

# GUIDELINES AND ETHICAL REQUIREMENTS OF EXPERIMENTAL ANIMALS.

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## Abstract:

*Animal welfare issues and the ethics surrounding this practice are receiving more attention as more animals are used in research projects. Two key purposes of information dissemination regarding existing ethical issues and alternatives in animal experiments are to increase researcher awareness of potential methods of using animals in the experiment and to ensure that potential users are aware of the established alternatives. For illustration, legislation adopted in many nations during the 1980s mandates that laboratory animal applications be minimized, improved, and replaced whenever possible in accordance with the 3Rs. As a result, scientists from all over the world tried to incorporate the 3Rs into their biomedical research regarding the welfare of the lab animals. But since their revelations, the Qur'an, the Muslim religion's holy book, and Hadiths have included the laws governing how to care for and treat animals. Islam holds that humans should care for animals' welfare and living conditions because they are seen as a representation of Allah's intelligence and power. According to a number of Islamic manuscripts, humans are in charge of providing the bare necessities for animals' well-being and they have their own place in the creation hierarchy. In an effort to promote the provision of thorough ethical regulations in animal experiments, which their establishment could be advantageous for animal ethics committees or research institutes, this paper has attempted to review ethical consideration in animal experiments and regarding resources in this case.*

**Keywords:** *Animals, Ethics, Research, Welfare, experiments, laboratory etc. ...*

## Introduction:

These guidelines have been prepared by the National Committee for Research Ethics in Science and Technology (NENT) They ultimately serve as a set of moral principles for scientists and other individuals who are thinking about performing animal studies. The principles will be helpful when designing initiatives, evaluating them, and evaluating and disseminating findings and outcomes. [1]They are also aimed at encouraging awareness on research ethics and the use of animals in study, both within the research community and in the general public. The use of animals for study purposes and other ethical concerns are also intended to be acknowledged by the research community as well as the general population. [2]Animals used in research are subjected to an extensive spectrum of ethical assessments. [3] In order to make advances for people, animals, or the environment, it is generally acknowledged that using laboratory animals may be necessary in some instances. The widespread understanding is that animals have a moral authority and that how we treat them should be governed by ethical standards. These positions represent such standpoints: [4]

- (i) Animals are sentient species with the ability to feel pain, so their interests must be considered when making decisions.

- (ii) Our attitudes concerning animals, especially how we treat them and also how we use them for research, influence how we behave ethically. [5]
- (iii) All of these perspectives are acknowledged in the guidelines, which also include principles and factors that might be taken into account when assessing advantages and harms. [6] The three Rs (Replace, Reduce, Refine) are established concepts that are also regulated by the law. Regardless of the significant benefits, these principles can establish strict regulations on animals in research. A good appraisal is rendered easier by these principles because they also specify what harm and benefit can be objectively assigned to one another. Evaluations of the possibilities for actual animal injury as a result of human experimentation, as well as the potential for future benefits to be uncertain, make assessments of the harm and benefit associated with trials on animals particularly complicated. [7]

Due to the dynamic nature of the rules, they must be modified to reflect advancements in technology and the emergence of fresh ethical quandaries. [8] The use of genetically manipulated animals in research, which is a technological evolution, is given significant chances by innovative gene technology approaches. The use of gene technology to genetically modify laboratory animals, or to alter their genetic heritage, carries with it a distinctive set of ethical implications because it encompasses both altering the animal's genetic heritage and engaging it as a research subject. It's conceivable that this technique will alter the way we think about others and how we feel about incorporating or eliminating genetic traits from ourselves. [9]

### **Housing:**

Animal welfare has recurrently earned little to no consideration when designing housing systems for captive animals. [10] These systems are quite often chosen based on economic and ergonomic concerns, such as facilities, costs, space, work load, and the competence to examine the animals and maintain a certain hygiene level. [11] The shoebox-shaped cage and consistent bedding material for rodents were created as a result of the normalization of the animal cage, which was thought to be necessary to eliminate variation. Animal welfare, the excellence of animal investigation and manufacturing, teaching or testing operations employing animals, and the health and safety of staff are all significantly affected by the design of animal facilities as well as with appropriate housing and management of the animals. [12]

It is important for cages, pens, or runs to provide adequate room for an animal's natural physiologic needs, postural adjustments, and appropriate lifestyle to its species. Interpersonal animals should be kept together in groups as often as practical. [13] Leading enclosures need to be made of quality material, capable of being cleaned and sterilized, and designed for both safety and comfort. Individually ventilated caging (IVC) technologies and static micro isolation (filter-top) cages both hinder the transmission of infectious agents from cage to cage. [14]

Nevertheless, in breeding colonies, infection can spread either horizontally or vertically from parents to offspring; naive mice implemented for cross-breeding and back-crossing can exacerbate the infection; and experimental mice may be exposed to pathogens through a toxic Elements, shared watering valves, research instruments, or when taken to research laboratories. [15]

In addition to saving space in the facility and being able to be engineered to mitigate aromas, allergens, dust, and heat exhaust into the macroenvironment, individual ventilation of cages helps to delay the deterioration of the surroundings within the cage and sustain a more stable and healthier microenvironment.

### **Animal transport:**

#### **Transport requirements:**

The necessary accreditation for laboratory animal practitioners must be held by anyone transporting animals. Animal transport must be lessened by the use of sensible precautions. For the safety of the animals during transit, safety measures must be implemented.

#### **Transport conditions:**

In order to ensure that the animals are transported in the swiftest, safest, and most comfortable way imaginable, the shipping institution and the receiving institution must counsel and negotiate in advance to arrive to an animal transport plan that includes carrier details, means of transport, transit route, transit duration, weather conditions, shipping containers, and countermeasure. [16]

Under the supervision of a laboratory animal veterinarian or laboratory animal expert, the animal transport strategy must be put into practice. A welfare and ethical review must be implemented if an animal transport scheme could have a significant effect on animal welfare. Animals are not supposed to be transported when they are ill, healing from surgery, about to conceive a child, or at any other time when they are not healthy enough to travel. Furthermore, transportation must abide by the guidelines on experimental animal transportation outlined in the "Guidance on the Care of Laboratory Animals".

### **Import and export:**

Animals are only allowed to be transported across country boundaries when the settings are appropriate for their physiological and behavioral requirements and they are healthy. To avoid the chance of cross-contamination between animals and the environment, effective precautions must be taken to assure that transport cages and containers are adequately confined.

### **Loading, unloading, and arrival:**

Animal loading and unloading professionals must be accredited as laboratory animal specialists or have a basic comprehension of the guidelines for the welfare of laboratory animals. When social animals are imported in pairs or groups, they must, to the fullest extent conceivable, be kept in the same pairs or groups during the induction phase as they were when transported. [17]

### **Animal Handling and Procedures:**

The most important aspect of handling an animal is undoubtedly choosing the right way to pick it up, carry it, or immobilize it. The strategy must be suitable for the desired species (see detailed suggestions below); any strain- or person-specific variations must also be taken into account.

More frightened individuals or strains could take longer to become used to specific measures, demanding additional training or adapting management procedures until they are at ease and understand that interaction is not dangerous. To establish a swift and effective restraint, finishing touch of the person and the animal is necessary. To inhibit resisting, which would escalate anxiety and raise the likelihood of harm happening to the animal or handler, animals need to feel secure and be absolutely immobilized. It's crucial to watch the animal's behavior while handling it because this enables slight adjustments to keep the animal safe and secure. But, witnessing how the animal reacts when confronted and after it has been restored to its natural habitat is also indeed very illuminating. When liberated from the handler, anxious animals usually flee in an attempt to avoid being apprehended or, less plainly, they may try to hide discreetly. To be able to handle an animal promptly and competently regardless of how it is exhibited, its behavior, or the scenario, one needs expertise in the proper handling strategies and a great deal of expertise. The potential to promptly, confidently, and securely capture animals on first attempt without any chasing should be sufficient. Failure effort to catch an animal could make it more uneasy and induce it to act even more dismissively, which causes frustration and perhaps resentment in the handler. [18]

### **Handling and restraint of mice:**

#### **Handling tunnels:**

Mice can sometimes be acquired by guiding them into a carrying tunnel, pulling them inside the tunnel, and then transporting them to their location. One hand must hold the tunnel while the other is used to navigate the animal. Animals can be immediately constituted using this method, and it doesn't take as long as other methodologies. Although there is little direct contact when using a tunnel, mice quickly become accustomed to handling and are susceptible to human contact when excluded from the tunnel, even after being restrained physically.

**Cupping:**

Alternatively, you could just scrape the mouse onto your hand. Although naive and more jittery young animals will briefly leap from the hands, this works well once mice have developed habitual to being picked up. Animals can be collected in a handling tunnel or initially held loosely between closed hands (for instance, to transfer between cages during cleaning) until they stop jumping from the hand. To ensure that the animal is clenched tightly and transferred safely, be particularly attentive to how it behaves. This approach is suitable for docile breeds, animals that are acquainted to handling and remain on the hand, and competent handlers with a confident demeanor. [19]

**Restraint:**

Mice that have grown accustomed to non-aversive handling will survive physical restraint without losing their tameness. Mice shouldn't be handled by the tail, but once on the hand, the base of the tail can be held to control the mouse. Put mice on anything they can grip for comprehensive restraint. Hold the tail bottom firmly in one hand and grab the slack skin at the back with the other while softly drawing back to persuade the animal to grip of the neck between the thumb and forefingers. The animal should be restrained but still be able to breathe normally. [20]

**Handling of Rats:**

Rats and other laboratory rodents can generally be handled in the same ways as mice, although certain species-specific distinctions and size modify the specifics of handling techniques that are impactful in each species. Avoid picking up rats by the tail because it is agitated with one hand, gently but firmly grasp the rat's shoulders; place your thumb behind one forelimb and your index finger between the opposite shoulder and jaw. This stops the rat from crawling or biting. With your other hand, support the weight & hindquarters. The handler's thumb should be behind and under the rat's forelimb, and the index finger should be situated between the shoulder and jaw on the conflicting side to ensure the rat is held securely.

**Restrainers:**

If you plan to use a restrainer, make sure it is safe for the animal and the handler, is simple to clean, and can comfortably be placed inside the animal. By firmly grasping the base of the tail, rats can be restrained. Degloving (stripping off the skin) injuries can occur when the tail is held inferiorly to the base. For moving the rat over a short distance or conducting a quick examination, this restraint is appropriate. Put your lab coat on to satisfy a rat. The rat can be calmed down by granting it a place to hide, like under a towel. The index and middle fingers should be situated along the sides of the head, and the thumb and remaining fingers should be placed under the axilla for a firmer restraint. Conversely, support your head between your middle and index fingers while the additional fingers stabilize your body behind your forelimbs. With the other hand, hold the tail while continuing to support the lower body. Both techniques prevent head movement while allowing access to the face. Too much pressure on the head or chest can cause the animal to struggle and suffer injuries. It might also make people more likely to bite. Distinct rat strains have distinctive levels of aggression. [21]

**Tail Hold:**

For intimidating rats or rats you are not accustomed to Take hold of the animal at the base of its tail and lift it. Never let your tail hang; always support your body weight. Short-term use of this hold is safe, but it must be avoided at all costs because the tail is easily broken and/or complexioned off.

**Combination/Three Finger Hold:**

Only techniques like ear tag/notch, where the rat can stay on the work surface, are relevant for this hold. Grab the tail and slide the left hand forward, putting the thumb under the leg and the index finger on top of the shoulder and along the right side of the neck. Do this while gently pulling the tail backward. While implementing light pressure to the rat to hold them into the tabletop, place the ring and pinky fingers under the left foreleg. [22]

### **Animal Handling and Safety Procedures:**

The relevant Heads of Department, managers, and supervisors are in responsible for carrying out the following procedures. It is the obligation of each workplace to set up and enforce the policies as well as to inform, educate, train, and supervise employees and students who handle animals. Employees and students are expected to follow workplace policies and to report any known or suspected safety and health risks, incidents, or injuries. When working alone, each person is responsible for taking all reasonably accessible precautionary measures to ensure their own safety and personal security.

- Physical injuries
- Zoonotic diseases
- Allergic hazards

### **Preventing Exposure Animal handlers should take:**

- whenever possible, handling animals in safety cabinets or ventilated hoods.
- When working with animals, gloves and lab coats should be worn as a minimum level of protection, so try to avoid wearing casual clothing.
- Leaving work attire at the office to prevent exposure troubles for family members.
- The upkeep of animal areas and cages.
- lessening skin contact with animal products like dander, serum, and urine by wearing gloves, lab coats, and accredited particulate respirators with face shields.
- The development of asthma may be stopped by teaching employees how to recognise the tell-tale signs and symptoms of allergic reactions and sensitization.
- Acknowledging the risks that come with their job.
- Establishing suitable safety measures.

letting the lead investigator know about malfunctions and risky situations.

### **❖ Ethical guidelines for animal research:**

Research in the field of animal science is crucial for our understanding of animals, their performance, and their interconnections with their physical and social environments.

Research in the field of animal science spans a broad spectrum of academic fields, which opens the door to the use of innumerable animal experimentation and a wide range of experimental techniques. The use of animals in research is subject to a wide range of ethical appraisals.<sup>2207</sup>

- Animals have intrinsic values that must be respected.
- Even though animals have the ability to feel pain, their needs must be taken into account.
- The way we treat all animals, including those used in research, reflects our attitudes and impacts how we are morally.

### **❖ Norwegian National Committee for Research Ethics in Science and Technology (NENT) have a set of ethical guidelines for the use of animals in research:**

#### **➤ Respect Animal Dignity:**

Regardless of the animals' worth and interests as living, sentient beings, researchers must respect their worth. Respect must be shown when choosing research topics and methodologies as well as when broadening previous evidence. Each laboratory animal must receive care that is adapted to its needs, pertaining to researchers.



➤ **Responsibility for considering options (*Replace*):**

When alternatives to using animals in research exist, it is the responsibility of researchers to investigate them. When there are no viable alternatives, researchers must decide whether the research can be stalled until a viable alternative is established. Researchers must therefore take accountability for the absence of accessible options and the drive to get the data as soon as possible while still being able to justify the use of animal trials.

➤ **The principle of proportionality: responsibility for considering and balancing suffering and benefit:**

Investigators must weigh the potential for pain and suffering inflicted on lab animals against the magnitude of the connection between the research on animals, people, and the environment. It is the obligation of researchers to investigate whether their work will benefit people, animals, or the environment. The potential outcomes of the study must be taken into account, maintained, and described in the short- and long-term. This liability also entails the duty to take into account both the experiment's scientific value and its potential for providing pertinent scientific advantages. Only when there are significant and likely advantages for animals, people, or the environment can there be animal suffering. As there are multiple strategies to calculating the costs and benefits, research institutions must teach their staff in appropriate models, and it is the duty of researchers to incorporate these approaches into their plans for any animal experimentation.

➤ **Responsibility for considering reducing the number of animals (*Reduce*):**

Researchers have the responsibility to consider whether or not it's acceptable to Plan to use and include the number required for the experiments' scientific validity and their significance to the results alone. Before beginning an experiment, researchers must do reading studies, weigh alternative designs, and carry out the necessary computations.

➤ **Responsibility for minimizing the risk of suffering and improving animal welfare (*Refine*):**

Assessing the anticipated impact on lab animals is the job of the researcher. The possibility of suffering must be reduced, and great animal welfare must be provided. Suffering consists of discomfort, hunger, malnutrition, thirst, and unusual cold or heat. Anxiety, distress, illnesses, trauma, and limitations prevent an animal from acting in a natural and normal manner. The animal that suffers the most should be taken into account when figuring out how much pain constitutes. If there is any doubt about the suffering that the animals will endure, then the animals must be taken into account. However, there are dangers before and after the suffering, such as those associated with breeding, transportation, trapping, euthanasia, labelling, anaesthesia, and stabling. Researchers must take into account the potential direct pain that an animal may experience throughout an experiment. This implies that all researchers must consider the requirements of adaptational periods both prior to and following an experiment. [23]

➤ **Responsibility for maintaining biological diversity:**

The use of experimental animals must not disturb or jeopardise biological variety, and this is another duty of researchers. This necessitates that scientists take into account how their results will affect the habitat as a whole as well as the stock. Minimum possible use is the utilisation of threatened and endangered species. Researchers are required to use the precautionary principle when there is credible and unconfirmed knowledge that using animals in study or using certain techniques may have ethically reprehensible effects on the stock or the environment as a whole.

➤ **Responsibility when intervening in a habitat:**

Investigators have a duty to reduce any disruption to the population, the environment, and any effects on the normal behaviour of the animals, regardless of whether they aren't used as direct test subjects in study. The predominance of technology and analysis initiatives, such as those involving environmental technology and monitoring, may have an effect on the animals and their living conditions. In those scenarios, researchers must work to adhere to the proportionality principle and lessen any possible adverse consequences.

➤ **Responsibility for openness and sharing of data and material:**

Researchers are accountable for making sure that the research outcomes are accessible and for facilitating the sharing of the documentation and resources from all animal experiments. In order to avoid performing the same animal experiment twice, awareness and sharing are crucial. In order to provide the information that the public needs and as part of their duty to disseminate, researchers must be transparent. Bad outcomes of animal experimentation must be made widely known. By sharing negative findings with other researchers, you can help them decide which trials are not worth continuing, draw attention to poor research methods, and cut down on the usage of animals in research. [24]

➤ **Requirement of expertise on animals:**

Researchers and other professionals working with live animals must maintain complete, up-to-date documentation on each animal. This includes knowing able to properly care for the animals and possess knowledge of the biology of the appropriate animal species.

➤ **Requirement of due care:**

The use of laboratory animals is subject to a number of laws, legislation, multilateral agreements, and agreements that must be respected by both researchers and research managers. The present legislation should be acquainted by everyone who intends to conduct animal exploitation. [25]

## **Conclusion:**

Legislation of animal experimentation in modern societies is form on the supposition that this is ethically acceptable, when certain more-or less defined formal logistical, technical demands and ethical principles are met. In comparison with the other Abrahamic Judaic and Christian traditions, there are more teachings about the treatment, care and respecting animal's ethics in Islam. Islamic teachings exhibit an ingrained environmental ethic of stewardship and a way of life for Muslims that are rooted firmly in seeking harmony with the environment. Increasingly, humans transgress their ecological responsibilities. Instead of living within a circle of ecological interest, humans act in self-interest and at the expense of a relationship within nature that is caring and responsible. Millions of animals are used every year in many extremely painful and distressing scientific procedures. Islamic considerations have recommended humans to provide water and food for animals and respect to their welfare and safety. The development of biomedical sciences further obligates researchers to respect principles of caring and using animals because of expanded animals' utilization. It is hoped that utilization of ethical considerations in animal experiments improves the scientific design of the researches and related hygienic standards. This paper has tried to review ethical consideration in animal experiments and regarding Islamic resources in this case to establish comprehensive ethical regulations in animal experiments, which its establishment could be beneficial and useful for animal ethics committees or research institutes.

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