

INNOVATIONS IN SCIENCE

HIGHLIGHTING RESEARCH & DEVELOPMENTS IN
SCIENTIFIC FIELDS, TECHNOLOGY & SOCIAL SCIENCES



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Innovations in Science: New Ideas for a Healthy Nation — Research and Application

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Mental health disorders such as depression, post-traumatic stress disorder (PTSD), and traumatic brain injury (TBI) affect millions of Americans and frequently resist conventional treatment. For many patients, antidepressants, psychotherapy, and other standard interventions provide only partial relief. In recent years, scientific innovation has turned toward novel therapeutic approaches rooted in neuroscience, including the therapeutic potential of psychedelic compounds. Research on psilocybin and ibogaine—once on the margins of biomedical inquiry—has re-emerged in rigorous clinical and policy discussions, offering promising new ideas for addressing entrenched mental-health challenges.

At Cornell University, neuroscientist Alex Kwan and his team are illuminating how psilocybin may produce sustained therapeutic effects by acting on neural circuitry. Using advanced imaging tools that allow real-time observation of neural networks, Kwan's research demonstrates that psilocybin induces rapid and persistent structural plasticity in the medial frontal cortex—promoting the growth of new dendritic spines critical for synaptic connectivity and cognitive flexibility. This plasticity is associated with improved behavior in animal models of depression, suggesting that psilocybin's benefits go beyond temporary changes in mood to encompass durable reorganization of brain circuits that underlie negative thought patterns and emotional rigidity.

Additionally, studies from Kwan's lab

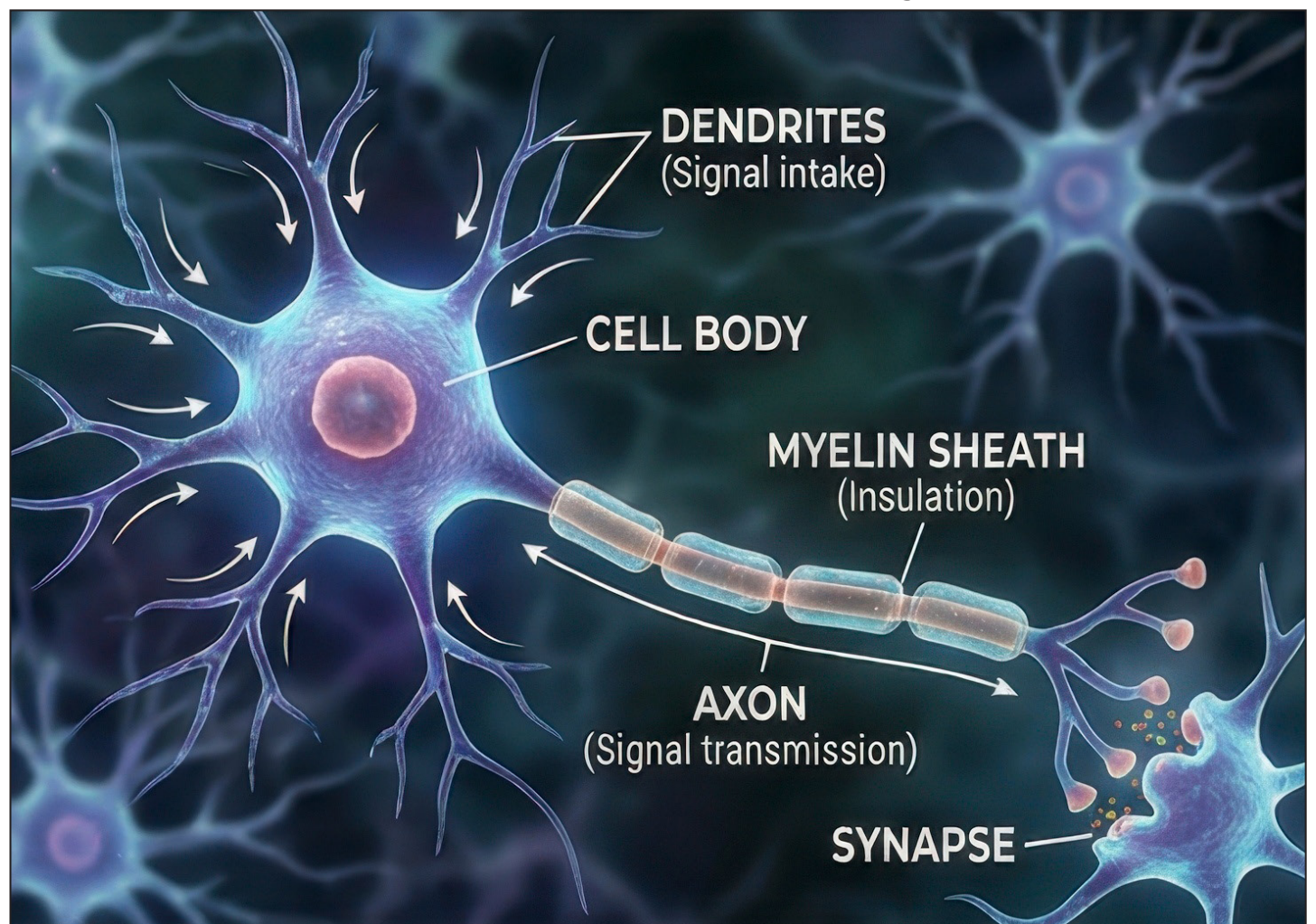


Illustration of the parts of a neuron. Structural changes in neurons are associated with learning and potentially with the therapeutic effects of psychedelic compounds such as psilocybin and ibogaine. (Illustration: Charming Studio/stock.adobe.com)

highlight specific neurons expressing serotonin 5-HT_{2A} receptors as key mediators of these long-term effects, emphasizing a mechanistic basis for psilocybin's therapeutic promise. Recently, Kwan confirmed that my understanding of the science is accurate, and appreciated us highlighting his research and new government funding initiatives revealed below.

While psilocybin continues to be evaluated

for its potential in treating mood disorders such as depression and PTSD, ibogaine has attracted attention for its wide-ranging potential, especially in the contexts of addiction, PTSD, and TBI—conditions that often co-occur and compound one another. Ibogaine is a psychoactive alkaloid derived from the *Tabernanthe iboga* shrub, and its complex pharmacology engages multiple neurotransmitter systems, including dopamine,

glutamate, and opioid pathways, in addition to promoting neuroplasticity, making it a unique candidate for treating interrelated neurological and psychological dysfunctions.

In 2025, the State of Texas made a historic investment by allocating \$50 million in public funding to support clinical trials of ibogaine, marking one of the largest government-level research investments in psychedelic medi-



The iboga shrub (*Tabernanthe iboga*), native to Central Africa, contains the psychoactive compound ibogaine, which researchers are studying for potential therapeutic use in addiction and neurological conditions. (Illustration: foxyliam/stock.adobe.com)



organizations like Americans for Ibogaine highlight a pivotal moment in mental-health innovation. Rather than viewing psychedelics solely as substances of recreational or historical interest, scientists and policymakers are increasingly approaching them as tools for targeted, neuroscience-informed therapy. Psilocybin's capacity to promote adaptive neural connectivity and ibogaine's multi-modal potential in addressing complex brain injuries and co-morbid disorders reflect a shift in understanding mental illness as a condition of disrupted neuromodulation rather than simply a chemical imbalance.

This emerging paradigm emphasizes neuroplasticity, circuit remodeling, and integrative clinical approaches—opportunities that may yield more robust and enduring outcomes for individuals plagued by treatment-resistant depression, chronic PTSD, and the cognitive sequelae of brain injury. As research progresses from exploratory studies to well-funded clinical trials, psychedelics hold the promise not only of scientific insight but of meaningful therapeutic breakthroughs for millions of Americans in need of new, effective treatment strategies.

cine in U.S. history. This funding—approved through state legislation—supports FDA-approved clinical trials intended to investigate ibogaine's safety and efficacy in treating substance use disorders, trauma-related conditions, and TBI, potentially positioning Texas as a national leader in psychedelic research infrastructure. The Texas investment reflects bipartisan interest among policymakers in exploring alternatives to conventional psychiatric treatments and addressing conditions that have high societal and economic costs.

Shortly after Texas's initiative, Arizona also moved forward with public funding for ibogaine research. In its 2025–2026 budget, Arizona lawmakers appropriated \$5 million to study ibogaine in clinical trials focused on neurological conditions such as PTSD and TBI, with research institutions now able to apply for grants to conduct these studies. Former U.S. Senator Kyrsten Sinema played a high-profile advocacy role in advancing this legislation, testifying before the Arizona legislature and pledging to help raise matching private funds to support the research. Sinema emphasized that current treatment options for PTSD and brain injury are inadequate and that ibogaine research could provide new hope for veterans and others who have exhausted existing therapies.

According to Angela Skudin of Americans for Ibogaine, many states—including Oklahoma, Missouri, Mississippi, Louisiana, Oregon, Michigan and Ohio—have bills or proposals under discussion, with many first responders—supported through the Casey Skudin 343 Fund—providing testimony on the benefits of ibogaine treatment. Momentum continues to spread across America. Oklahoma's HB 3834 has successfully passed through two house committees and is expected to reach a floor vote soon.

- ▶ In Tennessee, lawmakers have introduced the Helping Open Pathways to Effective (HOPE) Treatment Act, which would create a Mental Health Innovation Fund to support FDA-supervised ibogaine clinical trials through public-private partnerships involving hospitals, research institutions, and drug developers.
- ▶ In Maryland, the proposed Veterans Mental Health Innovations Act would establish a state grant program to fund ibogaine clinical trials at in-state research institutions, drawing from the state's opioid settlement funds and focusing in part on treatment options for veterans.
- ▶ In Vermont legislators have proposed creating a Psychedelic Therapy Advisory Board to review scientific evidence on psychedelic treatments, develop pilot programs, and support clinical trials—including initiatives centered on ibogaine.

Skudin also notes research led by the late Dr. Nolan Williams at Stanford University, which is further contributing to the scientific understanding of ibogaine's effects. Skudin, who recently attended the 1st International Iboga & Ibogaine Conference in Libreville, Gabon, has facilitated ibogaine treatment access for over 200 first responders, highlighting both clinical outcomes and personal transformation. These combined efforts—state-level legislation, clinical research, and community advocacy—illustrate a growing movement to recognize ibogaine as a legitimate therapeutic intervention for complex mental health conditions and brain injuries. Many of these programs rely on opioid settlement funds or public-private research partnerships and aim to con-

duct rigorous, FDA-regulated studies rather than informal or unregulated use. Policymakers increasingly view ibogaine research as a potential tool for addressing the intertwined crises of opioid addiction, trauma-related mental illness, and neurological injury.

Together, research and funding initiatives from institutions like Cornell, the public support seen in states such as Arizona, Texas, and Oklahoma, and the advocacy of

EDITOR'S NOTE: This article is intended to inform readers about ongoing scientific research and public policy developments related to psychedelic compounds. The information presented does not constitute an endorsement of any substance, treatment, or clinical practice. Research in this field is ongoing, and these substances remain regulated under federal and state law. Readers should not interpret this coverage as medical advice.



Advanced imaging technologies allow neuroscientists to observe how compounds like psilocybin influence neural circuits and structural plasticity in the brain. (Photo: Irina Anoshkina/stock.adobe.com)