



Animal Research: Past, Present, Future

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Over the past century, our health and quality of life as an entire population has grown considerably. One of the major factors in this improvement has been the use of animals in biomedical research. This research has led to methods, cures, and vaccines that have all helped us live longer, healthier lives. But some people now say that we have emptied the tap on animal research, that we can no longer benefit from it and there are better, more efficient ways to conduct medical research. Although there are developing methods for research, I still believe that a scientist must do research on a living organism before introducing a drug or technique to the human population. Those who oppose it say that animal research is unethical, but I think that letting advances in medicine go undiscovered is a real breach of ethics.

One of the reasons our health has improved in the last century is because of new surgery techniques. Because doctors understand the human body like never before, we can now heal major deficiencies through surgery. But, before these techniques were ever introduced into the human population, their effectiveness and safety was tested on animals. Without these tests, a surgeon would have no way to develop new forms of surgery, and we might still be amputating legs with a saw. For example, the first studies in organ transplantation were done on dogs, and pigs are being studied for the purpose of donating their organs to humans, called xenotransplants. Although computer models are sometimes used for surgical research and training, a true experience of how procedures affect all systems of a body is needed for research results. A computer model is no match for a living, breathing organism like animals.

Another use of animals in medical research is the development and testing of new or improved drugs. When a new drug is developed, it slowly makes its way through the testing ranks, from small cell cultures all the way up to human tests. In between, the drug must be tested on animals to see its effectiveness and safety, as it applies to an entire body of organ systems. Although cell and tissue cultures do return results, they are isolated to that particular cell or tissue, and do not show how entire body systems are affected,

which is crucial in seeing the actual results of the drug. Scientists do not know enough about the human body to create it on a computer model, so animals must be used to determine whether or not the drug can move on to human testing. It would be unethical to skip from cell cultures to humans, because it may cause unnecessary injury, and even death.

Of all the animals used in research, almost 95% of them are either rats or mice. Most other animals include rabbits, guinea pigs, hamsters, farm animals,

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and insects. Combined, less than 1% of research animals are cats, dogs, and non-human primates. A large majority of animals used in research are bred specifically for lab experiments. Although only about a .33% of tested animals are primates, that number is on the rise. Primates have a history of being useful in the lab, as the polio vaccine was developed by implanting the disease in primates. Their main uses are in surgical technique development and in AIDS/HIV research. They are useful in surgical technique development because of their similarities to humans, which allows realistic test subjects for research and practice. They are useful in AIDS/HIV research because scientists have isolated a strain of "primate HIV," called SIV. They believe that a cure for SIV will bring them very close to curing HIV. Also, some primates have been able to carry the HIV virus, giving scientists a way to study the disease on an entire body level, not just in cell or tissue cultures.

A more specific example of primates in research is the use of macaque monkeys to find ways to reduce multiple organ failure following hypotensive shock, which is a loss of blood pressure due to massive blood loss. Researchers have hypothesized that the organs are damaged in the first few minutes that blood flow is returned to the area, when a kind of white blood cell attaches to the wall of blood vessels and destroys them

by releasing toxic substances. The researchers have based their experiments on developing a substance that prevents the white blood cells from attaching to the blood vessels. Without animal testing experiments this would be impossible, because researchers would not be able to study whole body affects of a crisis like hypotensive shock.

Although rats and mice are the main animals used in testing, many animals have helped our overall health. Some surprising examples are armadillos, worms, quails, and sea urchins. Armadillos are currently used in labs to help develop a vaccine for leprosy. Because armadillos have a low core body temperature, the bacteria that causes leprosy is easily grown inside their body, giving scientists a template to experiment with different vaccines and methods. Worms, more specifically nematodes, or flatworms, are used in studying the development of nerve cells because they have a simple nervous system that is easy to study. The winners of the 2002 Nobel Prize did their research on nematodes. Quails have been used to research the development of facial structure and how facial deformities are developed. The basic form of the experiment was to mix quail and duck embryos, which caused quails that had duck beaks and ducks with quail beaks. This has helped to highlight when and where facial defects occur in embryonic development. The study of the reproductive process of sea urchins won the Nobel Prize for Medicine in 2001, and helped scientists learn more about the processes that drive reproduction in the human body, such as what proteins trigger a sperm to fertilize an egg.

Although my paper so far may make it sound like researchers and scientists do not care about the well being of their tests subjects, this is not true. For fifty years almost all scientists have followed a system known as the 3Rs. These three guidelines are the refinement of tests so animal distress or pain is minimal, the reduction of the number of animals used in any particular study, and the replacement, whenever possible, of animal experiments with non-animal experiments. Also, an animal that is not treated well will show emotional side effects that may affect the results of the experiment, so researchers attempt to make their test subjects as happy as possible. But, unfortunately, some suffering by these test subjects does occur. Although this is a major downside to animal testing, I believe that it is necessary for developing health improvements for both humans and animals.

But there are people who do not believe that animals should be tested on. They say that animal research is cruel and unnecessary. One of the leading

critics of animal testing is PETA, or the People for the Ethical Treatment of Animals. PETA's main stance is that animals are being physically and emotionally hurt by testing, and they believe these tests to be unnecessary. Although I agree that some animal testing, like those done by cosmetic companies is unnecessary, I disagree with their position because I believe that true ethical treatment for both animals and people can only be achieved by doing what is needed to develop cures to major health problems. Another critic of animal testing is the CAAT, which is a group of doctors involved in research. Their main stance is that animal research brings us down the wrong path, that because animals and humans are so anatomically different animal research is a waste of both time and money. Although this may be true in some cases, I think that the history of what animal testing has done for us speaks for itself. We have developed so many cures because of these tests, and we are close to breakthroughs in areas like AIDS and cancer, based on animal testing. It would be irresponsible of us to abandon the methods that have helped us throughout our past, and appear like they will help us into the future.

Over the past century animal testing has played a major role in the improvement of our overall health. As we move into the future I think it is important that we learn from our past and continue to utilize the methods of animal testing that have led us to where we are today. I also think it is important to truly embrace the 3Rs, and use new technology to phase out the suffering of animals, as long as it brings us the same results. We are getting closer to curing the major diseases of our time, and the success of these studies are going to be defined by animal testing and its effectiveness.

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