Drug Enforcement Administration
Diversion Control Division
Drug & Chemical Evaluation Section

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DEA/DC/DOE

MEDETOMIDINE
(including DEXMEDETOMIDINE)

Introduction:

Medetomidine is a potent and short-acting alpha-2 agonist that is used as a non-opioid sedative for its analgesic and muscle relaxant effects. As an alpha-2 agonist, medetomidine is similar in its pharmacological effects to xylazine. Like xylazine, medetomidine has been increasingly found as an adulterant in illicit substances.

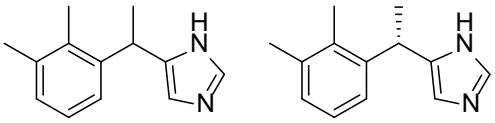
Licit Uses:

The U.S. Food and Drug Administration (FDA) has approved medetomidine and dexmedetomidine—the pharmacologically active form of medetomidine. In humans, FDA has approved dexmedetomidine for use in intensive care settings or during medical procedures. It is administered either intravascularly or intramuscularly. Dexmedetomidine is sold under various product names (e.g., Dexdor® and Precedex™). According to IQVIA National Prescription Audit®, total prescriptions dispensed in the United States for dexmedetomidine was 104 in 2022, 326 in 2023, 502 in 2024, and 173 in 2025.

In veterinary medicine, FDA has approved medetomidine (e.g., Domitor®, Placadine™) and dexmedetomidine (e.g., Dexdomitor®, Dexmedesed®, Dexmopet®) for use as a sedative, analgesic, or preanesthetic. Both drugs are sold as a sterile injectable solution. Dexmedetomidine is also sold as an oromucosal gel (e.g., Sileo®).

Chemistry:

Medetomidine is chemically known as 5-(1-(2,3-dimethylphenyl)ethyl)-1*H*-imidazole. Medetomidine is synthetically manufactured and is a racemic mixture of enantiomers dexmedetomidine and levomedetomidine. The chemical structures of medetomidine (CAS number: 86347-14-0), and dexmedetomidine (CAS number: 113775-47-6) are shown below:



Medetomidine Dexmedetomidine

Pharmacology:

The pharmacology of medetomidine is well established in animals but limited in humans; in contrast, the pharmacology of dexmedetomidine is well established in humans.

Medetomidine produces sedation and analgesia in a dose-dependent manner. In addition, medetomidine is more potent and selective for the alpha-2 adrenergic receptor, compared to xylazine. Similar to xylazine, the effects or presumed overdose of medetomidine is not reversed by naloxone (e.g., Narcan®). However, because medetomidine is often encountered in combination with opioids, naloxone should still be administered to individuals suspected of exposure to medetomidine. Medetomidine toxicity resembles that of xylazine; symptoms include respiratory and central nervous system depression and other life-threatening conditions.

According to FDA, medetomidine administration in animals leads to a net decrease in blood pressure and heart rate. Similarly, dexmedetomidine administration in humans results in decreased blood pressure and/or heart rate, as well as decreased sympathetic nervous system activity.

Illicit Uses:

Medetomidine is emerging as an adulterant in the illicit drug supply. As a result, this substance is increasingly detected in illicit drug mixtures, drug paraphernalia, and overdose cases.

The Drug Enforcement Administration's Toxicology Testing Program (DEA TOX) is a surveillance program aimed at detecting new psychoactive substances in the United States. DEA TOX detected medetomidine in 27 cases (4 fatal, 23 nonfatal) since April 2023. Of these cases, 26 biological samples, as well as 2 paraphernalia samples, contained both medetomidine and fentanyl. Of note, 14 of these cases were from a large cluster that originated in Chicago, IL in May 2024.

User Population:

Exposure to medetomidine is common among abusers of fentanyl and other opioids.

Illicit Distribution:

Publicly available reports and literature support the rise of medetomidine in the illicit drug supply. Medetomidine has been increasingly identified in law enforcement seizures.

DEA's National Forensic Laboratory Information System (NFLIS) Drug database collects scientifically verified data on drug items and cases submitted to and analyzed by participating federal, state, and local forensic drug laboratories. NFLIS-Drug first received 12 reports of medetomidine [10 of dexmedetomidine] in 2021. Since then, the annual number of reports has increased to 263 [39] in 2022; 247 [12] in 2023; 2,616 [53] in 2024; and 8,391 [289] in 2025 (reports still pending). In 2025, the two most co-reported substances with medetomidine were fentanyl and xylazine, respectively.

Control Status:

Medetomidine and dexmedetomidine are not controlled under the 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.