Finding A Cure to Diabetes Through Animal-Based Research

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Introduction

Animal based research has contributed to numerous medical advances for humans. Despite scientific advances, animal based research is still necessary. Many of the treatments available today have come from animal research. About 150 years ago, the animal research era began. One important discovery was made by Louis Pasteur and Robert Koch in the late 19th century. They used anthrax to prove micro-organisms caused health problems in humans and animals. They used cattle and sheep for their research. Pasteur developed a vaccine for anthrax and later, developed a vaccine for rabies. Many other important medical discoveries in the past were the result of animal research. To name a few, the Polio vaccine was developed in the 1950’s, drugs to treat mental illness were created in the 1960’s because of the testing on mice; drugs to treat stomach ulcers, asthma and leukemia were developed in the 1970’s as a result of testing on guinea pigs, life support for premature babies was developed in the 1980’s as a result of testing on monkeys, and the cloning of Dolly, a sheep, was successfully completed in the 1990’s (Thomassen, Trolid, Arondsen and Gystol 3). Without animal research we would not be able to advance society.

Benefits of Animal Research to Humans

Animal based research has contributed to increased life expectancy for humans in the United States. In 1900 the life expectancy on average was 49 years and in 2004 the average increased to 69.3 years. In the year 2030, it is expected that 1 in 5 Americans will be 65 years or older and people 85 and older will be the fastest growing population. According to recent studies, 1 in 4 adults has high blood pressure, which can cause heart attacks, strokes and heart disease. Animal research has helped identify the causes of heart
disease and develop treatments for heart diseases. For instance, dogs have been very important in developing pacemakers, more successful open heart surgery and heart transplants.

**Diabetes: The Silent Killer**

One of the big problems in the United States is the increase in diabetes. There are two main categories of diabetes: type 1 and type 2. Type 1 diabetes is a chronic (lifelong) disease that occurs when the pancreas does not produce enough insulin to properly control blood sugar levels. Only 5-10% of people with diabetes have this form of the disease (10). Type 2 diabetes is the most common form of diabetes. In type 2 diabetes, either the body does not produce enough insulin or the cells ignore the insulin. Insulin is necessary for the body to be able to use glucose for energy. When you eat food, the body breaks down all of the sugars and starches into glucose, which is the basic fuel for the cells in the body. Insulin takes the sugar from the blood into the cells. When glucose builds up in the blood instead of going into cells, it can cause two problems: (1) your cells may be starved for energy and (2) over time, high blood glucose levels may hurt your eyes, kidneys, nerves or heart.

According to the American Diabetes Association (ADA), there are 23.6 million people in the United States, or 7.8% of the population, who have diabetes. I have many family friends with diabetes. The long term goal for scientists is to find a cure for diabetes. In type 1 diabetes, islet transplantation is one way to get closer to a cure. This treatment would require patients to take immunosuppressants to prevent rejection of the transplant tissue. One way to treat type 2 diabetes is through gene therapy. This approach involves using a genetically engineered virus to change the intestinal cell’s DNA so they can produce insulin (Understanding Animal research).
Animal Research and Diabetes

Millions of people are alive because of the discovery of insulin in dogs. That discovery was yet another important medical discovery. In 1889, German scientist Oskar Minkowski and German physician Joseph von Mering removed a pancreas from a dog to prove its role in digestion. After the pancreas was removed, the scientists observed that flies would swarm around the dog’s urine. Sugar was found in the dog’s urine, proving their connection between diabetes and the pancreas. The scientists were able to determine that the pancreas contained regulators to control blood sugar. They provided a model for the study of diabetes. Research has also led to the development of insulin pumps which replace insulin shots (AALAS Foundation 2).

The Future of Animal Research

Future medical advances will require animal research. A quote from The Lancet, September 4, 2004 states “Without animal testing, there will be no new drugs for new or hard-to-treat diseases” There are no other alternatives for some types of medical research. There are laws that say all medicines must be tested on animals to make sure the drugs are safe for humans. Animals are likely to be used in stem cell research, gene therapy, vaccines and oral or inhaled insulin development.

Mouse stem cells have led to the use of human stem cell lines for research in treating stroke, heart disease, osteoarthritis and brain damage. Gene therapy can help find cures for sickle cell disease, muscular dystrophy, and cystic fibrosis. Vaccines may be developed to treat, Alzheimer’s, malaria, HIV/AIDS. (Understanding Animal Research) With the increase in the elderly population in America, there will be an increase in the number of people with health problems, therefore requiring more medical research. The growing controversy in animal testing has resulted in a variety of alternative approaches. However, the limitation of alternative approaches should be considered before eliminating animal testing completely.
**Alternative Methods**

Presently, there are a number of different research alternatives being considered. Some alternative methods are cell culturing and computer simulations. Cell culturing has established itself as one of the most successful alternatives to the use of animals. It has been effective and accurate when producing vaccines. Vaccines and hormones made in cell cultures have been proven to be more pure than in animals. As our knowledge of body cells improves, the usefulness of cell cultures will increase. Another alternative is computer simulation. This method has become an increasingly working alternative to animal testing. The use of pigs for testing has been replaced by computer operated mannequins. (Nakate 1)

**Limitations of Alternative Methods**

On the other hand, there are still limitations with alternative methods. With cell culturing, behavioral responses cannot be studied in cultures of cells. Computers are not able to simulate how a particular cell may react with a medical compound. The idea a computer can simulate the functions of the body working together is unimaginable, considering the fact that the body has eleven systems. Regulating the body’s ph between 7.35 to 7.45 requires three systems, the respiratory, cardiac and urinary systems. Using computers in research can be more expensive to perform experiments. The cost of computers and cell/tissue/organ culture equipment might exceed the costs of animals themselves, increasing the cost of research and in turn, increasing the cost of medicine. (Canadian Council on Animal Research 1). These alternatives have limitations; therefore there is still a need for animal based research.

**Conclusion**

Using animals in research has had many benefits, increasing human life expectancy and improving the health of animals. There are alternatives that reduce the demand for animal based research, but they have their limitations. At this time, animal based research is our best hope for continued advancement of
medical treatment for humans and animals. With the development of alternatives, perhaps in the near future, animal based research will become obsolete.

References

1. Arondsen, Tonje, Marit Gystol, Marte Thomassen, and Ellen Trolid. “Animal Testing in Medical Research.” pg. 15


9. American Association for Laboratory Animal Science” Use of Animals in Biomedical Research: Understanding the Issues.” pg. 4