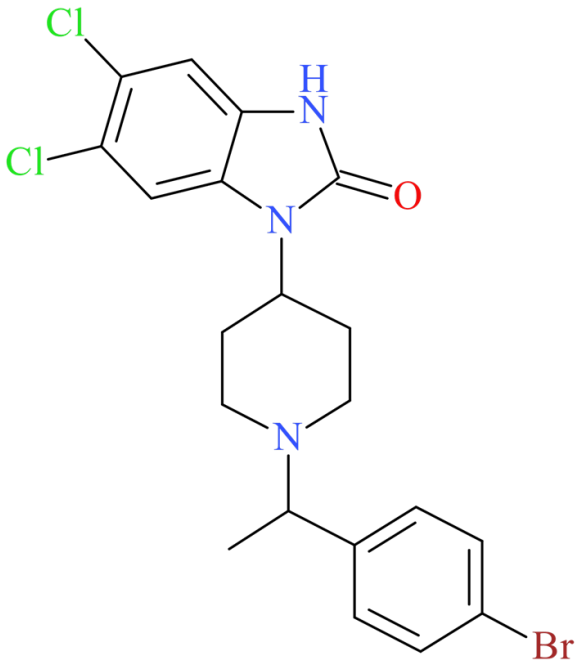
5,6-Dichloro Brorphine



NPS SUBCLASS
Opioid
REPORT DATE
December 12, 2025
SAMPLE RECEIVED
November 5, 2025
SAMPLE TYPE
Drug Material

Preferred Name	5,6-Dichloro Brorphine
Synonyms	SR-14968
Formal Name	3-[1-[1-(4-bromophenyl)ethyl]-4-piperidyl]-5,6-dichloro-1H-benzimidazol-2-one
InChI Key	DJSSLECNUQMYKG-UHFFFAOYSA-N
CAS Number	2133455-40-8
Chemical Formula	$C_{20}H_{20}BrCl_2N_3O$
Molecular Weight	469.2
Molecular Ion [M⁺]	467
Exact Mass [M+H]⁺	468.0240

Characterization & Intelligence

The following information was compiled in December 2025 and is subject to change as new research is conducted and as new information becomes available:

Description: 5,6-Dichloro brorphine is a novel synthetic opioid characterized as an "orphine" analogue and bears structural similarity to other benzimidazolones (e.g., brorphine, chlorphine, 5,6-dichloro desmethylchlorphine). 5,6-Dichloro brorphine was originally synthesized and researched for use for analgesia with a suggested large therapeutic window and decrease of severe adverse side effects (e.g., respiratory depression).[1,2] 5,6-Dichloro brorphine was first identified by our laboratory in November 2025 and confirmed after acquiring standard reference material.

Sample Source: CFSRE NPS Discovery Test Purchase Program (Philadelphia, PA)

Sample Appearance: White powder

Pharmacology: 5,6-Dichloro brorphine is a G protein-biased mu-opioid receptor agonist with potency and efficacy values (EC_{50}=8.9±3.8nM, E_{max}=92±1%) higher than that of fentanyl (EC_{50}=43±9.7nM, E_{max}=80±5%).[2-5]

Toxicology: 5,6-Dichloro brorphine has not been detected in toxicology cases to date at the CFSRE.

Drug Materials: 5,6-Dichloro brorphine has been detected in two drug materials to date at the CFSRE.

Demographics / Geographics: Drug materials originated from an online retailer and New England. 5,6-Dichloro brorphine was identified alone and alongside 5,6-dichloro desmethylchlorphine and MDPiHP.

Legal Status: 5,6-Dichloro brorphine is not currently scheduled in the United States.

References:

- Cayman Chemical: 5,6-Dichloro Brorphine
- [1]Bohn et al. (2021) Search for safer pain relief advances with new engineered compounds
- [2]Ju et al. (2025) Biased opioid receptor agonists: balancing analgesic efficacy and side-effect profiles
- [3]Schmid et al. (2017) Bias factor and therapeutic window correlate to predict safer opioid analgesics
- [4]Stahl et al. (2021) G protein signaling-biased mu opioid receptor agonists that produce sustained...
- [5]Kudla et al. (2021) Comparison of an addictive potential of mu-opioid receptor agonists with G protein...

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.

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Gas Chromatography Mass Spectrometry (GC-MS)

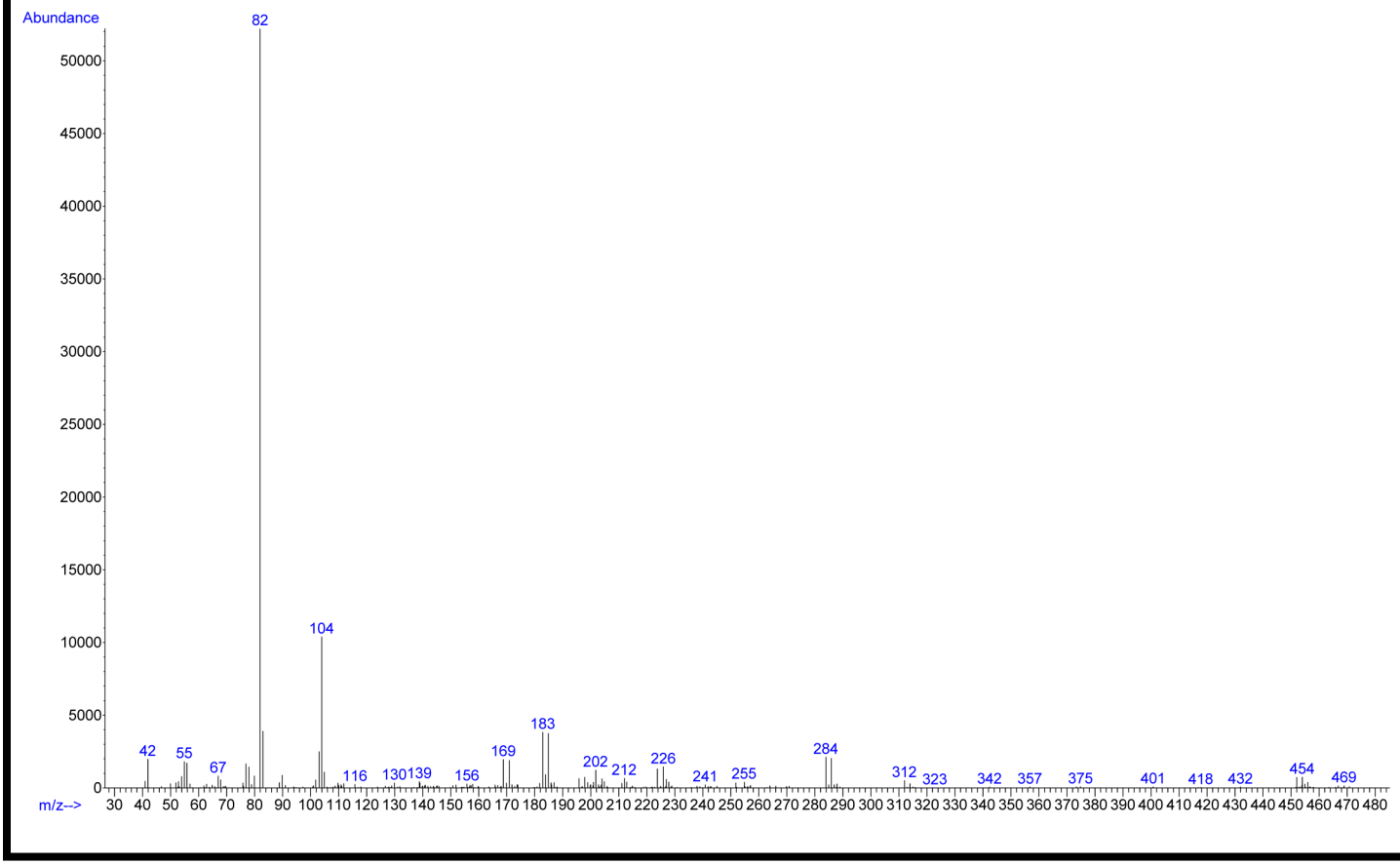
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham PA, USA)

Sample Preparation: Acid-base extraction

Instrument: Agilent 5975 Series GC/MSD

Methods: GC-MS Method Details & Monographs

GC-MS: Mass Spectrum (EI 70 eV)



Confirmation Using Drug Standard: *Reference material for 5,6-dichloro brorphine (Batch: 0811590-3) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be 5,6-dichloro brorphine based on retention time (sample: 10.03 min vs. standard: 10.04 min) and mass spectral data comparisons.*

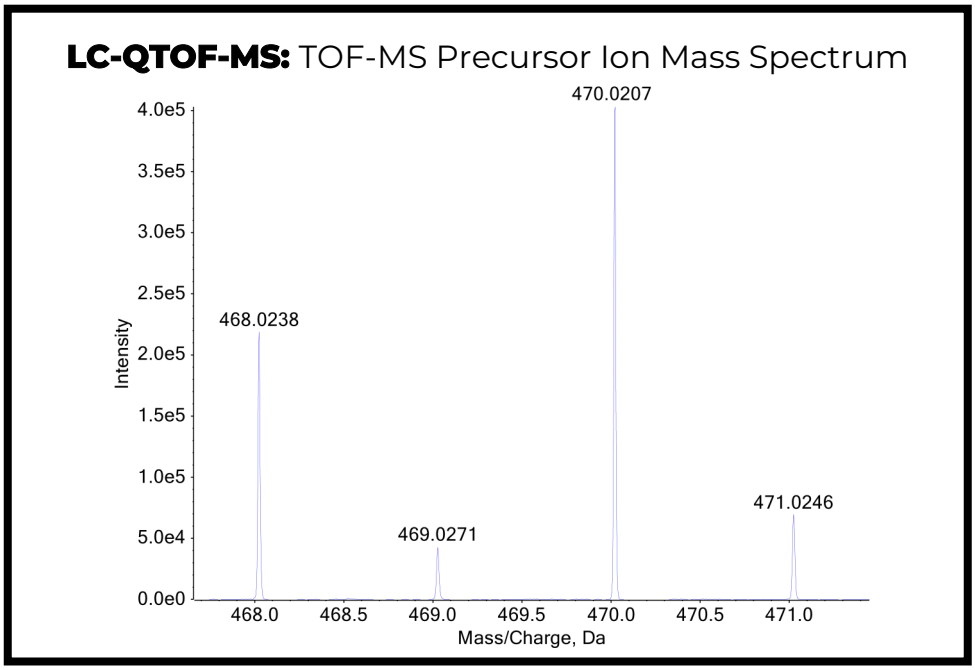
Liquid Chromatography Quadrupole Time-of-Flight Mass Spectrometry (LC-QTOF-MS)

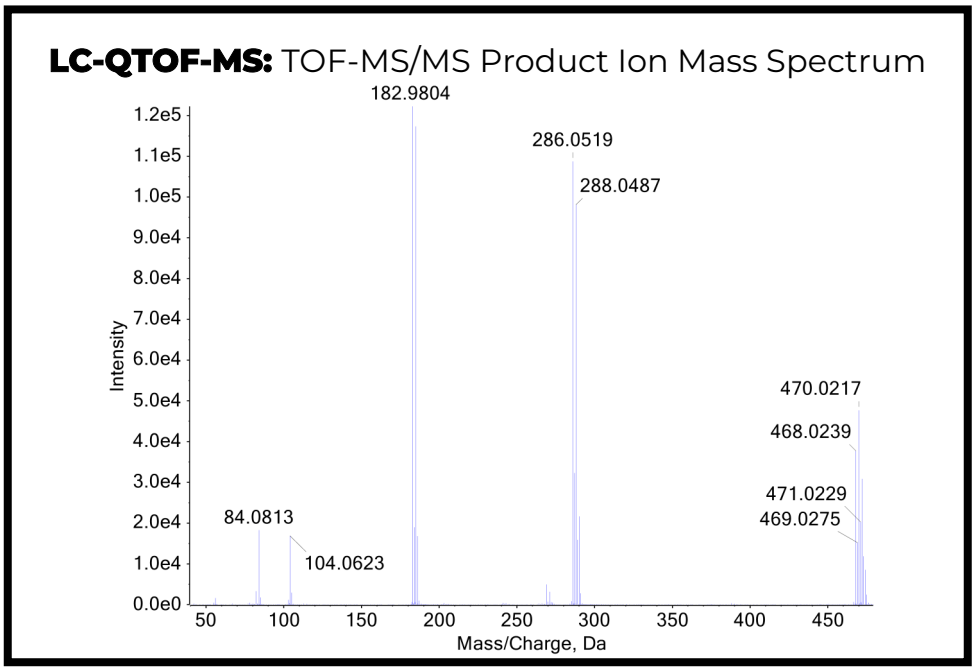
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham, PA, USA)

Sample Preparation: Dilution in mobile phase

Instrument: Sciex 5600+ LC-QTOF-MS

Methods: LC-QTOF-MS Method Details & Monographs





Confirmation Using Drug Standard: *Reference material for 5,6-dichloro brorphine (Batch: 0811590-3) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be 5,6-dichloro brorphine based on retention time (sample: 7.49 min vs. standard: 7.59 min) and mass spectral data comparisons.*