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Kernel's Brain-Imaging Helmet Approved For Clinical Trial On Patients Using Ketamine

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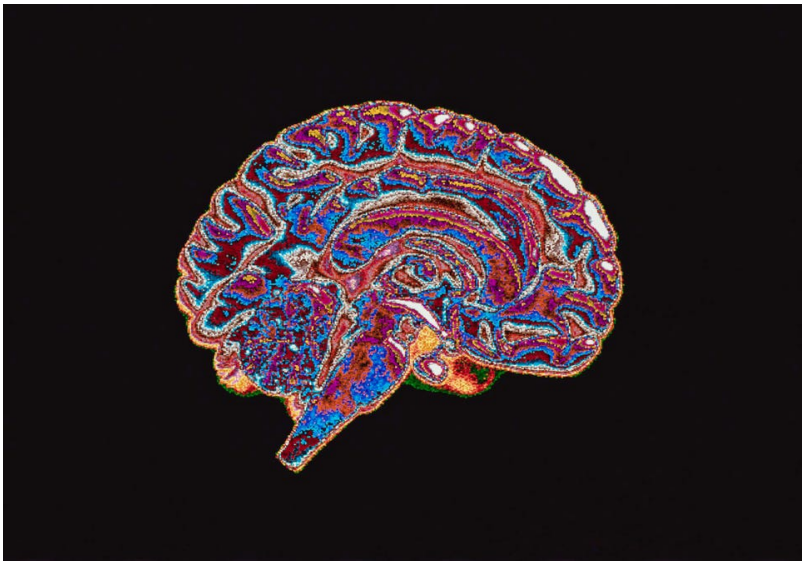
Vices



Your Brain On Drugs: Psychedelic therapeutics company Cybin and neuroimaging tech startup Kernel will study patients' brains while on ketamine. GETTY

The U.S. Food and Drug Administration has approved a clinical trial using a neuroimaging helmet made by Los Angeles-based Kernel to track what happens in the brain when a human takes a psychedelic dose of ketamine.

Cybin, a Toronto-based psychedelic therapeutics startup, is sponsoring the study. The study will begin before the end of the year with 15 patients at a ketamine-assisted therapy clinic in Marina Del Rey, California. All patients will go through two rounds of the trial. The first one will be a placebo session with saline solution so the Kernel Flow brain-imaging device can get a baseline for the patient's neurological activity and the second session patients will get an intramuscular injection of a psychedelic dose of ketamine while wearing the Kernel Flow headset.

potential treatments for depression, substance use, post-traumatic stress disorder and obsessive-compulsive disorder.

“We're trying to open up the black box of human cognition, experience and feeling to understand what is happening in the brain when people are having a psychedelic state of consciousness,” says Belser, who is a licensed psychologist and a psychedelic researcher at Yale University. “We can measure that for the first time meaningfully, in real time, with a wearable. And we can measure how different areas of the brain are potentially relating to other areas to start to understand and tell the story about how mind-manifesting drugs actually manifest in the mind.”

For the most part, the effects of psychedelic substances on patients with mental health issues like depression and post-traumatic stress disorder have relied heavily on subjective self-reporting by patients. What Cybin and Kernel hope to do is leverage the data from a patient’s brain to better understand why psychedelic substances like ketamine, and eventually psilocybin and other molecules, seem to help people with depression and other issues.

The reason psychedelic drugs have been found to alleviate symptoms of depression and PTSD in clinical trials, it is thought, is due to the signaling of the 5-HT-2A receptor, which sparks what’s called neuroplasticity. Neuroplasticity helps the brain form new neural connections, which is believed to generate rapid and sustained positive mood effects.

In a slate of studies, psilocybin-assisted psychotherapy has provided almost immediate reductions in depression symptoms after a single high dose, along with antidepressant effects that can last as long as six months in some participants. Cross talk between different regions of the brain is also associated with potential benefits of psychedelics. But more neurological data, especially longitudinal data, is needed to measure if and how these drugs are helping patients.

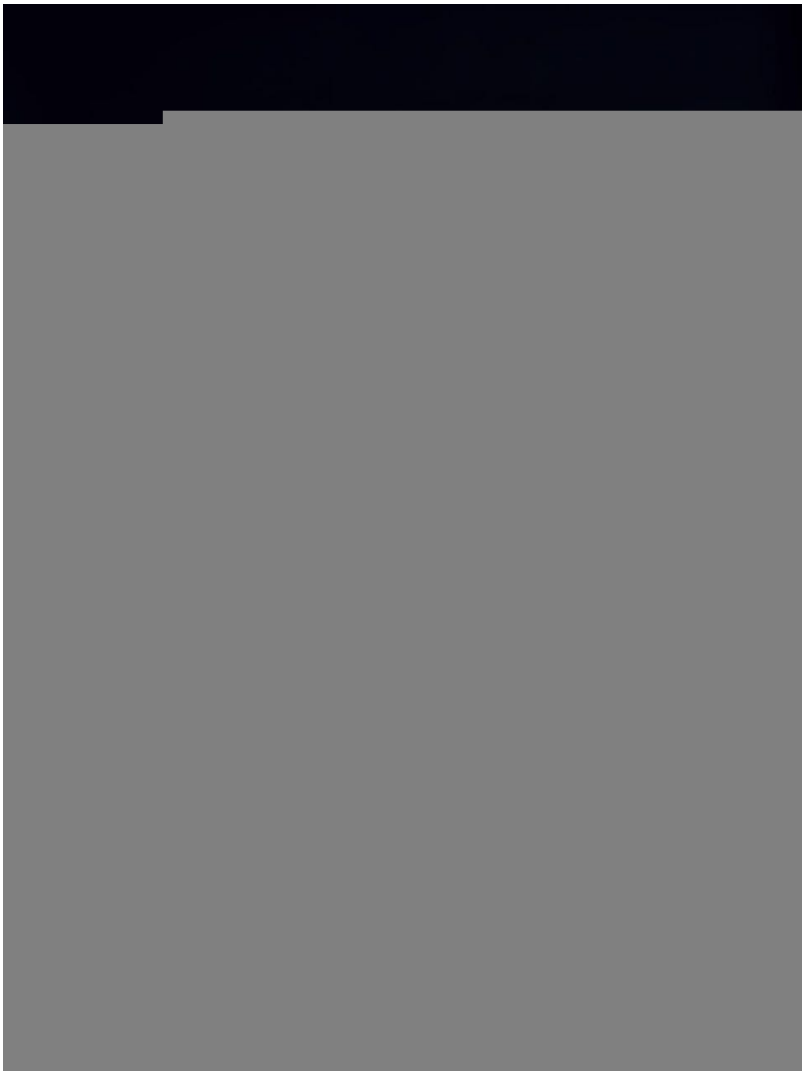
“You have different regions of the brain, under the influence of psychedelics, talking to other regions,” says Belser. “We’d like to be able to actually measure that in real time for the first time. This may be one of the reasons why psychedelic medicine has been shown to be so clinically efficacious and successful.”

Kernel, which was founded in 2016 by Bryan Johnson, who had founded mobile payments company Braintree and sold it to PayPal in 2013, has a broader goal to become a “fitness tracker for your brain,” says Johnson.

Brain-imaging technology like EEG, PET and fMRI are certainly advanced and good at what they do, these are expensive and clunky and require the patient to sit still. Kernel’s device, which is about the size of a bicycle helmet, can be worn while the patient moves around naturally. By collecting enough data, Johnson hopes to identify biomarkers that will help define a healthy

The Kernel Flow uses pulses of infrared light to track cortical hemodynamics —or in layman's terms, it uses lasers to track blood flow throughout the brain.

"We rely upon measurement technology for everything we do in life, whether it be how fast we're driving in a car, to the temperature, to our hearts and blood glucose levels," says Johnson. "And one of the only things we can't reliably measure is our brain—our minds. We can measure black holes, our calories and our steps, but the brain has eluded us."



Mind Reader: Bryan Johnson likens his creation, the Kernel Flow, to a "fitness tracker for the brain."
COURTESY OF KERNEL

Johnson wants his technology to develop statistical reference ranges so people can keep track of their mental health the same way they track sleep, calories or blood sugar. As for why he's partnering with Cybin to study the effects of psychedelic drugs, he says he believes in the potential of psychedelics as treatments for mental health and wellness but wants more precise brain-imaging data to lead the development of therapeutics.

"Psychedelics are this emergent frontier of possibility and what might really

during the development of Covid-19 vaccines and had to ask patients if they felt like the vaccine was working. “It would’ve been a disaster,” he says.

He hopes his device can help usher in a future where we can measure a person’s mental health not through self-reporting of symptoms, which he likens to haphazardly throwing darts at a board, but by tracking specific biomarkers in the brain.

“We can’t enter into this conversation with unchecked confidence,” he says. “We are cautious, we’re being measured. We hope to be helpers and bring credibility to the effects [of psychedelic medicine].”

For Cybin, which is also developing novel psychedelic molecules they hope to bring to market as FDA-approved medicines for mental health issues like depression and substance use disorder, the Kernel Flow might be able to guide their drug development.

“It’s potentially a new frontier in neuroscience and psychedelic medicine,” says Belser.

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