MAYO CLINIC LABORATORIES

Test Definition: MGS

Magnesium, Serum

Overview

Useful For

Monitoring preeclampsia patients being treated with magnesium sulfate, although in most cases monitoring clinical signs (respiratory rate and deep tendon reflexes) is adequate and blood magnesium levels are not required

Special Instructions

- Metals Analysis Specimen Collection and Transport

Method Name

Colorimetric

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Container/Tube:

Preferred: Serum gel

Acceptable: Red top

Specimen Volume: 0.5 mL

Collection Instructions:

1. See Metals Analysis Specimen Collection and Transport for complete instructions.
2. Serum gel tubes should be centrifuged within 2 hours of collection.
3. Red-top tubes should be centrifuged and aliquoted within 2 hours of collection.

Additional Information: If other metal tests are also desired when drawing for a serum magnesium level; the specimen must be drawn in a plain, royal blue-top Vacutainer plastic trace element blood collection tube.

Forms

If not ordering electronically, complete, print, and send a Kidney Transplant Test Request with the specimen.

Specimen Minimum Volume

0.25 mL

Reject Due To

Gross	Reject

hemolysis	

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	7 days	
	Frozen	365 days	

Clinical & Interpretive

Clinical Information

Magnesium, along with potassium, is a major intracellular cation. Magnesium is a cofactor of many enzyme systems. All adenosine triphosphate (ATP)-dependent enzymatic reactions require magnesium as a cofactor. Approximately 70% of magnesium ions are stored in bone. The remainder is involved in intermediary metabolic processes; about 70% is present in free form while the other 30% is bound to proteins (especially albumin), citrates, phosphate, and other complex formers. The serum magnesium level is kept constant within very narrow limits. Regulation takes place mainly via the kidneys, primarily via the ascending loop of Henle.

Conditions that interfere with glomerular filtration result in retention of magnesium and, hence, elevation of serum concentrations. Hypermagnesemia is found in acute and chronic renal failure, magnesium overload, and magnesium release from the intracellular space. Mild-to-moderate hypermagnesemia may prolong atrioventricular conduction time. Magnesium toxicity may result in central nervous system (CNS) depression, cardiac arrest, and respiratory arrest.

Numerous studies have shown a correlation between magnesium deficiency and changes in calcium, potassium, and phosphate homeostasis, which are associated with cardiac disorders such as ventricular arrhythmias that cannot be treated by conventional therapy, increased sensitivity to digoxin, coronary artery spasms, and sudden death. Additional concurrent symptoms include neuromuscular and neuropsychiatric disorders. Conditions that have been associated with hypomagnesemia include chronic alcoholism, childhood malnutrition, lactation, malabsorption, acute pancreatitis, hypothyroidism, chronic glomerulonephritis, aldosteronism, and prolonged intravenous feeding.

Reference Values

0-2 years: 1.6-2.7 mg/dL
3-5 years: 1.6-2.6 mg/dL
6-8 years: 1.6-2.5 mg/dL
9-11 years: 1.6-2.4 mg/dL
12-17 years: 1.6-2.3 mg/dL
>17 years: 1.7-2.3 mg/dL

Interpretation

Symptoms of magnesium deficiency do not typically appear until levels are 1.0 mg/dL or lower.

Levels of 9.0 mg/dL or higher may be life-threatening.

Cautions

Serum or plasma magnesium concentration provides only an approximate guide to the presence or absence of magnesium deficiency. Hypomagnesemia reliably indicates magnesium deficiency, but its absence does not exclude significant magnesium depletion. The concentration of magnesium in serum has not been shown to correlate with any other tissue pools of magnesium except interstitial fluid.

Clinical Reference

1. Tietz Textbook of Clinical Chemistry. Chapter 49: Fourth edition. Edited by CA Burtis, ER Ashwood, DE Bruns. Philadelphia, WB Saunders Company, 2006, pp 1893-1912
2. Ryan MF: The role of magnesium in clinical biochemistry: an overview. Ann Clin Biochem 1991;28:19-26

Performance

Method Description

In alkaline solution, magnesium forms a purple complex with xylidyl blue, diazonium salt. The magnesium concentration is measured photometrically via the decrease in xylidyl blue absorbance.(Package insert: Magnesium Gen.2. Roche Diagnostics; 11/2023)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 2 days

Specimen Retention Time

1 week

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

83735

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
MGS	Magnesium, S	19123-9

Result ID	Test Result Name	Result LOINC® Value
MGS	Magnesium, S	19123-9