

## Overview

### Useful For

Determining vitamin B6 status, including in persons who present with progressive nerve compression disorders, such as carpal tunnel and tarsal tunnel syndromes

Determining the overall success of a vitamin B6 supplementation program

Diagnosis and evaluation of hypophosphatasia

### Method Name

Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

### NY State Available

Yes

## Specimen

### Specimen Type

Plasma Heparin

### Shipping Instructions

[Ship specimen in amber vial to protect from light.](#)

### Specimen Required

#### Patient Preparation:

1. Fasting-overnight (12-14 hours) (infants-draw prior to next feeding).
2. Patient must not ingest vitamin supplements for 24 hours before the specimen is drawn.

**Supplies:** Amber Frosted Tube, 5 mL (T192)

**Collection Container/Tube:** Green top (sodium or lithium heparin) or plasma gel separator tube (PST)

**Submission Container/Tube:** Amber vial

**Specimen Volume:** 1 mL

**Collection Instructions:** Centrifuge at 4 degrees C within 2 hours of collection, then aliquot all plasma into amber vial.

### Forms

If not ordering electronically, complete, print, and send a [General Request](#) (T239) with the specimen.

### Specimen Minimum Volume

0.5 mL

### Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

### Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Plasma Heparin	Refrigerated (preferred)	7 days	LIGHT PROTECTED
	Frozen	14 days	LIGHT PROTECTED

## Clinical and Interpretive

### Clinical Information

[Vitamin B6 is a complex of 6 vitamers: pyridoxal, pyridoxol, pyridoxamine, and their 5'-phosphate esters. Due to its role as a cofactor in a number of enzymatic reactions, pyridoxal phosphate \(PLP\) has been determined to be the biologically active form of vitamin B6.](#)

Vitamin B6 deficiency is a potential cause of burning mouth syndrome and a possible potentiating factor for carpal tunnel and tarsal tunnel syndromes. Persons who present chronic, progressive nerve compression disorders may be deficient in vitamin B6 and should be evaluated. Vitamin B6 deficiency is associated with symptoms of scaling of the skin, severe gingivitis, irritability, weakness, depression, dizziness, peripheral neuropathy, and seizures. In the pediatric population, deficiencies have been characterized by diarrhea, anemia, and seizures.

Markedly elevated PLP in conjunction with low levels of pyridoxic acid are observed in cases of hypophosphatasia, a disorder characterized by low levels of alkaline phosphatase and a range of skeletal abnormalities.

### Reference Values

5-50 mcg/L

### Interpretation

[Levels for fasting individuals falling in the range of 3 to 30 mcg/L for pyridoxic acid \(PA\) and 5 to 50 mcg/L for pyridoxal 5-phosphate \(PLP\) are indicative of adequate nutrition.](#)

The following are interpretative guidelines based upon PLP and PA results:

If PLP is greater than 100mcg/L; or -If PLP is greater than 100 mcg/L and PA is less than or equal to 30, the increased pyridoxal 5-phosphate is suggestive of hypophosphatasia. Consider analysis of serum alkaline phosphatase isoenzymes (ALKI / Alkaline Phosphatase, Total and Isoenzymes, Serum) and urinary phosphoethanolamine (AAPD / Amino Acids, Quantitative, Random, Urine).

-If PLP is greater than 100 mcg/L and PA is 31 to 100 mcg/L; or PLP is 81 to 100 mcg/L and PA is less than or equal to 30 mcg/L, the increased pyridoxal 5-phosphate is likely related to dietary supplementation; however a mild expression of hypophosphatasia cannot be excluded. Consider analysis of serum alkaline phosphatase isoenzymes (ALKI / Alkaline Phosphatase, Total and Isoenzymes, Serum) and urinary phosphoethanolamine (AAPD / Amino Acids, Quantitative, Random, Urine).

-If PLP is 51 to 80 mcg/L or PLP is 81 to 100 mcg/L and PA is greater than 30; or PLP is greater than 100 mcg/L and PA is greater than 100 mcg/L, the elevated pyridoxal 5-phosphate is likely due to dietary supplementation.

### Cautions

Reference ranges were established using healthy fasting volunteers who abstained from vitamin supplementation for 24 hours prior to collection. Vitamin supplementation and nonfasting may result in elevated plasma vitamin concentrations.

### Clinical Reference

1. Kimura M, Kanehira K, Yokoi K: Highly sensitive and simple liquid chromatographic determination in plasma of B6 vitamins, especially pyridoxal 5'-phosphate. *J Chromatogr A* 1996;722(1-2):296-301
2. Ball GFM: *Vitamins: Their Role in the Human Body*. Blackwell Publishing. Oxford, 2004, pp 310-325
3. Mackey AD, Davis SR, Gregory JF III: Vitamin B6. In *Modern Nutrition in Health and Disease*. Tenth edition. Edited by ME Shils, M Shike, AC Ross, et al. Lippincott Williams and Wilkins, 2006, pp 452-461
4. Roberts NB, Taylor A, Sodi R: Chapter 37 Vitamins and Trace Elements. In *Tietz Textbook of Clinical Chemistry and Molecular Diagnostics*. Edited by N Rifai, AR Horvath, CT Wittwer. Sixth edition. Elsevier, 2018. pp 639-718

### Performance

#### Method Description

The stable isotope pyridoxal 5-phosphate-d2 and/or pyridoxic acid-d2 is added to plasma as an internal standard. Meta-phosphoric acid solution is then added to precipitate the proteins. Following sedimentation of the proteins, an aliquot of the clarified supernatant fluid is subjected to separation of pyridoxal 5-phosphate, pyridoxic acid, and internal standards from other plasma components by reverse-phase HPLC with quantitation by tandem mass spectrometry (LC-MS/MS). (Unpublished Mayo method)

#### PDF Report

No

#### Day(s) and Time(s) Test Performed

Monday through Thursday, Sunday; 11:59 p.m.

#### Analytic Time

1 day

#### Maximum Laboratory Time

4 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](#).

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**Test Classification**

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

**CPT Code Information**

84207

**LOINC® Information**

Test ID	Test Order Name	Order LOINC Value
PLP	Pyridoxal 5-Phosphate (PLP), P	30552-4

Result ID	Test Result Name	Result LOINC Value
4047	Pyridoxal 5-Phosphate (PLP), P	30552-4