MAYO CLINIC LABORATORIES

Test Definition: CURCU

Copper/Creatinine Ratio, Random, Urine

Overview

Useful For

Investigation of Wilson disease and obstructive liver disease using a random urine specimen

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
CURC	Copper/Creat Ratio, U	No	Yes
CRETR	Creatinine, Random, U	No	Yes

Special Instructions

- Metals Analysis Specimen Collection and Transport

Method Name

CURC: Triple-Quadrupole Inductively-Coupled Plasma Mass Spectrometry (ICP-MS/MS)
CRETR: Enzymatic Colorimetric Assay

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Patient Preparation: High concentrations of barium are known to interfere with this test. If barium-containing contrast media has been administered, **the specimen should not be collected for at least 96 hours.**
Supplies: Urine Tubes, 10 mL (T068)
Collection Container/Tube: Clean, plastic urine collection container with no metal cap or glued insert
Submission Container/Tube: Plastic, 10-mL urine tube or a clean, plastic aliquot container with no metal cap or glued insert
Specimen Volume: 3 mL
Collection Instructions:
1. Collect a random urine specimen.
2. See Metals Analysis Specimen Collection and Transport for complete instructions.

Specimen Minimum Volume

2 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)	28 days	
	Ambient	14 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

The biliary system is the major pathway of copper excretion. Biliary excretion of copper requires an adenosine triphosphate (ATP)-dependent transporter protein. Variants in the gene for the transporter protein cause hepatolenticular degeneration (Wilson disease). Ceruloplasmin, the primary copper-carrying protein in the blood, is also reduced in Wilson disease. Urine copper excretion is increased in Wilson disease due to a decreased serum binding of copper to ceruloplasmin or due to allelic variances in cellular metal ion transporters.

Hypercupriuria (increased urinary copper) is also found in hemochromatosis, biliary cirrhosis, thyrotoxicosis, various infections, and a variety of other acute, chronic, and malignant diseases (including leukemia). Urine copper concentrations are also elevated during pregnancy and in patients taking contraceptives or estrogens.

Low urine copper levels are seen in malnutrition, hypoproteinemia, malabsorption, and nephrotic syndrome. Increased zinc consumption interferes with normal copper absorption from the gastrointestinal tract causing hypocupremia.

Reference Values

COPPER/CREATITINE:
Males:
0-17 years: Not established
> or =18 years: 9-43 mcg/g creatinine
Females:
0-17 years: Not established
> or =18 years: 7-72 mcg/g creatinine

CREATITINE:
> or =18 years old: 16-326 mg/dL
Reference values have not been established for patients who are younger than 18 years.

Interpretation

Humans normally excrete less than 60 mcg/24 hour in the urine.
Urinary copper excretion greater than 60 mcg/24 hour may be seen in:
-Wilson disease
-Obstructive biliary disease (eg, primary biliary cirrhosis, primary sclerosing cholangitis)

-Nephrotic syndrome (due to leakage through the kidney)
-Chelation therapy
-Estrogen therapy
-Mega dosing of zinc-containing vitamins
Because ceruloplasmin is an acute phase reactant, urine copper is elevated during acute inflammation. During the recovery phase, urine copper is usually below normal, reflecting the expected physiologic response to replace the copper that was depleted during inflammation.

Cautions
No significant cautionary statements

Clinical Reference
1. Zorbas YG, Kakuris KK, Deogenov VA, Yerullis KB. Copper homeostasis during hypokinesia in healthy subjects with higher and lower copper consumption. Tr Elem Electro. 2008;25:169-178
2. Lech T, Sadlik JK. Contribution to the data on copper concentration in blood and urine in patients with Wilson's disease and in normal subjects. Biol Trace Elem Res. 2007;118(1):16-20
3. Czlonkowska A, Litwin T, Dusek P, et al. Wilson disease. Nat Rev Dis Primers. 2018;4(1):21. doi:10.1038/s41572-018-0018-3
4. Rifai N, Chiu RWK, Young I, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 9th ed. Elsevier; 2023
5. Mohr I, Weiss KH. Biochemical Markers for the Diagnosis and Monitoring of Wilson Disease. Clin Biochem Rev. 2019;40(2):59-77. doi:10.33176/AACB-18-00014

Performance

Method Description
The metal of interest is analyzed by triple-quadrupole inductively-coupled plasma mass spectrometry.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Monday, Thursday

Report Available
2 to 5 days

Specimen Retention Time
14 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

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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 was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

82525
82570

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CURCU	Copper/Creat Ratio, Random, U	13829-7

Result ID	Test Result Name	Result LOINC® Value
CRETR	Creatinine, Random, U	2161-8
615258	Copper/Creat Ratio, U	13829-7