Test Definition: HMHA
Heavy Metals, Hair

Overview

Useful For
Detection of nonacute arsenic, mercury, and lead exposure in hair specimens

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>ASHA</td>
<td>Arsenic, Hair</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>PBHA</td>
<td>Lead, Hair</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>HGHAR</td>
<td>Mercury, Hair</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Special Instructions

- Collecting Hair and Nails for Metals Testing

Method Name
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)

NY State Available
No

Specimen

Specimen Type
Hair

Specimen Required

Supplies: Hair and Nails Collection Kit (T565)

Specimen Volume: 0.2 g

Collection Instructions: Prepare and transport specimen per the instructions in kit or see Collecting Hair and Nails for Metals Testing in Special Instructions.

Additional Information: If known, indicate source of hair (axillary, head, or pubic).

Specimen Minimum Volume
0.05 g

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information
**Clinical and Interpretive**

**Clinical Information**

**ARSENIC**

Arsenic circulating in the blood will bind to protein by formation of a covalent complex with sulfhydryl groups of the amino acid cysteine. Keratin, the major structural protein in hair and nails, contains many cysteine residues and, therefore, is one of the major sites for accumulation of arsenic. Since arsenic has a high affinity for keratin, the concentration of arsenic in hair is higher than in other tissues.

Arsenic binds to keratin at the time of exposure, "trapping" the arsenic in hair. Therefore, hair analysis for arsenic is not only used to document that an exposure occurred, but when it occurred. Hair collected from the nape of the neck can be used to document recent exposure. Axillary or pubic hair are used to document long-term (6 months-1 year) exposure.

**MERCURY**

Once absorbed and circulating, mercury becomes bound to numerous proteins, including keratin. The concentration of mercury in hair correlates with the severity of clinical symptoms. If the hair can be segregated by length, such an exercise can be useful in identifying the time of exposure.

**LEAD**

Hair analysis for lead can be used to corroborate blood analysis or to document past lead exposure. If the hair is collected and segmented in a time sequence (based on length from root), the approximate time of exposure can be assessed.

**Reference Values**

**ARSENIC**

0-15 years: not established

> or =16 years: 0.0-0.9 mcg/g of hair

**LEAD**

0.0-3.9 mcg/g of hair

Reference values apply to all ages.

**MERCURY**

0-15 years: not established

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
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</thead>
<tbody>
<tr>
<td>Hair</td>
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</table>
**Interpretation**

Hair grows at a rate of approximately 0.5 inch/month. Hair keratin synthesized today will protrude through the skin in approximately 1 week. Thus, a hair specimen collected at the skin level represents exposure of 1 week ago, 1 inch distally from the skin represents exposure 2 months ago, etc.

**ARSENIC**

Hair arsenic levels above 1.00 mcg/g dry weight indicate excessive exposure. It is normal for some arsenic to be present in hair, as everybody is exposed to trace amounts of arsenic from the normal diet.

The highest hair arsenic observed at Mayo Clinic was 210 mcg/g dry weight in a case of chronic exposure that was the cause of death.

**MERCURY**

Normally, hair contains less than 1 mcg/g of mercury; any amount more than this indicates that exposure to more than normal amounts of mercury has occurred.

**LEAD**

Normal hair lead content is below 5.0 mcg/g. Hair lead content above 10.0 mcg/g indicates significant lead exposure.

**Cautions**

No significant cautionary statements

**Clinical Reference**


**Performance**

**Method Description**

Arsenic, mercury, and lead in hair are analyzed by inductively coupled plasma-mass spectrometry (ICP-MS) in kinetic energy discrimination (KED) mode using gallium, iridium, and lutetium as internal standards, and a salt matrix calibration. (Unpublished Mayo method)

**PDF Report**

Document generated July 4, 2020 at 1:54pm CDT
No

**Day(s) and Time(s) Test Performed**
Tuesday; 3 p.m.

**Analytic Time**
2 days

**Maximum Laboratory Time**
7 days

**Specimen Retention Time**
14 days

**Performing Laboratory Location**
Rochester

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**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**
82175-Arsenic
83655-Lead
83825-Mercury

**LOINC® Information**

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
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<tbody>
<tr>
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<td>Heavy Metals, Hair</td>
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