MAYO CLINIC LABORATORIES

Test Definition: IMIPR

Imipramine and Desipramine, Serum

Overview

Useful For

Monitoring imipramine and desipramine concentrations during therapy

Evaluating potential imipramine and desipramine toxicity

May aid in evaluating patient compliance

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 Serum
Collection Instructions:
1. Collect specimen immediately before next scheduled dose (minimum 12 hours after last dose).
2. Within 2 hours of collection, centrifuge and aliquot serum into a plastic vial. Serum **must be** separated from cells within 2 hours of collection.

Forms

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

Specimen Minimum Volume

Serum: 0.25 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum Red	Refrigerated (preferred)	28 days	
	Ambient	7 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Imipramine and its metabolite desipramine are tricyclic antidepressants used to treat endogenous depression requiring 1 to 3 weeks of treatment before therapeutic effectiveness becomes apparent. Desipramine is used for treatment of endogenous depression when the patient needs a drug with significant stimulatory side effects. These drugs have also been employed in the treatment of enuresis (involuntary urination) in childhood and severe obsessive-compulsive neurosis.

Imipramine:
The optimal dosage of imipramine yields trough (just before the next dose) blood levels of imipramine and desipramine combined from 175 to 300 ng/mL. If desipramine is given, no imipramine should be detected, and the therapeutic concentration for desipramine alone is 100 to 300 ng/mL.

Toxicity associated with imipramine is characterized by QRS widening (intraventricular conduction delay) leading to ventricular tachycardia and asystole. In some patients, toxicity may manifest at lower concentrations or at therapeutic concentrations in the early state of therapy. Cardiac toxicity (first-degree heart block) is usually associated with blood concentrations more than 400 ng/mL.

Desipramine:
Desipramine is the antidepressant of choice in patients where maximal stimulation is indicated.

The therapeutic concentration of desipramine is 100 to 300 ng/mL. About 1 to 3 weeks of treatment are required before therapeutic effectiveness becomes apparent.

The most frequent side effects are those attributable to anticholinergic effects, such as dry mouth, constipation, dizziness, tachycardia, palpitations, blurred vision, and urinary retention. These occur at blood concentrations more than 400 ng/mL, although they may occur at therapeutic concentrations in the early stage of therapy. Cardiac toxicity (first-degree heart block) is usually associated with blood concentrations more than 400 ng/mL.

Reference Values

Imipramine and Desipramine
Total therapeutic concentration: 175-300 ng/mL

Desipramine
Therapeutic concentration: 100-300 ng/mL

Note: Therapeutic ranges are for specimens collected at trough (ie, immediately before next scheduled dose). Levels may be elevated in non-trough specimens.

Interpretation

Most individuals display optimal response to imipramine when combined serum levels of imipramine and desipramine are between 175 and 300 ng/mL. Risk of toxicity is increased with levels above 400 ng/mL.

Most individuals display optimal response to desipramine with serum levels of 100 to 300 ng/mL. Risk of toxicity is increased with desipramine levels above 400 ng/mL.

Some individuals may respond well outside of these ranges or may display toxicity within the therapeutic range; hence, interpretation should include clinical evaluation.

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

Cautions

This test cannot be performed on whole blood. Serum must be separated from cells within 2 hours of collection; if serum is not removed within this time, tricyclic antidepressant levels may be falsely elevated due to drug release from red blood cells.

Specimens that are obtained from gel tubes are not acceptable because the drug can absorb on the gel and lead to falsely decreased concentrations.

Clinical Reference

1. Wille SM, Cooreman SG, Neels HM, Lambert WE. Relevant issues in the monitoring and the toxicology of antidepressants. Crit Rev Clin Lab Sci. 2008;45(1):25-89
2. Thanacoody HK, Thomas SHL. Antidepressant poisoning. Clin Med (Lond). 2003;3(2):114-118
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 CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:420-453

Performance

Method Description

The tricyclic antidepressants are extracted from serum using a solvent to precipitate proteins. The supernatant is removed, and analysis is by liquid chromatography tandem mass spectrometry.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday, Wednesday, Friday

Test Definition: IMIPR

Imipramine and Desipramine, Serum

Report Available
3 to 5 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
80299

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
IMIPR	Imipramine and Desipramine, S	43123-9

Result ID	Test Result Name	Result LOINC® Value
63508	Imipramine	3690-5
37121	Desipramine	3531-1
37122	Imipramine and Desipramine	9627-1