Anesthetic Drug Classification's

1. Central Nervous System (CNS) Depressants

CNS depressants slow down the operations of the brain and the body. Examples of CNS depressants include alcohol, barbiturates, anti-anxiety tranquilizers (e.g., Valium, Librium, Xanax, Prozac, and Thorazine), GHB (gamma hydroxybutyrate), Rohypnol, and many other anti-depressants (e.g., Zoloft, Paxil).

2. CNS Stimulants CNS stimulants accelerate the heart rate and elevate the blood pressure and "speed-up," or over-stimulate, the body. Examples of CNS stimulants include cocaine, "crack" cocaine, amphetamines, and methamphetamine ("crank")
3. Hallucinogens Hallucinogens cause the user to perceive things differently than they actually are. Examples include LSD, peyote, psilocybin and MDMA (Ecstasy)

Anesthetic Drug Classification's

4. **Dissociative Anesthetics** Dissociative anesthetics include drugs that inhibit pain by cutting off or dissociating the brain's perception of the pain. PCP, its analogs, and dextromethoraphan are examples of dissociative anesthetics.
5. **Narcotic Analgesics** Narcotic analgesics relieve pain, induce euphoria, and create mood changes in the user. Examples of narcotic analgesics include opium, codeine, heroin, demerol, darvon, morphine, methadone, Vicodin, and oxycontin.
6. **Inhalants** Inhalants include a wide variety of breathable substances that produce mind-altering results and effects. Examples of inhalants include Toluene, plastic cement, paint, gasoline, paint thinners, hair sprays, and various anesthetic gases.
7. **Cannabis** Cannabis is the scientific name for marijuana. The active ingredient in cannabis is delta-9 tetrahydrocannabinol, or THC. This category includes cannabinoids and synthetics like Dronabinol.

PCP Anethesia

- **1950's Anethesia PCP**

in the 1950’s doctors and chemists were working to synthesize new anesthetic drugs with analgesic properties. Physicians needed a better way to reduce surgery pain and treat a variety of pain management situations. Originally PCP (phencyclidine) was discovered by Parke-Davis and Company's laboratories in Detroit, Michigan, USA. and appeared to meet these criteria.

Ketamine

- **1960's Ketamine is Created**

Following the development of PCP, ketamine, a close structural analog, was first synthesized in 1962.

In 1964, ketamine treatments were first tested on volunteer prisoners.

The participants described feeling like they were floating in outer space, with no feeling in their limbs.

Some patients also described feelings of dying.

Ketamine was found to have many of the same anesthetic and analgesic properties as PCP, but consistently produced fewer adverse side effects.

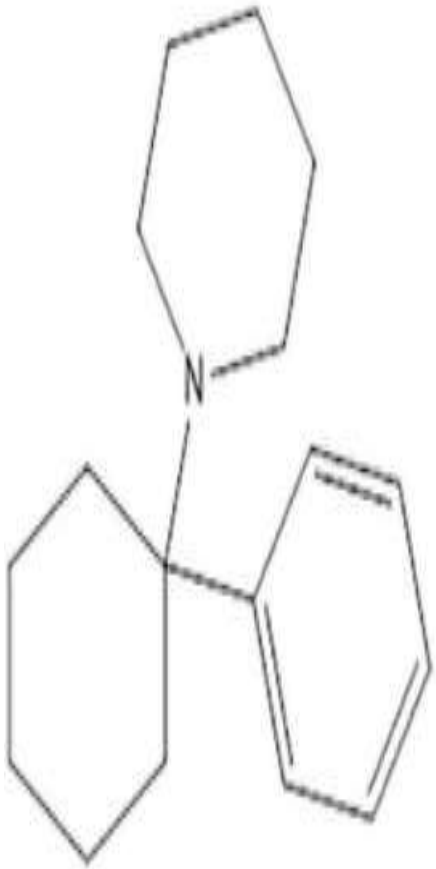
Following this initial research, ketamine was characterized as a dissociative anesthetic.

Ketamine

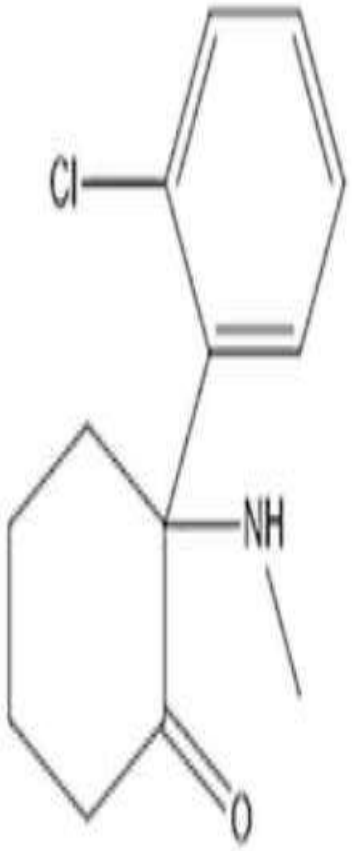
1970's French Clinical Trials

- In the 1970s, clinical trials for ketamine infusions began in France. The researchers found that ketamine was a potent analgesic but was comparatively less potent and significantly shorter in duration than PCP. The researchers also noted that one of the main side effects of ketamine was hallucinations, which was considered undesirable for clinical practice at the time. In the U.S., the FDA approved ketamine's use as a field anesthetic for soldiers during the Vietnam war.
- ketamine was used less as a medical drug by the end of the 1970's. From 1978 onward, ketamine became a Class III substance under the US Controlled Substances Act in 1999.

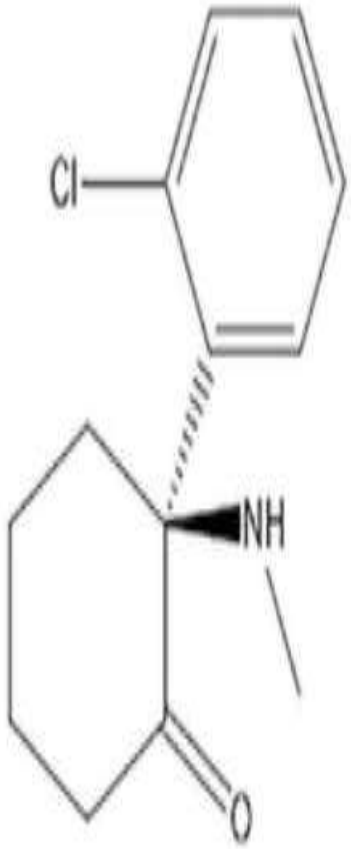
PCP vs Ketamine



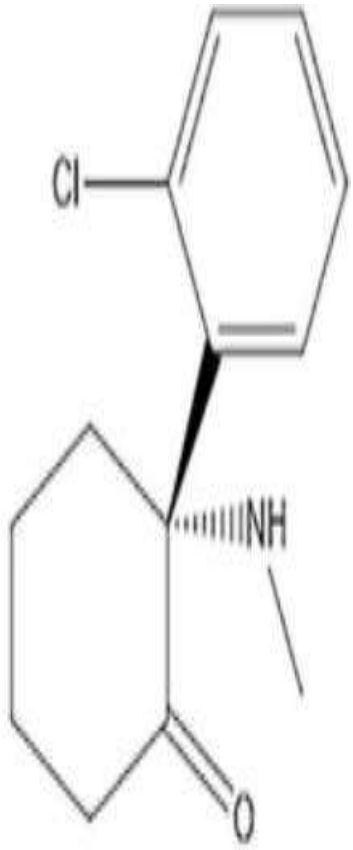
Phencyclidine (PCP)
(Ki = 0.06 μM)



(*R,S*)-Ketamine
(Ki = 0.53 μM)

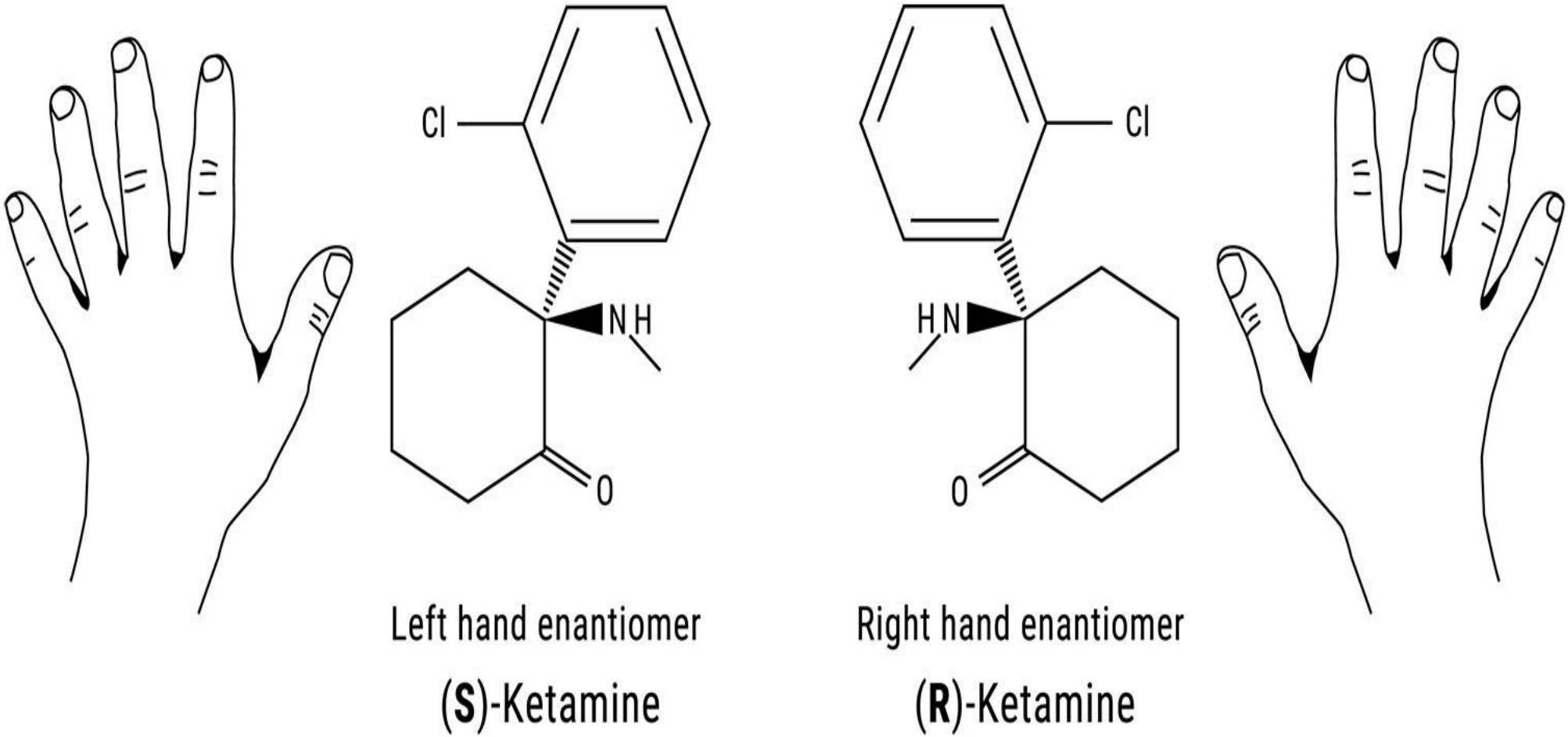


(*S*)-Ketamine
(Ki = 0.30 μM)



(*R*)-Ketamine
(Ki = 1.40 μM)

Ketamine Stricture's



(S)-ketamine and (R)-ketamine. An (S)-ketamine nasal spray has been developed and approved for use in treatment-resistant depression in the United States and Europe;
(R)-ketamine may have longer lasting antidepressant effects than (S)-ketamine, alongside fewer side effects.

Ketamine Mechanism of Action

is a partially water-soluble and highly lipid-soluble phencyclidine derivative differing from most other intravenous anesthetics in that it produces significant analgesia.

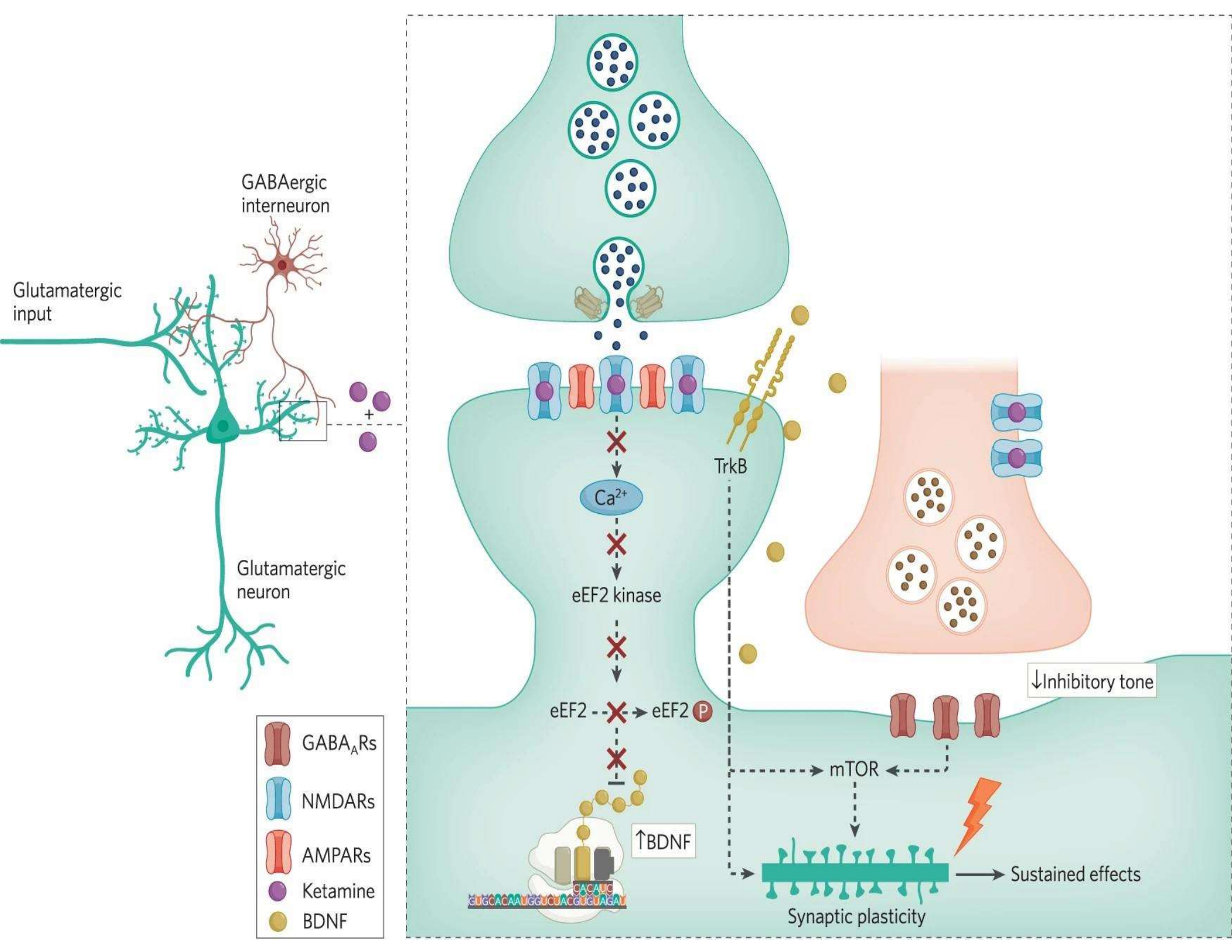
The characteristic state observed after an induction dose of ketamine is known as “dissociative anesthesia,” wherein the patient’s

eyes remain open with a slow nystagmic gaze (cataleptic state). Of the two stereoisomers, the S(+) form is more potent than the R(−) isomer, but only the racemic mixture of ketamine is available in

the USA.

Ketamine Mechanism of Action

- The N-methyl-D-aspartate (NMDA) receptor is a receptor of glutamate, the primary excitatory neurotransmitter in the human brain.
- Ketamine's mechanism of action is complex, but the major effect is probably produced through inhibition of the NMDA receptor complex.


GABAergic interneuron
Glutamatergic input
Glutamatergic neuron
+
Ca2+
eEF2 kinase
eEF2
eEF2 P
TrkB
↑BDNF
↓Inhibitory tone
mTOR
Sustained effects
Synaptic plasticity
GABAARs
NMDARs
AMPARs
Ketamine
BDNF

Clinical Uses & Dosage

- in the early postoperative period may be useful to produce analgesia or reduce opioid tolerance and opioid-induced hyperalge
- Induction of anesthesia can be achieved with ketamine, 1–2 mg/kg intravenously or 4–6 mg/kg intramuscularly. Although the drug is not commonly used for maintenance of anesthesia, its short context-sensitive half-time makes ketamine a candidate for this purpose.
- For example, general anesthesia can be achieved with the infusion of ketamine, 15–45 mcg/kg/min

Adverse Effects of Ketamine

- Disorientation, confusion, or loss of motor coordination.
- Dizziness, nausea, or vomiting.
- Increased blood pressure, heart rate, breathing, or body temperature.
- Changes in sensory perceptions, including visual or auditory hallucinations.
- Feeling detached from yourself, your surroundings, or your environment.

Licit Uses

- Xylazine is approved by the U.S. Food and Drug Administration (FDA) for veterinary use only. It is available
- in liquid solutions at 20, 100, and 300 mg/mL. Typically, this drug is administered either alone or in conjunction with other anesthetics (e.g., ketamine or barbiturates) intravenously, intramuscularly, or orally for sedative and relaxant properties.