

## Overview

### Useful For

Monitoring imipramine and desipramine concentrations during therapy

Evaluating potential imipramine and desipramine toxicity

The test may also be useful to evaluate patient compliance

### 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 are **not acceptable**)

**Submission Container/Tube:** Plastic vial

**Specimen Volume:** 1 mL

#### Collection Instructions:

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

### Forms

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

[-Cardiovascular Test Request Form](#) (T724)

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

### Specimen Minimum Volume

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 |                   |
|               | Frozen                   | 28 days |                   |
|               | Ambient                  | 7 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 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 in excess of 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 in excess of 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 in excess of 400 ng/mL.

**Reference Values****IMIPRAMINE AND DESIPRAMINE**

Total therapeutic concentration: 175-300 ng/mL

**DESIPRAMINE ONLY**

Therapeutic concentration: 100-300 ng/mL

**Note:** Therapeutic ranges are for specimens collected at trough (ie, immediately before next scheduled dose). Levels

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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 400ng/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, thus, 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 Mar-Apr;3(2):114-118
3. Hiemke C, Baumann P, Bergemann N, et al: AGNP Consensus Guidelines for Therapeutic Drug Monitoring in Psychiatry: Update 2011. *Pharmacopsychiatry.* 2011 Sep;44(6):195-235
4. Burtis CA, Ashwood ER, Bruns DE, eds. *Tietz Textbook of Clinical Chemistry and Molecular Diagnostics.* 5th ed. Elsevier; 2012

**Performance****Method Description**

The tricyclic antidepressants are extracted from serum using a solvent crash 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**

Tuesday, Thursday, Sunday

**Report Available**

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3 to 5 days

**Specimen Retention Time**

14 days

**Performing Laboratory Location**

Rochester

**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 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**

80335

G0480 (if appropriate)

**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              |