ISSUE

NABR

THE HUMANE CARE AND TREATMENT OF LABORATORY ANIMALS

Virtually every major medical advance of the last century has depended upon research with animals. Data from experiments on humans are obviously the most scientifically reliable; however, in many cases human research is ethically unacceptable. Researchers first must use animals, the living systems most closely related to humans, before humans are asked to participate in experimentation. Animals serve as surrogates in the investigation of human diseases and new ways to treat, cure or prevent them. The health of animals also has improved due to animal research.

Approximately 70% of the American public supports the necessary use of animals in biomedical research.[1] Yet, people also are justifiably concerned about the care and treatment of laboratory animals. They want assurance that animals are treated humanely, do not suffer, and are kept under conditions that allow them to be as healthy and comfortable as possible.

The scientific community recognizes its professional obligation to safeguard and improve the welfare of laboratory animals. In fact, individual researchers concerned about the care and treatment of laboratory animals were the first to set voluntary care standards at the turn of the century, long before federal laws and regulations were instituted. In 1909, the first voluntary procedures regarding lab animals were adopted and enforced in medical school laboratories. To care more effectively for research animals, veterinarians created a board-certified speciality in laboratory animal medicine in 1957. The scientific community founded a host of organizations to improve laboratory animal care, such as the American Association for Laboratory Animal Science (AALAS) and the Association for the Assessment and Accreditation of Laboratory Animal Care International (AAALAC). Many medical specialty societies and voluntary health organizations, such as the Society for Neuroscience and the American Heart Association, have written standards for the care and treatment of laboratory animals. Researchers advocate high-quality animal care and treatment not only for reasons of conscience, but also for reasons of science. Good animal care is good science.

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How Many Animals Are Used in Research?

In the most recent summary report, published in 1986, the U.S. Congress Office of Technology Assessment (OTA) estimated that 17 million to 22 million animals were used in research and testing in the United States; 85–90% of these animals were rats and mice.[2] OTA cited the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA/APHIS) as the best available data source. However, USDA does not include rats and mice in its annual reports. OTA estimated that the USDA data account for approximately 10% of the total animals.

According to the USDA, 1,267,828 animals—including dogs, cats, nonhuman primates, guinea pigs, hamsters, rabbits, farm and other animals—were used by research facilities in 1997.[3] The estimates listed below are based on this data from OTA and USDA.

Rats, mice & other rodents	85–90%
Dogs and Cats	Less than 1%
Nonhuman Primates	Less than 0.3%

There has been a 40% reduction in the number of USDA-regulated animals used in biomedical research since 1968.[4]

Do Laboratory Animals Experience Pain?

According to the 1997 USDA report, most research (92%) was not painful to the animals involved. In the majority of cases (54%), the animals were not exposed to or involved in any painful procedures. In approximately 38% of cases, anesthesia or pain-relieving drugs were given because the animals may experience some pain or distress. In about 8% of research projects, anesthetics or analgesics (pain-relieving drugs) were not used because they would have interfered with the end results. In these rare cases in which research may require that pain not be relieved, prior institutional approval and full justification is necessary.

What Professional Principles Do Animal Researchers Follow?

Good animal care is essential to good science. If a laboratory animal is unhealthy due to stress or disease, the researcher will be unable to collect reliable data. Animals that are treated well, on the other hand, provide the normal biological or behavioral responses that researchers need to examine. In protecting their lab animals, researchers are protecting the source of their scientific data. Researchers are guided by the following four basic principles:

- Ensure all research animals receive good care and humane treatment;
- Use animal models only when nonanimal methods are inadequate or inappropriate;
- Use as few animals as possible; and
- Design experiments so that all animal studies yield scientifically reliable results.

Numerous professional organizations comprising researchers and scientists have their own standards for lab animal care. The Association for the Assessment and Accreditation of Laboratory Animal Care International (AAALAC) and the American Association for Laboratory Animal Science (AALAS) are two of the most prominent organizations.

During the 1940s, a group of professionals involved in animal research were concerned about the varying standards of lab animal care. In 1950, this group founded AALAS, which today has more than 8,000 individual and institutional members ranging from veterinarians to lab technicians to university administrators. AALAS is dedicated to developing and maintaining the highest standards of animal care. The Association serves as a

forum for presenting and exchanging scientific information on all phases of laboratory animal welfare through its educational activities and certification programs.

Leading veterinarians and researchers organized AAALAC in 1965 "to promote high standards of animal care, use and well-being and enhance life sciences research and education through the accreditation process." AAALAC conducts voluntary peer review evaluation of laboratory animal care facilities and programs which involves site visits, evaluation of site visit reports and recommendations concerning proposed accreditation status.

Professional societies, such as the American Physiological Society, the American Psychological Association, and the Association for Research in Vision and Ophthalmology, have codes and policies governing animal research, which their members must follow. Voluntary health organizations, such as the American Heart Association, the American Cancer Society and the Juvenile Diabetes Foundation, have adopted official policies outlining acceptable standards for the care and use of lab animals. Research funded by these organizations must meet these criteria.

Are There Laws To Ensure Humane Care and Treatment of Laboratory Animals?

In 1955 the National Institutes of Health (NIH) published the first federal laboratory animal guidelines, now entitled the *Guide for the Care and Use of Laboratory Animals*. The U.S. Department of Agriculture (USDA) developed the first federal regulations under the Animal Welfare Act, originally passed in 1966. (For detailed information, please refer to *NABR Issue: Regulation of Biomedical Research Using Animals*.)

Many people, however, are unaware of the extensive system of laws, guidelines, regulations and principles that ensure the welfare of laboratory animals in the U.S. Requirements, which are periodically updated, address veterinary care (surgery, analgesics, anesthesia, and euthanasia methods) and housing conditions (food, water, sanitation, temperature, humidity, lighting, and drainage). All facilities must provide exercise for dogs and a physical environment adequate to promote the psychological well-being of non-human primates.

How Is a Researcher Granted Permission To Use Animal Models?

As required by the Animal Welfare and Public Health Service Acts, a researcher must submit a detailed animal care and use procedure plan to a review committee at the institution. The Institutional Animal Care and Use Committee (IACUC) is required by law and must have no less then three members; one must be a veterinarian and one must not be affiliated with the institution in any way. According to federal regulations, the legally required animal care and use plan must contain the following:

- A rationale for involving animals and the species and number to be used;
- A complete description of the proposed use of the animals;
- A description of procedures designed to assure that discomfort and pain to animals will be limited to that which is unavoidable for the conduct of scientifically valuable research, including the provision for the use of analgesic, anesthetic and tranquilizing drugs where indicated and appropriate to minimize discomfort and pain; and
- A description of any euthanasia method.

The researcher also must provide the IACUC with written assurance that the plan does not unnecessarily duplicate previous research. Finally, the researcher must consider alternatives to any procedure that may cause more than momentary or slight pain or distress to the animals and provide a written description of the methods and sources used to determine that nonanimal alternatives were not available.

The IACUC may approve, reject, or ask for additional information about a plan. If the IACUC finds that the plan does not address each area of animal care sufficiently, the plan is rejected, and the researcher cannot begin the project. However, the researcher is given the opportunity to address the IACUC's concerns and may resubmit the denied plan with appropriate changes.

Once a project is under way, subsequent changes must be IACUC-approved, and the committee has the authority to suspend the work for cause. The IACUC must inspect the research institution's animal facilities at least once every six months.

Why Is Research Sometimes Duplicated?

Duplication—or more accurately, replication—of research is necessary to validate scientific findings. This requires some experimentation that may deviate in only minor ways from previous work and, therefore, may appear to be duplicative. Such replication, however, provides for rigorous testing of hypotheses and the formulation of conclusions that carry a higher degree of validity. Once validated, the data becomes biomedical knowledge that researchers throughout the world may draw upon for new investigations. The scientific peer review process and keen competition for federal research funds prevent unnecessary duplication of research.

Funds are not granted for projects that will not make significant contributions to the existing body of biomedical knowledge. The National Institutes of Health—the single major source of federal funding for biomedical research in this country—currently can support only about one-quarter of all worthy research proposals due to limited available funding. Certainly, scarce funds are not awarded for studies which will not add significantly to biomedical research.

Are There Alternatives To Using Animals in Research?

Scientists use a variety of methods in research. In some areas, the use of animals is neither necessary nor appropriate. In others, such as developing a fundamental understanding of how complex biological systems function, the use of animals has been and continues to be essential. In these cases, there is no method to replace the use of animals.

Our knowledge of higher organisms is quite limited. Even though science has made remarkable progress, we cannot create an organ or even a cell. We cannot grow organs in culture dishes, as cells can be grown. With progressive knowledge, we hope that one day we will be able to grow groups of organs and actually make a whole organism from a few cells in a petri dish. That possibility is far into the future. Today, the replacement of whole animals with nonanimal models for advanced biomedical research is simply not possible.

As a byproduct of basic research, scientists have developed a number of valuable nonanimal research methods. Such methods are useful for some research, and in other cases they complement work in animal systems. Today, one of the widest uses of nonanimal tests is in initial screening of chemical substances for potentially toxic and harmful effects. With increasingly sophisticated com-

puter technology and laboratory instrumentation, it is feasible to conduct many biological studies without using whole animals. A number of very important adjunct research methods are in use. Some examples of these nonanimal methods are physicochemical techniques, computer and mathematical models, microbiological systems, and cell and tissue cultures.

The increased use of nonanimal adjunctive tests is reflected in the fact that there has been a 40% drop in the number of animals used in research since 1968.[5] However, no responsible researcher believes that the technology exists today, or in the foreseeable future, to replace the use of animals altogether in biomedical research.

Good animal care is essential to good science.

Who Takes Care of Laboratory Animals?

Each animal research institution has an animal care staff. This staff works under the direct supervision of a veterinarian, generally a specialist in the practice of laboratory animal medicine or a related veterinary medical field such as comparative pathology. Like physician specialists who practice human medicine, these veterinarians undergo postgraduate and residency training to qualify for the rigorous certification examinations required for their specialties.

The animal care staff are laboratory animal technicians or technologists, occupations that combine traditional veterinary nursing skills with an understanding of research methods and requirements. Technicians check on each animal's health daily. They control the animal's environment, a responsibility that extends far beyond feeding and watering the animals and keeping them clean, dry and comfortable. Technicians continuously monitor external factors such as noise, light, heat and humidity, as well as the use of insecticides, detergents and disinfectants. Many animal technicians also are skilled veterinary nurses and medical assistants. They are trained to draw blood, take X-rays, give medications, administer fluid therapy, induce anesthesia, assist at surgery, give postoperative care and humanely, painlessly euthanize an animal.

Today, 76 degree-granting programs for animal technicians/technologists in 40 states are accredited by the American Veterinary Medical Association. Most are two-year, associate degree programs; some are four-year undergraduate programs offered by schools of agriculture or veterinary medicine. As part of its ongoing effort to set high-quality animal care standards, AALAS instituted a national certification program for laboratory animal personnel. AALAS administers qualifying examinations and certifies successful candidates at three levels. Approximately 1,000 examinations are given annually. AALAS certification is highly encouraged for all animal care staff.

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[1] ICR Survey Research Group, *Associated Press*—"How AP Poll on Animal Rights Was Conducted," December 3, 1995.

[2] U.S. Congress, Office of Technology Assessment, *Alternatives to Animal Use in Research, Testing and Education* (Washington, DC: U.S. Government Printing Office, OTA-BA-273, February 1986), p. 5.

[3] U.S. Department of Agriculture, Animal and Plant Health Inspection Service, *Animal Welfare Enforcement Fiscal Year 1997: Report of the Secretary of Agriculture to the President of the Senate and the Speaker of the House of Representatives*, Appendix, Table 2. APHIS 41-35-054.

[4] Center for Animals & Public Policy, Tufts University School of Veterinary Medicine, *The Animal Research Controversy, Protest, Process & Public Policy, An Analysis of Strategic Issues*, ii.

[5] *The Animal Research Controversy*, ii.

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