Test Definition: CUU

Copper, 24 Hour, Urine

Overview

Useful For

Investigation of Wilson disease and obstructive liver disease using a 24-hour urine specimen

Special Instructions

- Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens
- Metals Analysis Specimen Collection and Transport

Method Name

Triple-Quadrupole Inductively-Coupled Plasma-Mass Spectrometry (ICP-MS/MS)

NY State Available

Yes

Specimen

Specimen Type

Urine

Necessary Information

24-Hour volume (in milliliters) is required.

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 urine tube or clean, plastic aliquot container with no metal cap or glued insert
Specimen Volume: 10 mL
Collection Instructions:
1. Collect urine for 24 hours.
2. Refrigerate specimen within 4 hours of completion of 24-hour collection.
3. See Metals Analysis Specimen Collection and Transport for complete instructions.
Additional Information: See Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens for multiple collections.

Forms

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

Urine Preservative Collection Options

Note: The addition of preservative or application of temperature controls **must occur within 4 hours of completion** of the collection.

Ambient (no additive)	OK
Refrigerate (no additive)	Preferred
Frozen (no additive)	OK
50% Acetic Acid	OK
Boric Acid	No
Diazolidinyl Urea	No
6M Hydrochloric Acid	OK
6M Nitric Acid	OK
Sodium Carbonate	No
Toluene	No

Specimen Minimum Volume

0.4 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	28 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.

Hypercupricuria (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, hypoproteinemias, malabsorption, and nephrotic syndrome. Increased zinc consumption interferes with normal copper absorption from the gastrointestinal tract causing hypocupremia.

Reference Values
0-17 years: Not established
> or =18 years: 9-71 mcg/24 h

Interpretation
Humans normally excrete less than 60 mcg/day of copper in the urine.

Urinary copper excretion greater than 60 mcg/day 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, et al. 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. Rifai N, Horwath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018
4 .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

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

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CUU	Copper, 24 Hr, U	5633-3

Result ID	Test Result Name	Result LOINC® Value
8590	Copper, 24 Hr, U	5633-3
TM7	Collection Duration (h)	13362-9
VL4	Volume (mL)	3167-4