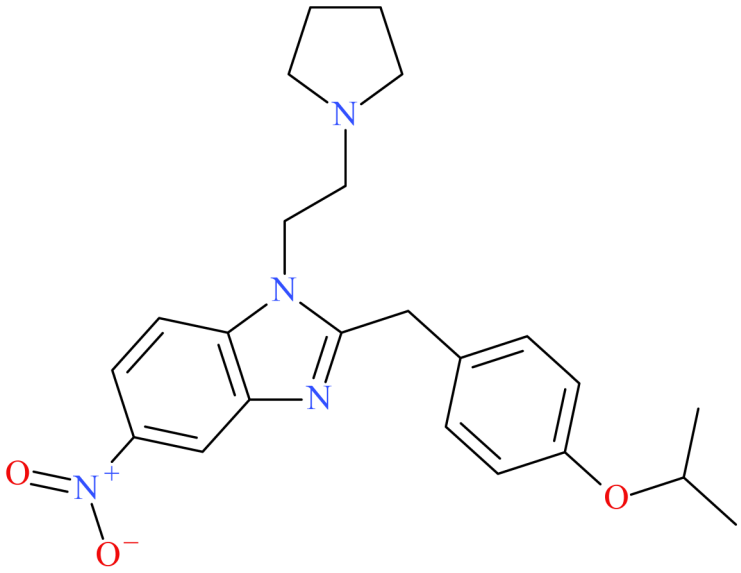
N-Pyrrolidino Isotonitazene



NPS SUBCLASS
Opioid
REPORT DATE
December 20, 2024
SAMPLE RECEIVED
September 11, 2024
SAMPLE TYPE
Toxicology

Preferred Name	*N*-Pyrrolidino Isotonitazene
Synonyms	Isotonitazepyne
Formal Name	2-[(4-isopropoxyphenyl)methyl]-5-nitro-1-(2-pyrrolidin-1-ylethyl)benzimidazole
InChI Key	VRKDSDBBRNHHCR-UHFFFAOYSA-N
CAS Number	N/A
Chemical Formula	$C_{23}H_{28}N_4O_3$
Molecular Weight	408.5
Molecular Ion [M⁺]	408
Exact Mass [M+H]⁺	409.2234

Characterization & Intelligence

The following information was compiled in December 2024 and is subject to change as new research is conducted and as new information becomes available:

Description: *N*-Pyrrolidino isotonitazene is a novel synthetic opioid bearing structural resemblance to isotonitazene, *N*-pyrrolidino protonitazene, *N*-pyrrolidino etonitazene, and other nitazene (2-benzylbenzimidazole) analogues. *N*-Pyrrolidino isotonitazene is a positional isomer of *N*-pyrrolidino protonitazene. *N*-Pyrrolidino isotonitazene was first identified in September 2024 by CanTEST and subsequently in October 2024 by drug checking services in Australia.[1,2] *N*-Pyrrolidino isotonitazene was identified in October 2024 by our laboratory and confirmed using standard reference material.

Sample Source: Montgomery County Coroner's Office (Dayton, OH)

Sample Appearance: Blood specimen

Pharmacology: *In vitro* data available show that *N*-pyrrolidino isotonitazene is a potent mu-opioid receptor agonist (EC_{50}: 0.288 nM, E_{max}: 216% to hydromorphone).[3]

Toxicology: *N*-Pyrrolidino isotonitazene has been identified in one toxicology case to date at the CFSRE.

Drug Materials: *N*-Pyrrolidino isotonitazene has not yet been detected in drug materials at the CFSRE.

Demographics / Geographics: *N*-Pyrrolidino isotonitazene was identified in one blood specimen from Ohio and was found alongside the designer benzodiazepine etizolam.

Legal Status: *N*-Pyrrolidino isotonitazene is not currently a scheduled drug in the United States.

References:

- Cayman Chemical: N-Pyrrolidino Isotonitazene
- [1]CanTEST (2024) N-Pyrrolidino isotonitazene found in counterfeit oxycodone pill
- [2]Curtis et al. (2024) Identification of the novel synthetic opioid N-pyrrolidino isotonitazene...
- [3]De Vrieze et al. (2024) In vitro structure-activity relationships and forensic case series...

About: In collaboration with medical examiner and coroner offices, crime laboratories, clinical partners, and other stakeholders, the Center for Forensic Science Research and Education (CFSRE) is documenting first confirmations of NPS through analysis of drug materials and/or toxicology samples. These reports are generated using comprehensive analytical techniques (e.g., GC-MS, LC-QTOF-MS, NMR) and include available information about the new substances identified at the time of reporting, as well as the analytical data generated during testing. Our new drug monographs are intended to assist with the rapid identification of NPS in forensic casework and related disciplines, and should not be used for confirmatory purposes alone.

Analytical Notes: All identifications were made based on evaluation of analytical data (GC-MS and LC-QTOF-MS) in comparison to analysis of acquired reference material.

Acknowledgements: This report was prepared by Sara E. Walton, Matthew Juhascik, Kent Harshbarger, Brianna N. Stang, Alyssa G. Reyes, Savannah M. Baker, Barry K. Logan, and Alex J. Krotulski at the Center for Forensic Science Research and Education (CFSRE) at the Fredric Rieders Family Foundation. The authors acknowledge scientists at the CFSRE for their involvements and contributions. For more information, contact npsdiscovery@cfsre.org or visit www.npsdiscovery.org.

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Suggested Citation: Walton, SE; Juhascik, M; Harshbarger, K; Stang, BS; Reyes, AG; Baker, SM; Logan, BK; Krotulski, AJ. (2024) *N-Pyrrolidino Isotonitazene — NPS Discovery New Drug Monograph*, Center for Forensic Science Research and Education, United States.

Gas Chromatography Mass Spectrometry (GC-MS)

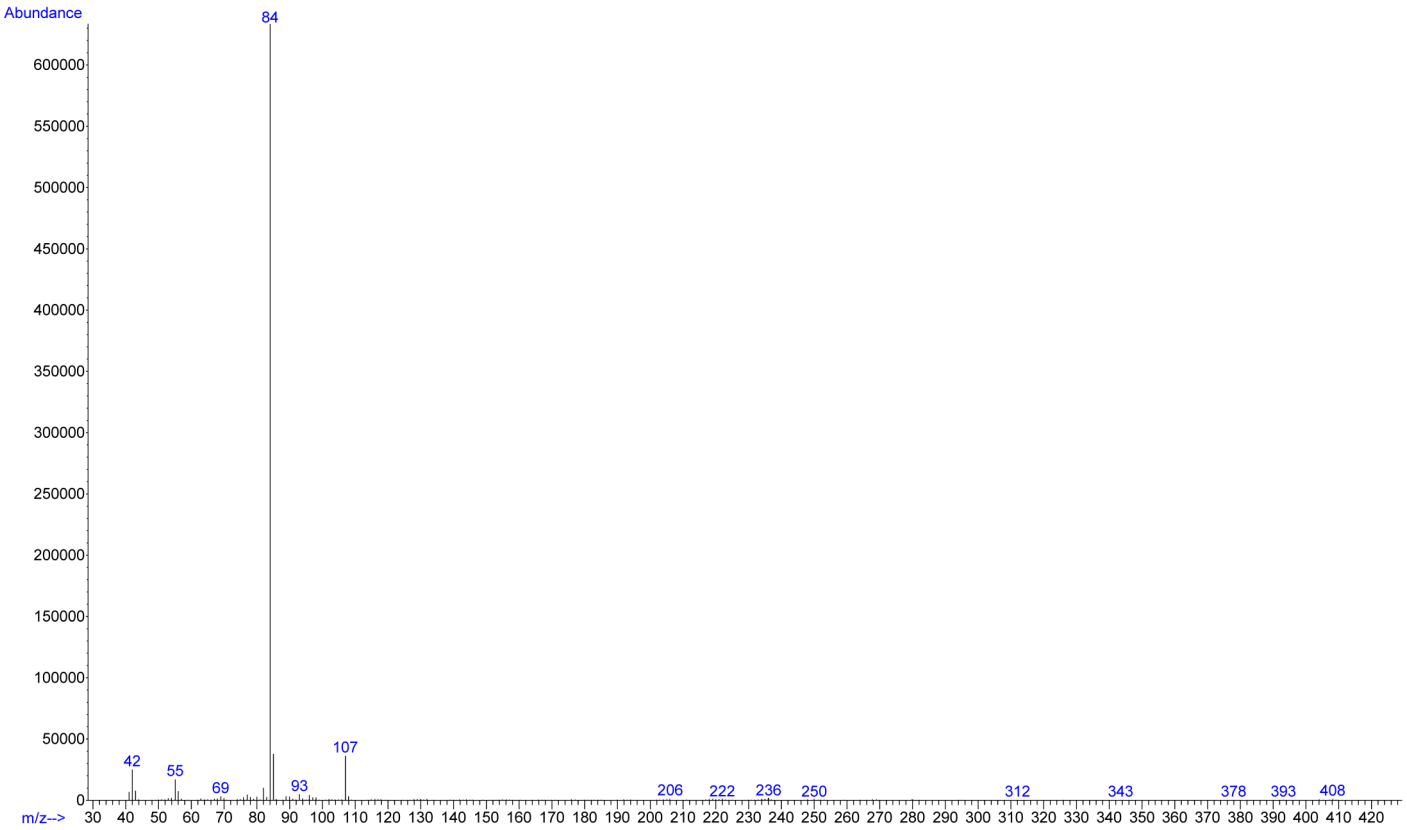
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham, PA, USA)

Sample Preparation: Standard diluted in methanol

Instrument: Agilent 5975 Series GC/MSD

Methods: GC-MS Method Details & Monographs

GC-MS: Mass Spectrum (EI 70 eV)



Liquid Chromatography Quadrupole Time-of-Flight Mass Spectrometry (LC-QTOF-MS)

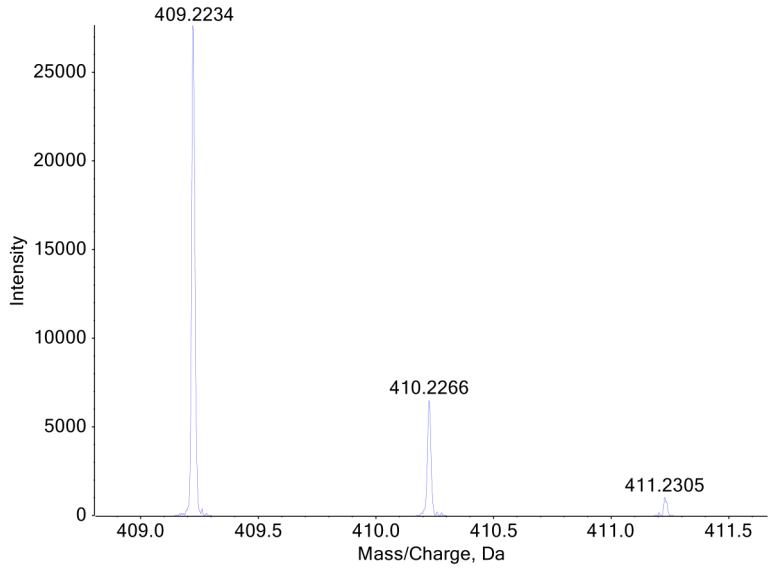
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham, PA, USA)

Sample Preparation: Liquid-liquid extraction

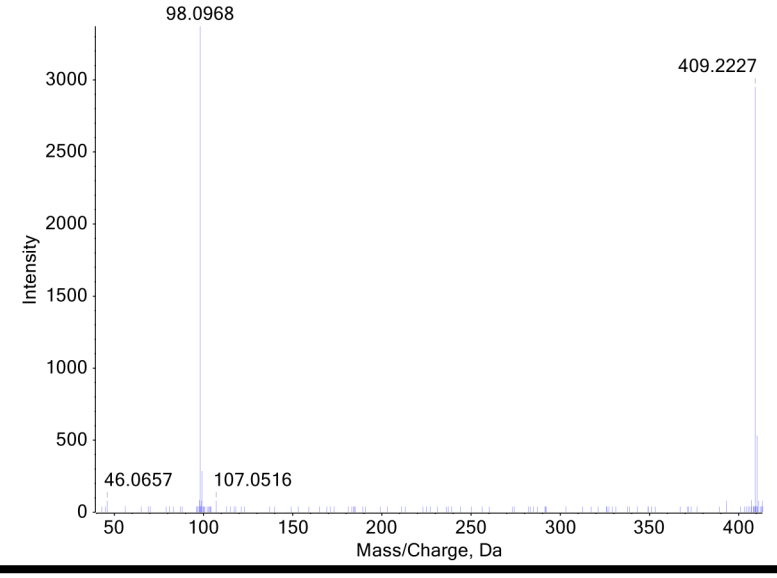
Instrument: Sciex X500R LC-QTOF-MS

Methods: LC-QTOF-MS Method Details & Monographs

LC-QTOF-MS: TOF-MS Precursor Ion Mass Spectrum



LC-QTOF-MS: TOF-MS/MS Product Ion Mass Spectrum



Confirmation Using Drug Standard: *Reference material (Batch: 0624243-13) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be N-pyrrolidino isotonitazene based on retention time (sample: 6.73 min vs. standard: 6.84 min) and mass spectral data comparisons.*