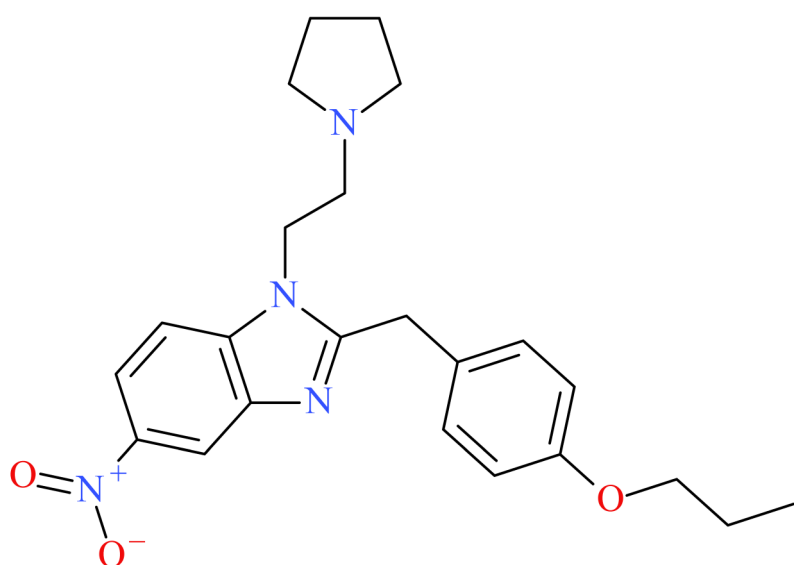




N-Pyrrolidino Protonitazene



NPS SUBCLASS	Opioid
REPORT DATE	June 22, 2023
SAMPLE RECEIVED	January 10, 2023
SAMPLE TYPE	Drug Material

Preferred Name	N-Pyrrolidino Protonitazene
Synonyms	Protonitazepyne
Formal Name	5-nitro-2-[(4-propoxyphenyl)methyl]-1-(2-pyrrolidin-1-ylethyl)benzimidazole
InChI Key	KCRWXNIIIGBPID-UHFFFAOYSA-N
CAS Number	Not Available
Chemical Formula	C ₂₃ H ₂₈ N ₄ O ₃
Molecular Weight	408.49
Molecular Ion [M ⁺]	408
Exact Mass [M+H] ⁺	409.2234

Characterization & Intelligence

The following information was compiled in June 2023 and is subject to change as new research is conducted and as new information becomes available:

Description: N-Pyrrolidino protonitazene is a novel synthetic opioid bearing structural resemblance to protonitazene, N-pyrrolidino etonitazene, and other nitazene (2-benzylbenzimidazole) analogues and is an isomer of N-pyrrolidino isotonitazene. In January 2023, N-pyrrolidino protonitazene was detected for the first time in the United States. Our laboratory continues to gather toxicology data for this novel drug.

Sample Source: NMS Labs – Toxicology Laboratory, NMS Labs – Criminalistics Laboratory, etc.

Sample Appearance: Drug Material – Brown Powder. Toxicology – Blood Specimens.

Pharmacology: Limited information regarding the pharmacology of N-pyrrolidino protonitazene is currently known. Recent *in vitro* studies examining activity and potency found that N-pyrrolidino protonitazene is an active opioid with potency approximately 25 times greater than that of fentanyl [unpublished data from L. De Vrieze and C. Stove]. Based on structural similarity, N-pyrrolidino protonitazene is expected to exhibit similar adverse effects to other nitazene analogues.

Toxicology: N-Pyrrolidino protonitazene has been detected in eight toxicology cases at the CFSRE.

Drug Materials: N-Pyrrolidino protonitazene has been identified in one drug material at the CFSRE.

Demographics / Geographics: Cases originated from at least three states, including Illinois, West Virginia, and Minnesota. In death investigations, decedents were predominantly male, ranging in age from 20s-70s.

Legal Status: N-Pyrrolidino protonitazene is not explicitly scheduled in the United States.

References:

- ▶ Cayman Chemical: [N-Pyrrolidino Protonitazene](#)
- ▶ National Forensic Laboratory (Slovenia): [N-Pyrrolidino Protonitazene](#)

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 Alex J. Krotulski, Nicole Lattanzio, Katie Jones, Krystal Alston, Sara E. Walton, Donna M. Papsun, Joshua DeBord, Melissa F. Fogarty, and Barry K. Logan at the Center for Forensic Science Research and Education (CFSRE) at the Fredric Rieders Family Foundation. The authors acknowledge scientists at the CFSRE and NMS Labs for their involvements and contributions. For more information, contact npsdiscovery@cfsre.org or visit www.npsdiscovery.org.

Funding: CFSRE's NPS Discovery is supported by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice (Award Number 15PNIJ-22-CG-04434-MUMU, "Implementation of NPS Discovery – An Early Warning System for Novel Drug Intelligence, Surveillance, Monitoring, Response, and Forecasting using Drug Materials and Toxicology Populations in the US"). The opinions, findings, conclusions and/or recommendations expressed in this publication are those of the author(s) and do not necessarily represent the official position or policies of the U.S. Department of Justice.

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Gas Chromatography Mass Spectrometry (GC-MS)

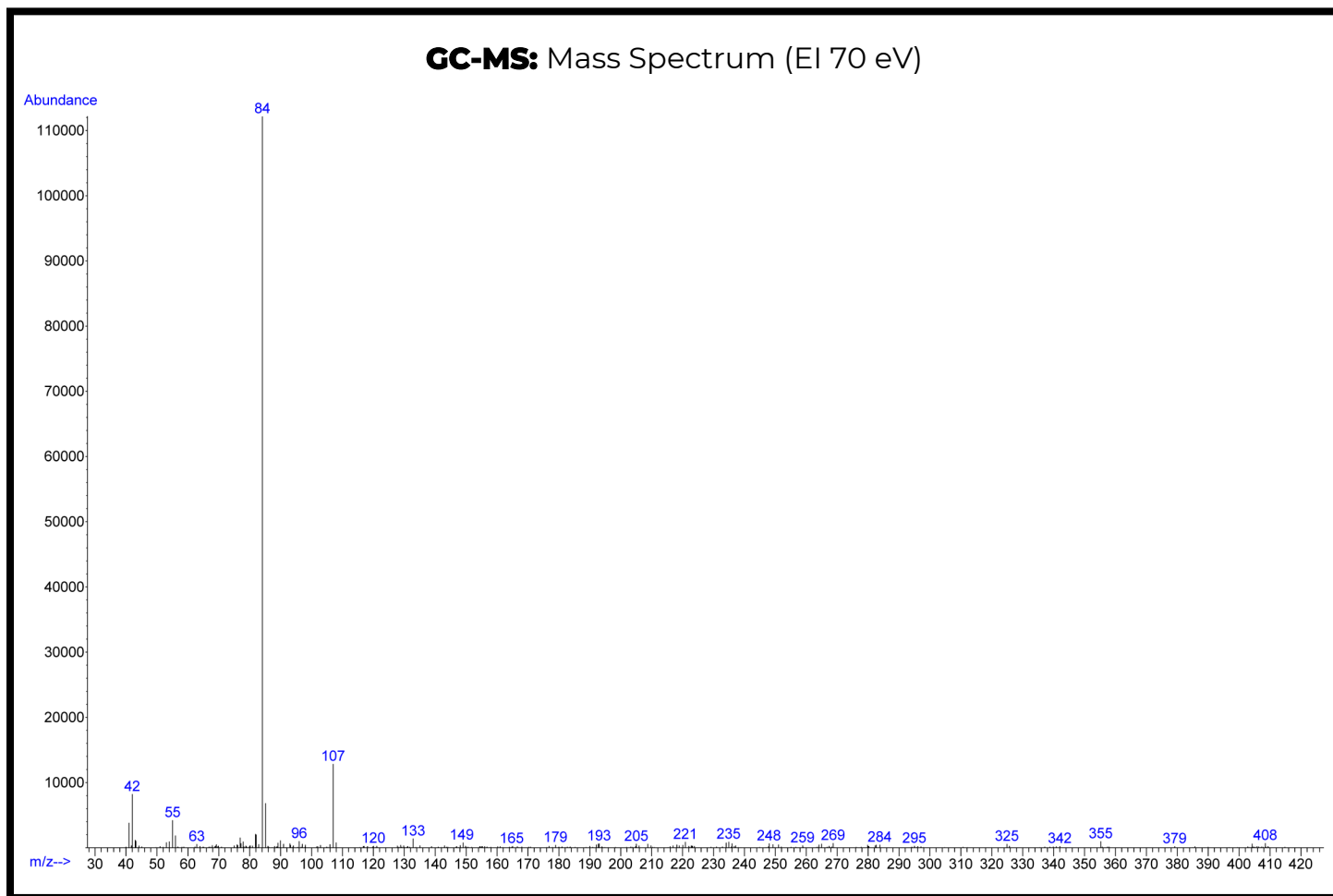
Laboratory: Center for Forensic Science Research and Education (CFSRE, Willow Grove, PA, USA)

Instrument: Agilent 5975 Series GC/MSD

Sample Preparation: Sample: Acid / base extraction

Methods: www.cfsre.org/nps-discovery/monographs

Standard (below): Diluted in methanol



Confirmation Using Drug Standard: Reference material (Batch: 0654417-3) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be N-pyrrolidino protonitazene based on retention time (sample: 9.655 min vs. standard: 9.655 min) and mass spectral data comparisons. [Note: The retention time for N-pyrrolidino isotonitazene (Batch: 0624243-13, Cayman Chemical) was 9.489 min.]

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

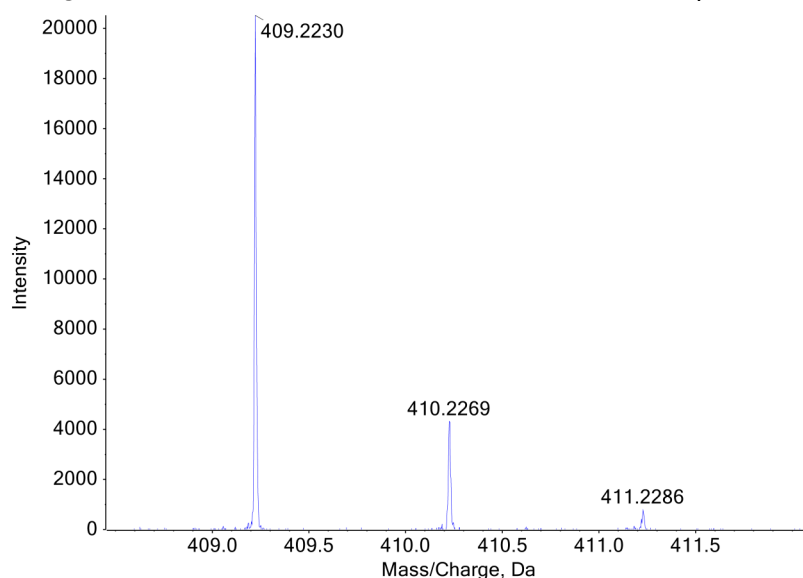
Laboratory: Center for Forensic Science Research and Education (CFSRE, Willow Grove, PA, USA)

Instrument: Sciex TripleTOF® 5600+ LC-QTOF-MS

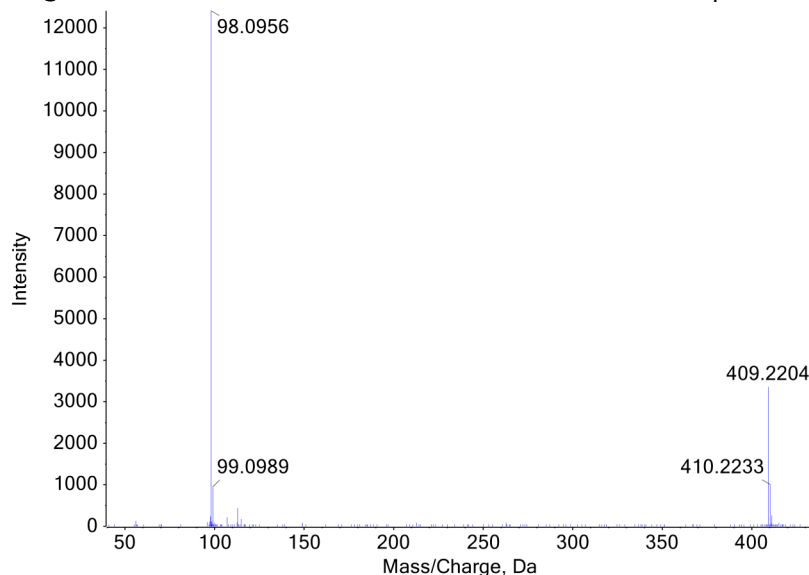
Methods: www.cfsre.org/nps-discovery/monographs

Sample Preparation: Acid / base extraction

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: 0654417-3) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be N-pyrrolidino protonitazene based on retention time (sample: 7.05 min vs. standard: 6.97 min) and mass spectral data comparisons. [Note: The retention time for N-pyrrolidino isotonitazene (Batch: 0624243-13, Cayman Chemical) was 6.84 min.]