MAYO CLINIC LABORATORIES

Test Definition: CERS

Ceruloplasmin, Serum

Overview

Useful For
Investigation of patients with possible Wilson disease

Testing Algorithm
For information see Wilson Disease Testing Algorithm.

Special Instructions
- Wilson Disease Testing Algorithm

Method Name
Nephelometric Assay

NY State Available
Yes

Specimen

Specimen Type
Serum

Specimen Required
Patient Preparation: Patient should be fasting: 4 hours preferred, nonfasting acceptable
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial (false-bottom vials are **not acceptable**)
Specimen Volume: 1 mL
Collection Instructions: Centrifuge and aliquot serum into plastic vial.

Forms
If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Benign Hematology Test Request (T755)
-General Request (T239)
-Gastroenterology and Hepatology Test Request (T728)
-Biochemical Genetics Test Request (T798)

Specimen Minimum Volume
0.5 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	7 days	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

Ceruloplasmin is a positive acute-phase reactant and a copper-binding protein that accounts for over 95% of serum copper in normal adults. Ceruloplasmin is measured primarily to assist with a diagnosis of Wilson disease. Other indications include Menkes disease, dietary copper insufficiency, and risk of cardiovascular disease.

Wilson disease is a rare inherited disorder of copper transport that results in low serum copper and ceruloplasmin and accumulation of copper in various tissues. The pathological accumulation of copper in the liver, brain, cornea, and kidney causes cirrhosis, neuropsychiatric symptoms, Kayser-Fleischer rings, and hematuria/proteinuria, respectively. See Wilson Disease Testing Algorithm for appropriate use of clinical findings, serum biomarkers, genetic tests, and tissue biopsies when working up suspected cases.

Menkes disease is an X-linked disorder in which dietary copper is absorbed from the gastrointestinal tract but cannot be transported, so copper is not available to the liver for incorporation into ceruloplasmin.

Dietary ceruloplasmin deficiency may be due to inadequate dietary copper intake, long-term parenteral nutrition without copper supplementation, malabsorption, penicillamine therapy, or a combination of these.

Reference Values

Males:
0-8 weeks: 7.4-23.7 mg/dL
9 weeks-5 months: 13.5-32.9 mg/dL
6-11 months: 13.7-38.9 mg/dL
12 months-7 years: 21.7-43.3 mg/dL
8-13 years: 20.5-40.2 mg/dL
14-17 years: 17.0-34.8 mg/dL
> or =18 years: 19.0-31.0 mg/dL

Females:

0-8 weeks: 7.4-23.7 mg/dL
9 weeks-5 months: 13.5-32.9 mg/dL
6-11 months: 13.7-38.9 mg/dL
12 months-7 years: 21.7-43.3 mg/dL
8-13 years: 20.5-40.2 mg/dL
14-17 years: 20.8-43.2 mg/dL
> or =18 years: 20.0-51.0 mg/dL

Interpretation

Low concentrations of ceruloplasmin are consistent with Wilson disease and warrant further investigation according to the recommended algorithm; see Wilson Disease Testing Algorithm.

Ceruloplasmin is a positive acute-phase reactant. Increases in serum ceruloplasmin have been reported during pregnancy, in women taking oral contraceptives, in hepatitis, pneumonia, tuberculosis, rheumatoid arthritis, myocardial infarction, various forms of anemia, and many obscure neurological disorders.

Cautions

Ceruloplasmin is a positive acute-phase reactant; therefore, levels are elevated in cases of inflammation (as in chronic hepatitis or active infection). Consequently, ceruloplasmin levels are not always extremely low in patients with Wilson disease.

Values vary considerably from patient to patient and may be in the normal range in some patients with Wilson disease (indicating a different primary defect).

Birth control pills and pregnancy increase ceruloplasmin levels.

Clinical Reference

1. Wilson Tang WH, Wu Y, Hartiala J, et al: Clinical and genetic association of serum ceruloplasmin with cardiovascular risk. Arterioscler Thromb Vasc Biol. 2012 Feb;32(2):516-522
2. Dadu RT, Dodge R, Nambi V, et al: Ceruloplasmin and heart failure in the Atherosclerosis Risk in Communities study. Circ Heart Fail. 2013 Sep 1;6(5):936-943
3. Cox DW, Tumer Z, Roberts EA: Copper transport disorders: Wilson's disease and Menkes disease. Inborn Metabolic Disease. Fernandes J, Sandubray JM, VandenBerghe F, eds. Springer-Verlag; 2000:385-391
4. Sontakke AN, More U: Changes in serum ceruloplasmin levels with commonly used methods of contraception. Indian J Clin Biochem. 2004 Jan:19(1):102-104
5. Schilsky ML: Wilson disease: Diagnosis, treatment, and follow-up. Clin Liver Dis. 2017 Nov;21(4):755-767
6. Hermann W: Classification and differential diagnosis of Wilson's disease. Ann Transl Med. 2019 Apr;7(Suppl 2):S63

Performance

Method Description

Human ceruloplasmin forms a precipitate with a specific antiserum, which is then measured nephelometrically.(Package insert: Ceruloplasmin. Siemens; 08/2018)

PDF Report
No

Day(s) Performed
Monday through Sunday

Report Available
1 to 7 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 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
82390

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CERS	Ceruloplasmin, S	2064-4

Result ID	Test Result Name	Result LOINC® Value
CERS	Ceruloplasmin, S	2064-4