

## Overview

### Useful For

Monitoring serum concentration of fluoxetine during therapy

Evaluating potential toxicity

Evaluating 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. Draw blood immediately before the next scheduled dose (trough).
2. Centrifuge and aliquot serum into plastic vial 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

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	Ambient	72 hours	
	Refrigerated (preferred)	28 days	
	Frozen	28 days	

**Clinical & Interpretive****Clinical Information**

Fluoxetine is a selective serotonin reuptake inhibitor approved for treatment of bulimia, obsessive-compulsive behavior, panic disorders, premenstrual dysphoria, and major depressive disorder, with a variety of off-label uses. Both fluoxetine and its major metabolite, norfluoxetine, are pharmacologically active and are reported together in this assay. Most individuals respond optimally when combined serum concentrations for both parent and metabolite are in the therapeutic range (120-500 ng/mL) at steady state. Due to the long half-life of the parent and metabolite (1-6 days), it may take several weeks for patients to reach steady-state concentrations. Fluoxetine is a potent inhibitor of the metabolic enzyme cytochrome P450 (CYP) 2D6, with lesser inhibitory effects on CYP2C19 and CYP3A. Therapy with fluoxetine is, therefore, subject to numerous drug interactions, which are compounded by wide interindividual variability in fluoxetine pharmacokinetics. Measurement of the drug is useful for managing comedications, dose or formulation changes, and in assessing compliance. Side effects are milder for fluoxetine than for older antidepressants, such as tricyclic antidepressants. The most common side effects of fluoxetine therapy include nausea, nervousness, anxiety, insomnia, and drowsiness. Anticholinergic and cardiovascular side effects are markedly reduced compared to tricyclic antidepressants. Fatalities from fluoxetine overdose are extremely rare.

**Reference Values**

Fluoxetine + Norfluoxetine: 120-500 ng/mL

**Interpretation**

Most individuals display optimal response to fluoxetine when combined serum levels of fluoxetine and norfluoxetine are between 120 and 500 ng/mL. Some individuals may respond well outside of this range or may display toxicity within the therapeutic range; therefore, interpretation should include clinical evaluation. A toxic range has not been well established.

**Cautions**

Specimens obtained from gel tube or anticoagulant collections can cause assay interference.

**Clinical Reference**

- 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
- Westanmo AD, Gayken J, Haight R: Duloxetine. A balanced and selective norepinephrine- and serotonin-reuptake inhibitor. *Am J Health-Syst Pharm*. 2005;62(23):2481-2490
- Waldschmitt C, Vogel F, Pfuhlmann B, Hiemke C. Duloxetine serum concentrations and clinical effects. Data from a therapeutic drug monitoring (TDM) survey. *Pharmacopsychiatry*. 2009;42(5):189-193
- Feighner JP, Cohn JB. Double-blind comparative trials of fluoxetine and doxepin in geriatric patients with major depressive disorder. *J Clin Psychiatry*. 1985;46(3 Pt 2):20-25

5. Kelly MW, Perry PJ, Holstad SG, Garvey MJ. Serum fluoxetine and norfluoxetine concentrations and antidepressant response. *Ther Drug Monit.* 1989;11:165-170
6. Benfield P, Heel RC, Lewis SP. Fluoxetine: A review of its pharmacodynamic and pharmacokinetic properties, and therapeutic efficacy in depressive illness. *Drugs.* 1986;32(6):481-508
7. Wille SM, Cooreman SG, Neels, et al. Relevant issues in the monitoring and toxicology of antidepressants. *Crit Rev Clin Lab Sci.* 2008;45(1):25-89

## Performance

### Method Description

Serum samples containing fluoxetine and norfluoxetine are diluted in an aqueous solution containing deuterated internal standards and then injected onto a high-turbulence liquid chromatography system for online extraction. Detection is by tandem mass spectrometry. (Unpublished Mayo method)

### PDF Report

No

### Day(s) Performed

Wednesday

### Report Available

1 to 8 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 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

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**LOINC® Information**

Test ID	Test Order Name	Order LOINC® Value
FLUOX	Fluoxetine, S	78437-1

Result ID	Test Result Name	Result LOINC® Value
80228	Fluoxetine, S	74982-0
251	Norfluoxetine, S	3868-7
252	Fluoxetine+Norfluoxetine	74948-1