Name	Available Separately	Always Performed
RPEU	Protein Electrophoresis, Random, U	No	Yes
PTCON	Protein, Total, Random, U	No	Yes

### Reflex Tests

Test ID	Reporting Name	Available Separately	Always Performed
RIFXU	Immunofixation, Random, U	No	No

### Testing Algorithm

Urine protein electrophoresis alone is not considered an adequate screening for monoclonal gammopathies. If a discrete electrophoresis band is identified, the laboratory will evaluate the urine protein electrophoresis and, if necessary, perform immunofixation at an additional charge.

The following algorithms are available in Special Instructions:

[-Laboratory Approach to the Diagnosis of Amyloidosis](#)

[-Laboratory Screening Tests for Suspected Multiple Myeloma](#)

### Special Instructions

- [Laboratory Approach to the Diagnosis of Amyloidosis](#)
- [Laboratory Screening Tests for Suspected Multiple Myeloma](#)

### Method Name

PTCON: Turbidimetry

RPEU: Agarose Gel Electrophoresis

RIFXU: Immunofixation

### NY State Available

Yes

### Specimen

**Specimen Type**

Urine

**Advisory Information**

Random urine specimens may be sufficient for identifying monoclonal proteins, but 24-hour specimens should be used to quantitate and monitor urinary abnormalities. See MPSU / Monoclonal Protein Study, 24 Hour, Urine.

**Shipping Instructions**

Refrigerate specimen after collection and send refrigerated.

**Specimen Required****Supplies:**

Urine Container, 60 mL (T313)

Aliquot Tube, 5 mL (T465)

**Submission Container/Tube:** Plastic, 60-mL urine bottle and plastic, 5-mL tube

**Specimen Volume:** 50 mL

**Collection Instructions:**

1. Collect random urine specimen.
2. Aliquot at least 25-mL specimen in plastic, 60-mL urine bottle and at least 1-mL of specimen in plastic, 5-mL tube.
3. Label specimens appropriately (60-mL bottle for protein electrophoresis and 5-mL tube for protein, total).

**Specimen Minimum Volume**

25 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	
	Frozen	5 days	
	Ambient	72 hours	

**Clinical and Interpretive****Clinical Information**

Urine proteins can be grouped into 5 fractions by protein electrophoresis:

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- Albumin
  - Alpha-1
  - Alpha-2
  - Beta-globulin
  - Gamma globulin

The urine total protein concentration, the electrophoretic pattern, and the presence of a monoclonal immunoglobulin light chain may be characteristic of monoclonal gammopathies such as multiple myeloma, primary systemic amyloidosis, and light-chain deposition disease.

The following algorithms are available in Special Instructions:

- [-Laboratory Approach to the Diagnosis of Amyloidosis](#)
- [-Laboratory Screening Tests for Suspected Multiple Myeloma](#)

### Reference Values

PROTEIN, TOTAL

No reference values apply to random urine.

ELECTROPHORESIS, PROTEIN

The following fractions, if present, will be reported as a percent of the total protein:

- Albumin
- Alpha-1-globulin
- Alpha-2-globulin
- Beta-globulin
- Gamma-globulin

No reference values apply to random urines.

### Interpretation

A characteristic monoclonal band (M-spike) is often found in the urine of patients with monoclonal gammopathies. The initial identification of an M-spike or an area of restricted migration should be followed by immunofixation to identify the immunoglobulin heavy chains and light chains.

Immunoglobulin heavy chain fragments as well as free light chains may be seen in the urine of patients with monoclonal gammopathies.

The presence of a monoclonal light chain M-spike of greater than 1 g/24 hours is consistent with a diagnosis of multiple myeloma or macroglobulinemia.

The presence of a small amount of monoclonal light chain and proteinuria (total protein >3 g/24 hours) that is predominantly albumin is consistent with primary systemic amyloidosis (AL) and light-chain deposition disease (LCDD).

Because patients with AL and LCDD may have elevated urinary protein without an identifiable M-spike, urine protein electrophoresis is not considered an adequate screen for these disorders and immunofixation is also recommended.

### **Cautions**

Patients suspected of having a monoclonal gammopathy may have a normal urine protein electrophoretic pattern, and these patients should have immunofixation performed.

Monoclonal gammopathies are rarely seen in patients younger than 30 years of age.

Hemolysis may cause a discrete band on protein electrophoresis, which will be negative on immunofixation.

Penicillin may split the albumin band.

Radiographic agents may produce an uninterpretable pattern.

### **Clinical Reference**

1. Kyle RA, Katzmann JA, Lust JA, Dispenzieri A: Clinical indications and applications of electrophoresis and immunofixation. In: Rose NR, Hamilton RG, Detrick B, eds. Manual of Clinical Laboratory Immunology. 6th ed. ASM Press; 2002:66-67
2. Kyle RA, Katzmann JA, Lust JA, Dispenzieri A: Immunochemical characterization of immunoglobulins. In: Rose NR, Hamilton RG, Detrick B, eds. Manual of Clinical Laboratory Immunology. 6th ed. ASM Press; 2002:71-91
3. Keren DF, Humphrey RL: Clinical indications and applications of serum and urine protein electrophoresis. In: Detrick BD, Hamilton RG, Schmitz JL eds. Manual of Molecular and Clinical Laboratory Immunology. 8th ed. 2016:chap 8

### **Performance**

#### **Method Description**

Urine proteins are separated in an electric field according to their size, shape, and electric charge (Helena SPIFE 3000). The separation is performed on agarose gels (Helena SPIFE SPE Vis Gel). The proteins are visualized by staining with acid blue and the intensity of staining is quantitated by densitometry (Helena Quick Scan Touch). Multiplying by the urine protein concentration (benzethonium chloride) converts the percentage of protein in each fraction into urine concentration. (Abraham RS, Barnidge DR: Protein analysis in the clinical immunology laboratory. In: Detrick BD, Hamilton RG, Schmitz JL eds. Manual of Molecular and Clinical Laboratory Immunology. 8th ed. 2016:chap 4)

#### **PDF Report**

No

#### **Day(s) and Time(s) Test Performed**

[Protein, total: Monday through Sunday: Continuously](#)

Electrophoresis, protein: Monday through Friday; 12 p.m.

#### **Analytic Time**

Same day/1 day

**Maximum Laboratory Time**

3 days

**Specimen Retention Time**

7 days

**Performing Laboratory Location**

Rochester

**Fees and 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 Regional Manager. For assistance, contact [Customer Service](#).

**Test Classification**

This test has been cleared, approved or is exempt by the U.S. 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

84166

86335-Immunofixation (if appropriate)

**LOINC® Information**

Test ID	Test Order Name	Order LOINC Value
REPU	Electrophoresis, Protein, Random, U	In Process

Result ID	Test Result Name	Result LOINC Value
33039	Albumin	13992-3
33040	Alpha 1-Globulin	13990-7
33041	Alpha 2-Globulin	13993-1
33042	Beta-Globulin	13994-9
33043	Gamma-Globulin	13995-6
33044	A/G Ratio	44293-9
33045	M spike	42483-8
33046	M spike	42483-8
33047	Impression	49299-1
PTCON	Protein, Total, Random, U	2888-6



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Result ID	Test Result Name	Result LOINC Value
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