

**Overview****Useful For**

Monitoring methotrexate concentrations postglucarpidase therapy

**Method Name**

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

**NY State Available**

Yes

**Specimen****Specimen Type**

Serum

**Shipping Instructions**

Ship specimen in amber vial to protect from light.

**Specimen Required**

[Supplies: Amber Frosted Tube, 5 mL \(T192\)](#)

**Collection Container/Tube:**

**Preferred:** Red top

**Acceptable:** Serum gel

**Submission Container/Tube:** Amber vial

**Specimen Volume:** 1 mL

**Forms**

If not ordering electronically, complete, print, and send a [Therapeutics Test Request](#) (T831) with the specimen.

**Specimen Minimum Volume**

0.2 mL

**Reject Due To**

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK
Exposed to light >24 hours	Reject

**Specimen Stability Information**

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

## Clinical and Interpretive

### Clinical Information

Methotrexate, an antimetabolite (folate reductase inhibitor), is used at high dose (12 gm/m<sup>2</sup>) to treat neoplastic diseases, such as lymphocytic leukemia. Therapy is guided by measurement of serum concentration: 24 hours after dosage, the serum concentration should be less than 10 mcml/L; 48 hours after dosage, concentration should be less than 1 mcml/L; and 72 hours after dosage, the concentration should be less than 0.1 mcml/L or less than 0.05 mcml/L, depending on clinical protocol. It is also administered at low dose (a single dose of 5-15 mg per week) to treat severe psoriasis and rheumatoid arthritis. Methotrexate is 65% orally bioavailable. Peak serum concentrations are reached 2 to 3 hours after dosing. Protein binding is approximately 45%. Volume of distribution is 0.4 L/kg. Elimination is concentration dependent with an apparent elimination half-life of 1.8 hours when the serum concentration is above 1 mcml/L, 8 hours when between 0.1 and 1 mcml/L, and approximately 30 hours when below 0.1 mcml/L.

Voraxaze (glucarpidase) is a carboxypeptidase enzyme indicated for the treatment of toxic plasma methotrexate (MTX) concentrations (>1 mcml/L) in patients with delayed methotrexate clearance due to impaired renal function. Measurement of methotrexate using immunoassays is unreliable for specimens collected within 48 hours following Voraxaze administration since it can result in falsely elevated results. As a result, this liquid chromatography-tandem mass spectrometry assay should be used to monitor MTX concentrations postglucarpidase therapy.

### Reference Values

Nontoxic drug concentration after 72 hours: <0.1 mcml/L

### Interpretation

Following a 4 to 6 hour intravenous infusion of methotrexate, postinfusion concentrations greater than the following indicate an increased risk of toxicity if conventional low-dose leucovorin rescue is given:

-24-hour postinfusion concentration: 5.0 to 10.0 mcml/L

-48-hour postinfusion concentration: 0.5 to 1.0 mcml/L

-72-hour postinfusion concentration: 0.1 mcml/L

### Cautions

The specimen must be protected from light.

### Clinical Reference

1. Cadman EC, Durivage HJ: Cancer chemotherapy: alkylating agents. In: Wilson JD, Braunwald E, Isselbacher KJ, eds. Harrison's Principles of Internal Medicine. 12th ed. McGraw-Hill Book Company; 1991: 1592-1594

2. Jameson JL, Fauci AS, Kasper DL, Hauser SL, Longo DL, Loscalzo J, eds: Harrison's Principles of Internal Medicine. 20th ed. McGraw-Hill Education; 2018

**Performance****Method Description**

Methotrexate is isolated from serum using methanol extraction. Analysis is performed by liquid chromatography-mass spectrometry/mass spectrometry using selected ion monitoring. (Package insert: Voraxaze [Glucarpidase]. BTG International Inc; 2012)

**PDF Report**

No

**Day(s) Performed**

Monday through Sunday

**Report Available**

Same day/1 day

**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**

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 US Food and Drug Administration.

**CPT Code Information**

80204

**LOINC® Information**

Test ID	Test Order Name	Order LOINC Value
MTXSG	Methotrexate Post Glucarpidase, S	51602-1

Result ID	Test Result Name	Result LOINC Value
62580	Methotrexate Post Glucarpidase, S	51602-1