IMPORTANCE OF FOLLOWING STANDARDIZED GUIDELINES FOR THE CARE AND USE OF LABORATORY ANIMALS IN RESEARCH AND TEACHING IN IRAQI SCIENTIFIC INSTITUTIONS

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Abstract

The proposed study was initiated as a result of the first author visit to one of the American higher education institution as a research scholar couple of years ago. He noticed strict measures taken by the IACUC committee (Institutional Animal Care and Use Committee) within the university when he wanted to learn certain procedures. He then started to discuss the issue with his faculty associate of the possibility of adopting some kind of guidelines on laboratory animals to be used in Iraqi higher education institutions for research and teaching.
To the knowledge of both authors, there is no committee or guidelines on laboratory animals care and use in Iraqi scientific institutions. There was one committee used to look into the ethics of each research proposal years ago and is not functioning at this time and the authors fail to get on touch with any member. This report was sent to the Ministry of Higher Education and Scientific Research in Iraq through the Iraqi cultural attaché for their consideration to implement or use any part of it to start with when doing research and teaching.

**Keywords:** Laboratory Animals In Research, Biological Research

**Introduction**

Researchers all over the world may use laboratory animals during their studies and these animals gave and continue to give so much to humanity that we will not be able to pay them back in whatever we will do to them in the future. However, handling and treatment of these laboratory animals during experimentations whether feeding, watering, or injecting certain medications to study their effects will all end up in a great deal of knowledge to humanity. Handling and treatment of animals are under certain rules and regulations depending on where we are in the world. There are so many associations and institutions which have strict rules on the use and handling of laboratory animals in USA, Europe, Japan, Australia and New Zealand (Kagiyama and Nomura, 2004; Houde et al., 2009). Unfortunately, in most developing countries including Iraq, it is up to the researcher or his/her own technician to determine how to use, handle and treat these laboratory animals when they use them in research experiments.

All high impact factor journals all over the world have strict regulations on what are expected when it comes to laboratory animals experimentations (handling, watering, feeding, method of euthanasia at the end of the study and other criteria). Therefore, the reported findings of the research and the manuscript will be rejected without following these rules and regulations when the researcher did the study under no such guidelines or regulations.

The reason behind suggesting these guidelines is to encourage the faculty all over Iraq to publish and be rewarded according to their effort in research. To our knowledge, the Ministry of Higher Education and Scientific Research (MHER) in Iraq demanded that faculty in all universities within Iraq should first try to publish in high impact journals for their better financial reward and promotion. When any faculty submit a manuscript without mentioning certain protocol number and date of obtaining the approval on use and handling of laboratory animals, the manuscript will be rejected by all esteemed scientific journals.

Therefore this report was initiated after a visit of the first author to Western University of Health Sciences (WUHS), California, USA couple of years ago. During that visit, the author was exposed to the strict requirements, rules and regulations imposed by the IACUC (Institutional Animal Care and Use Committee) and suggested to use a shorter version of it to be presented to the Ministry of Higher Education and Scientific Research (MHESR) in Iraq.
Guide for the Care and Use of Laboratory Animals (CULA) in research and teaching

Who Must Apply for CULA Protocol Approval?

Anyone wishing to conduct research or teaching using animals at Baghdad University must file an Animal Use Protocol (AUP) for review and approval by the specific college Animal Care and Use Committee (ACUC) before the activity begins and before any animals are obtained. The use of animals shall include alive or dead animals obtained by the principal investigator for use in a research or teaching exercise.

Evaluating the Justification for Laboratory Animal Use

If there is no alternative to the use of the specified animals, the ACUC shall evaluate the research and require justification for the number of animals requested. The ACUC will judge the adequacy of the training and skill of the investigator and laboratory personnel and the adequacy of the equipment and facilities. Where appropriate, the ACUC shall enlist the help of consultants in evaluating protocols.

Animal Preparation

All animals must exhibit good health and normal behavior prior to entering a study. Restraint or altered conditions should be planned ahead of time so that the animals will be acclimated to the new conditions prior to conducting the study. Animals must receive physical examination appropriate to the species prior to being used in a study to determine the presence of preexisting abnormalities or conditions which would impact the study results.

Committee to revise the guide for the care and use of laboratory animals

The goal of this guide is to promote the humane care of animals used in biomedical and behavioral research, teaching, and testing; the basic objective is to provide information that will enhance animal well-being, the quality of biomedical research, and the advancement of biologic knowledge that is relevant to humans or animals. The use of animals as experimental subjects in the 20th century has contributed to many important advances in scientific and medical knowledge (Leader and Stark 1987).

Principles

The principles for taking care of animals for research and teaching encourage:

- Design and performance of procedures on the basis of relevance to human or animal health, advancement of knowledge, or the good of society.
- Use of appropriate species, quality, and number of animals.
Avoidance or minimization of discomfort, distress, and pain in concert with sound science.

Use of appropriate sedation, analgesia, or anesthesia.

Establishment of experimental end points.

Provision of appropriate animal husbandry directed and performed by qualified persons.

Conduct of experimentation on living animals only by or under the close supervision of qualified and experienced persons.

In general, the principles stipulate responsibilities of investigators, whose activities regarding use of animals are subject to oversight by an animal care and use committee (ACUC). Responsibility for directing the program is generally given either to a veterinarian with training or experience in laboratory animal science and medicine or to another qualified professional. At least one veterinarian qualified through experience or training in laboratory animal science and medicine or in the species being used must be associated with the program. The institution is responsible for maintaining records of the activities of the ACUC and for conducting an occupational health and safety program.

Monitoring the care and use of animals

Animal Care and Use Committee (ACUC)

The responsible administrative official at each college must appoint an ACUC, to oversee and evaluate the college/institute animal program, procedures, and facilities to ensure that they are consistent with the recommendations in this Guide. ACUC Committee will be consisted of five members elected by their colleagues. The committee members will serve for three years. The first meeting, the committee elects a chair for the committee to serve for one year. The committee is responsible for oversight and evaluation of the animal care and use program and its components. Its functions include inspection of facilities; evaluation of programs and animal-activity areas; submission of reports to responsible institutional officials; review of proposed uses of animals in research, testing, or education (i.e., protocols); and establishment of a mechanism for receipt and review of concerns involving the care and use of animals at the college.

Animal Care and Use Protocols

The following topics should be considered in the preparation and review of animal care and use protocols:

- Rationale and purpose of the proposed use of animals.
- Justification of the species and number of animals requested.
- Availability or appropriateness of the use of less-invasive procedures.
- Adequacy of training and experience of personnel in the procedures used.
- Housing and husbandry requirements.
- Appropriate sedation, analgesia, and anesthesia.
- Unnecessary duplication of experiments.
- Conduct of multiple major operative procedures.
- Criteria and process for timely intervention, removal of animals from a study, or euthanasia if painful or stressful outcomes are anticipated.
- Post procedure care.
- Method of euthanasia or disposition of animal.
- Safety of working environment for personnel.

Personnel caring for animals should be appropriately trained Technical and Professional Education, and the college/institute should provide for formal or on-the-job training to facilitate effective implementation of the program and humane care and use of animals.

**Animal Environment, Housing, and Management**

Proper housing and management of animal facilities are essential to animal well-being, to the quality of research data and teaching or testing programs in which animals are used, and to the health and safety of personnel. A good management program provides the environment, housing, and care that permit animals to grow, mature, reproduce, and maintain good health; provides for their well-being; and minimizes variations that can affect research results.

Many factors should be considered in planning for adequate and appropriate physical and social environment, housing, space, and management. These include:
- The species, strain, and breed of the animal and individual characteristics, such as sex, age, size, behavior, experiences, and health.
- The design and construction of housing.
- The project goals and experimental design (e.g., production, breeding, research, testing, and teaching).
- Animals should be housed with a goal of maximizing species-specific behaviors and minimizing stress-induced behaviors.

**Housing**

**Primary Enclosures**

The primary enclosure (usually a cage, pen, or stall) provides the limits of an animal's immediate environment. Acceptable primary enclosures
- Allow for the normal physiologic and behavioral needs of the animals.
- Allow nonspecific social interaction.
- Make it possible for the animals to remain clean and dry.
- Allow adequate ventilation.
- Allow the animals access to food and water.
➢ Provide a secure environment that does not allow escape of or accidental entrapment of animals.
➢ Are free of sharp edges or projections that could cause injury to the animals.
➢ Allow observation of the animals with minimal disturbance of them.

Primary enclosures should be constructed with materials that balance the needs of the animal with the ability to provide for sanitation. They should have smooth, impervious surfaces with minimal ledges, angles, corners, and overlapping surfaces so that accumulation of dirt, debris, and moisture is reduced and satisfactory cleaning and disinfecting are possible.

All primary enclosures should be kept in good repair to prevent escape of or injury to animals, promote physical comfort, and facilitate sanitation and servicing. Rusting or oxidized equipment that threatens the health or safety of the animals should be repaired or replaced.

Food

Animals should be fed palatable, non-contaminated, and nutritionally adequate food daily or according to their particular requirements unless the protocol in which they are being used requires otherwise.

Water

Ordinarily, animals should have access to potable, uncontaminated drinking water according to their particular requirements. Periodic monitoring for pH, hardness, and microbial or chemical contamination might be necessary to ensure that water quality is acceptable. Water can be treated or purified to minimize or eliminate contamination when protocols require highly purified water. Watering devices, such as drinking tubes and automatic waterers should be checked daily to ensure their proper maintenance, cleanliness, and operation.

Bedding

Animal bedding is a controllable environmental factor that can influence experimental data and animal well-being. The veterinarian or facility manager, in consultation with investigators, should select the most appropriate bedding material. Bedding should be used in amounts sufficient to keep animals dry between cage changes, and, in the case of small laboratory animals, care should be taken to keep the bedding from coming into contact with the water tube, because such contact could cause leakage of water into the cage.

Pain, analgesia, and anesthesia

Minimization of Pain and Distress

The appropriate use of anesthetics and analgesics is important for ethical and regulatory reasons. Pilot studies, in consultation with the attending veterinarian, may be necessary to assess the compatibility of drugs with the investigation proposed. The PI (Primary Investigator) and the
ACUC shall carefully consider any procedures in which alleviation of pain or distress cannot be reasonably assured.

An integral component of veterinary medical care is prevention or alleviation of pain associated with procedural and surgical protocols. The proper use of anesthetics and analgesics in research animals is an ethical and scientific imperative.

Some species-specific behavioral manifestations of pain or distress are used as indicators, for example, vocalization, depression or other behavioral changes, abnormal appearance or posture, and immobility. It is therefore essential that personnel caring for and using animals be very familiar with species-specific (and individual) behavioral, physiologic, and biochemical indicators of well-being. The selection of the most appropriate analgesic or anesthetic should reflect professional judgment as to which best meets clinical and humane requirements without compromising the scientific aspects of the research protocol. Preoperative or intraoperative administration of analgesics might enhance postsurgical analgesia. The selection depends on many factors, such as the species and age of the animal, the type and degree of pain, the likely effects of particular agents on specific organ systems, the length of the operative procedure, and the safety of an agent for an animal, particularly if a physiologic deficit is induced by a surgical or other experimental procedure.

**Euthanasia**

Euthanasia is the act of killing animals by methods that induce rapid unconsciousness and death without pain or distress. In evaluating the appropriateness of methods, some of the criteria that should be considered are ability to induce loss of consciousness and death with no or only momentary pain, distress, or anxiety; reliability; nonreversibility; time required to induce unconsciousness; species and age limitations; compatibility with research objectives; and safety of and emotional effect on personnel.

Euthanasia might be necessary at the end of a protocol or as a means to relieve pain or distress that cannot be alleviated by analgesics, sedatives, or other treatments. Protocols should include criteria for initiating euthanasia, such as degree of a physical or behavioral deficit.

ACUC requires that the methods of euthanasia are consistent with the standardized recommendations used currently among the scientific community in the world. Any deviation from the regular protocol must be justified for scientific reasons and approved by the ACUC.

**Conclusion**

It is clear that compliance with world scientific approach to handling and care of laboratory or experimental animals is a must these days in any country in the world. Therefore, we see that Iraq must consider establishing committees at the university levels and college/institute levels to look into the approval of the protocol used in each and every scientific experiment involving laboratory animals. Once these committees are established and start to offer their help to researchers through training and consultations, the researchers in Iraqi institutions will be able to publish their findings in higher impact reputable refereed scientific journals. This proposal can be modified to include not only laboratory animals but all experimental farm animals whenever used in research or teaching by adding certain paragraphs to describe the handling, use and treatment of these animal species.
References:


11. Western University of Health Sciences Institutional Animal Care and Use Committee Protocol form. http://www.westernu.edu/bin/research/iacuc-policy-manual.pdf Proposed form to be used or modified according to the need of the Iraqi higher education researchers

Ministry of Higher Education and Scientific Research
University of ------------------------/College of --------------------------
Animal Care and Use Protocol Application
Protocol #:_________________________
Type of protocol: [ ] New  
Full Renewal; Old Protocol #--------------- Expiration Date: ---------------------------
Duration of approval: --------------------------- to---------------------------

1. Title of Project: -------------------------------------------------------
2. Principal Investigator:--------------------------------------------------
3. Department/College:-----------------------------------------------------
4. Office phone: email: Emergency phone number:-----------------------------

Declarations
Declarations and Signatures
As the Principal Investigator on this protocol, I acknowledge full responsibility to abide by this protocol and provide assurances for the following:
1. All persons participating in the following approved activities are assuming responsibility for the well-being of all animals involved in these activities.
2. The animals authorized for use in this protocol will be used only in the activities and in the manner described herein, unless deviation is specifically approved by the IACUC.
3. Safety issues have been addressed and all personnel understand the rules and regulations regarding radiation protection, bio-security, animal handling, etc.
4. All personnel involved in animal handling described herein are technically competent, have been specifically trained to appropriate methods, will be supervised to the appropriate degree, and agree to comply with this protocol.
5. This protocol accurately reflects the description of animal use provided in all appropriate funding

Principal Investigator Signature----------------- Date---------------------
Dean/Dept Chair Signature--------------------- Date---------------------

6. For each person, including the PI and off campus personnel, involved in this study that will have animal contact, provide a) their name, email address and phone number, b) Their specific duties in this project, c) A description of their animal training relevant to their duties in this project.

7. Summary of:
   Animal species ----------------------------------------------------
   Number of Animals Requested: Species/Strain ---------------------
   Number Requested -------------------------------------------------
   Gender -------------------------------------------------------------
   Age or Weight ------------------------------------------------------
   Housing Location-----------------------------------------------------
   Vendor/Source --------------------------------------------------------
If additional species are requested, provide information here:
a) Estimate the total (mothers, fathers, and offspring) number of animals on hand at any one time during breeding.
b) Describe any special care or monitoring that may be required.
c) What will be done with any surplus offspring?
d) If transferring animals from an off-campus investigator, an animal transfer form and health report must be submitted and approved prior to protocol approval.

8. For what scientific purpose are these animals being bred?
9. Provide a detailed description of how the animals will be housed and grouped for breeding.
10. Reduction and Replacement of Animals
   a. How does the experimental or course design assure the use of the fewest animals? Justify the numbers of animals requested. This should agree with the numbers in the table requested in 7.
   b. Can the project/course for which these animals are being bred be done using a lower species or a non-animal model? Yes; explain why it is not being used No; how was this determined?

11. Please fill the blank spaces with appropriate responses:
   a. Provide the names, titles and off campus emergency phone numbers of anyone other than the Animal Care Facility personnel who will provide daily animal care, including weekends and holidays.
   b. What will be the criteria used to warrant euthanasia or premature removal from the study/course? ____________________________________________________________
   c. Who will monitor morbidity and serve as a contact person if problems arise?
   d. If euthanizing animals, the IACUC requires pentobarbital, 100 mg per kg, or isoflurane 32%. If not using the required methods, justify.________________________________________________________

12. Transferring Animals
   a. If you will be transporting animals between different colleges or facilities or between institutions, explain.

13. Final Disposition of Animals - Mark all appropriate items and provide the required information.
The animals are under the care of their private owners._______________________________
For euthanizing animals, the ACUC requires pentobarbital, 100 mg per kg, or isoflurane 32%. If not using one of the required methods state the method and justify.
   (i) How is death confirmed? ________________________________________________
   (ii) How will you dispose of the carcasses? ________________________________
   Transferring to another protocol. Provide the protocol number to which these animals will be transferred. ____________________________________________________________
If none of the above, explain__________________________________________________

Thank you
This protocol was modified and adopted with permission from Western University of Health Sciences/California/USA