An Overview of Using Animals in Laboratory: Review

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Abstract **- Using animals in research has historically proved to be useful. During the initial phase where ethics were not as strong as it is today, there were no regulations at all. But soon animal rights became a significant point of discussion within the society. Ethical guidelines were established to curtail unregulated use of animals in scientific procedures. But this did not end the debate of whether or not researchers should use animals to perform experiments. Moreover, the arguments from both ends are comprehensive and valid. This eventually has led to researchers trying to find other alternatives that could potentially help replace the need for animals in research. These alternatives are improving with the help of constant technological advancements and will be exclusively implemented ethically in further times.**

Index Terms **- Animal ethics, animal research, law, experimentation.**

I.INTRODUCTION

A lot of research into understanding behavior is being conducted in the field of psychology which can eventually contribute towards the welfare of animals and humans. Although most research in psychology uses humans as subjects, studies involving animals still continue to play an important role in trying to address certain fundamental questions. The study of animal behavior has a long history, going back more than 2000 years. But laboratory research got well known only in the twentieth century with the ascent of behaviorism, with research utilizing animal models to gain more insight about the human processes of learning and memory. (Jayne & See, 2019).

The impact of research on animals, as well as their welfare, depends on the nature of the experiments. Animals have been used frequently throughout the history of biomedical as well as in laboratory research. Going through the history of using the animal in the experiment, early Greek physician-scientists, Erasistratus, (304 – 258 BC), and Aristotle (384 – 322 BC), performed experiments on living animals. And Galen (129 – 199 / 217 AD), a Greek physician who practiced in Rome and was a nobleman in the history of medicine, conducted animal experiments to advance the understanding of physiology, anatomy, pathology, and pharmacology. Ibn Zuhr, an Arab physician in the 12th century, introduced animal testing as an experimental technique for testing surgical procedures beforehand applying them to human patients. And In recent years, the practice of using animals for biomedical or laboratory research has come under severe criticism by animal rights and protection groups. Laws have been approved in several countries to make the practice more 'humane.' Debates on the ethics of animal testing have raged since the seventeenth century. Theodore Roosevelt, in the 19th century, stated, "Common sense without conscience may lead to crime, but conscience without common sense may lead to folly, which is the handmaiden of crime." (Animal Testing and Medicine, n.d.).

The first extensive opposition to the use of animals in research was expressed in the 19th century. Even before this, however, concerns had arisen about the treatment of farm animals. The first piece of legislation to prohibit cruelty to animals was accepted by the General Court of Massachusetts in 1641 and specified that "No man shall exercise any tyranny or cruelty towards any brute creatures which are usually kept for man's use" (Stone, 1977). In England, Martin's Act was passed in 1822 to provide protection for farm animals. In 1824, the SPCA (Society for the Prevention of Cruelty to Animals) was founded to ensure that this act was observed. (Introduction - Use of Laboratory Animals in Biomedical and Behavioral Research - NCBI Bookshelf, n.d.).

Animal researches have been conducted for a very long time. One of the main arguments for animal testing is the fact that we can produce data that will be beneficial for treating disease in humans. Though, the use of non-human subjects for research has become an area for intense debate. Within the realm of the scientific debate, there arise questions whether we should utilize animals in experimentation; we could

find two positions for this issue: those for and those against. Disapproval against animal experimentation is based on the belief that it is but one more among a number of research methods, and as such, is insufficient at present. It should be stressed that this attitude does not question the practicality of experimentation in previous periods, but rather states that sciences now have better approaches available. The arguments in contradiction of animal experimentation are based mostly on the concept that animal 'models may even establish similarities with human conditions, but that no theory can be proven or disproved by similarity. This can be verified by a series of errors in the biomedical/ laboratory field during the time in which it was still grounded on animal experimentation (Barnard & Kaufman, 1997). With that, according to this view, the attention given to animal research averts the focus from other more effective methodologies for combating health-related problems (Sharpe, 1989:111). (Cheluvappa et al., 2017). Those in contradiction of, contend that the advantage to humans does not validate the harm to animals. Several people also believe that animals are inferior to human beings and very different from them, henceforth results from animals cannot be applied to humans. (Animal Testing and Medicine, n.d.).

Food deprivation was every often utilized as a strategy to propel lab animal subjects to "perform". This is still oftentimes utilized today across behavioral research. In the 1920s, Pavlov utilized canines to exhibit classical conditioning: a dog was isolated and separated in a space for prepping them to be used for a series of trial where food would be paired with another neutral stimulus (like the sound of a bell), so as to record their reaction in terms of salivation. Still utilized today and created during the 1920s by Skinner, the Skinner Box (now and then alluded to as an "operant chamber") confines partially food-deprived animals (regularly pigeons or rodents) within a crate with a gadget they should work to get a food reward. Sometimes, animals were also additionally offered amphetamines to evaluate the effect it would have on their conduct under these conditions. Furthermore, concepts such as helplessness and depression were understood through studies that conducted experiments which included giving dogs electric shocks. But this was not the only path of development that came out of beginning research in animals. A contrasting method of studying the natural behavior of animals, known as ethology, also came about. Ethology mainly focused on questions about animals and their behavior in a natural setting. But these studies too, at times, took in those animals into laboratories to study them further. For example, certain studies would use an attached lens to the animal's eye or would cut certain nerves in them to observe how they would navigate their way through their habitat.

II. REVIEW OF LITERATURE

The study done by Domjan & Purdy (1995) clearly states the justifications for conducting research on animals. They also clearly articulate about how all of the books that were published at the time, included some examples of research in which the use of animals was stated. But, the exact need for using animals instead of humans were not explained. Animal research has also contributed significantly to the exploration of concepts such as sensation and perception. Much of what is known about the anatomy and physiology of senses such as vision, hearing, taste, touch, and smell has come from animal research.

Studies with animals have also helped in developing a greater understanding about the physiological and neural bases of emotion and have also been helpful in terms of testing competing theories of emotion. Animal research has also been instrumental in guiding research on the opponent process theory of emotion, aggression, and the relation between frustration and aggression. Even the fundamental understanding of the neurophysiological mechanisms of drug action are also an indirect result of animal study. Behavior therapies are well grounded in basic behavioral research with animals. This can be seen in a number of essential treatments for psychological disorders that are derived from animal research.

Moreover, even though an animal model would not be completely representative of human anatomy, physiology, cognition or behavior, it is still helpful in drawing conclusions due to various reasons. For example, mice and rats (which share 95 per cent of our genes) are very close models and actually represent most of the human characteristics and attributes in an excellent way. Claude Bernard who is known as the father of physiology, stated that "experiments on animals are completely conclusive for the hygiene and toxicology of man. The effects of these materials are

the same on man as on animals, save for differences in degree". Bernard made-up animal experimentation as part of the standard scientific method. (Animal Testing and Medicine, n.d.). The arguments are based on the various benefits increasing from animal experimentation for both animal and human health (AMA, 1989; Smith & Boyd, 1991:25-44; Paton, 1993:55-107). As per to animals are a 'model' for the human species, there seems to be agreement that the 'ideal model may not exist', but 'most appropriate model' exists. This can be made known by the biological continuum between the knowledge accumulated from animals, species and the adoption of given criteria for validation of these models (Held, 1983: 13).

Lorenz stated that "When behaviorists place experimental pigeons in an opaque box that prevents their perception of any information except the frequency and time at which the animal presses a bar, I cannot avoid thinking that they select not to see pigeons' various other activities because they are fearful that it might diminish their belief in their own explanatory monism." Science took such an observation as the basis for accepting certain stances towards the existence of given conditions for the performance of animal experimentation, stating that "the presenceof pain can induce a range of undesirable physical or biological changes which may change the rate of recovery from surgical measures, and these changes may have an effect on the results obtained" (Wolfensohn & Lloyd, 1995:174). Thus, 'animal welfare', over ethical considerations, became a significant aspect of scientific methodology and permitted for the overview of The Principles of Humane Experimental Technique, established since 1959 (Russel & Burch, 1992), aimed at attaining the three R's ('replacement', 'reduction', 'refinement') in the utilization of animals for scientific purposes.

Where in the First R, animal experiments must be replaced somewhere possible by other approaches such as an in vitro biological system or mathematical modeling.

In the Second R, there must be a reduction in the number of animals being used. Only the number mandatory to obtain reliable data must be used in an experiment.

The Third R shows that the study must be refined to minimize its overall impact on the animals used (Ethics and animal experimentation: what is debated?).

III. CONCLUSION

Overall, we could find that Animal ethics is an issue as important as human welfare. More efforts need to be undertaken for effective implementation of 3 Rs during laboratory use of animals. Animals have been made use in research as it usually simulates human biology. The ethics relating to animal research evolved over centuries of philosophical traditions, and not firm rules of operation, but an avenue to show our moral obligations towards research animals. Russell and Burch set of 3Rs (Replacement, Reduction, and Refinement) are currently the most utilized set of animal ethics. (Cheluvappa et al., 2017b). Excluding animals from experimental research is not a very viable option, but there are other methods being developed that can potentially deliver an alternative means for drug and chemical testing, up to some levels. These include the use of computer models, cells and tissue cultures and other types of organisms such as eukaryotes, some of the lower vertebrates and invertebrates. Advantages with these methods are, time efficiency, requires less manpower, and cost effectiveness. In the near future, integrated approaches that would result in minimum involvement of animals in scientific procedures may help research be more ethically effective.

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