

Alternatives to Animal Experimentation

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Short Communication

ABSTRACT

Today in every new drug discovery countless monkeys, dogs, rats and other animals are burned, blinded, cut open, poisoned, starved and drugged behind closed laboratory doors. In most of drug study we obtained inaccurate result because of vast physiological variation of animal and human. Animal studies teach us nothing about the health of humans because human reactions to illness and medications are completely different from the reactions of other animals. different animal absorbs, metabolize and excrete substances differently than human do. After all of this we continuously used animals for experimentation at research centers and collages. so, why we can use animals. Nowadays several non-animal testing are available, they can't provide accurate result but provide comparable information about testing of drug. Today's most challenges about non animal experimental is to obtain accurate result. Vivisection in India is very careless. animals are yelled at, hit, left to suffer after surgery without any painkillers, crammed into small cages, denied veterinary care and more in India approximately 50,000 animals are supplied every year by NCLAS. Nowadays several techniques are used which can reduce animal uses. Two major technique are *in vitro* cell culture and *in silico* computer stimulation. *In silico* computer stimulation also used data from prior animal experiments and *in vitro* cell culture also used animal derived products. all of the above information says that according to my opinion the animal and non-animal experiment can't give satisfactory result. By doing experiment on human individual or its product we can only obtained accurate result.

INTRODUCTION

Today we use animals for various purpose like food, sports, transportation, etc. nowadays in every research and education we use lot of animals for experimentation. Mostly used animals are rat, mice, guinea pig, hamster, rabbit and monkey. Only animals are not used. So, many amphibians, fishes and birds are also used for experimentation. Animals are also a reach source of antibiotics and vaccines which are dominantly used in diagnosis and treatments. For experimentation whole animal or part of animal is used. Animal is isolated from their natural instincts for experiment and euthanized by established methods.

Animal experimentation is a debating issue for a long time because of distress, pain and death of animal during scientific experiment [1]. Various rules and regulations have been made to carried out the control over unethical experimentation on animals and reduce the pain to animals during experiment. E.g in 1824, the organization for animal rights was formed by the royal society for the prevention of cruelty to animals in 1876, an act for prevention of cruelty to animal was formed in the UK. It came into existence in India in 1960 which are commonly known as the prevention of cruelty to animal act 1960.

Guidelines by committee for the purpose of control and supervision of experiment on animals (CPCSEA), university grants commission (UGC) and the medical council of India (MCI) suggest 3 Rs; replacement, reduction and refinement, with the 4th Rs added, that is their responsibility [2]. These 4 Rs are followed for research testing on animals. CPCSEA and NIH (national institute of health) provide guidelines for animal house keeping, breeding, feeding and mainly for their use in scientific experimentation.

Replacement

Replacement means replacing animals with non-animal models as well as replacing higher animals with lower animals. Such like higher vertebrates are replaced with lower amphibians, fishes, plants, eggs and reptiles [3]. Today so many non-animal models are available which can replace the animals. e.g. reconstituted human skin model can replace

rabbits for notorious raise skin irritation test, little innovative device lung-on-a-chip replace animal for lung disease study, human-on-a-chip model can mimic the human body [4].

Reduction

Reduction means less no. of animals used for experiment. At laboratory level as well as at research level animal use is reduced by using *in vitro* cell culture [5]. Uses of human hepatocyte culture gives the information about drugs pharmacokinetics [6]. In order to minimize the uses of female mice used it is common practice to administered hormone for superovulation [5].

Refinement

Refinement means reduced distress, pain and uncomfortable of animal during experiment [7]. Refinement is necessary for improve life of laboratory animals and improve the quality of research. Enriching the cage environment by taking care of animals reduces the stress on animals.

Responsibility

Responsibility of researcher towards animal is also important [2]. Researcher's responsibility towards animal use to follow rules and regulation.

Alternative methods are these methods or anything from absolute to partial replacement of live animals in testing and research or development and implemented methods of testing which avoid the use of live animals [8]. There are so many methods for alternative to animal use which are described as follows:

Computer model: Various computer models and software programs help to obtain stimulation through which we predict the various possible properties of drug without animal dissection. i.e. CADD (Computer aided drug design) is used to predict the receptor binding for potential drug molecule. Computer model can also use for find out diseased condition and help the scientist to understand the way different substance can be used to cure or treat disease. Computer model is useful for designing the structure of drugs to specific target receptor. i.e. the protease inhibitor for patient with HIV were designed by computer and tested in human tissue culture and computer models, bypassing animal tests due to the urgent need for the treatment [2]. Computer models of heart, lungs, kidneys, skins, digestive and skeletal system already exists.

In vitro testing (cell and tissue culture): *in vitro* cell and tissue cultures are alternative methods which involves growth of cells outside the body. The cell or tissue is isolated from animal and kept suitable growth medium for few days to few years for testing and research.

Alternative organism: main debating issue of animal experiment is because of experimentation on higher animal (e.g. vertebrates). Alternative organism is one of the useful method in which higher animal are replaced with lower animal or organism (e.g. fruit fly, zebra fish) [1].

Those three methods are widely used as alternatives for animal uses but there are other so many techniques developed which reduce uses of animal in very small extend. E.g. synthetic membranes (used to demonstrate the effect of chemicals or topical treatments on skin), MRI (used to investigate disease through human scans), EpiSkin and EpiDerm (for irritation test) [9], etc.

Alternative method can reduce animal uses in research and testing in some extended but more efforts need to be under taken for effective implementation of 4 Rs during laboratory use of animals.

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