NELSON MANDELA UNIVERSITY

Guidelines for Ethical Conduct in the Care and Handling of Animals used for Research and Education at the Nelson Mandela University.

Introduction

The use of animals is absolutely essential for the biological and health sciences teaching and research programmes in all modern Universities. However, there are many people and organisations that disapprove of animal experiments on the grounds that they are morally indefensible and the experiments conducted on animals have no direct value or relevance for man.

The case for using animals in the pursuit of scientific and medical objectives is however overwhelming when it is viewed against a background of the vast benefits to both animals and man which have arisen directly from past animal research, and the reasonable expectation that such research will be of equal or greater benefit to all forms of life in the future.

While this point of view may serve to justify the continuation of animal experimentation in general, the scientific community must never lose sight of the fact that even though the use of animals for teaching and research is not perhaps an issue of the first importance in our society it does arouse deep emotions. Therefore we need to exercise special care with our public relations in this area, for concern for the welfare of animals is not only our business, but society's in general.

The use of animal models for teaching and research is a longstanding imperative. It is in the effective and humane use of animal models where improvements must be sought: it requires the expert handling of a body of knowledge and manual skills that must be acquired by caregivers and users. The ethical review of proposed animal experiments is predicated upon the acceptance that non-human animals are organisms fully worthy of moral concern, and as such their interests must be protected as far as possible in their use for advancement of biological knowledge and for the promotion of the health and welfare of animals and humans and the protection of the environment.

Additional information and informed opinion can be obtained from a Medical Research Council document named Guidelines on Ethics for Medical Research: Book 3 : Use of animals in Research and Training which is available on-line free of charge. The necessary contact information is given at the end of this document.

Purpose and Scope

A Research Ethics Committee (Animals) (REC-A) has been appointed by the University Senate to monitor the treatment of living animals at the Nelson Mandela University. The functions of the REC-A include:

assisting animal users with any ethical problem which their teaching or research projects may raise
ensuring that animal care and use is in keeping with the institutional policies and accepted scientific practice

The REC-A has been charged with the responsibility of reviewing all protocols involving animal use in order to ensure that they have been prepared in accordance with acceptable ethical and scientific standards.

Any pain, suffering, stress, distress or other discomfort suffered by an animal must be minimised, and must be justifiable by the benefits or potential benefits that such discomfort may bring. Since the reputation, standing and image of the Nelson Mandela University is what is at risk, the Nelson Mandela University has to be in a position to justify to the public any discomfort caused to an animal. Hence the Nelson Mandela University by way of the REC-A must be put in a position to justify any discomfort. This is done through the medium of the answers given by applicants for ethics approval submitted to the REC-A. In order to foster, encourage and expand a positive attitude and proactive "ethical thinking" in the research and teaching fraternity at Nelson Mandela University, considerable effort has gone into streamling and simplifying the process of application for ethics approval. Please approach the task of applying for ethics approval from the perspective of empowering the committee to see that you have put thought and effort into minimising distress in the animals involved, and that the benefits warrant the costs (as measured in animal discomfort).

Formal application must be made to the REC-A (using the appropriate electronic form, available on the Intranet and from the Nelson Mandela University Research Capacity Development Department) for all activities that involve live animals.

The procedure has been adopted in order to:

Prevent objectionable activities
Encourage humane practices
Provide for accountability to the public for all animal experiments which are performed in the University.

No research or teaching activity involving the use of animals may be commenced until it has been authorised by the REC-A. Records of all experiments performed on living animals must be kept by the applicant, and must be available upon request for inspection by the REC-A. Entries must be kept up to date.

The proposal must be signed which will serve as a declaration that the applicant has read, understood and will comply with the guidelines in this document and has taken cognisance of the availability (on-line) of the Medical Research Council Guidelines on Ethics for Medical Research: Use of animals in Research and Training at http://www.sahealthinfo.org/ethics/index.htm and information relating to appropriate sizes of cages which may be found in: EEC Directive 86/609 and NIH Publication recommendations n. 86.23 (U.S.A.)

This guide has been prepared to give direction to the use of animals by students, academics and technical personnel in the University. Attention is directed to the important ethical, legal and scientific responsibilities associated with animal experimentation, and guiding principles are given to assist individual animal users and University Departments in discharging their obligations in this regard.

While the REC-A wishes to emphasise that nothing in this Guide is intended to limit an investigator's freedom and obligation to plan and conduct animal experiments in accordance with accepted scientific practice, animal-based teaching and research must:

address an important question relevant to the objectives in advancing knowledge, education, science and human and animal welfare, and be based on a plausible hypothesis and have a reasonable prospect of yielding good results.

In the use of animals, animal interests obligate scientists and educators to:

- Not allow animals to be used for research and/or to be killed for trivial, irrational, unjustified or inappropriate reasons;
- Permit animals to live, reproduce and grow under conditions that are comfortable and reasonably natural to their species;
- Keep animals free from disease, parasitism, injury and pain by prevention, rapid diagnosis and treatment;
- Allow animals to be able to express normal behaviour through providing as far as possible sufficient space, proper facilities in which to live and in the company of the animal's own kind, recognising their inherently social nature, and hence the necessity of a social relationship for many species;
- Protect animals from fear, deprivation, stress, distress and pain by ensuring that their living conditions, handling and treatment will be such that it will either minimise or eliminate the causation of these states upon those animals which are used for research, teaching and testing; and
- Not unnecessarily repeat animal experiments the outcome of which are already known or are predictable.

Humane Considerations in the use of Animals

The humane care and use of all animal life is the concern of any ethical and conscientious society, and is a primary responsibility of persons who use animals for research or educational purposes.

It should be appreciated that all humans are not naturally endowed with an instinct to be kind to animals. Although based in part on the conditioning of inborn emotional responses, the evolution of humaneness is associated principally with the psychological and social development of individuals. Although humaneness is part of many cultures this does not always suffice to protect the interests of animals when they are used in research to promote human welfare. There is nothing in the process of becoming an animal technician or a scientist who experiments with animals that ensures humaneness unless their education includes attention to this problem. Animal experimentation should therefore be considered to be a discipline for which a special education programme is necessary.

Many animal experiments such as those concerned with for example nutritional studies, reproduction, animal behaviour, parasitic infestation, etc. can be conducted without inflicting any pain on an animal. The same cannot be said of many physiological and surgical experiments in which operative procedures have to be performed. Despite good anaesthetic and surgical techniques and post-operative care, the procedures are unavoidably unpleasant for the animal subject on which they are performed. The use of large numbers of small animals for biological assay procedures, drug and vaccine development and testing and toxicity testing in which substances are administered orally, topically or parenterally often produce extreme discomfort and death. In many instances food and drug standards are maintained by biological testing which is mandatory in terms of legislation.

No scientist who is well informed can therefore honestly claim that animals never experience pain and discomfort, or that the quality of animal care and treatment in all laboratories and institutions is optimal. The ethical position of the scientific community is weakened if it exhibits ignorance of these facts or attempt to conceal them.

A by-product of mankind's capacity for social co-operation - which surpasses all other animal species - is a friendly and constructive attitude to lower animals. This attitude comprises the concept of humaneness as it is applicable to the animal kingdom.

In the concept of animal experimentation, humaneness is concerned with reducing the sum total of fear, discomfort and pain that may be caused to animals. Such discomfort and pain may be caused by an experimental procedure or may be a contingent factor arising from methods of animal procurement, transportation, nutrition, handling and restraint or from exposure to injury, communicable disease or parasitism. Contingent inhumanity is almost always detrimental to the objectives of an experiment since it introduces psychological and physiological disturbances which are likely to confuse almost any biological investigation.

In reducing the sum total of discomfort and pain in an animal experiment, both quantitative and qualitative aspects need to be considered. These concern the number of experimental subjects and the severity of distress and pain which a procedure may produce in the individual animal subject.

Minimising the sum total of stress, discomfort and pain may be accomplished by applying the following three approaches:

Replacement: of living animals with nonsentient research systems where possible, i.e. researchers should strive to avoid using animals if alternative methods can yield the data they need.

Reduction: of the numbers of animals which are to be used to a minimum by the right choice of strategies in the planning and performance of research and by the application of statistical design in order to achieve only sufficient statistical power to allow the objectives of the experiment to be achieved.

Refinement: of the experimental methodology to be adopted by the implementation and if necessary the improvisation of procedures which will have the least distressing or harmful effect to the animals, and when this is not avoidable to counter those effects by the use of ataractics (tranquilisers), neuroleptics (dissociative agents), anaesthetics, analgesics and other effective strategies. Included is the application of technological advancement in order to reduce the severity of an experimental procedure on the animals which still have to be used, and the elimination of contingent inhumanity which is associated with handling and husbandry in an animal facility.

Pain in Animals

In considering pain and stress in animals, it is necessary to put these terms into some perspective, for a human assessment of these states in animals must be subjective and anthropomorphic. Most people who perform experiments on animals are not experts on pain and would differ in their judgement of what is, and is not acceptable in animal experimentation.

There is scientific evidence that all mammals have physical structures which seem to be involved in the production of sensation of pain, and, that these function in the same way as in man. The responses to given stimuli have, however, been observed to vary widely in man and animals. The detection and assessment of pain thus poses a formidable problem for animal users. Untill there is greater understanding of this intractable problem, it must be assumed that any procedure that would cause pain or distress in man would also do so in an animal, and it would follow that the animal should be protected from the possible ill-effects. For example, in experiments involving surgery with subsequent recovery, this principle would require not only adequate anaesthesia during the operation but also proper postoperative care. An animal subjected to a procedure that is initially so trivial as to require no anaesthetic but which, as a later result, may produce pain, should be carefully observed so that it may receive adequate analgesia or be painlessly destroyed if and when such pain ensues.

Three recognisable states of suffering may be identified:

1. Discomfort (such as may be characterised by such negative signs as poor condition, torpor, diminished appetite).
2. Stress (a condition of tension or anxiety predictable or readily explicable from environmental causes).
3. Pain (recognisable by more positive signs as struggling, squealing, convulsions, severe palpitation).

With regard to these the following recommendations are made:

Each animal user shall take effective precautions to prevent or reduce to a minimum any pain, stress or other distress or discomfort in the animal used.

Every animal which is suffering discomfort which is likely to endure shall be painlessly killed as soon as the experiment is completed.

In no case shall any animal be subjected to severe pain which endures or is likely to endure.

The Use of Animals

Proper care and humane treatment of animals during their use in teaching and research requires scientific and professional judgement. This implies specific knowledge of the needs of the animals, the requirements of research, and adequate facilities to carry out the experimental procedures. The guidelines in this section outline the general procedures and standards of practice that are to be adopted by animal users.

Legal Requirements

Animal users should be aware of the laws applicable to the acquisition, holding and usage of animals and abide by these.

Student Use of Animals

When animals are used by an undergraduate student for education or for research, such work shall be under the direct supervision of an experienced member of staff of the Department in which the project is undertaken. This person will be considered to be primarily responsible for the welfare of the animals used by the student. In postgraduate projects, the senior supervising member of staff is the primary responsible person.

Housing, Handling and Nutrition

Animal facilities should be clean, orderly and free from vermin. The physical comfort of animals should be a prime consideration of all animals users. Physical comfort applied to housing includes factors such as keeping the animal dry, maintaining animals in a state of relative thermal neutrality, providing sufficient space to assume freedom of movement and to allow for normal postural adjustments, avoiding unnecessary physical restraint, and if animals are not housed singly, maintaining them in compatible groups without overcrowding. Unless the approved protocol dictates otherwise, all animals should have daily access to food and water according to their particular requirements. The food should be clean and free of contaminants and be palatable and nutritionally adequate. It should be fed in amounts that will ensure normal growth in immature animals and maintenance of body weight in adults.

For aquatic animals, due attention should be given to providing temperature and salinity holding regimes approximating the natural environment.

Animal Health

Diseased or parasitised animals must be recognised and appropriate steps taken to treat the animals and to control the spread of disease.

Anaesthesia and Analgesia

The proper use of anaesthetics, analgesics and tranquillisers is necessary for humane and scientific reasons. The use and choice of the most appropriate drug(s) are matters of judgement for the investigator concerned in conjunction with a competent advisor if necessary. Muscle relaxants or paralysing drugs are not anaesthetics. They must not be used alone for surgical restraint but may be used with drugs known to be effective anaesthetics or analgesics. Anaesthetics must be administered to animals by competent personnel who are familiar with the agents and their effects on the animal used. All major surgical operations must be done under general anaesthesia. Minor surgical procedures may be done under general anaesthesia or local analgesia. Details of the anaesthesia and analgesia to be used in all animal experiments must be entered on the application forms submitted to the REC-A.

Surgery

Appropriate facilities and equipment should be available for surgical procedures. Laboratory facilities may be used for non-sterile terminal procedures. Laboratory facilities may be used for "clean" surgery on small rodents, birds, amphibians and reptiles. "Clean" surgery entails the use of heat or chemically sterile instruments and surgical materials; cleansing depilation and disinfection of skin surrounding the operative site and scrubbing and disinfection of the operator's hands. All non-terminal surgery on mammals should be done aseptically preferably in a facility intended for aseptic surgery. Aseptic surgery should only be performed by individuals qualified by training or experience.

Post-Operative Care

Appropriate facilities and equipment and trained personnel should be available for the post-operative care of animals. Post-surgical care should include observation until the animal has recovered from anaesthesia, administration of supportive fluids and drugs, care of operative wounds and regular observation to assure the animals physical comfort and optimal recovery.

Euthanasia

Euthanasia is the act of inducing death without exciting the animal or causing distress or pain. A method of euthanasia must be adopted to suit the particular animal species and the requirements of the study. The

administration of a fatal dose of an anaesthetic agent is generally accepted as the most convenient method of euthanasia. Dogs, cats, guinea pigs, rabbits and primates can be killed quickly and humanely by injecting barbiturate solutions intravenously or intraperitoneally. Small rodents, rats, mice and hamsters can be killed by cervical dislocation, intraperitoneal barbiturates or by the use of ether or carbon dioxide in an uncrowded chamber.

Emergency Care

Provision should be made for emergency care of animals. Technical staff or security personnel should know how to reach some responsible individual after hours every day including weekends and holidays to ensure that animals will receive attention if any emergency should arise.

Biological Hazards and Infectious Agents

Wild caught animals and conventional laboratory animals carry infectious agents which are transmissible to man. Animal users should assess the risk of cross infection between animals and persons who come into contact with the animals. Appropriate steps should be taken to inform all persons associated with possible exposure about the hazard which may exist. Adequate precautions should be taken to ensure human safety. In infectious disease studies and other situations in which infectious agents are likely to be present in animals, effective methods of disposal of carcase material and animal wastes must be enforced. While the above paragraph emphasizes animal-human cross infection, animal-animal as well as human-animal cross infection must also bear equally strenuous consideration. A booklet called: Zoonoses-Animal diseases and man (LW van den Heever, JH du Preez – Butterworths) may be useful in assessing the potential risks of cross infection.

Further reading recommended: Medical Research Council Guidelines on Ethics for Medical Research: Use of animals in Research and Training at http://www.sahealthinfo.org/ethics/index.htm

Evolved from a document received from Dr JC Austin, Central Animal Services, University of the Witwatersrand. Adapted with permission by Mr Ian Davidson, UPE (1980). Further modified by Dr PED Winter, Zoology Department, Nelson Mandela University (2005) and information from MRC documentation (Prof D du Toit, TUT) incorporated. Valuable inputs from Dr Shaleen Els and Dr Maryna Lehmann-Maritz.