

Medical Research with Animals

From the National Institutes of Health

Did you know that a child born today in the United States is expected to live into his or her late 70s, whereas the same child born at the turn of the 20th century would have been expected to live only into his or her 40s?

Eating better and learning how to keep ourselves and our environment clean played a role, but medical research using laboratory animals was a vital factor driving this incredible progress.

What is medical research that uses animals?

Animals and people get many of the same illnesses. Certain types of animals can stand in for humans with particular diseases. The information we gain from these studies—about how we’re the same and how we’re different—benefits people and animals.

Medical research with animals is one type of medical research, but other types include experiments with cells and chemicals and simulations on computers. Animal research usually describes research involving vertebrates, such as cats, mice, frogs, pigs, and primates. Most animals used in research are specifically bred for use in medical research.

Another important type of research is clinical research, in which scientists conduct studies with humans. These studies almost always require the results of preliminary tests in animal research studies.

Table 1. Medical Research with Animals Saves Lives

Animal Model	Medical Benefit for People
Dog	Discovery of insulin
Monkey	Polio vaccine
Mouse	Rabies vaccine
Pig	Skin grafts for burn victims
Pig	Computer-assisted tomography (CAT) scans
Rabbit	Corneal transplants
Rat	Carcinogen screening

How do scientists decide to use animals in medical research?

All medical research is carefully planned, and this includes medical research with animals. Experts who review a scientist’s proposed experiment involving animals weigh several considerations before approving each study.

The most important thing is that the research must be relevant to human or animal health. Studies need to protect the animals’ welfare. That means that only the fewest number of the most appropriate species may be used. Under federal law, all animals must be treated humanely and undergo the least distress possible.



Jim Weed, NIH Division of Veterinary Resources

Who does medical research with animals?

Medical researchers who have Ph.D., D.V.M., or M.D. degrees oversee animal research studies. These scientists study animals because they are a lot like people when it comes to basic body functions like breathing, eating, hearing, and seeing. That's because nature is extremely economical. Throughout vast evolutionary time—from bacteria to plants to people—the same biological processes are recycled over and over.

Veterinarians with specialized training in laboratory animal medicine are an integral part of a medical research team. As part of this research group, veterinarians assure the humane treatment of animals and provide medical and surgical support throughout research studies. Emergency veterinary care for research animals is available on a 24-hour basis.



NIH Medical Arts

How are animals protected?

Congress and the Public Health Service have set up laws, regulations, and policies to ensure humane treatment of all animals in research. The Public Health Service Policy on Humane Care and Use of Laboratory Animals, the Guide for the Care and Use of Laboratory Animals, and the Animal Welfare Act give details about day-to-day animal care. (Links to these publications are provided at the end of the fact sheet.)

Scientists use this and other information to answer important questions about setting up the proper environment for research animals. How big should the cages be, and how warm or cool do the animals need to be to stay healthy? What kind of food is best, and how much noise do the animals like to have (some like it very quiet)? Do the animals like bright or dim light, and do they need other animals or toys to play with?



Jim Weed, NIH Division of Veterinary Resources

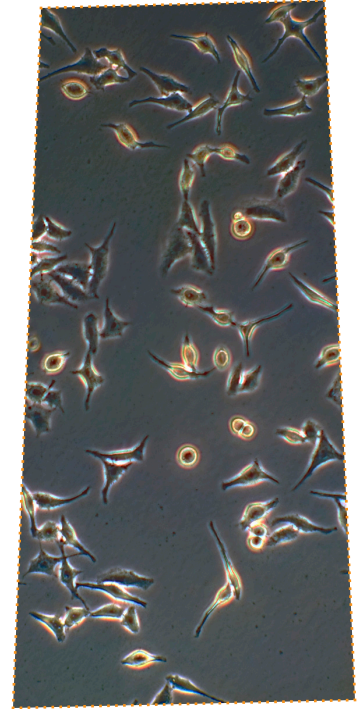
Why do medical research with animals?

Results from animal studies are crucial for closing knowledge gaps about health and disease in both humans and animals. Understanding cell and organ function—which is similar in all vertebrates—helps researchers design experiments to test new treatments in people.

Cell culture studies or computers are important but cannot at present take the place of research models that use animals. No single set of results from a particular model—whether animal, cell, or computer—can predict exactly what will happen, so researchers often ask the same questions in different kinds of studies. When different models yield similar results, the results are much more believable.

Computer Models in Research

Even though computer models are very valuable, they are limited by what is already known about a process or disease. Data for computer models often comes from animal studies. In turn, computer models reveal gaps for further study in living organisms. Thus, medical research with animals and computer modeling studies work together to increase our understanding of health and disease.



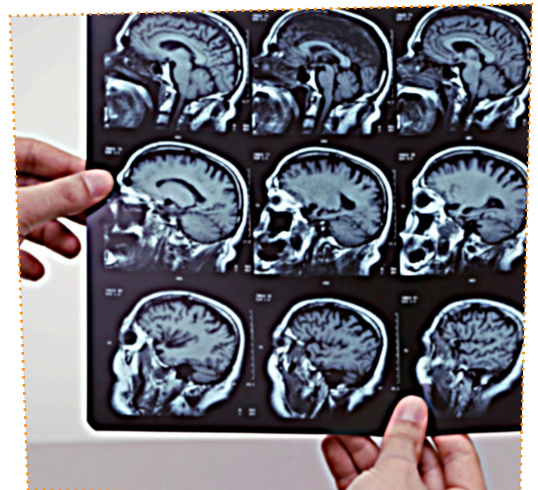
In Vitro Studies in Research

In vitro experiments are performed in test tubes and plastic dishes. These studies usually use tissues or cells obtained from animals or people. When scientists study living cells in laboratory containers, they cannot reproduce the whole, complex, interactive system that is present in an animal or a human. But researchers can learn a lot from in vitro studies. The results of these experiments help scientists design further experiments to conduct in an animal.

Where is medical research with animals conducted?

The National Institutes of Health funds most of the basic medical research in the United States and beyond. This research takes place at universities and medical schools in all 50 states. In turn, biotechnology and pharmaceutical companies, often in partnership with the NIH, expand on this foundation of knowledge to develop medical treatments.

Every academic institution funded by the NIH that conducts medical research with animals is required to have a committee called the Institutional Animal Care and Use Committee that oversees care of animals in research. These committees are responsible for making sure that all the researchers at the institution obey the animal welfare laws. Additionally, the government even has rules about who should serve on these committees.



When do research results in animal studies get applied to humans?

Sometimes quickly, sometimes slowly. Scientists don't understand human biology enough to risk using new medical treatments or surgical procedures directly on people. Because research is a quest to understand the unknown, the rate of progress varies a lot. In research, one discovery builds upon another.

Nearly everyone considers finding lifesaving cures through biomedical research to be one of humanity's highest purposes. Although research helps humans protect and provide for

themselves, humans are also the only species capable of considering the needs of other species on the planet we share.

Table 2. Medical Research that Helps Animals

Discovery	How it Helps Animals
Research on viruses	Dog parvovirus vaccine
Research on reproduction	Breeding programs for endangered species (like pandas, white tigers)
HIV/AIDS research	Cat leukemia vaccine
Surgical research	Dog heart valves, hip replacements
Chronic disease treatments	Diabetes, heart disease treatments for pets

Learn more at these Web sites:

National Institutes of Health
<http://www.nih.gov>

Animals in Research
<http://science.education.nih.gov/animals>

Living Laboratories
<http://publications.nigms.nih.gov/thenewgenetics/livinglab.html>

NIH Office of Laboratory Animal Welfare
<http://grants.nih.gov/grants/olaw/olaw.htm>

Public Health Service Policy on Humane Care and Use of Laboratory Animals
<http://grants.nih.gov/grants/olaw/references/phspol.htm>

Guide for the Care and Use of Laboratory Animals
<http://books.nap.edu/readingroom/books/labrats>

Animal Welfare Act
http://www.access.gpo.gov/uscode/title7/chapter54_.html

Office of Animal Care and Use Regulations and Standards
<http://oacu.od.nih.gov/regs/index.htm>

NIH Clinical Research
http://grants.nih.gov/grants/funding/PHS398/instructions2/p2_human_subjects_definitions.htm

ClinicalTrials.gov
<http://clinicaltrials.gov>