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Ethical considerations in animal studies

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Abstract

Scientists undoubtedly owe their great advance and knowledge in biomedical research to millions of animals which they use every year in often-times extremely painful and distressing scientific procedures. One of the important issues in scientific research is to consider ethics in animal experimentation. Since this is a crucial issue in the modern era of medical research, in this paper, we have provided some guidelines (most of which have been adopted from Guidelines for Ethical Conduct in the Care and Use of Animals provided by American Association of Psychologists) which could be useful for researchers to design studies on a variety of animals.

Key words: *Ethics, Code of ethics, Ethics in research.*

Introduction

‘‘Frankenstein science’’ is a phrase never far from the lips of those who object strongly to some aspects of science or indeed some supposed abuse by scientists (1, 2). We should not, however, forget the powerful obligation there is to undertake, support, and participate in scientific research, particularly biomedical research, and the powerful moral imperative that underpins these obligations. Now, it is more imperative than ever to articulate these obligations and to do so is the subject and the object of this paper (1). One of the pivotal issues in scientific research is to consider ethics in animal experimentation. Animal research has had a pivotal contribution to a large number of scientific advances of the past century and continues to aid our understanding of various diseases (3-5). Additionally, the use of animals in experimental research parallels the development of medicine, which had its roots in ancient Greece (Aristotle, Hippocrate). Experiments on animals initially could be performed without great moral problems which were in accordance with the Cartesian philosophy in the 17th century. The discovery of anaesthetics and Darwin's publication on the “Origin of Species”, defending the biological similarities between man and animal, contributed to the increase of animal experimentation (6- 8) and this issue besides the increased interest and concern in animal welfare issues led to legislative regulations in many countries and the establishment of animal ethics committees (6). For instance, it has been reported that approximately 2.7 million

regulated animal procedures were conducted in 2003 in the UK - half the number performed 30 years ago (4). Legislation of animal experimentation in modern societies is based on the supposition that this is ethically acceptable when certain more-or-less defined formal (e.g. logistical, technical) demands and ethical principles are met (9). The main parameters in this context correspond to the "3Rs" concept as defined by Russel and Burch in 1959, i.e., that all efforts to replace, reduce, and refine experiments must be undertaken (4, 5, 9, 10, 11). The licensing of animal experiments normally requires an ethical evaluation process, often-times undertaken by ethics committees (12, 13). Since considering ethics in animal experiments is a crucial issue in the modern era of medical research, in this paper, we have provided some guidelines (most of which have been adopted from Guidelines for Ethical Conduct in the Care and Use of Animals provided by American Association of Psychologists) which could be useful for researchers to design studies on a variety of animals.

Justification of the research

Before using animals, it is mandatory for researchers to clearly clarify their scientific purpose. There should be a reasonable expectation that the research will result in increasing scientific knowledge in different aspects of biomedicine and also will increase understanding of the species under study or provide results that could improve the quality of health or welfare of humans or other animals. The scientific purpose of the research should be of sufficient potential significance to justify the use of animals. The species chosen for study should be the best suited to answer the question(s) posed. Moreover, it is noteworthy that good experimental design helps reducing the number of animals used in research since they allow scientists to collect data using the minimum number of animals required. However, a sufficient number must be used to enable precise statistical analysis and results, preventing the repetition of experiments and the consequent need to use more animals (4).

Personnels and researchers

Scientists should ensure that all individuals who use animals under their supervision receive explicit instruction in experimental methods and in the care, maintenance, and handling of the species being studied. Refining the experimental procedures themselves and refining the management of pain are the most important issues that researcher should be aware of. They should carefully assess the method of administration, the effects of the substance on the animal, and the amount of handling and restraint required. The researchers should handle the animals carefully and administer appropriate anaesthetics and analgesics during the experiments. These works can help to reduce any pain experienced by the animals during procedures. This culture of care is achieved not only through strict regulations but also by ensuring that animal technicians and other workers understand and adopt such regulations 4, 9, 14, 15). Therefore, adequate training is an important aspect of the refinement of animal research, and should continually be reviewed and improved (4).

Care and housing animals

All procedures on animals are to be reviewed by a local animal care committee to ensure that the procedures are appropriate and humane. In the event that it is not possible to constitute an appropriate local animal care committee, scientists are encouraged to seek advice from a corresponding committee of a cooperative institution. Responsibilities for the conditions under which animals are kept, both within and outside of the context of active experimentation or teaching, rests with the researcher under the supervision of the animal care committee and with individuals appointed by the institution to oversee animal care. Therefore, researchers are encouraged to consider enriching the environments of their laboratory animals. In this regard, legislation in Britain, Scandinavia and in many European countries has been seemingly efficient and effective because of the relatively small number of research institutions and scientists in those countries (4, 9, 10). However, American scientists are facing three possibilities: mandatory regulation (legislation), self-regulation, or some combination of both. Self-regulation of animal experimentation appears to be the optimal choice. It would reflect the success of animal protection groups in raising the consciousness and concerns of scientists about the humane treatment of experimental animals: (1) reducing the numbers of animals used for experimentation, (2) unnecessary duplication of experiments, and (3) minimizing pain and distress. Although scientists are proceeding toward a program(s) of self-regulation, this approach will be based on the scientific method and will not satisfy completely the differences between scientific and animal protection groups (4, 5, 10, 14).

Experimental procedures

Humane consideration for the well-being of the animal should be incorporated into the design and conduct of all procedures involving animals. Surgical procedures require close supervision and attention to humane considerations by the scientist. Aseptic techniques must be used on laboratory animals whenever possible. All surgical procedures

and anesthetization should be conducted under the direct supervision of a person who is competent in the use of the procedures. If the surgical procedure is likely to cause greater discomfort than that attending anesthetization, and, unless there is specific justification for acting otherwise, animals should be maintained under anesthesia until the procedure is ended. Animals cannot be subjected to successive surgical procedures unless these are required by the nature of the research, the nature of the surgery, or for the well-being of the animal. Multiple surgeries on the same animal must receive special approval from the animal care committee.

Conclusion

Millions of animals are used every year in many extremely painful and distressing scientific procedures. Legislation of animal experimentation in modern societies is based on the supposition that this is ethically acceptable when certain more-or-less defined formal (e.g. logistical, technical) demands and ethical principles are met. In this paper, we gathered some guidelines for using animals in medical research which could be useful for researchers to design their studies on a variety of animals.

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