

## BRORPHINE

(Chemical name: 1-(1-(1-(4-bromophenyl)ethyl)piperidin-4-yl)-1,3-dihydro-2H-benzimidazol-2-one)

### Introduction:

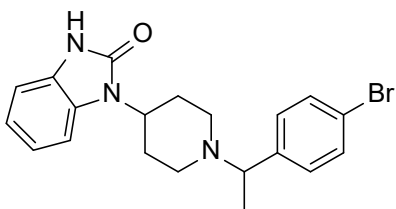
Brorphine is a synthetic opioid that appeared in the United States recreational opioid drug market in 2019 amidst an unprecedented epidemic of opioid misuse. Brorphine has been identified in reports either alone or in combination with other substances such as heroin and fentanyl. Adverse health effects associated with the abuse of synthetic opioids include cyanosis and respiratory depression that may lead to death. The availability of synthetic opioids continues to pose an imminent hazard to public safety.

### Licit Uses:

Brorphine has not been approved for medical use in the United States, and there are no published studies on safety for human use. Brorphine has no industrial use.

### Chemistry:

Brorphine (CAS 2244737-98-0) is comprised of three main units: a 4-bromophenethyl group, a piperidine ring, and a 1,3-dihydro-2H-benzimidazol-2-one group. Brorphine is being trafficked as its hydrochloride salt (CAS 2707204-49-5), which is water-soluble. The chemical structure of brorphine is shown below:



### Pharmacology:

Brorphine, similar to fentanyl, binds to the mu-opioid receptors (MOR) and acts as a MOR agonist. It is known that activation of MOR produces several pharmacological effects including analgesia, euphoria, and respiratory depression. Consistently, *in vivo* studies (using animals) have shown that brorphine, similar to other MOR agonists (such as fentanyl), produced analgesic effects and fully substituted for the discriminative stimulus effects of morphine in rodents that were trained to discriminate morphine stimulus. There are no clinical studies conducted in humans using brorphine. Consistent with its opioid pharmacological profile, brorphine is expected to produce psychoactive effects in humans.

### Illicit Uses:

The misuse of brorphine has been associated with non-fatal and fatal overdose events. In postmortem cases, brorphine has been co-detected with other substances to include other opioids, stimulants, and designer benzodiazepine. According to data from the Food and Drug Administration's Adverse Event Reporting System, brorphine was involved in six cases between 2021 and 2022. Of those, five cases resulted in death.

### User Population:

Traffickers advertise brorphine as a replacement for fentanyl, which places the user at serious health risk. The population likely to abuse brorphine appears to be the same as those abusing prescription opioid analgesics, heroin, tramadol, fentanyl, and other synthetic opioids. This is evidenced by the additional drugs identified in brorphine seizures.

Like many other synthetic opioids, brorphine is abused as a recreational drug. Brorphine has been discussed in online drug forums, with discussions tailored to effects, dosages, routes of administration, and comparisons of experiences to other synthetic opioids.

International reporting noted an emergency room presentation for opioid withdrawal and subsequent detoxification of brorphine.

### Distribution:

DEA's National Forensic Laboratory Information System (NFLIS) Drug database collects scientifically verified data on drug items and cases submitted to and analyzed by federal, state, and local forensic drug laboratories. There have been over 200 reports of brorphine to NFLIS-Drug, starting with six reports in 2019, 123 reports in 2020, 22 reports in 2021, 29 reports in 2022, 12 reports in 2023, and 16 reports in 2024.

### Control Status:

Brorphine is a schedule I controlled substance under the federal Controlled Substances Act.

Comments and additional information are welcomed by the Drug and Chemical Evaluation Section; Fax 571-362-4250, Telephone 571-362-3249, or Email [DPE@dea.gov](mailto:DPE@dea.gov).