

# KETAMINE INFUSION: A Breakthrough In Treating Mood Disorders

An innovative approach to treating mood disorders,  
including depression and anxiety.

**DRS. JANSEN AND KOZFKAY**



# What Is Ketamine?

## Quick Introduction

1. Introduced in 1964 as an anesthetic
2. 1985 WHO declared ketamine an "essential medication" due to its safety profile and the ability to preserve breathing and airway reflexes unlike most other anesthetic
3. First noted its mood-enhancing benefits in 2000
4. Since, has been hailed by Yale School of Medicine as: "The greatest breakthrough in psychiatry in over 50 years."
5. It is a gentle dissociative drug and NOT a hallucinogenic - primary due to its anesthetic properties
6. Ketamine is considered a safe drug with LOW addictive properties

# Ketamine Neurological Impact Overview



## **Ketamine Fosters Neurogenesis**

the brain's ability to create new neurons (primarily in hippocampus - a region critical to stress response, memory and emotional regulation)



## **Ketamine Helps Repair**

damaged brain cells by facilitating the release of Brain-Derived Neurotrophic Factor (BDNF)



## **Ketamine Increase Neuroplasticity**

the brains ability to create new connections amongst neurons



## **Ketamine Deactivates the Default Mode Network**

which allows the brain to become "unstuck" in negative and harmful thinking and emotional patterns

# The Science Behind Ketamine Infusion



## KETAMINE'S MECHANISM OF ACTION

Ketamine is a **dissociative anesthetic that primarily acts as an antagonist of the N-methyl-D-aspartate (NMDA) receptor**, a type of glutamate receptor in the brain. This inhibition of NMDA receptors leads to a cascade of neurochemical changes that ultimately contribute to its antidepressant effects.



## POTENTIAL FOR NEUROGENESIS

Emerging research suggests **that ketamine may also have the ability to stimulate neurogenesis, the growth of new brain cells, in brain regions associated with mood regulation**. This process can help counteract the negative effects of chronic stress and depression on the brain's structure and function.



## IMPACT ON MOOD REGULATION

Ketamine's **inhibition of NMDA receptors leads to increased levels of the neurotransmitter glutamate, which in turn stimulates the production of brain-derived neurotrophic factor (BDNF)**. BDNF promotes the growth and development of new neural connections, contributing to improved mood regulation and reduced symptoms of depression and anxiety.

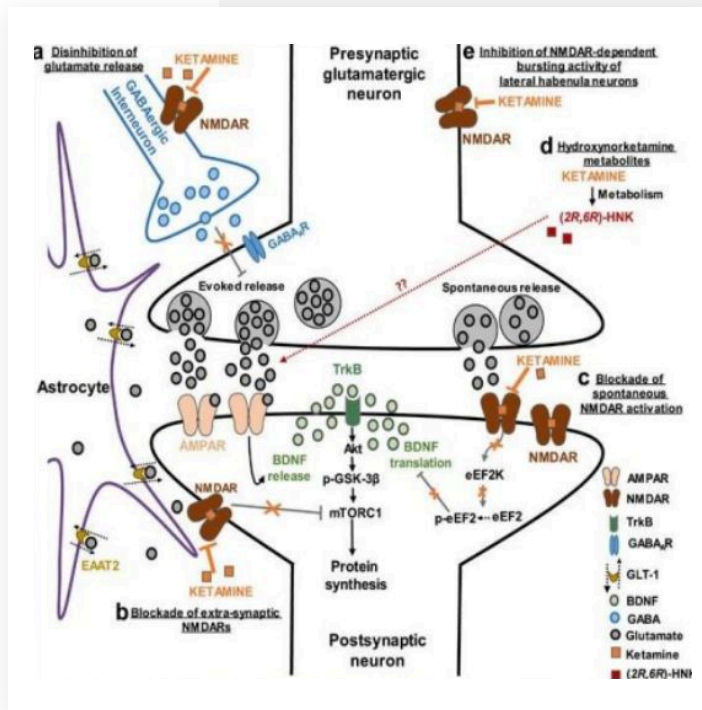


## RAPID-ACTING ANTIDEPRESSANT EFFECTS

Unlike traditional antidepressants that can take weeks to take effect, **ketamine has been shown to elicit rapid and robust antidepressant effects, often within hours or days of administration**. This rapid onset of action is thought to be due to its ability to modulate glutamate signaling and promote synaptic plasticity in the brain.

# Mechanisms Of Action

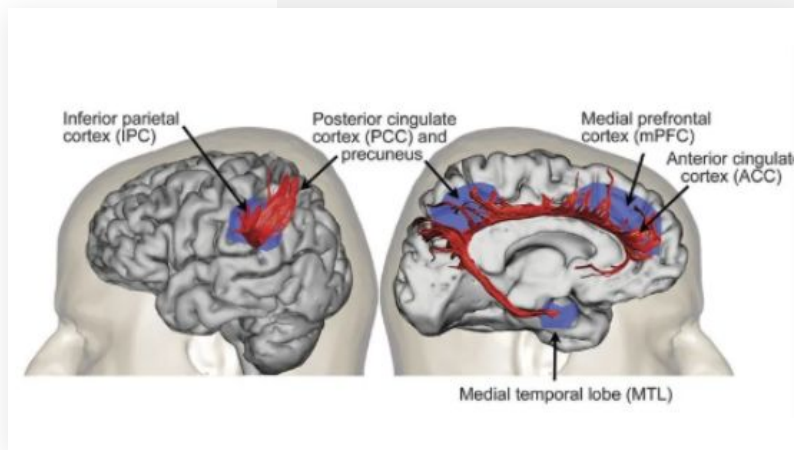
1. Works primarily on the NMDA receptors - as an antagonist
2. Ketamine blocks NMDA receptors and this causes a surge in Glutamate, which promotes synaptic (space between neuron connections) plasticity and increases communication between neurons
3. Continues to affect AMPA receptors (known to play a role in depression), which creates a rush of new neuronal connections and boosts Brain-Derived Neurotrophic Factor (BDNF) that enhances brain repair
4. This rewires the brain and impacts the Default Mode Network...



# DFM & Ketamine

## HOW KETAMINE IMPACTS THE DFM

- **DFM is**  
interconnected brain regions that are "overactive" and have "laid tracks" that lead to persistent negative thinking and emotions
- **Ketamine deactivates the DMN**  
and allows for the DMN to make connections to other brain networks, which appears to "break" rigid thought patterns that contribute to depression and anxiety
- **It appears the DMN change remains longer-term**  
this can lead to longer-term improvements in mood and sustained healthier cognitive patterns



# Traditional Anti-Depressants Vs. Ketamine

## TRADITIONAL ANTI-DEPRESSANTS

Targets Symptoms

Tend to Numb

Take weeks to work

Must be taken daily

Hard to start and stop

Used as dials on neurotransmitters

Require trial and error to find what works

Cause troublesome side effects for many

VS.

## KETAMINE INFUSION

Targets root causes

Tends to awaken

Provides relief within hours

Has effects that last months

Can be easily stopped or started

Boosts neurotransmitters AND repairs and grows the brain

Impacts many neurotransmitters (dirty), largely eliminating experimentation

Causes only mild or temporary side effects

# Advancing Ketamine Infusion Research

## • 2015

First FDA-approved ketamine nasal spray for treatment-resistant depression.

## • 2020

Advancements in delivery methods, including intranasal, oral, and transdermal ketamine formulations.

## 2022

Development of personalized dosing protocols to optimize ketamine infusion therapy.

## • 2018

Initiation of large-scale clinical trials investigating ketamine infusion for suicidal ideation.

## • 2021

Exploration of ketamine's potential for treating post-traumatic stress disorder (PTSD).

## • 2023

Investigations into the long-term effects and safety of repeated ketamine infusions.



# Effectiveness Of Ketamine Infusion: First Report Of Impact On Mood

## Response Rate

71%

## Improvement in Symptoms

Significant reduction in depression  
and anxiety symptoms

85%

Rapid improvement in mood within  
24 hours of infusion

**Referencia:** *Berman, R.M., Cappiello, A., Anand, A., Oren, D.A., Heninger, G.R., Charney, D.S. and Krystal, J.H., 2000. Antidepressant effects of ketamine in depressed patients. Biological psychiatry, 47(4), pp.351-354.*

# Ketamine found effective in treating severe depression

| MGB Communications

May 31, 2023 • 4 min read

Had no major side effects compared to electroconvulsive therapy, considered the 'gold standard' treatment

[Home](#) / [Health Lab](#) / Ketamine's promise for severe depression grows, but major questions remain

## Ketamine's promise for severe depression grows, but major questions remain

New findings show strong response in many patients, but ongoing research aims to find blood biomarkers that might predict success, and compare IV and nasal delivery

February 8, 2024 5:00 AM

Author | [Kara Gavin](#) >



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ORIGINAL ARTICLE



## Ketamine versus ECT for Nonpsychotic Treatment-Resistant Major Depression

**Authors:** Amit Anand, M.D., Sanjay J. Mathew, M.D., Gerard Sanacora, M.D., Ph.D., James W. Murrough, M.D., Ph.D., Fernando S. Goes, M.D., Murat Altinay, M.D., Amy S. Aloysi, M.D., [+15](#), and Bo Hu, Ph.D. [Author Info & Affiliations](#)

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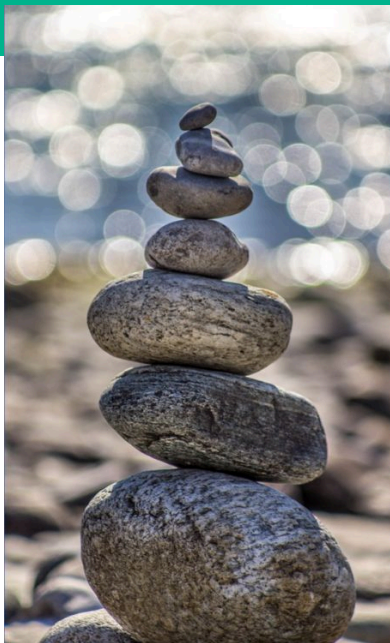
#### Original Research

**Ketamine for depressive symptoms: A retrospective chart review of a private ketamine clinic**

**Violetta M. Juby, Saanda Paruk, Mitsuki Tomita, Bongu Chilla**  
Received: 30 Aug. 2023; Accepted: 30 Nov. 2023; Published: 19 Feb. 2024

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# Introduction To Ketamine Infusion



Ketamine infusion is a novel treatment approach that has shown promising results in managing mood disorders, such as treatment-resistant depression and certain types of anxiety. This innovative therapy involves the administration of low doses of ketamine, a dissociative anesthetic, through an intravenous (IV) drip, with the goal of alleviating symptoms and improving overall mental well-being.

# The Ketamine Infusion Process

**1**

## INITIAL CONSULTATION

Patients meet with a healthcare provider to discuss their medical history, symptoms, and suitability for ketamine infusion therapy. The provider will evaluate the patient's condition and determine the appropriate treatment plan.

**2**

## PREPARATION

Patients are asked to fast for several hours prior to the procedure and may be given pre-medications to help manage side effects. An IV line is inserted, and vital signs are monitored throughout the process.

**3**

## KETAMINE INFUSION

Patients receive a slow, controlled infusion of ketamine over the course of 40–60 minutes. The dosage is tailored to the individual patient's needs and is carefully monitored by the healthcare team.

**4**

## OBSERVATION

After the infusion, patients remain under the close supervision of the healthcare team for a period of time, typically 30–60 minutes, to ensure their safety and monitor for any potential side effects.

**5**

## FOLLOW-UP

Patients are provided with instructions for post-treatment care and may be scheduled for additional infusion sessions, depending on their response to the treatment and the healthcare provider's assessment of their progress.

## OVERVIEW

# Typical Ketamine Protocol

## Ketamine Infusion



2x per week for the first 3 weeks

## Alternate Days



Administration on alternate days: For example, Monday and Wednesday or Tuesday and Thursday

## Timing



Infusion lasts approximately 40 minutes

## Recovery



- An additional 15–30 minutes
- No additional intense work, driving, etc., after infusion for at least 6 hours

# What To Expect From My Infusion Session

## ✓ SAFETY FIRST

You will be monitored for blood pressure and O<sub>2</sub> levels to ensure proper health prior to administration.

## ✓ COMFORT

You will be in a relaxed position, given headphones, a sleep mask, and a weighted blanket.

## ✓ STAFFING

Staff will administer your IV and then be present and you will be monitored via camera and in-room visits.

## ✓ EXPERIENCE

Ketamine can have strong effects on your psyche. You may feel that you are "trapped" or perhaps even leaving your body. We will train you on how to manage your thoughts, breathing, and how to get out of a "K-hole."

## ✓ POST-TREATMENT

Our staff will meet with you and ensure your experience went well. We will place you in a wheelchair, if needed, and bring you to your vehicle with your driver. We will schedule a follow-up with you soon after your visit.

# What Do Most People Experience During Ketamine Infusion

## EXPERIENCE


Most experience an increased feeling of:

- Connectedness
- Calm
- Insight
- Rebooted
- Peace and Contentment
- Open to new experiences

## YOUR EXPERIENCE

- Your experience is unique to you
- Some people report seeing nature and others their loved ones
- Almost all report a sense of wonder and amazement

## Testimonials



*"Ketamine therapy saved my life. I had been put on every medication for depression since I was 11, and nothing worked. I tried ECT, medications, TMS, and had been in and out of treatment centers for depression and self-harm for 10 years. About a month into ketamine treatments, I started noticing slight differences - I wasn't hoping a car would hit me. I was able to say that I feel okay today, instead of 'I'm fine' (while dying on the inside). I did 12 sessions and two maintenance."*

*"My goodness, did this therapy help me SO MUCH! After TEN YEARS of anxiety, panic attacks, and depression - I painted my nails, I dyed my hair, I went and bought arts and crafts materials to start some art projects, I cooked meals, I did my dishes... It gave me back my personality. And it's all thanks to my doctors and the ketamine clinics. THANK YOU! From the bottom of my heart." **10/10***

# Common Side Effects

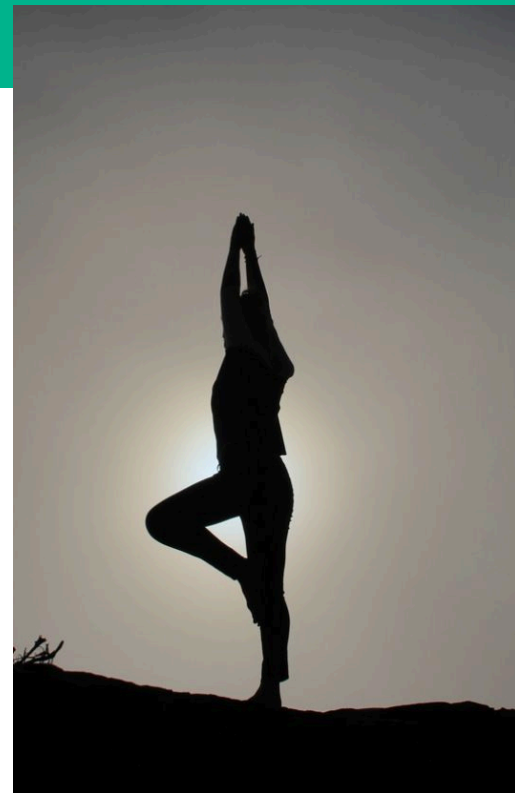
*most are extinguished within 15 minutes after ketamine infusion is completed*

- 33% dizziness
- 27% dissociation
- 25% nausea
- 25% headache
- 19% respiratory infection
- 17% sleepiness
- 12% change of taste
- 9% raised blood pressure
- 5% increased urinary symptoms



# Overall

1. Ketamine is a powerful treatment for mood disorders including: Depression, Anxiety, PTSD, OCD
2. Ketamine is generally safe and considered an "essential medicine" by the WHO – although all drugs include risks
3. Ketamine's positive impacts appear to be long-lasting
4. Ketamine is not without side-effects
5. Ketamine should only be utilized in a facility where the staff is properly trained, licensed, and qualified to handle a patient's care pre, during, and post-treatment





# Thank you!

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