Overview

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

Profile Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Reporting Name</th>
<th>Available Separately</th>
<th>Always Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUCR</td>
<td>Copper/Creat Ratio, U</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>CDCR</td>
<td>Creatinine Conc</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Special Instructions
- [Trace Metals Analysis Specimen Collection and Transport](#)

Method Name
- CUCR: Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
- CDCR: Enzymatic Colorimetric Assay

NY State Available
Yes

Specimen

Specimen Type
Urine

Specimen Required

Patient Preparation: High concentrations of barium are known to interfere with most metals tests. If barium-containing contrast media has been administered, a specimen should not be collected for 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 (T068) 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 Trace Metals Analysis Specimen Collection and Transport in Special Instructions for complete instructions.
**Test Definition: CUCRU**
Copper/Creat Ratio, Random, U

**Forms**
If not ordering electronically, complete, print, and send a [Gastroenterology and Hepatology Client Test Request](#) (T728) with the specimen.

**Specimen Minimum Volume**
0.7 mL

**Reject Due To**
All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

**Specimen Stability Information**

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine</td>
<td>Refrigerated (preferred)</td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient</td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frozen</td>
<td>28 days</td>
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</tbody>
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**Clinical and 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. Mutations 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 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 in patients taking contraceptives or estrogens and during pregnancy.

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

Male > or =18 years: 9-43 mcg/g creatinine

Female > or =18 years: 7-72 mcg/g creatinine

**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:
Test Definition: CUCRU
Copper/Creat Ratio, Random, U

- 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

Performance

Method Description
This assay is performed on an inductively coupled plasma-mass spectrometer in dynamic reaction cell mode. Calibrating standards and blanks are diluted with an aqueous acidic diluent containing internal standards. Quality control specimens and patient samples are diluted in an identical manner. In turn, all diluted blanks, calibrating standards, quality control specimens and patient specimens are aspirated into a pneumatic nebulizer and the resulting aerosol directed to the hot plasma discharge by a flow of argon. In the annular plasma the aerosol is vaporized, atomized, and then ionized. The ionized gases plus neutral species formed in the annular plasma space are aspirated from the plasma through an orifice into a quadrupole mass spectrometer. The mass range from 1 to 263 amu is rapidly scanned multiple times and ion counts tabulated for each mass of interest. Instrument response is defined by the linear relationship of analyte concentration versus ion count ratio (analyte ion count/internal standard ion count). Analyte concentrations are derived by reading the ion count ratio for each mass of interest and determining the concentration from the response line. (Unpublished Mayo method)

Creatinine is measured using an enzymatic method based on the determination of sarcosine from creatinine with the aid of creatininase, creatinase, and sarcosine oxidase. The liberated hydrogen peroxide is measured via a modified Trinder reaction using a colorimetric indicator. (Package insert: Roche Diagnostics, Indianapolis IN, 2004)

PDF Report
No

Day(s) and Time(s) Test Performed
Tuesday, Thursday; 8 a.m.
Test Definition: CUCRU
Copper/Creat Ratio, Random, U

Analytic Time
1 day

Maximum Laboratory Time
4-6 days

Specimen Retention Time
14 days

Performing Laboratory Location
Rochester

Fees and 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 Regional Manager. For assistance, contact Customer Service.

Test Classification
See Individual Test IDs

CPT Code Information
82525 Copper Concentration
82570 Creatinine Concentration

LOINC® Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
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<tr>
<td>CUCRU</td>
<td>Copper/Creat Ratio, Random, U</td>
<td>13829-7</td>
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<table>
<thead>
<tr>
<th>Result ID</th>
<th>Test Result Name</th>
<th>Result LOINC Value</th>
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<tbody>
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<td>CDCR</td>
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<td>32872</td>
<td>Copper/Creat Ratio, U</td>
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