

Ketamine and analogues

Ketamine is a synthetic molecule, patented in Belgium in 1963, designed in the research of structural analogues of cyclohexylamines to which belongs also phencyclidine (PCP). Ketamine has analgesic and anesthetic properties and is widely used in the veterinary field, much less as an anesthetic in humans. Ketamine in the illicit market is in the form of liquid, crystalline powder and capsules. Ketamine has also been found in tablets sold as ecstasy or adulterant of other drugs such as cocaine, amphetamines, heroin.

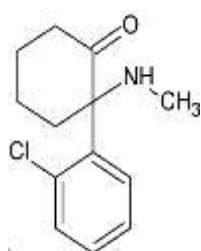
Description

Methoxetamine is an analogue of ketamine from which it differs for the presence of a 3-methoxy substituent in place of the 2-chlorine in the aromatic ring and the 2-ethylamine in place of methylamine. Similar to ketamine, methoxetamine is thought to act as non-competitive antagonist of NMDA receptors and dopamine reuptake inhibitor. Also would act as an agonist of dopamine D2 receptors, serotonin 5-HT₂, muscarinic cholinergic, sigma-1, mu and kappa opioids.

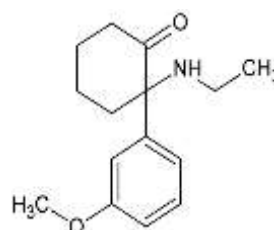
Compared to the effects of ketamine, the presence of the N-ethyl group in methoxetamine lead to an increased and prolonged toxicological effects, while the presence of the 3-methoxy group in place of the 2-chloro leads to less analgesic and anesthetic effects, as well as a longer half-life.

In addition to ketamine and methoxetamine, have appeared on the European territory, other synthetic analogs with the basic chemical structure of ketamine, and the presence of different substituents on the aromatic ring, such as 2-MeO-ketamine, N-ethylketamine and the bromo derivative of ketamine.

Chemical structure of ketamine and methoxetamine



Ketamine



Methoxetamine

The non-medical use of ketamine, the powder is mainly inhaled or injected after taking it in solution. It is also reported the oral, rectal, and the smoking assumption. Methoxetamine is reported to be assumed orally, intravenously, intramuscularly, rectally and by snorting. As reported by some consumers, the effects can appear later (after 30-90 minutes) when assumed by sniffing, with the risk of repeated

Assumption and effects

dosing at short distance; if the assumption is instead intramuscularly, effects can appear after a few minutes. The duration of effects is highly variable (average 5-7 hours). To prolong the effects sought, is often co-assumed with hallucinogens (eg, LSD) or amphetamines and analogues.

The effects sought and reported after use of methoxetamine are euphoria, increased empathy, intensification of sensory experiences, distorted sense of reality, vivid visual and persistent hallucinations. Some consumers report that they have experienced nausea, vomiting, diarrhea, paranoia, anxiety, confusion, dizziness, distortion of time, aphasia, synaesthesia and severe psychomotor agitation, acute renal failure and rhabdomyolysis. After methoxetamine consumption are also reported undesired effects such as sensory deprivation, prolonged dissociative state and derealization (generically described as "near-death" experience).

Beginning from 2011 15 methoxetamine intoxication cases were reported to the National Early Warning System, most of which (12) identified in northern Italy, while the remaining 3 in central Italy, specifically in the regions of Tuscany and Lazio.

**Methoxetamine
intoxication
cases
registered in
Italy**

The main symptoms recorded at the entrance to the emergency department were: severe psychomotor agitation associated with hallucinations, mydriasis, tachycardia, confusion, stupor.

The figure below shows the geolocation of cases of acute intoxication related to the consumption of methoxetamine which have requested access to the emergency room or in intensive care units.

Geolocation of intoxication cases related to methoxetamine consumption which have requested access to the emergency room and registered by the national Early Warning System in 2011-2012.



Photos of some products notified to the National Early Warning System and resulted to contain methoxetamine

In Italy, ketamine and methoxetamine are illegal (Schedule I of the Law on the regulation of narcotic drugs and psychotropic substances, prevention, treatment and rehabilitation of drug addiction Presidential Decree 309/90 as amended). These molecules are not easily detectable to the normal screening test but are subsequently detected through blood tests and urine tests conducted in the laboratory. In case of positivity to ketamine or methoxetamine driving a car, motorcycle or scooter, the law enforcement may withdraw the license, impound the vehicle, impose fines, make report to the Prefecture, pick up the passport.

Legal status