MAYO CLINIC LABORATORIES

Test Definition: LEVE

Levetiracetam, Serum

Overview

Useful For

Monitoring serum concentration of levetiracetam, particularly in patients with kidney disease

Assessing compliance with levetiracetam therapy

Assessing potential toxicity of levetiracetam

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube 5 mL (T914)
Collection Container/Tube:
Preferred: Red top
Acceptable: Serum gel
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions:
1. Draw blood immediately before next scheduled dose.
2. **For sustained-release formulations only**, draw blood a minimum of 12 hours after last dose.
3. Within 2 hours of collection, centrifuge, and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Neurology Specialty Testing Client Test Request (T732)
-General Request (T239)
-Therapeutics Test Request (T831)

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
Serum	Refrigerated (preferred)	28 days	
	Ambient	28 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Levetiracetam is approved for treatment of partial, myoclonic, and tonic-clonic seizures and is used off-label for manic states and migraine prophylaxis. Levetiracetam has very favorable pharmacokinetics with good bioavailability and rapid achievement of steady state. Its hepatic metabolism is minimal and nonoxidative, making it safe for use with hepatic enzyme inducers or inhibitors. The major metabolite is a carboxylic acid derivate, which is inactive and accounts for roughly one quarter of the administered dose. Levetiracetam is excreted renally, with a mean half-life of 7 hours in adults and slightly less than that in children. Kidney dysfunction may warrant therapeutic monitoring and/or dose adjustment.

Given the lack of drug interactions and favorable pharmacokinetics, the primary uses for therapeutic drug monitoring of levetiracetam are compliance assurance and management of physiological changes such as puberty, pregnancy, and aging. Toxicities associated with levetiracetam use include decreased hematocrit and red blood cell count, decreased neutrophil count, somnolence, asthenia, and dizziness. These toxicities may be associated with blood concentrations in the therapeutic range.

Reference Values

10.0-40.0 mcg/mL

Interpretation

Most individuals display optimal response to levetiracetam with serum levels 10.0 to 40.0 mcg/mL. Some individuals may respond well outside of this range or may display toxicity within the therapeutic range; thus, interpretation should include clinical evaluation.

Toxic levels have not been well established. Therapeutic ranges are based on specimen collected at trough (ie, immediately before the next dose).

Cautions

This test cannot be performed on whole blood.

Clinical Reference

1. 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
2. Johannessen SI, Tomson T. Pharmacokinetic variability of newer antiepileptic drugs: when is monitoring needed? Clin Pharmacokinet. 2006;45(11):1061-1075
3. Hiemke C, Bergemann N, Clement HW, et al. Consensus guidelines for therapeutic drug monitoring in neuropsychopharmacology: Update 2017. Pharmacopsychiatry. 2018;51(1-02):9-62
4. Milone MC, Shaw LM. Therapeutic Drugs and Their Management. In: Rifai N, Chiu RWK, Young I, Burnham C-AD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:420-453

Performance

Method Description

The serum sample is diluted in acetonitrile containing internal standard. The protein precipitate is centrifuged, and a portion of the supernatant is diluted with mobile phase for detection by a tandem mass spectrometer.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 2 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.

CPT Code Information

80177

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
LEVE	Levetiracetam, S	30471-7

Result ID	Test Result Name	Result LOINC® Value
83140	Levetiracetam, S	30471-7