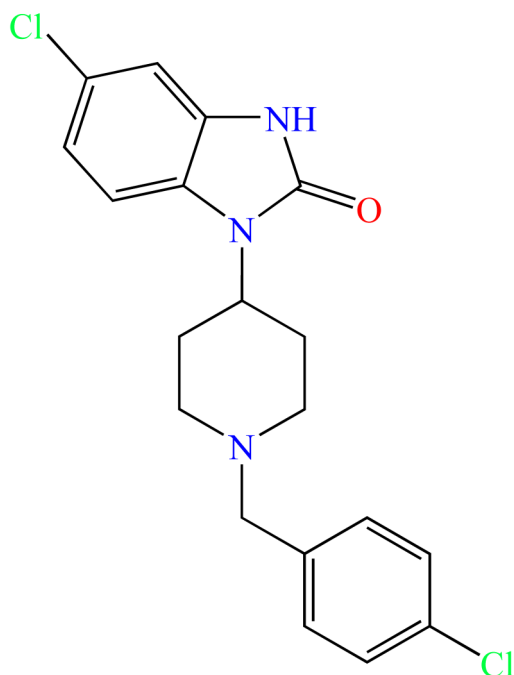




5-Chloro Desmethylchlorphine



NPS SUBCLASS	Opioid
REPORT DATE	June 1, 2026
SAMPLE RECEIVED	May 8, 2026
SAMPLE TYPE	Drug Material

Preferred Name	5-Chloro Desmethylchlorphine				
Synonyms	DSR-2, 5Cl-Desmethylchlorphine, 5-chloro Desmethyl Chlorphine				
Formal Name	5-chloro-1-(1-(4-chlorobenzyl)piperidin-4-yl)-1,3-dihydro-2H-benzo[d]imidazol-2-one				
Chemical Formula	C ₁₉ H ₁₉ Cl ₂ N ₃ O				
Molecular Weight	376.3	Molecular Ion [M ⁺]	375	Exact Mass [M+H] ⁺	376.0983

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, and should not be used for confirmatory purposes alone.

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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 Max T. Denn, Sara E. Walton, Nicholas Khorozov, Alexis D. Quinter, Angel McDowell, Joshua S. DeBord, 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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Characterization & Intelligence

The following information was compiled in May 2026 and is subject to change as new research is conducted and as new information becomes available:

Description: 5-Chloro desmethylchlorphine is a novel synthetic opioid with structural similarity to other benzimidazolones (e.g., chlorphine, 5,6-dichloro desmethylchlorphine). No data currently exists regarding potency and activity of 5-chloro desmethylchlorphine; however, the dichloro analog (5,6-dichloro desmethylchlorphine) is reported to be a mu-opioid receptor agonist with similar potency to morphine.¹⁻³ 5-Chloro desmethylchlorphine is not currently scheduled in the United States. 5-Chloro desmethylchlorphine has been identified in three drug materials originating from Massachusetts and Ohio. 5-Chloro desmethylchlorphine was found alongside other opioids (e.g., fentanyl, *ortho*-methylfentanyl, heroin) and xylazine.

References:

- ▶ Cayman Chemical: [5-chloro Desmethyl Chlorphine](#)
- ▶ ¹Schmid *et al.* (2017) [Bias factor and therapeutic window correlate to predict safer opioid analgesics](#)
- ▶ ²Kudla *et al.* (2021) [Comparison of an addictive potential of mu-opioid receptor agonists...](#)
- ▶ ³Pantouli *et al.* (2020) [Comparison of morphine, oxycodone and the biased MOR agonist SR-17018...](#)

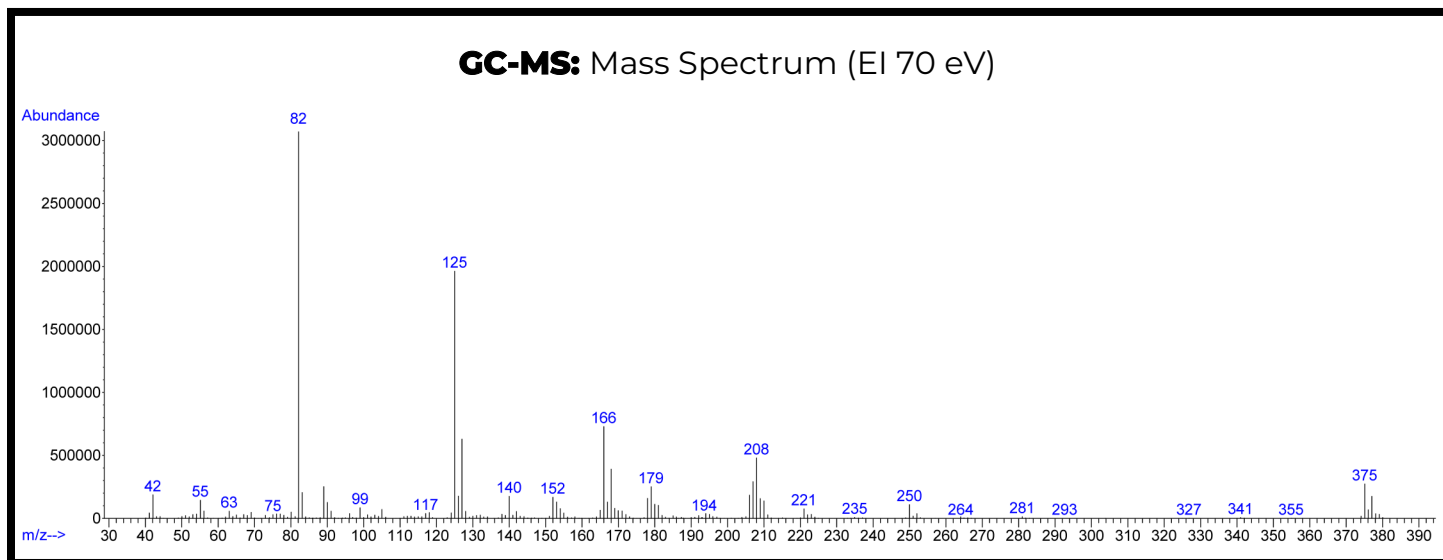
Gas Chromatography Mass Spectrometry (GC-MS)

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

Instrument: Agilent 5975 Series GC/MSD

Methods: [GC-MS Method Details](#) & [Monographs](#)

Sample Preparation: Acid-base extraction



Confirmation Using Drug Standard: Reference material for 5-chloro desmethylchlorphine (Batch: 0820017-2) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be 5-chloro desmethylchlorphine based on retention time (sample: 9.29 min vs. standard: 9.28 min) and mass spectral data comparisons.

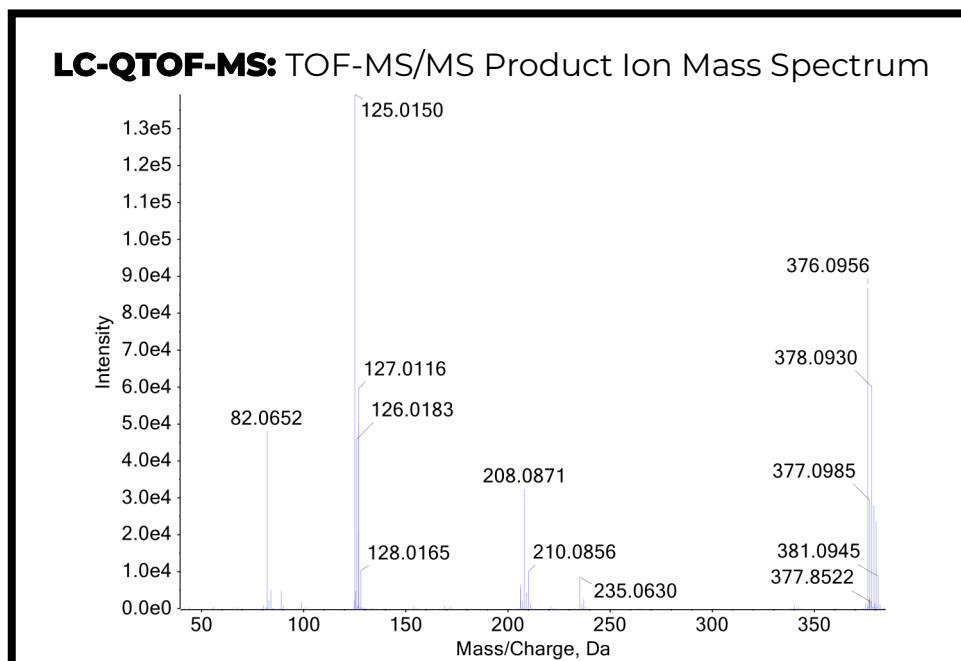
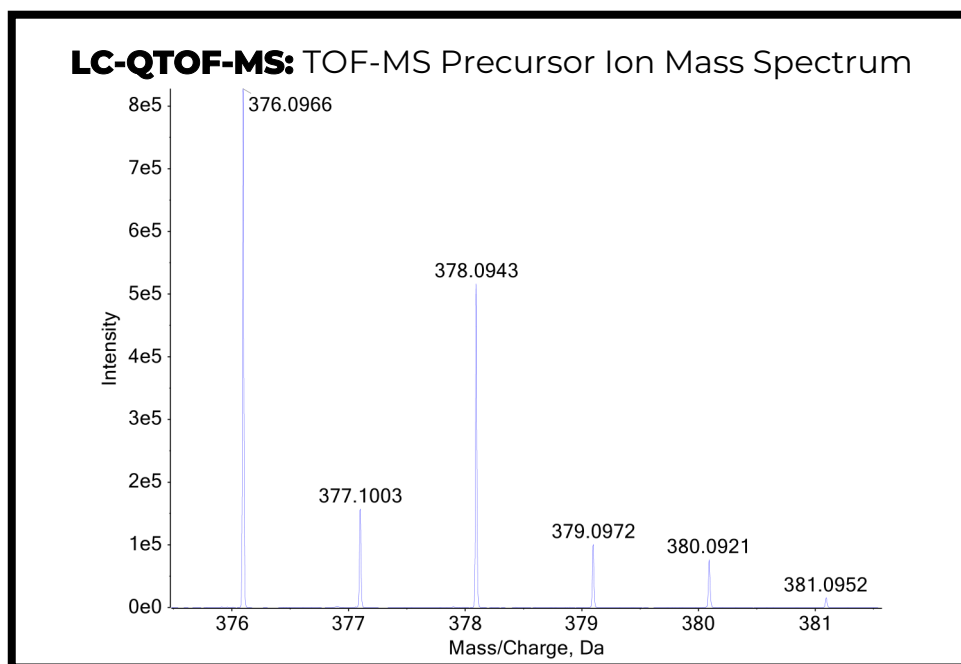
Liquid Chromatography Quadrupole Time-of-Flight Mass Spectrometry (LC-QTOF-MS)

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

Instrument: Sciex 5600+ LC-QTOF-MS

Methods: [LC-QTOF-MS Method Details](#) & [Monographs](#)

Sample Preparation: Dilution in mobile phase



Confirmation Using Drug Standard: Reference material for 5-chloro desmethylchlorphine (Batch: 0820017-2) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be 5-chloro desmethylchlorphine based on retention time (sample: 6.57 min vs. standard: 6.58 min) and mass spectral data comparisons.