MAYO CLINIC LABORATORIES

Test Definition: MYGLU

Myoglobin, Random, Urine

Overview

Useful For
Confirming the presence of a myopathy

Method Name
Electrochemiluminescent Immunoassay (ECLIA)

NY State Available
Yes

Specimen

Specimen Type
Urine

Specimen Required
Supplies: Urine Myoglobin Transport Tube (T691)
Container/Tube: Plastic, 5-mL urine myoglobin transport tube
Specimen Volume: 4 mL
Collection Instructions:
1. Collect a preservative-free, random urine specimen.
2. If specimen is at ambient temperature, aliquot the urine to a urine myoglobin transport tube within 1 hour of collection. Refrigerate specimen.
3. If specimen is at refrigerate temperature, aliquot the urine to a urine myoglobin transport tube within 2 hours of collection.
Additional Information: Urinary myoglobin is highly unstable unless alkalinized with sodium carbonate preservative.

Specimen Minimum Volume
1 mL

Reject Due To

Use of any transport tube other than urine myoglobin transport tube	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated	7 days	MYOGLOBIN TRANSPORT TUBE

Clinical & Interpretive

Clinical Information

Myoglobin is a small 17.8 kDa oxygen-binding heme protein, present in striated muscle to carry and store oxygen in muscle cells. By virtue of its small size, myoglobin is readily filtered by the glomerulus and catabolized by endocytosis and proteolysis in the proximal tubule. Healthy subjects normally have low concentrations (less than 5%) of protein appearing in the urine. Injury to skeletal or cardiac muscle results in a large release of myoglobin into systemic circulation within a few hours, which can overwhelm tubular resorption causing notable quantities of myoglobin to appear in urine giving it a red-brown appearance. The presence of myoglobin in the urine is a risk factor for developing acute kidney injury. Myoglobin concentration declines rapidly, with a serum half-life of 2 to 3 hours and has been studied for its ability to predict acute kidney injury.

High concentrations appear very rapidly in the urine in various conditions, including some metabolic diseases. Conditions that can lead to rhabdomyolysis associated with myoglobinuria include:
-Trauma or crush injury
-Heatstroke, hypothermia, malignant hyperthermia
-Seizures, strenuous exercise, prolonged immobility
-Hypoxic injury
-Metabolic disturbances in electrolyte concentrations
-Genetic disorders that lead to muscle cell breakdown
-Infections
-Drugs or toxins

The presence of myoglobin in the urine can indicate serious muscle injury, which is a risk factor for developing acute kidney injury. Rhabdomyolysis is often confirmed and monitored by measuring serum creatine kinase, electrolytes, kidney function, and urine tests for protein and blood. Myoglobin will give a positive reaction with hemoglobin test strips, though red blood cells will be absent upon microscopic review.

Reference Values

0-24 mcg/L
Reference values have not been established for patients younger than 18 years; however myoglobin is not expected to be detectable in urine.

Interpretation

Increased excretion of urinary myoglobin is suggestive of one of the disorders or conditions listed in Clinical Information.

Most clinically significant elevations are elevated 2 to 10 times normal.

Cautions

An elevated level of urinary myoglobin alone does not identify the clinical disorder.

Physiological variables, such as patient hydration status, acid-base status, kidney function, and hypoxia affect myoglobin metabolism and, consequently, its presence in urine.

Urinary myoglobin concentration deteriorates rapidly unless stabilized immediately after collection by alkalinizing with sodium carbonate. Urine collected with any preservative other than sodium carbonate will not provide valid results.

Urinary myoglobin does not withstand freezing even when the pH is raised with sodium carbonate.

Clinical Reference

1. Chavez LO. Leon M, Einav S, Varon J. Beyond muscle destruction: a systematic review of rhabdomyolysis for clinical practice. Crit Care. 2016;20(1):135
2. Rodriguez-Capote K, Balion CM, Hill SA, Cleve R, Yang L, El Sharif A. Utility of urine myoglobin for the prediction of acute renal failure in patients with suspected rhabdomyolysis: a systematic review. Clin Chem. 2009;55(12):2190-2197
3. Dawley C. Myalgias and myopathies: rhabdomyolysis. FP Essent. 2016;440:28-36
4. Nance JR, Mammen AL. Diagnostic evaluation of rhabdomyolysis. Muscle Nerve. 2015;51(6):793-810. doi:10.1002/mus.24606
5. Yao Z, Yuan P, Hong S, Li M, Jiang L. Clinical features of acute rhabdomyolysis in 55 pediatric patients. Front. Pediatr. 2020;8:539. doi:10.3389/fped.2020.00539
6. Lamb EJ, Jones GRD. Kidney function tests. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 34

Performance

Method Description

This myoglobin test is a sandwich-principal assay. The first incubation is 9 mcL of sample, a biotinylated monoclonal myoglobin-specific antibody, and a monoclonal myoglobin-specific antibody labeled with a ruthenium complex, which react to form a sandwich complex. In the second incubation, the complex becomes bound to the solid phase via interaction of biotin and streptavidin after addition of streptavidin-coated microparticles. The reaction mixture is aspirated into the measuring cell where the microparticles are magnetically captured onto the surface of the electrode. Results are determined via a calibration curve, which is instrument specifically generated by 2-point calibration, and a master curve provided via the cobas link.(Package insert: Elecsys Myoglobin. Roche Diagnostics; 10/2022)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

1 to 2 days

Specimen Retention Time

7 days

Performing Laboratory Location

Rochester

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 modified from the manufacturer's instructions. Its performance characteristics were 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

83874

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
MYGLU	Myoglobin, Random, U	2641-9

Result ID	Test Result Name	Result LOINC® Value
MYGLU	Myoglobin, Random, U	2641-9