
Overview**Useful For**

Monitoring serum gabapentin concentrations

Assessing compliance

Adjusting dosage in patients

Method Name

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

NY State Available

Yes

Specimen**Specimen Type**

Serum Red

Specimen Required

Collection Container/Tube: Red top (serum gel/SST is **not** acceptable)

Submission Container/Tube: Plastic vial

Specimen Volume: 1 mL

Collection Instructions:

1. Draw blood immediately before next scheduled dose.
2. Centrifuge and aliquot serum into plastic vial within 2 hours of collection.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:

[-Neurology Specialty Testing Client Test Request \(T732\)](#)

[-Therapeutics Test Request](#) (T831)

Reject Due To

Gross hemolysis OK
Gross lipemia OK
Gross icterus OK

Specimen Minimum Volume

0.2 mL

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum Red	Refrigerated (preferred)	28 days	
	Ambient	28 days	
	Frozen	28 days	

Clinical & Interpretive**Clinical Information**

Gabapentin is an antiepileptic drug that is effective in treating seizures, neuropathies, and a variety of neurological and psychological maladies. Although designed as a gamma amino butyric acid (GABA) analogue, gabapentin does not bind to GABA receptors, nor does it affect the neuronal uptake or degradation of GABA. In fact, the precise mechanism by which it exerts its analgesic and anticonvulsant effects is unknown.

After oral administration and absorption, gabapentin circulates essentially unbound to serum proteins. In addition, gabapentin does not undergo hepatic metabolism, unlike most other antiepileptic drugs, and is eliminated almost entirely by renal excretion with a clearance that approximates the glomerular filtration rate. The elimination half-life is 5 to 7 hours in patients with normal renal function.

Since gabapentin does not bind to serum proteins, it does not exhibit pharmacokinetic variability and interactions with other highly protein-bound medications (eg, phenytoin). In addition, the lack of hepatic metabolism eliminates the interactions with other hepatically cleared medications, which can induce/inhibit hepatic drug metabolizing enzyme systems (cytochrome P450s). Therefore, gabapentin serum concentrations are not changed following the addition or discontinuation of other common anticonvulsants (ie, phenobarbital, phenytoin, carbamazepine, or valproic acid), nor are their serum concentration altered upon the addition or discontinuation of gabapentin.

In general, adverse effects with gabapentin are infrequent and usually resolve with continued treatment. The most common side effects include somnolence, dizziness, ataxia, and fatigue. Experience to date indicated that gabapentin is safe and relatively nontoxic.

Reference Values

2.0-20.0 mcg/mL

Toxic Range: > or =25.0 mcg/mL

Interpretation

Therapeutic ranges are based on specimens collected immediately before the next dose (ie, trough).

Most epileptic patients show response to the drug when the trough concentration is in the range of 2-20 mcg/mL. Therapeutic drug monitoring may be useful due to inter-individual variation in pharmacokinetics and dose-dependent bioavailability; specimens for measurements should be collected before the morning dose since the short half-life may affect the interpretation of the concentration.

Cautions

This test cannot be performed on whole blood. Serum must be separated from cells within 2 hours of collection.

Specimens collected in serum gel tubes are not acceptable as the drug/analyte can absorb on the gel and lead to falsely decreased concentrations.

Clinical Reference

1. Hiemke C, Bergemann N, Clement HW, et al. Consensus Guidelines for Therapeutic Drug Monitoring in Neuropsychopharmacology: Update 2017. *Pharmacopsychiatry*. 2018;51:9-62
2. Patsalos PN, Berry DJ, Bourgeois BF, et al: Antiepileptic drugs-best practice guidelines for therapeutic drug monitoring: a position paper by the subcommission on therapeutic drug monitoring, ILAE Commission on Therapeutic Strategies. *Epilepsia*. 2008;49(7):1239-1276
3. Johannessen SI, Tomson T: Pharmacokinetic variability of newer antiepileptic drugs: when is monitoring needed? *Clin Pharmacokinetics*. 2006;45(11):1061-1075

Performance

Method Description

Gabapentin and the internal standard are separated from other serum constituents with analysis on a tandem mass spectrometer equipped with an electrospray ion source using multiple reaction monitoring. (Unpublished Mayo method)

PDF Report

No

Specimen Retention Time

2 weeks

Performing Laboratory Location

Rochester

Fees & Codes**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

80171

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
GABA	Gabapentin, S	9738-6

Result ID	Reporting Name	LOINC®
80826	Gabapentin, S	9738-6