Animal Ethics and Welfare - An Update

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ABSTRACT
Animal ethics is a term used to describe human-animal relationships and how animals ought to be treated. Animal welfare serves as a platform which prevents animals from unnecessary suffering. Yet another concept is that, each individual animal has an intrinsic value, and should be respected and protected. Whereas Animal rights denotes the philosophical belief that animals should have rights, including the right to live their lives free of human intervention. The present review highlights the concept and mile stones of animal welfare and ethics.

Keywords: Animal ethics, animal welfare, rats, mice.

1. INTRODUCTION
For the past century animal research had played a vital role in many scientific and medical advances and thus paved a way for our understanding of various diseases. This understanding of diseases using animal models helps in the development of effective medical treatments. World is a better place for human living but on the other hand it is the scariest place for the animals. Question arises for this unbalanced living environment where one community enjoys the life by the sacrifice of the other. This unbalanced living environment occurs as a result where these animals provide scientists with complex living systems consisting of cells, tissues and organs. Yet another reason may include animal models ability to respond to the stimuli, giving researchers a clear cut idea about the compound moving through a living system and a clue of how those stimuli might react in a human being. Unlike other living organism, animals are biologically similar to humans in many ways which makes them - an effective model for researchers to study. However, the use of animals in scientific and medical research is being a subject of debate for many decades which opened a way for the term “Animal Ethics and Welfare”.

Animal ethics is a term used to describe human-animal relationships and how animals ought to be treated. It rather includes two different concepts which refer to a Social Reality, i.e. how, in different contexts, human beings actually use and treat animals, and also how they think about their treatment of animals. It also refers to a branch of Applied Philosophy which, relies on the theories of good and bad, right and wrong where discussion arose as of how we ought to use and treat animals. On the other hand is comes the term “Animal Welfare”. Very often the term animal welfare and animal rights is synonymously used and even now the actual meaning is unaware for many. The difference between both the concepts is visualized...
Animal welfare serves as a platform which prevents animals from unnecessary suffering. Yet another concept is that, each individual animal has an intrinsic value, and should be respected and protected. Whereas Animal rights denotes the philosophical belief that animals should have rights, including the right to live their lives free of human intervention.

Animal welfare is much more complex than we think. It’s not just the absence of cruelty but rather it include different states as per the WSPA (World Society for the Protection of Animals):

**Physical State:** it is how the animal copes with its environment (i.e.) coping is a reflection of physical condition of an animal.

**Mental State:** it is how the animals feel (i.e.) whether it’s in a stressful condition or it is compatible with the environment.

**Naturalness:** it is the ability of animals to fulfill its natural needs and desires.

The mouse genome and the human genome are believed to have the same complement of genes. Hence knowing the functions of these genes provide an effective way of discovering the role of a gene in human health and disease. Transgenic rats are found to have a promising future in the field of medicine and also it is found to be the better alternative for studying certain human disease than the mice [1]. Recently, the mouse and rat genomes were sequenced. This achievement promises to significantly advance biomedicine. A better observation of what happens during the progression of Parkinson’s disease, cancer, cystic fibrosis, heart disease, memory loss, muscular dystrophy, and spinal cord injuries can be studied by the alterations made in the genetic traits. A very recent discovery is the sequencing of whole mouse and rat genome which provide the advancement in biomedicine.

### 2. Animals used in medical research

The fact that animals and people are having more or less similar biological characteristics make them the most suitable model for medical research. Most commonly used animals in research include rats and mice. They make up 90–95% of the mammals in biomedical research. Rest 5% comprises of guinea pigs, rabbits, hamsters, and farm animals such as pigs and sheep, cats, dogs and non-human primates.

### 3. Types of animals in research

#### 3.1 Rats and Mice

Guinea pigs are widely used as it serves for wide range medical experiments. These models are important for toxicology and teratology studies due to its long gestation period with mature central nervous system at birth. It is also found that it is being important for studies like asthma, nutrition studies, environmental pollution, entomology, inner ear and wound healing. Guinea pig serum contains hemolytic complement with higher activity levels than other lab animals and hence it is used as a source for complement fixation test. It is also found that Guinea Pig immune system possesses a similar antigen-macrophage interaction to man [2].

#### 3.3 Rabbits

Rabbits are small mammals in found in several parts of the world. The fact that the microstructure and macrostructure of rabbit bone are dissimilar to human
bone exist these rabbit models are still used for screening implant material prior to testing in a larger animal model. There are many strains for rabbits and the most commonly used animal strain is New Zealand white strains of rabbit. These strains are less aggressive and have less health problems as compared with other breeds.

3.4 Hamsters

The hamster has unique characteristics which make it a valuable and well suited laboratory animal for biomedical research. Hamsters used in research may be classified into three different strains namely, the Syrian or golden hamster, the European or black hamster (Cricetus cricetus) and the Chinese hamster. Nowadays Chinese hamster is being widely used in research. Micro circulation and transplantation of neonatal, adult, and neoplastic tissue studies was made possible by the eversible cheek pouch in hamsters [3].

3.5 Farm animals

The term farm animal refers to a mammal or bird commonly kept for agricultural purposes, and also those used for food, fibre, fertilizer or work. Farm animal used in research include dairy and beef cattle, sheep, goats, swine, poultry, horses and farmed wildlife. Recently farm animals are used in fetal and pediatric nutrition research. As nutritional science is advanced into nutrigenomics, nutriproteomics, and metabolomics, the research interaction on farm animals and human nutrition leads to the production of genetically modified farm animals (improved function and product quality) for agricultural needs [4].

3.6 Cats

Cats are used in biomedical research due to their various contributions in the field of medicine. Research on cats paved a way for the development of vaccines against AIDS and provide us with a better understanding of eye disorders like amblyopia (“lazy eye”) and strabismus (“cross-eye”) [5]. They also have contributed to research on glaucoma and cataract surgery. Contribution of cats in medical research is higher than our expectations. Cats also suffer from hearing disorder due to exposure of high level noises, this similarity enabled researches to study the effects of noise on cats and apply the information to humans. Yet another area where cats are found useful is in curing diabetes mellitus [6].

3.7 Dogs

Dogs contribution to various fields of medicine are numerous and mentioned below are some of the ongoing research on dogs. Resemblance of dogs cardiovascular and respiratory systems to those of a human being, serves as an instrumental to the current research where understanding the functions and diseases of these organs are made possible. The greatest disadvantage in organ transplantation is organ rejection and the immunological basis of organ rejection was studied by the researchers which showed a new future in the field of organ transplant in human beings. Other fields of medicine where dogs give us a promising future include diabetes, trauma and shock, skeletal system, anesthesia, microsurgery, gastrointestinal system and neurological research. [7].

3.8 Non-Human Primates

The non-human primates used in the field of research include monkeys, baboons, chimpanzees, rhesus macaque monkeys and the cotton-topped tamarin, a monkey native to Columbia. Cancer studies are nowadays carried out with non-human primates. Baboons are being used in bone marrow cancer research where it led to a cell-separation technique that allows cancerous cells in bone marrow to be removed without destroying healthy cells. Baboons are also being used in the development of artificial blood vessels to bypass or replace segments of arteries block by atherosclerosis [8].

Cancer that arises from solid tumors is being studied with the help of chimpanzees. Research in primates also leads to development of newer drug against the parasitic disease, malaria. It also brings forth novel techniques to treat Parkinson’s disease and Alzheimer’s disease. Studies in rhesus macaque monkeys explore ways to reduce multiple organ failure following hypotensive shock, a loss of blood pressure due to loss of blood. Nutrition studies are also being carried out with these non-human primates which serves as a solution for human obesity, taurine deficiency, which causes vision problems, and zinc deficiency, which causes growth retardation among infants and fetuses. The success rate of in vitro fertilization can be raised by research on primates that provides clues to what causes infertility [9].
4. Principles of Humane Experimental Technique – 3R’S

When working with animal models the important thing to be considered is that the animals tested should be at minimal distress or pain. For more than 5 decades scientists rely on the “Principles of Humane Experimental Technique” published by William Russell and Rex Burch in 1959. This principle put forward the concept of 3R’s (Replace, Reduce and Refine), the guiding principles for more ethical use of animals in testing.

- Replace: this method refers to the preferred use of non-animal methods over animal methods whenever it is possible to achieve the same scientific aim.
- Reduce: this method enable researchers to obtain comparable levels of information from fewer animals, or to obtain more information from the same number of animals.
- Refine: this method minimize potential pain, suffering, or distress, and enhance animal welfare for the animals used.

Putting together the above concept, every effort should be taken to Replace animals with other alternative, to Reduce the number of animals used, and to Refine experiments which used animals so that they caused the minimum pain and distress [10].

5. Milestones in Animal Welfare

5.1 Global scenario

The United Kingdom was the first country in the world to implement laws protecting animals. They started in 1822 by introducing an Act to Prevent the Cruel and Improper Treatment of Cattle which was passed by Parliament. In 1911 was the first general animal protection law came into existence, called the Protection of Animals Act. It was updated several times since. Replacement of The Protection of Animals Act with The Animal Welfare Act was effective since 2007. Other laws in UK which protect animals include,

- The Performing Animals (Regulation) Act 1925
- The Pet Animals Act 1951 (amended 1983)
- Cock fighting Act 1952
- Abandonment of Animals Act 1960
- Animal Boarding Establishments Act 1963
- Riding Establishments Act 1964 and 1970
- The Breeding of Dogs Act 1973
- The Dangerous Wild Animals Act 1976
- The Zoo Licensing Act 1981
- The Breeding of Dogs Act 1991
- The Breeding and Sale of Dogs (Welfare) Act 1999
- Farriers (Registration) Act 1975 and the Farriers (Registration) (Amendment) Act 1977
- Protection Against Cruel Tethering Act 1988

5.2 Indian Scenario

In India, animal welfare and animal protection was enacted as early as 1960's called the 'Prevention of Cruelty to Animals Act' amended in 1982 which provided the prevention of cruelty to animals in general. The act provides the Animal Welfare Board to constitute a Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). The main of the committee is to take care of the legal and ethical aspects of experimental animals being used in research and enact preventive measures wherever there is violation of the law. A Gazette Notification was issued by CPCSEA in December 1998 called “Breeding of and experiment on Animals (Control) and (Supervision) Rules, 1998” and it’s amended in February 2001 to accomplish the above intent. Animal protection law which is reinforced in India are listed below,

- The Prevention of Cruelty to Animals Act, 1960
- Transportation of Animals Rules, 1978
- CPCSEA Rules, 1998
- Cinematograph Act, 1952
- Wildlife Protection Act, 1972
- Animal Birth Control Rules, 2001

6. Conclusion

Animal protection is a human action but animal welfare is a varying quality of a living animal. The scientific study of animal welfare has developed rapidly during the last fifteen years. The concepts had been refined and a range of methods of assessment have been developed. Substantial challenges to animal functioning include those resulting from: pathogens, tissue damage, attack or threat of attack by a conspecific or predator, other social competition, complexity of information processing in a situation
where an individual receives excessive stimulation, lack of key stimuli such as a teat for a young mammal or social contact cues, lack of overall stimulation, and inability to control interactions with the environment.

Conflict of Interest

The author declare that there is no conflict of interest.

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