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Use of Experimental Mammals for Biomedical Research

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Editorial

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INTRODUCTION

The correct diagnosis and better treatment options today for human and other mammals are due to the information generated using experimental mammals for more than hundred years. Since mammals are very close to human, use of experimental mammals in research enabled scientists to develop a new and more effective methods for the diagnosis and treatment of several diseases [1-4]. Animal experimentation not only generates information on the various health problems but also explores possibility for the use of new and better treatment options. Experimental mammals are good animal model for variety of reasons [1-4]. They are phylogenetically, anatomically and physiologically very close to the human beings. For example, rat and mouse share more than 98% of similar DNA content and suffer similar kind of health problems as human. The short life span makes them a better experimental model for research even for several generations [1-4]. These experimental mammals can be maintained under controlled conditions (captivity) for acclimatization, which may not be possible with human. These experimental mammals include mouse, rat, rabbit, guinea pig, sheep, dog, cat, monkey, bat, bovine, porcine, ovine and chimpanzee [1-5]. Over the last 20 years, chimpanzees have been used as experimental model of human in biomedical research fields including infectious diseases, reproduction, language and behavior [5]. According to one assessment report [1], majority of experimental mammals come from rodents group. Approximately 95% of these mammals are rat and mouse that are maintained in laboratory conditions and bred in captivity. Less than 5% of experimental mammals include rabbit, guinea pig, sheep, cow, buffalo and monkey. Other precious species such as cat, dog and primate count less than 1% among all experimental mammals [1-4].

The experimental mammals are used for wide variety of biomedical research. Based on the studies carried out over the last several decades, certain mammals are considered better animal model for a specific biomedical research. Although any experimental mammal could be used for any field of biomedical research, use of specific mammals for specific biomedical research is based on various scientific reasons [2,6-12]. For example, mice are often used to study human genetic disorders. Rats are frequently used for nutritional, behavioral, endocrinological and reproduction studies. Hamsters are commonly used for reproduction, cytogenesis and immunological studies. These rodents are also used for cancer and nutrition, kidney disease, skin transplantation and many other biomedical research studies. Dogs are often used to study cardiovascular issues, CPR techniques, anemia, heart disease and many other health issues [3,7,10,12]. Cats are used to study neurological, cancer, genetic and immunological diseases. Rabbits are used to test the safety of drugs and vaccines, study of transplants, product safety, production of antibodies, pharmacology, toxicological, teratogenicity and reproduction. Guinea pigs are used for immunological, pharmacological and nutritional studies [2,4,9,12]. Cows and buffaloes are used in tests involving organ transplants, diabetes and heart disease, reproduction and development. Primates are used in research on the subject of AIDS, Parkinson's, anesthesia, measles and many other diseases [3,5-8,12].

The teaching and research in zoology is dependent on morphology, anatomy, physiology and biochemistry of experimental animals. The restrictions and regulations on the animal use for teaching and research recruited criticism from scientists and teachers of academic and research institutions in India [13-16].

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The system research using experimental mammals cannot be replaced by computer model, tissue and cell culture that are used today in biomedical research. For instance, blindness cannot be studied in bacteria and effect of blood pressure in tissue culture [1,3,7]. The mammalian system is very complex and various organ systems are interrelated, it is difficult to predict the course of disease and effect of possible treatment without observation and testing the whole animal [1,7,10,11]. The scientists are looking for possible ways to reduce the number of experimental animals required to validate the results in bio-medical research. Meanwhile, it's important to restrict the use of precious mammalian species for consumption, their capture from wild and use for several other purposes in order to protect their number in the field [1,5,8]. The animal research benefits not only human, but also the mammals themselves. Therefore, use of experimental mammals for biomedical research should not be restricted for those species that can be bred in captivity may be used for biomedical research under the animal ethical committee guidelines of concern organization.

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