

Overview

Useful For

Detection and confirmation of illicit drug use involving fentanyl

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Urine

Advisory Information

For situations where chain of custody is required, a Chain-of-Custody Kit (T282) is available. For chain-of-custody testing, order FENTX / Fentanyl with Metabolite Confirmation, Chain of Custody, Urine.

Additional Testing Requirements

If urine creatinine is required or adulteration of the sample is suspected, the following test should be requested, ADULT / Adulterants Survey, Urine. For additional information, refer to ADULT / Adulterants Survey, Urine.

Specimen Required

Supplies: Plastic, 10-mL urine tube (T068)

Collection Container/Tube: Clean, plastic urine collection container

Submission Container/Tube: Plastic, 10-mL urine tube

Specimen Volume: 3 mL

Collection Instructions:

1. Collect a random urine specimen.
2. No preservative.

Additional Information:

1. No specimen substitutions.
2. No STATS are accepted for this procedure.
3. Submitting less than 3 mL will compromise our ability to perform all necessary testing.

Forms

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

Specimen Minimum Volume

2.1 mL

Reject Due To

Gross hemolysis	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	14 days	
	Frozen	14 days	
	Ambient	72 hours	

Clinical and Interpretive
Clinical Information

Fentanyl is an extremely fast acting synthetic opioid related to the phenylpiperidines.(1,2) It is available in injectable as well as transdermal formulations.(1) The analgesic effects of fentanyl is similar to those of morphine and other opioids(1): it interacts predominantly with the opioid mu-receptor. These mu-binding sites are discretely distributed in the human brain, spinal cord, and other tissue.(1,3)

Fentanyl is approximately 80% to 85% protein bound. In plasma, the protein binding capacity of fentanyl decreases with increasing ionization of the drug. Alterations in pH may affect its distribution between plasma and the central nervous system (CNS). The average volume of distribution for fentanyl is 6 L/kg (range 3-8).(3,4)

In humans, the drug appears to be metabolized primarily by oxidative N-dealkylation to norfentanyl and other inactive metabolites that do not contribute materially to the observed activity of the drug. Within 72 hours of intravenous (IV) administration, approximately 75% of the dose is excreted in urine, mostly as metabolites with less than 10% representing unchanged drug.(3,4)

The mean elimination half-life is (1-3):

-IV: 2 to 4 hours

-Iontophoretic transdermal system (Ionsys) terminal half-life: 16 hours

-Transdermal patch: 17 hours (13-22 hours, half-life is influenced by absorption rate)

-Transmucosal:

Â - Lozenge: 7 hours

Â - Buccal tablet

Â - 100 to 200 mcg: 3 to 4 hours

Â - 400 to 800 mcg: 11 to 12 hours

In clinical settings, fentanyl exerts its principal pharmacologic effects on the CNS. In addition to analgesia, alterations in mood (euphoria, dysphoria) and drowsiness commonly occur.(1,3) Because the biological effects of fentanyl are similar to those of heroin and other opioids, fentanyl has become a popular drug of abuse.

Reference Values

Negative

Interpretation

The presence of fentanyl above 0.20 ng/mL or norfentanyl above 1.0 ng/mL is a strong indicator that the patient has used fentanyl.

Cautions

Urine concentrations do not correlate well to serum drug levels. For therapeutic drug management, monitor serum levels using FENTS / Fentanyl, Serum.

Clinical Reference

1. Gutstein HB, Akil H: Chapter 21: Opioid analgesics. In Goodman and Gilman's: The Pharmacological Basis of Therapeutics. Vol. 11. Edited by JG LL Hardman, AG Gilman. New York, McGraw-Hill Book Company Inc. 2006
2. Kerrigan S, Goldberger BA: Opioids. In Principles of Forensic Toxicology. Second Edition. Edited by ZB Levine. Washington DC, AACC Press, 2003, pp 187-205
3. Package insert: DURAGESIC (fentanyl transdermal system). Janssen Pharmaceutica Products. Titusville, NJ. LP, 2006
4. Baselt RC: Disposition of Toxic Drugs and Chemicals in Man. Eighth edition. Foster City, CA. Biomedical Publications, 2008, pp 616-619

Performance

Method Description

Fentanyl is isolated from urine using a liquid-liquid extraction. The solvent is dried and the analytes are reconstituted with mobile phase. Analysis is performed by liquid chromatography-mass spectrometry using selected ion monitoring.(Unpublished Mayo method)

PDF Report

No

Day(s) and Time(s) Test Performed

Friday; Varies

Analytic Time

2 days

Maximum Laboratory Time

6 days

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

Fees and 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 U.S. Food and Drug Administration.

CPT Code Information

80354

G0480 (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
FENTU	Fentanyl w/metabolite Conf, U	In Process

Result ID	Test Result Name	Result LOINC Value
45530	Fentanyl	58381-5
45531	Norfentanyl	58383-1
45532	Fentanyl Interpretation	69050-3