Drug Enforcement Administration
Diversion Control Division
Drug & Chemical Evaluation Section

Acetyl fentanyl
(*N*-(1-phenethylpiperidin-4-yl)-*N*-phenylacetamide)

March 2020

Introduction:

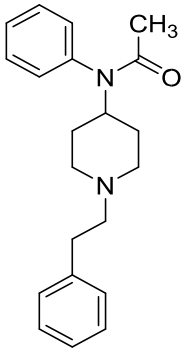
Acetyl fentanyl, similar to the Schedule II opioid fentanyl, is a potent opioid analgesic. Recently, it has been linked to a number of overdose deaths in the United States. Acetyl fentanyl may not be a part of most illicit drug screens and may remain undetected in many of these cases.
Immunoassays (e.g. ELISA) for fentanyl do not differentiate fentanyl and acetyl fentanyl; confirmatory analysis such as gas chromatography/mass spectrometry (GC/MS) is required to confirm the presence of acetyl fentanyl.

Licit Uses:

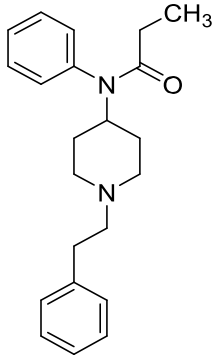
Acetyl fentanyl has not been approved for medical use in the United States and there are no published studies on safety for human use.

Chemistry:

The chemical structure of acetyl fentanyl and the schedule II substance fentanyl are shown below.



Acetyl fentanyl



Fentanyl

Acetyl fentanyl and fentanyl are in the phenylpiperidine class of synthetic opioids. Acetyl fentanyl contains a phenylacetamide group whereas fentanyl has a phenylpropanamide group at the corresponding position. Desmethyl fentanyl is a synonymous name for acetyl fentanyl, likely due to the removal of a methylene group from the structure of fentanyl.

Pharmacology:

Acetyl fentanyl, similar to fentanyl, possesses opioid-like *in vitro* binding affinity to μ-opioid receptors as well as produce μ-opioid receptor agonist effects. Acetyl fentanyl has also been shown to inhibit the twitch response in electrically stimulated vas deferens preparation. Similarly, in another study using tail flick and phenylquinone writhing tests, acetyl fentanyl produced analgesic response in mice. Acetyl fentanyl has been shown to completely suppress the signs of withdrawal in morphine-dependent monkeys. Furthermore, acetyl fentanyl produce morphine-like subjective effects in drug discrimination study. Besides analgesia, fentanyl-like substances, similar to other opioid analgesics, produce a variety of pharmacological effects including alteration in mood, euphoria, drowsiness, respiratory depression, suppression of cough reflex, constriction of pupils (miosis), and impaired gastrointestinal motility.

Clinical studies evaluating pharmacological effects of acetyl fentanyl in humans have not been reported in the scientific literature.

In acute toxicity studies in mice, the LD_{50} (the dose causing death of 50% of test animals) of acetyl fentanyl and fentanyl are 9.3 mg/kg and 62 mg/kg, respectively. Significant bleeding in the small intestines of mice was observed in acetyl fentanyl-administered mice.

Illicit Uses:

As a μ-opioid receptor agonist, acetyl fentanyl may serve as a direct substitute for heroin or other μ-opioid receptor agonist substance in opioid dependent individuals. Acetyl fentanyl has been detected in tablets that mimic pharmaceutical opioid products, in powder form and spiked on blotter papers.

Illicit Distribution:

According to DEA's National Forensic Laboratory Information System (NFLIS) databases, federal, state and local forensic laboratories reported 9 exhibits identified as acetyl fentanyl in 2013 and 63 exhibits identified as acetyl fentanyl in 2014. In more recent years, the number of acetyl fentanyl exhibits identified have been 2,060 in 2015, 1,921 in 2016, and 1,746 in 2017. Preliminary, for 2018 and 2019, there were 7,663 and 10,798 exhibits, respectively, identified as acetyl fentanyl.

The DEA is aware of numerous fatalities involving acetyl fentanyl in the United States. Fatalities have been confirmed in several states.

Control Status

Acetyl fentanyl is a schedule I 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 E-mail DPE@usdoj.gov.