MAYO CLINIC LABORATORIES

Test Definition: BIWB

Bismuth, Blood

Overview

Useful For

Determining bismuth toxicity

Special Instructions

- Metals Analysis Specimen Collection and Transport

Method Name

Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

NY State Available

Yes

Specimen

Specimen Type

Whole blood

Specimen Required

*****This specimen container cannot be opened or used for any other testing before shipping.*****

Patient Preparation: High concentrations of gadolinium and iodine are known to potentially interfere with most inductively coupled plasma mass spectrometry-based metal tests. If either gadolinium- or iodine-containing contrast media has been administered, **a specimen should not be collected for at least 96 hours**.

Supplies:

-Metal Free EDTA 3 mL Tube (T989)

-Metal Free B-D Tube (EDTA), 6 mL (T183)

Collection Container/Tube:

Preferred: Royal blue-top BD vacutainer with EDTA blood collection tube (3 mL) (BD catalog no. 367777)

Acceptable: Royal blue-top BD Vacutainer Plus with EDTA blood collection tube (6 mL) (BD catalog no. 368381)

Specimen Volume: 0.25 mL

Collection Instructions:

1. See Metals Analysis Specimen Collection and Transport for complete instructions.
2. Send whole blood specimen in original tube. **Do not aliquot**.

Specimen Minimum Volume

See Specimen Required

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole blood	Refrigerated (preferred)	28 days	
	Ambient	28 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Bismuth is used in the production of alloys, pigments, and chemical additives. Various compounds have also been used as therapeutic agents, astringents, and antacids.(1) Bismuth subsalicylate (Pepto-Bismol) is one example commonly used for indigestion and diarrhea.

In unexposed individuals, bismuth blood concentrations are typically less than 0.02 mcg/L compared to peptic ulcer patients taking bismuth medications where the concentrations ranged from 4 to 30 mcg/L.(2-4) Elimination from the body takes place primarily by the urinary and fecal routes, but the exact proportion contributed by each route is still unknown. Elimination from blood displays multicompartment pharmacokinetics with half-lives of 8 to 16 hours (early) and 5 to 11 days (late).(1)

A number of toxic effects have been attributed to bismuth compounds in humans including nephropathy, encephalopathy, osteoarthropathy, gingivitis, stomatitis, and colitis. Common early symptoms include salivation, mucosal swelling, discoloration of the tongue, gums, abdominal pain, and nausea.(1,5)

Reference Values

<1 ng/mL (Unexposed)
4-30 ng/mL (Therapeutic)

Interpretation

Normal blood concentrations for unexposed individuals are less than 1 ng/mL and the therapeutic range is 4 to 30 ng/mL.(2-4,6)

Cautions

No significant cautionary statements

Clinical Reference

1. Baselt R. Disposition of Toxic Drugs and Chemicals In Man. 10th ed. Biomedical Publications; 2014
2. Heitland P, Koster HD. Biomonitoring of 37 trace elements in blood samples from inhabitants of northern Germany by ICP-MS. J Trace Elem Med Biol. 2006;20(4):253-262

3. Serfontein WJ, Mekel R, Bank S, Barbezat G, Novis B. Bismuth toxicity in man-I. Bismuth blood and urine levels in patients after administration of a bismuth protein complex (Bicitropeptide). Res Commun Chem Pathol Pharmacol. 1979;26(2):383-389
4. Serfontein WJ, Mekel R. Bismuth toxicity in man II. Review of bismuth blood and urine levels in patients after administration of therapeutic bismuth formulations in relation to the problem of bismuth toxicity in man. Res Commun Chem Pathol Pharmacol. 1979;26(2):391-411
5. Keogan DM, Griffith DM. Current and potential applications of bismuth-based drugs. Molecules. 2014;19(9):15258-97. doi:10.3390/molecules190915258
6. Sodi R. Vitamins and trace elements. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 39

Performance

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

PDF Report
No

Day(s) Performed
Wednesday

Report Available
1 to 8 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.

Test Definition: BIWB

Bismuth, Blood

CPT Code Information

83018

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
BIWB	Bismuth, B	8161-2

Result ID	Test Result Name	Result LOINC® Value
64274	Bismuth, B	8161-2