

Roughly 4 million people in the United States have treatment-resistant depression. Now, esketamine — the discovery of which was possible with funding from the National Institutes of Health (NIH) and others for medical research in academic medicine — is giving those people hope for relief. Recently approved by the U.S. Food and Drug Administration (FDA), esketamine is the first new therapy in more than 30 years for the treatment of major depression.

MEDICAL DISCOVERY: BUILDING TO A BREAKTHROUGH

The treatment's long path to approval highlights the importance of federal support for medical research in academic medicine.





Breakthroughs are the result of sustained, long-term research and collaborations among academia, industry, and federal partners.

Scientific collaborations across institutions, research fields, and the world are key to developing the groundwork for achieving a breakthrough discovery.

Research at medical schools and teaching hospitals accounts for nearly 55% of National Institutes of Health (NIH) extramural research.

Sustained, predictable funding growth for medical research is vital to bringing discoveries from the bench to the bedside.

A research team at the **University of Michigan** first administers ketamine to humans, but how it interacts with the body to produce results is unknown.²

• Early 1960s

• Mid-1990s

Building off research

into the role of the glutamate system in depression and schizophrenia, a team at the Yale School of Medicine finds that a single dose of ketamine alleviated depression in veterans at the

West Haven VA
Medical Center.3

Pre-1980s

Neurobiology research, funded by federal partners, continues to identify neurotransmitters, including glutamate.

• 2009

An NIH-funded study led by researchers at the Icahn School of Medicine at Mount Sinai finds that within 24 hours of receiving ketamine, patients suffering from treatment-resistant depression show rapid improvement in suicidal thinking.⁵

• Early 2010s

Columbia University Irving Medical
Center researchers
examining physiological susceptibility to suicide, with funding from the NIH, discover that ketamine can ease suicidal thoughts more effectively than a control drug.⁷

· 2019

The FDA approves a nasal spray form of esketamine that can only be administered under the supervision of a health care provider in a certified office or clinic.¹⁰

2010

An NIH study replicates the results of the Icahn School of Medicine study.⁶

• **2018**

The results of two multiyear Phase 3 trials led by a pharmaceutical company and involving a number of teaching hospitals show the safety and efficacy of a nasal spray form of a derivative of ketamine, esketamine.^{8,9}

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• 2006

An NIH-led study shows that ketamine provides "robust and rapid antidepressant effect" to patients with depression.⁴

BASIC RESEARCH

TRANSLATIONAL RESEARCH

CLINICAL TRIALS

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 10 FDA approves esketamine, the first major depression treatment to reach U.S. market in decades. STAT. March 5, 2019.

• 1920s

Discovery of the first

chemical messenger

produced by nerve cells, or neurotransmitter.¹

Association of American Medical Colleges