



## CBRA Fact Sheet

### Why Are Animals Necessary in Biomedical Research?

For more than a hundred years, virtually every medical breakthrough in human and animal health has been the direct result of research using animals. The use 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. Scientists use animals to learn more about health problems, and to assure the safety of new medical treatments. Medical researchers need to understand health problems before they can develop ways to treat them. Some diseases and health problems involve processes that can only be studied in living organisms.

#### **Why are animals necessary in biomedical research?**

Animals make good research subjects for a variety of reasons. Animals are biologically similar to humans. In fact, chimpanzees share more than 99% of DNA with humans and mice share more than 98% DNA with humans, therefore, animals are susceptible to many of the same health problems as humans. Animals have a shorter life cycle than humans and as a result, they can be studied throughout their whole life span or across several generations. In addition, scientists can easily control the environment around animals (diet, temperature, lighting), which would be difficult to do with humans.

#### **What types of animals are used in biomedical research?**

A variety of animals provide very useful models for the study of diseases afflicting both humans and animals. These include animals such as rats, mice, birds, rabbits, guinea pigs, sheep, fish, frogs, pigs, birds, dogs, cats, primates, among others.

#### **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.

#### **What are some specific medical advances made as a result of using animals in biomedical research?**

The use of animals in biomedical research has allowed scientists to continue to discover innovative ways to treat and cure disease and illnesses. Some specific examples include:

**HIV/AIDS** – Scientists are continuously learning how HIV works through studying its counterpart in primates. This counterpart is known as Simian Immunodeficiency Virus. Some species of primates are also carriers of HIV, although it does not kill them.

**CANCER** – Researchers have placed cells from human cancer tumors into immunologically deficient mice without rejection, which allows the study of human cancer without risking human lives. In addition, studies with mice have shown that the immune system can be stimulated by genetically altered tumors, leading to hopes that gene therapy can be used to fight cancer.

**ASTHMA** – Studies in guinea pigs and non-human primates have led to the development of leukotiene-receptor antagonists. This was approved in the late 1990s as the first new type of asthma treatment in 20 years that is effective against both mild and severe forms of asthma.

**VACCINES** – In the early 1900s, scientists used extracts from the spinal cord of a boy who had died from polio to replicate the disease in monkeys. These experiments allowed the disease to be transmitted from monkey to monkey, providing an invaluable model of the disease that could be studied. In the 1950s, after many years of research using mice, rats, and monkeys, polio vaccines were developed and used to treat the disease.

**ANTIBIOTICS** – In 1940, a researcher infected eight mice with a lethal dose of Strptococci (the bacteria that causes scarlet fever and tonsillitis). Four mice were given penicillin and the remaining four mice were left untreated. The four mice treated with penicillin survived while the four untreated ones perished. This single experiment with just eight mice clearly defined the value of penicillin as an affective antibiotic that saves thousands of lives each year.

**HIGH BLOOD PRESSURE** – Research with rats, rabbits, cats, and mice have led scientists to discover three types of drugs to treat both severe and mild cases of hypertension. Today, researchers know that even treating moderate cases of hypertension can reduce stroke, heart disease, and kidney disease.

**ORGAN TRANSPLANTS** – In the mid 1900s, the first effective human transplant of a kidney was performed. The surgery had been previously perfected in dogs.

#### **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](http://www.ca-biomed.org).

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**\*Please note: Some of the above information was obtained by the Office of Laboratory Assessment; the USDA; Americans for Medical Progress; and the Kids 4 Research website.**

**TO SUPPORT THE ADVANCEMENT OF HUMAN AND ANIMAL HEALTH BY PROMOTING AND PROTECTING BIOMEDICAL RESEARCH AND TEACHING.**