



FASEB

Federation of American Societies
for Experimental Biology

ANIMAL RESEARCH: Necessary for Scientific Progress

Scientists use a wide range of animals to study diseases that affect humans—from flies and worms to laboratory-bred dogs and nonhuman primates. This research is highly regulated. All studies are peer-reviewed by expert scientists and community members provide input through participation on animal care committees.

Scientists take the decision to use animals very seriously, and it is important to use the most relevant animal to understand biology, behavior, and disease. The result of these studies also improve treatments for our animal friends.



Example

Dogs are important models to study cancer because they naturally develop many of the same cancers as humans. This research also benefits dogs with cancer.

Animal research enables researchers to study complex disorders such as:

- Alzheimer's
- Cancer
- Birth defects
- Diabetes
- Immune diseases



Animal Research Remains the Standard for Biomedical Research

Animals are the only way to evaluate whole-body effects when testing new drugs or treatments. The FDA requires animal studies before new drugs enter human clinical trials.

Are Nonanimal Models Effective?



Organ-on-a-chip
miniature circuits that attempt to mimic organ physiology



Computer models
used to simulate biological processes



Organoids
simplified 3-D version of an organ generated from human or animal cells



Cell culture
animal or human cells grown outside their natural environment

Nonanimal models (left) are only useful in certain research contexts. Scientists may use these methods to learn preliminary information about a biological process or potential therapy. But, in most cases, results must be validated in an animal model.

Limitations of Nonanimal Models:

- Cannot study whole-body effects and complex living systems
- Cannot study disease onset and progression
- Cannot study whole-body drug metabolism
- Cannot study whole-body developmental biology



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Studies with Animals Improve Public Health



Human tumors implanted in mice are used in pre-clinical trials to test the metabolism and efficacy of new cancer drugs.



Pig and human hearts have very similar anatomy.

Pigs are essential to developing new cardiovascular devices such as battery-free pacemakers.



Humans and nonhuman primates have very similar immune systems, which makes them indispensable to developing vaccines against diseases like COVID-19.

Nonanimal Models Supplement Work with Animals

Cultured cells and computer models are often used to expedite screening of new drugs. Information on drug action may be gained from organs-on-a-chip. These results must then be studied in an animal model to see if new drugs are effective and/or toxic in an intact living system.

Scientists can manipulate organoids to gain some understanding of how organs, such as the pancreas, develop in an embryo.



Using Only Nonanimal Models is Not Possible



Nonanimal models cannot reliably or fully mimic complex biological systems.

Nonanimal models can help researchers fulfill the 3Rs—reduction, replacement, refinement—a framework for performing humane animal research.

Scientists are working on nonanimal models to improve their ability to predict risk. Existing models, such as skin irritation hazard screening with cultured cells, are used for limited applications.