Test Definition: ASHA

Arsenic, Hair

Overview

Useful For
Detection of nonacute arsenic exposure in hair specimens

Special Instructions
- Collecting Hair and Nails for Metals Testing

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

NY State Available
No

Specimen

Specimen Type
Hair

Necessary Information
Indicate source of hair (axillary, head, or pubic) if known

Specimen Required
Supplies: Hair and Nails Collection Kit (T565)
Source: Head, beard, mustache, chest, pubic
Specimen Volume: 0.2 g
Collection Instructions: Prepare and transport specimen per the instructions in the kit or see Collecting Hair and Nails for Metals Testing.

Specimen Minimum Volume
0.05 g

Reject Due To

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

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Hair	Ambient (preferred)		
	Refrigerated		
	Frozen		

Clinical & Interpretive

Clinical Information

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 is used to document long-term (6 months-1 year) exposure.

Reference Values

0-15 years: Not established
> or =16 years: <1.0 mcg/g of hair

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.

Hair arsenic levels above 1.00 mcg/g dry weight may 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, which was the cause of death.

Cautions

Cosmetic and hair dyes can be a potential source of heavy metal contamination.

Clinical Reference

1. Sthiannopkao S, Kim K-W, Cho KH, et al. Arsenic levels in human hair, Kandal Province, Cambodia: The influences of groundwater arsenic, consumption period, age and gender. Applied Geochemistry 2010;25:81-90
2. Pearse DC, Dowling K, Gerson AR, et al. Arsenic microdistribution and speciation in toenail clippings of children living in a historic gold mining area. Sci Total Environ 2010;408:2590-2599
3. Strathmann FG, Blum LM. Toxic elements. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 44

Performance

Method Description

The metal analytes of interest are analyzed by triple-quadrupole inductively coupled plasma mass

spectrometry.(Unpublished Mayo method).

PDF Report
No

Day(s) Performed
Wednesday

Report Available
2 to 14 days

Specimen Retention Time
14 days

Performing Laboratory Location
Rochester

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
82175

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
ASHA	Arsenic, Hair	5584-8

Result ID	Test Result Name	Result LOINC® Value
31896	Arsenic, Hair	5584-8
ASHSC	Specimen Source	31208-2