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Biomedical Research with Animal Models

For more than a hundred years, virtually every medical breakthrough in human and animal health has been the direct result of research with animals. The role of animals in research is essential to the development of new and more effective methods for diagnosing and treating diseases that affect both humans and animals.

Our researchers are strong supporters of animal welfare and view their work with animals in biomedical research as a privilege. They are obligated to ensure the well-being of all animals in their care in strict adherence to the highest standards, and in accordance with federal and state laws, regulatory guidelines, and humane principles, and to continuously update animal care based on the newest information and findings in the fields of laboratory animal care and husbandry. Our researchers are dedicated to refining, reducing, and replacing animals in research whenever possible, and to using alternative methods (cell and tissue cultures, computer simulations, etc.) instead of or before animal studies are ever conducted.

Why are animals necessary in biomedical research?

Animals are biologically very similar to humans, in fact, mice share more than 98% DNA with us! In addition, animals also are susceptible to many of the same health problems as humans – cancer, diabetes, heart disease, etc. With a shorter life cycle than humans, animal models can be studied throughout their whole life span and across several generations, a critical element in understanding how a disease processes and how it interacts with a whole, living biological system. In addition, scientists can easily control the environment around animals (diet, temperature, lighting), which would be difficult to do with humans.

It is important to stress that 95% of all animals necessary for biomedical research in the United States are rodents – rats and mice especially bred for laboratory use – and that animals are only one part of the larger process of biomedical research. Because nothing so far has been discovered that can be a substitute for the complex functions of a living, breathing, whole organ system with pulmonary and circulatory structures much like those in humans, animals continue to play a critical role in helping researchers test potential new drugs and medical treatments for effectiveness and safety before using them on humans, and in identifying any undesired or dangerous side effects, such as infertility, birth defects, liver damage, toxicity, and cancer-causing potential. In addition, U.S. federal laws require that non-human animal research occur to show safety and efficacy before any human research will be allowed to be conducted. Not only do we all benefit from this research and testing, but hundreds of drugs and treatments development for human use are now routinely used in veterinary clinics, helping animals live longer, healthier lives.

What types of animals are used in biomedical research?

The vast majority of animals involved in biomedical research are rodents – more than 95%. A smaller and very diverse variety of animals also provide very useful models for the study of diseases afflicting both humans and animals. These include animals such as zebrafish, armadillos, electric eels, birds, rabbits, guinea pigs, sheep, frogs, pigs, birds, dogs, cats, primates, among other species. It is a common misconception that cats, dogs, and primates are the species most often used. Less than one percent of ALL animals necessary for biomedical research in the United States are dogs, cats, or primates. And the majority of the cats and dogs are adopted out to forever homes following research.

Advancing human and animal health through biomedical research

How many animals are used in biomedical research?

According to information from the Office of Technology Assessment it is estimated that between 17 and 23 million animals are used in research each year. Approximately 95% of these animals are rats and mice specifically bred for research and 4.25% of these animals include rabbits, guinea pigs, sheep, fish, frogs, insects, and other species. Most importantly, only 0.75% of the animals in research are cats, dogs, and primates.

Why can't alternative methods replace animals in research?

Whenever possible, researchers do use non-animal models for research. Computer models, tissue and cell cultures, and a number of other non-animal related research methods are used today in biomedical research. Computer models are used to screen and determine the toxic level of a substance in the beginning of an experiment and tissue and cell cultures have become valuable additions to the array of research tools and techniques. However, animal testing remains a necessity. For example, blindness cannot be studied in bacteria and it is not possible to study the affects of high blood pressure in tissue cultures.

The living system is extremely complex. The nervous system, blood and brain chemistry, gland and organ secretions, and immunological responses are all interrelated, making it impossible to explore, explain, or predict the course of diseases or the effects of possible treatments without observing and testing the entire living system of an animal. In the meantime, scientists continue to look for ways to reduce the number of animals needed to obtain valid results, refine experimental techniques, and replace animals with other research methods whenever feasible.

Does biomedical research only benefit humans?

No. In fact, the same methods that have been developed to prevent and treat diseases in human have improved the lives of countless animals. More than 80 medicines and vaccines developed for humans are now used to treat animals. Animal research has helped develop many animal vaccines to fight diseases such as rabies and distemper in dogs and cats, feline leukemia, infectious hepatitis virus, tetanus, and has assisted in the development of treatments for heartworm.

In addition, animal research has helped preserve nearly extinct species such as the California condor and the tamarins of Brazil due to new reproductive techniques being applied to endangered species.

There are many other benefits to both humans and animals as a result of biomedical research. For more information, please visit the CBRA website at www.ca-biomed.org. To explore the roles of animal research in the top 25 prescription drugs in the United States, visit the Foundation for Biomedical Research: <https://fbresearch.org/medical-advances/animal-testing-research-achievements/animal-research-behind-top-drugs/>