MAYO CLINIC LABORATORIES

Test Definition: TRAMS

Tramadol and Metabolite, Serum

Overview

Useful For
This test is useful to help determine compliance and/or to monitor adverse drug reactions or efficacy

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

NY State Available
Yes

Specimen

Specimen Type
Serum Red

Specimen Required
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube: Red top (Serum gel/SST are **not acceptable**)
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions: Within 2 hours of collection, centrifuge and aliquot serum into a plastic vial.

Forms
If not ordering electronically, complete, print, and send a Therapeutics Test Request (T831) 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
Serum Red	Refrigerated (preferred)	28 days	
	Ambient	28 days	

	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Tramadol is a synthetic opioid that is approximately equipotent with codeine but is considered to cause less respiratory depression and have less abuse potential. It is US Food and Drug Administration-approved for moderate to severe pain. It is available in immediate-release and extended-release tablets. It is extensively metabolized by CYP2D6 and CYP3A4 and has an active metabolite (O-desmethyltramadol). The eliminate half-life is approximately 5 hours to 7 hours (immediate-release) and approximately 6 hours to 10 hours (extended-release).

Reference Values

Tramadol:
Peak plasma levels following a single 100 mg oral dose: 230-380 ng/mL
Steady-state plasma levels following a 100 mg 4 times daily regimen: 420-770 ng/mL

O-desmethyltramadol:
Peak plasma concentration following a single 100 mg oral dose: 35-75 ng/mL
Steady-state plasma concentration following a 100 mg 4 times daily regimen: 80-140 ng/mL

Cutoff concentrations by liquid chromatography tandem mass spectrometry:
Tramadol: 10 ng/mL
O-desmethyltramadol: 5.0 ng/mL

Interpretation

Serum concentrations of tramadol and its active metabolite can be used to determine compliance and usage of tramadol within the past several days. In a group of 28 adult patients receiving daily oral immediate-release doses of 200 mg to 400 mg for 4 weeks, serum concentrations measured 12 hours after the last dose averaged 365 ng/mL (range: 95-841 ng/mL) for tramadol and 59 ng/mL (range: 5-123 ng/mL) for O-desmethyltramadol.(1)

Cautions

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

Clinical Reference

1. Sindrup SH, Madsen C, Brosen K, Jensen TS. The effect of tramadol in painful polyneuropathy in relation to serum drug and metabolite levels. Clin Pharmacol Ther. 1999;66(6):636-641. doi:10.1053/cp.1999.v66.103171001
2. Langman LJ, Bechtel LK, Holstege CP. Clinical toxicology. In: Rifai N, Chiu RWK, Young I, Burnham C-AD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 43
3. Baselt RC. Disposition of Toxic Drugs and Chemical in Man. 12th ed. Biomedical Publications; 2020
4. Jannetto PJ, Bratanow NC, Clark WA, et al. Executive summary: American Association of Clinical Chemistry Laboratory Medicine Practice Guideline-using clinical laboratory tests to monitor drug therapy in pain management patients. J Appl Lab Med. 2018;2(4):489-526

Performance

Method Description
The serum samples are mixed with internal standard and extracted by protein crash with methanol. The supernatant after centrifugation is diluted with clinical laboratory reagent water. The sample is then analyzed by liquid chromatography tandem mass spectrometer.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Wednesday

Report Available
3 to 9 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
G0480
80373 (if appropriate for select payers)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
TRAMS	Tramadol and metabolite, S	111526-0

Result ID	Test Result Name	Result LOINC® Value

623268	Tramadol	12437-0
623269	O-desmethyltramadol	82974-7