



Innovations in Substance Use Disorder: the critical role of animal studies in addiction research

Animal Research is essential for understanding addiction and developing life-saving treatments for substance use disorders. It is supported by decades of NIH-funded research and international scientific consensus.

*Every
FDA-approved
medication
for addiction treatment
was developed using
animal research, including:*

Naloxone
Naltrexone
Buprenorphine
Methadone
Varenicline
Bupropion

**Complex behaviors
such as addiction
cannot be modeled
without intact
brain-body systems.**

PURPOSE

Identify brain and behavioral mechanisms of addiction to develop safer and more effective treatments; and to advance medical, scientific, and veterinary knowledge.

CONDITIONS

Animals are housed in highly regulated, enriched environments with assured access to food and water, appropriate social housing, continuous veterinary oversight, and daily welfare monitoring by trained professionals.

REGULATION

Animal research is one of the most heavily regulated scientific activities in the United States. Federal law requires ethical justification, humane treatment, veterinary supervision, and ongoing oversight.

OUTCOMES

Aims to minimize harm and maximize benefit for both humans and animals.

See what animal research really looks like.

It's not what you see on TV. Learn how addiction research is conducted and why it matters. Learn more about animal research labs at the QR code, or come visit a researcher's lab by emailing info@cpdd.org.



The College on Problems
of Drug Dependence

Myths & Facts about Animal Studies for Addiction Research

Myth 1: “Findings from animal models do not provide relevant treatments for humans”.

Fact: Nearly every major addiction medication, including those for opioid use disorder, nicotine dependence, and alcohol withdrawal, was first identified, validated or refined in preclinical animal studies.

Research in animals allows us to reveal causal relationships in brain circuits and treatment outcomes, which is not possible in studies performed in humans. These findings allow us to better identify mechanisms that can guide clinical trials. Life-saving medications that were supported by preclinical animal studies include:

- Naloxone (Opioid Use Disorder)
- Naltrexone (Alcohol and Opioid Use Disorders)
- Buprenorphine (Opioid Use Disorder)
- Methadone (Opioid Use Disorder)
- Varenicline and bupropion (Nicotine Dependence)

Myth 2: “Animal research is outdated and easily replaced by modern technology such as AI or organ-on-a-chip approaches”.

Fact: While brain organoids and computational modeling are excellent tools that provide unique perspectives in addiction biology, no current technology can replicate the complexity of a living brain interacting with behavior, environment, and genetics.

Substance use disorders are brain disorders involving dysregulated reward systems and altered decision-making, which are highly influenced by genetics, environment, stress, and social factors. Leaders in the field of brain organoid research recognize that this technology cannot currently replace animal models for studying substance use disorder, as brain organoids are currently not capable of self-administering drugs or making human-like decisions. (Li 2025).

Myth 3: “Animal research is cruel and unregulated”.

Fact: Unlike illegal dogfighting and poorly regulated, high-volume commercial breeding operations such as puppy mills, animal research in the U.S. is very tightly regulated. Every study done in animals must be approved by an Institutional Animal Care and Use Committee comprised of veterinarians, scientists, and community members who ensure animal welfare in accordance with federal laws including the Animal Welfare Act are followed, including:

- Minimization of discomfort
- Environmental enrichment (toys, socialization, human interaction, etc.)
- Pain relief wherever possible
- Continuous veterinary care

Every researcher who works with animals receives extensive training prior to working with animals.

References:

Kangle Li, Longjun Gu, Hongwei Cai, Hui-Chen Lu, Ken Mackie, Feng Guo. Human brain organoids for understanding substance use disorders. *Drug Metabolism and Pharmacokinetics*. Volume 60. 2025.