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## Animal Research: Beneficial or Unnecessary?

Animals are used in scientific research, help us to gain significant knowledge about human physiology and pathological mechanism because of their similarities to human in many ways and are being tested as human models since 500 BC. They contribute a lot to the invention and development of newer types of drugs, vaccines, diagnostic investigations, antigen and antibody production also in agricultural and biotechnological fields. In a study, it is shown that 40% animals are used in basic or applied research while 26% in drug development, 20% in safety testing and rest 14% are used in other scientific purposes. (Shamoo et al., 2009). Although there have been many success in the past using animals in research, there is still considerable controversy over its ethical implement. Some people justify the importance of using animals in research field while others debate about animal rights and their sufferings during the procedures.

### Arguments in favour of using animals in research:

Animals are considered appropriate model for research as they are similar to human beings in many ways. As most of the mammals, including humans, are descended from common ancestors they share biological similarities like same vital organs, and function in the same way with help of central nervous system. The similarities can be observed in the genes of primates. Studies have shown that, Chimpanzee and rat respectively share 99% and 98% corresponding human DNA and they are susceptible to same kind of diseases like cancer, hypertension ,diabetes etc. Also, the life cycle of animals is short, so it is easier for researchers to observe the reactions of medicine over the whole life cycle which is more complicated to do in human. For example, the life span of rat or mice is only two to three years, so researchers can study the effects of treatments or genetic mutation over a whole lifespan, or across several generations, so they are often used for long term research like cancers, which would be infeasible using human subjects. Animal testing helps to develop some drugs which clinical trial were not possible to do in human such as rabies,cancers. (Banerjee, 2011)

Open heart surgery is a great example of success of using laboratory animals.The principle of heart lung machine was based on the animal experiments of Gibbon. The machine was moderated by De Bakey where animals' blood circulation was bypassed through a machine which allowed to add oxygen in animals blood, as a result it was possible to surgically treat 80% neonatal heart defects. Replacement of heart valves and surgical treatment of coronary arteries were experimented on animals first and after successful outcome they were implemented on patients. Transplantation of vital organs can not be possible without the proper knowledge of immunology which was acquired through experiment on animals. Kidney transplantation in non identical twin could not be successful until a study in dog proved that administration of drug 6-mercaptopurine after transplantation can reduce the immunological response and prevent failure. Immunosuppressive drugs like cyclosporin was tested in mice,rats and other animals before it's successful application on human. (Council, 1988)

Not only human, animals are also being benefitted from animal testing in research. Newer medical methods have been discovered like elimination of parasitism, antibiotics, anaesthesia, surgical procedures save millions of animals' life. If animals were not vaccinated many animals

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would have been died of various infectious diseases like hepatitis, rabies, anthrax and canine carvo virus. Animal research plays a vital role for the prevention of extinction of endangered species. Artificial insemination and embryo transfer help many endangered species to survive against adverse condition. Research on sexual behaviour is promoting to develop new hybrid species that will be able to introduce the extinct animals back to wild. Pets, livestock and zoo animals lead a improved quality of life due to animal research. (Council, 2004)

## **Arguments against using animal in research:**

Human diseases are artificially created in animal bodies but there are lots of anatomic, physiologic and metabolic differences between animals and humans. The incompatibility of human beings and animals is a major obstacle for translational research, as a result research may be sometimes misleading and ignore the probable diagnosis and treatment. Even the environment of the laboratory can alter the biochemistry, genetic expression, nerve stimulation of the animals. One study shows that the mice which are genetically develop for aortic defects, the effects of the disease are completely eradicated if they are kept on large cages. Such an event can have a profound effect on the effectiveness of medicine in every situation. (Akhtar, 2015) Depending on the sample of animals, the results of the study can be horrific if applied to the human body. In 1950 Thalidomide was introduced that caused deformities more than 10000 neonates which was positively tested on mice before commercial use. (Greek et al., 2011)

In 2006 A drug was proven competent on animals, for clinical trial a CD28 super agonist TGN1412 was introduced among 6 volunteers. The dosage was 500 times smaller that was found safe in animals but all volunteers faced a life threatening condition and was taken to ICU .(Attarwala, 2010)

There are also debates on effectiveness of in vivo biological research. Moreover it is more expensive and labour consuming than in vitro technique. Only 5% success in cancer resaerch which is based on in vivo. It is not appropriate to use animal models in extremely complex human cancer studies. Alternative techniques have been discovered that can easily establish linkage between in vitro and clinical trials such as human organs on a chip, human cell based assays, in silico chips and an increased emphasis on epidemiological studies. (Mak et al., 2014)

Medications that have a good results in animals but fail in the human body. Vaccines that worked well on non human primates but low efficacy rate on clinical trials. It is blamed that over dependency of pharmaceutical industry on in vivo is the main reason behind this situation .Due to less return on invesment, governments are lossing interest to fund in basic medical research on animals than clinical trial. Biotechnological and pharmaceutical reduce their expenditure on animal research caused by translational failure to minimize their big losses. (Pound and Bracken, 2014) . It is not found any evidence that animal research is mandatory for medical progres ,many non animal based dicoveries were later proven by animal experiment. If sufficient fund and resources are invested it will be possible to get alternative procedures. (Tatchell, 2004)