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California State Polytechnic University
Animal Care and Use Handbook
rev. 2002

Preface

Purpose of This Handbook

A core of knowledge about the ethical and humane care and use of animals in instruction and research is essential. Faculty, staff and students who work with animals have an obligation to know about laws governing, and ethical concerns relevant to, the care and use of animals and to be familiar with the guidelines and policies established by government agencies, scientific societies and this institution.

This handbook is designed to help meet these obligations and to provide you with information about the campus-wide Lab Animal Care Facility (LAF), located in Building 92 (909-869-4955), and the services offered.

California State Polytechnic University is committed to the ethical and humane care and use of animals and each person must share responsibility in meeting that commitment.

Acknowledgment

We thank our colleagues at other institutions who freely provided some of the material presented here. Persons in Laboratory Animal Science traditionally share information, published or unpublished, because we share the belief that the animals used in instruction and research are totally dependent on us for their care and well-being. Special thanks to San Jose State University for a major portion of this material.

Considerable effort has been made to ensure that the information provided is accurate, however, if errors of any kind are identified, please notify the Lab Animal Facilities Office as soon as possible.

This handbook, along with others of its kind, is considered a "living document," subject to change in the light of new information and changing conditions.

I. University Policy on Animal Care and Use

Cal Poly is committed to the humane care and use of animals. This commitment is reflected in the presence of four federally accredited and state licensed Veterinarians and a Certified Laboratory Animal Technologist/Registered Veterinary Technician who have as their principal concern the health and welfare of animals. The University has a designated Animal Care and Use Committee (ACUC) which is comprised not only of health care professionals (one veterinarian and one Registered Veterinary Technician) but also an outside individual who has no ties to the University and is also not a scientist. These individuals, along with four faculty members, the Director of Research and the Acting Director of Environmental Health and Safety review all experiments involving animals in both research and teaching settings. They review each protocol to assure that the use of animals is justified, and the procedures are done in a humane and approved fashion. They are guided, in part, by law as dictated through the Animal Welfare Act (administered by the United States Department of Agriculture - USDA). As required by law the ACUC does a semiannual review of programs for Humane Care & Treatment and a semi-annual inspection of all animal facilities. Their findings are reported to the University Administration and annual reports are sent to USDA and the National Institutes of Health (NIH). As a check to insure proper action of our animal care and use committee, federal veterinarians under the auspices of the USDA, make annual unannounced inspections. Cal Poly also adheres to recommendations published in a manual published by the National Academy Press for the National Institutes of Health called the "*Guide for the Care and Use of Laboratory Animals*." These recommendations dictate stringent requirements for the animals' environment, including light, temperature, humidity, etc., as well as their daily care and veterinary needs. Cal Poly's commitment to animal care has extended beyond federal requirements as indicated by its voluntary accreditation by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) International. This accrediting board provides the highest and most demanding requirements in the United States. Although many universities review only research involving animals, Cal Poly has extended its responsibility by reviewing the use of animals used in the teaching laboratory, again, to assure adequate humane care and use of these animals. Because some students might be intimidated about voicing their concerns to a faculty member who is using animals in a classroom setting, Cal Poly has established a procedure by which any person with these concerns can communicate them to the ACUC by contacting: the Chair of ACUC; the University Veterinarian; or by going directly to the Dean of their College. These procedures are clearly posted in the teaching and research laboratories where animals are routinely used.

II. Faculty and Staff Responsibilities

Individual faculty and staff members who are involved with the care and use of animals in instruction and research, including field studies of live vertebrates, are expected to study and review this handbook, and to acknowledge their acceptance of the responsibilities therein. Individuals are accountable by law to comply with the rules and regulations of the applicable statutes. Individuals are also accountable to Cal Poly to conform with the policies and guidelines adopted by this institution. These regulations and policies cover: (a) the acquisition, care and use of animals, (b) efforts to minimize animal pain and distress, (c) the training of personnel using animals, and (d) consideration of alternatives to animal use.

As a matter of educational policy, even faculty who do not themselves use animals should be aware of these regulations and policies since their students may use animals at a later time. Likewise, instruction of students in proper animal use is an essential component of education in the sciences.

A. Responsibilities of Principle Investigators

The responsibilities of the investigator (the term investigator is used broadly to designate those people responsible for the scientific aspects of projects that use animals in research, testing, or teaching) include the following:

1. **Designs experiments.**
   a. Selects the appropriate species, model, animal quality, and source; consults with a statistician to determine the minimum number of animals required for valid data analysis.
   b Considers previous work done in the area of study, using resources such as the databases of the National Agricultural Library and National Library of Medicine.
   c. Considers possible alternatives to living animals as subjects. See Appendix G. Resources for alternatives in animal care and use of this Handbook.
   d. Ensures that studies will not unnecessarily duplicate previous experiments.
   e. Establishes procedures and environments that minimize internal and external influences on experimental animals.
   f. Avoids, prevents, or minimizes animal discomfort, distress, and pain consistent with sound scientific practice.
   g. Uses appropriate endpoints for studies and acceptable procedures for euthanasia.
   h. Conducts all research in accordance with protocols approved by the ACUC.
   i. Obtains ACUC approval before instituting "significant changes."
   j. Procures all laboratory and wild animals in accordance with all relevant federal, state, and institutional regulations and policies.
   k. Maintains adequate records.
   l. Promptly files all necessary reports (e.g. student training, annual renewal, etc.)

2. **Ensures staff qualifications and training.**
   a. Recruits personnel qualified by background and temperament to work with animals.
   b. Orients personnel to the facility and the scientific study.
   c. Requires that staff members demonstrate skill with the techniques and procedures involved; provides training as needed.
   d. Ensures that staff members are able to recognize signs of disease and distress in animals and know to whom to report any such signs.
   e. Provides or identifies continuing education programs for staff and encourages participation in such programs.

3. **Provides for health and safety of personnel.**
   a. Ensures that staff have been provided with clearly defined procedures for conducting their duties, understand the hazards involved, and are proficient in implementing the required safeguards.
   b. Ensures that staff have received detailed instructions on proper procedures for using hazardous substances and pathogenic organisms, including the requirement and provision of protective clothing appropriate for the species of animal and the protocol.

c. Personnel should be trained regarding zoonoses, chemical safety, microbiologic and physical hazards (including those related to radiation and allergies), unusual conditions or agents that might be part of experimental procedures (including the use of genetically engineered animals and the use of human tissue in immunocompromised animals), handling of waste materials, personal hygiene, and other considerations (e.g., precautions to be taken during personnel pregnancy, illness, or decreased immunocompetence) as appropriate to the risk imposed by their workplace.

4. **Makes provisions for dealing with job-related stress.**
   a. Identifies activities and procedures that might be stressful to personnel, including euthanasia, long-term studies, and studies using animals generally regarded as pets.
   b. Provides opportunities for stress-reduction training for all employees involved in high-stress activities.
   c. Gives particular attention to reducing stress in inexperienced, naive, and highly emotional employees and students before and during studies.

5. **Maintains a scholarly, sensitive, and respectful environment and behaves in a professional manner**

6. **Endeavors to build public confidence in animal research**
   a. Provides a lay-language description of studies and procedure for the ACUC and for other institutional purposes.
   b. Might participate in community programs to promote understanding the need for and role of animals in research, testing, and teaching.

III. Policies, Principles, Standards and Guidelines

A. PHS Policy

The Public Health Service (PHS) Policy on the Humane Care and Use of Laboratory Animals (1986) incorporates the changes in the Public Health Service Act (PHS Act) mandated by the Health Research Extension Act of 1985 (Public Law 99-158). The PHS policy, frequently referred to as the NIH Policy, requires that each institution receiving PHS funds for research involving animals submit detailed information regarding the institution's program for the care and use of animals (including farm animals, rats, mice and birds) to the Office for Protection from Research Risks (OPRR). This information is in the form of an Animal Welfare Assurance Statement, and it must be resubmitted at least every five years. Significant changes in existing assurance status or problems encountered in implementing this policy must be reported immediately to the OPRR.

Institutions are required to identify an institutional official who is ultimately responsible for the institution's program for the care and use of animals, and a veterinarian qualified in laboratory animal medicine who will participate in the program. At Cal Poly the responsible institutional official is the Associate Vice President for Faculty Affairs. Each institution also is required to designate clear lines of authority and responsibility for those involved in animal care and use in PHS-supported activities.

The policy clearly defines the roles and responsibilities of institutional animal care and use committees in all aspects of PHS-supported research. The committees must be composed of at least five members and shall include an individual unaffiliated with the institution, a veterinarian who has program responsibilities and who has training or

experience in laboratory animal science and medicine, a practicing scientist experienced in research involving animals, and a member whose concerns are in a non-scientific area.

The policy requires institutional animal care and use committees to review and approve those sections of PHS grant applications that relate to the care and use of animals before funds will be awarded. Animal care and use committees also are required to report to the "responsible institutional official" the results of their semi-annual assessments of the institution's program for the humane care and use of animals and semi-annual inspections of the institution's facilities. The report must contain a description of the nature and extent of the institution's compliance with the PHS Policy, the *Guide for the Care and Use of Laboratory Animals* (a companion document to the PHS Policy), and the Animal Welfare Act. Minor and significant deficiencies in the institution's program must be identified, and the institution must adopt a "reasonable and specific" plan and schedule for correction of the deficiencies. Significant deficiencies must be promptly reported to USDA and NIH.

An institution's failure to comply with these policies may lead to various actions, including the termination of PHS support for all projects involving animals. Other federal agencies (e.g. NSF) require compliance with the NIH policy as a condition for receiving funds in support of teaching and research.

A full-text copy of this government document is available for perusal in the reference library of the Lab Animal Facility (LAF) Office.

B. US Government Principles for the Care and Use of Animals

The following "US Government Principles for the Care and Use of Animals" were developed by the US Government's Interagency Research Animal Committee. Both PHS policy and Cal Poly policy require that all research and instructional uses of animals conform to these Principles, which are reproduced below.

1. The transportation, care and use of animals should be in accordance with the Animal Welfare Act and other applicable Federal laws, guidelines and policies.

2. Procedures involving animals should be designed and performed with due consideration of their relevance to human or animal health, the advancement of knowledge, or the good of society.

3. The animals selected for a procedure should be of an appropriate species and quality and the minimum number required to obtain valid results. Methods such as mathematical models, computer simulation, and *in vitro* biological systems should be considered.

4. Proper use of animals, including the avoidance or minimization of discomfort, distress, and pain when consistent with sound scientific practices, is imperative. Unless the contrary is established, investigators should consider that procedures that cause pain or distress in human beings may cause pain or distress in other animals.

5. Procedures with animals that may cause more than momentary or slight pain or distress should be performed with appropriate sedation, analgesia, or anesthesia. Surgical or other painful procedures should not be performed on unanesthetized animals paralyzed by chemical agents.

6. Animals that would otherwise suffer severe or chronic pain or distress that cannot be relieved should be painlessly killed at the end of the procedure or, if appropriate, during the procedure.

7. The living conditions of animals should be appropriate for their species and contribute to their health and comfort. Normally the housing, feeding, and care of all animals used for biomedical purposes must be directed by a veterinarian or other scientist trained and experienced in the proper care, handling, and use of the species being maintained or studied. In any case, veterinary care shall be provided as indicated.

8. Investigators and other personnel shall be appropriately qualified and experienced for conducting procedures on living animals. Adequate arrangements shall be made for their in-service training, including the proper and humane care and use of laboratory animals.

9. Where exceptions are required in relation to the provisions of these Principles, the decisions should not rest with the investigators directly concerned but should be made, with due regard to Principle II, by an appropriate review group such as the institutional animal care and use committee. Such exceptions should not be made solely for the purposes of teaching or demonstration.

C. The PHS Guide for the Care and Use of Laboratory Animals

In 1962, NIH contracted with the National Academy of Sciences, Institute of Animal Resources (ILAR) to develop what is now called the *Guide for the Care and Use of Laboratory Animals*, or simply the Guide. The *Guide* underwent it's fifth revision in 1985. It's purpose is to assist scientific institutions in using and caring for laboratory animals in ways judged to be professionally appropriate. It is a long-standing policy that grantees and contractors using live vertebrate animals in projects or activities supported by NIH should be guided by the recommendations in this publication. This *Guide* is also used by the American Association for the Accreditation of Laboratory Animal Care (AAALAC) as a basis for its accreditation of institutions (see Section III.E.2. for more information on AAALAC). A copy of the *Guide* is available in the reference library of the LAF Office.

D. University Assurance of Compliance with PHS Policy

This document ("The Cal Poly Assurance"), approved as University Policy by President Bob Suzuki on April 28, 1995, adopted both the NIH Policy and the US Government Principles (Parts A and B above) as University policy. It is considered (as is the Guide) a "living document," subject to revision with changing conditions and new information. The Assurance establishes the Institutional Animal Care and Use Committee (ACUC), which shall inspect animal facilities and review research and teaching protocols.

E. Independent Professional Organizations

1. The American Association for Laboratory Animal Science (AALAS)

The American Association for Laboratory Animal Science (AALAS) is an organization composed of individuals and institutions professionally concerned with the production, care, and use of laboratory animals. It provides a means for the collection and exchange of information on all phases of laboratory animal care and management. The Association meets annually and publishes a bi-monthly refereed

journal entitled *Laboratory Animal Science*, the *AALAS Bulletin*, and other publications.

The Association's Animal Technician Certification Board provides a means of developing uniform standards for technician training by defining the qualifications, by preparing and approving examinations for training programs, and by certifying successful candidates.

Individuals and institutions can seek membership in AALAS at both the Branch (local) level and the National level. For further information about National AALAS or the local Branches of AALAS , contact the Lab Animal Facility Coordinator.

2. **The Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) International**
   The Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) International is the organization for voluntary peer-review accreditation of laboratory animal care facilities and programs in North America. AAALAC judges animal care by the standards set forth in the *Guide* for the Care and Use of Laboratory Animals. Periodic return visits and inspections are made by representatives of this organization to ensure that the institution continues to meet these standards. The NIH, in its current policies, accepts AAALAC accreditation as the best means of demonstrating conformance with NIH requirements for animal care and use.

3. **The American College of Laboratory Animal Medicine (ACLAM)**
   The American College of Laboratory Animal Medicine (ACLAM) is a specialty board recognized by the American Veterinary Medical Association (AVMA). It was founded in 1957, and its purposes are to encourage education, training, and research; to establish standards of training and experience for qualification; and to certify, by examination, qualified laboratory animal specialists as diplomats. To achieve these goals, the College seeks to interest veterinarians in furthering both training and qualifications in laboratory animal medicine.

   ACLAM meets biannually in conjunction with AVMA and AALAS national meetings. It emphasizes and sponsors continuing education programs, and co-sponsors symposia and autotutorial programs on the use, husbandry, and diseases of animals commonly used in research.

4. **The Institute of Laboratory Animal Resources (ILAR)**
   The Institute of Laboratory Animal Resources (ILAR) was founded in 1952 under the auspices of the National Research Council (NRC) which serves as an independent advisor to the federal government on scientific and technical questions of national importance. Jointly administered by the National Academy of Sciences (NAS), the National Academy of Engineering (NAE) and the Institute of Medicine (IOM), ILAR's goals are to develop standards for laboratory animal science. It serves as a coordinating agency to develop and make available scientific and technical information on laboratory animals and other biological research resources. This information is available to the federal government, the biomedical research community and the public.

   Over the years, ILAR has made important contributions in surveying animal facilities in the US, establishing standards, promoting education, sponsoring

conferences, and developing training guidelines for laboratory animal medicine. In addition, it has published a large amount of information, such as the *Guide*, which forms the foundation for governmental and institutional policies on animal care and use, and on specific types of animals (e.g. immunodeficient rodents, spontaneous hypertensive rats, and animal models for aging, thrombosis and hemorrhagic diseases) used in research. The *ILAR News* is the widely circulated quarterly publication. Copies of many of these publications are available in the reference library of the LAF Office.

5. **Miscellaneous Professional Societies**
In addition to the above, a number of scientific societies have developed guidelines of their own, usually in more detail. The American Psychological Association has published Guidelines for Ethical Conduct in the Care and Use of Animals. The American Toxicological Association and the American Physiological Society have published guidelines pertaining to the use of animals. Guidelines have also been developed for the study of animals in their natural environment. For example, the American Society of Mammalogists developed Acceptable Field Methods in Mammalogy; the American Ornithologists' Union developed Guidelines for the Use of Wild Birds in Research; the American Society of Ichthyologists and Herpetologists have developed Guidelines for the Use of Fishes in Field Research and Guidelines for the Use of Reptiles and Amphibians in Field Research; and the National Science Foundation has sponsored Field Research Guidelines: Impact on Animal Care and Use Committees. Refereed journals are increasingly requiring compliance with pertinent guidelines before accepting papers for publication. All of the above mentioned guidelines are available for perusal in the reference library of the LAF Office.

IV. Laws, Rules and Regulations

A. Federal

1. **The Animal Welfare Act** -- The Animal Welfare Act of 1966 and its amendments regulate the transportation, purchase, sale, housing, care, handling and treatment of animals used in teaching and research, for exhibitions, and sold as pets. The Act specifically includes dogs, cats, nonhuman primates, guinea pigs, hamsters, rabbits, wild mammals, and any other warm-blooded animals that the Secretary of Agriculture determines are being used or are intended for use in research, testing, experimentation, exhibition purposes, or as pets.

   Recent amendments address such issues as exercise for dogs; care of nonhuman primates to ensure their psychological well-being; the composition and duties of the Institutional Animal Care and Use Committee (ACUC); adequate veterinary care and responsibilities of the attending veterinarian; training of all personnel using laboratory animals in humane methods of animal maintenance and experimentation; and record keeping.

   The ACUC is responsible for reviewing all protocols involving animals to make certain that they meet criteria listed in the amendments. In addition, it must conduct semi-annual inspections of all animal study areas and animal facilities and ensure that there are no significant deviations in the use of animals from approved protocols. The importance of this requirement is underscored by the fact that the

Chief Executive Officer of the institution must certify that the attending veterinarian and the ACUC have the authority to enter any animal area at any reasonable time.

The Animal Welfare Act is administered by the United States Department of Agriculture (USDA), specifically, the Regulatory Enforcement and Animal Care (REAC) component of the Animal and Plant Health Inspection Service (APHIS). Research facilities are subject to unannounced inspections by USDA veterinarians, and are required to furnish annual reports that include, in addition to other information and assurances, the common names and numbers of animals used in procedures involving:

a. no pain, distress or use of pain-relieving drugs;
b. pain or distress for which appropriate anesthetic, analgesic or tranquilizing drugs were used; and
c. pain or distress for which the use of appropriate drugs would adversely affect the procedures, results, or interpretation of the research.

Routine procedures such as injections are exempt from the reporting requirements. The report must certify that anesthetic, analgesic, and tranquilizing drugs were used appropriately during research and testing, and that the principal investigator has considered alternatives to painful procedures and to the use of animals.

Non-compliance with USDA rules and regulations for the humane handling, treatment, and transportation of animals may lead to substantial fines and/or suspension of animal research activities. The text of the Animal Welfare Act is available for examination in the reference section of the LAF Office.

One amendment to the Act established the Animal Welfare Information Center (AWIC) in the National Agriculture Library (NAL), in cooperation with the National Library of Medicine, to provide reference material and services covering many aspects of animal welfare. Information about using the AWIC/NAL is available in the reference library of the LAF Office or one can contact AWIC directly by mail (10301 Baltimore Ave, Beltsville, MD, 20705-2351, by phone (301-504-6212) or on the internet at: http://www.nal.usda.gov/awic/

2. **The Health Research Extension Act of 1985 --** The Health Research Extension Act of 1985 (Public Law 99-158) directed the Secretary of Health and Human Services, acting through the Director of NIH, to establish guidelines for:

a. the proper care of animals used in research;

b. the proper treatment of animals while being used in research;

c. the establishment of animal care and use committees;

d. the establishment of requirements for the composition and function of these committees; and

e. the reporting of animal research activities to the government.

This law amended the Public Health Service Act to address the problems of "Animals in Research" in a more comprehensive fashion than ever before.

The Health Research Extension Act of 1985 affected animal research conducted intramurally by government agencies as well as grants and contracts funded by the federal government. The implementation of this law resulted in an amended Public Health Service (PHS) Policy on the Humane Care and Use of Laboratory Animals.

3. **The Controlled Substances Act of 1970 --** Potentially addictive or habituating drugs for human or animal use are classified under this law (Public Law 91-513). Examples of controlled substances include barbiturates and narcotics. The Department of Justice, Drug Enforcement Agency (DEA), enforces this law and requires appropriate security and record management of these substances. Information on the use of these substances can be found in Section V of this handbook.

4. **Endangered Species Act of 1973 --** This law (Public Law 93-205, as amended) seeks "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to achieve the purposes of the treaties and the conservation of wild flora and fauna worldwide."

   Regulatory authority under this Act is vested in the Secretary of the Interior and implemented by the federal Fish and Wildlife Service. Implementing rules and regulations are published in the Code of Federal Regulations (CFR), Title 50 (Wildlife and Fisheries).

5. **Other Federal Agencies and Regulations --** It is the investigator's responsibility to be aware of the various agencies which are empowered by Congress to develop rules and regulations under the applicable laws, or to promulgate guidelines and policies which affect the financing of research. Non-compliance (and ignorance is no excuse) may result in the entire university having all funding held up or withdrawn.

   In addition to the Department of Health and Human Services, NIH and the Department of Agriculture, other federal departments and agencies have jurisdiction over how you carry on your teaching and research when animals are involved. For example: Centers for Disease Control (CDC) on the use of infectious agents; Food and Drug Administration (FDA) for radiation protection and approval of medical devices; Environmental Protection Agency (EPA) for Good Laboratory Practices (GLP's), Pesticides and Toxic Substances; Department of the Interior (DOI) for Marine Mammal Conservation and Protection, and the Lacy Act on interstate transportation; US Nuclear Regulatory Commission on medical, academic, and commercial use of radioisotopes; and the Occupational Safety and Health Administration (OSHA), under the Department of Labor, on hazardous substances and the new Hazard Communication Standards. The LAF Office has information on how to contact these agencies.

B. State of California

1. **California State Department of Health Services --** California State Department of Health Services (SDHS) has been designated by the legislature to administer the

laws it has passed over the years relating to the "humane use of animals for scientific advancement in the diagnosis and treatment of human and animal diseases, for education, for research in the advancement of veterinary, dental, medical and biologic sciences, for research in animal and human nutrition, and improvement and standardization of laboratory procedures of biologic products, pharmaceuticals and drugs."

The rules and regulations developed include "requirements for satisfactory shelter, food, sanitation, record keeping, and for the humane treatment of animals by persons authorized by the board to raise, keep or to use animals...." (California Health and Safety Code-Division 2, Chapter 5, Section 1660).

In general, the provisions are essentially the same as the rules and regulations of the Animal Welfare Act and require individuals or agencies to obtain a "Certificate of Approval" prior to acquiring any animals. Since the passage of the Animal Welfare Act, the SDHS has taken the position that the Federal law supersedes the jurisdiction of the State of California law, and that the Laboratory Field Services Section, the enforcing section, maintains only a small force to ensure compliance, relying on federal inspectors to perform this function.

2. **California Department of Fish and Game --** In 1970, the California legislature was the first in the US to prohibit the importation, taking, possession, and sale of endangered and rare species, and gave authority to the Department of Fish and Game to administer the "California Species Preservation Act." In 1972, the first biennial report listed 43 species of wildlife threatened with extinction or possible peril and recommended actions for their protection and preservation.

   Subsequent status reports have been made which now include gastropods, crustaceans, insects, fishes, amphibia, reptiles, birds and mammals. There exists a cooperative agreement between the US Department of Interior -- Fish and Wildlife Service and the California State Department of Fish and Game to manage certain aspects of the federal Endangered Species Act of 1973.

   Severe penalties for those convicted of violating provisions of the Act can be imposed, and a reward system to encourage apprehension is provided.

3. **California State Department of Agriculture, and Other State Agencies** In addition to the California Department of Health Services and the Department of Fish and Game, the California Department of Agriculture is also empowered to administer a number of statutes that affect the acquisition, sale, transportation and care of animals that may be used in teaching and research. Sometimes all three agencies have an interest in the control of certain species.

   An example of this is the case of the Mongolian gerbil (*Meriones unguiculatus*). It was designated a "prohibited" species by the Department of Agriculture for fear it would destroy grain crops and irrigation systems; by the Department of Health because it was a carrier of sylvatic (bubonic) plague, leptospirosis, and other diseases affecting many species; and by the Department of Fish and Game because it might disturb ecological balances. All three agencies had to be brought together to work out a plan to permit scientists to use this valuable research animal. Its status was changed to "restricted," and the Department of Fish and Game controls

its presence in California by requiring inspections and permits to acquire, possess and use this species which, in other states, is considered a pet and is not controlled.

V. Animal Care and Use Committee: Policies & Procedures

The Animal Care and Use Committee (ACUC) is responsible for managing and administering the program of animal care in compliance with the federal Animal Welfare Act, the NIH *Guide for the Care and Use of Laboratory Animals*, the Public Health Service Policy on Humane Care and Use of Laboratory Animals, and the US Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training. The ACUC reviews all applications for Animal Use Protocols, conducts the Education Program, maintains records of the training program, and conducts the semi-annual reviews of the University program for the humane care and use of animals and the semi-annual inspections of all facilities used for maintaining animals.

The ACUC is assisted in fulfilling its responsibilities by the Lab Animal Facilities Coordinator and other members of the staff of the Lab Animal Facility (LAF), an academic service unit which reports to Academic Affairs. The functions of the LAF include, but are not limited to, daily animal husbandry and care, provision of information and technical assistance, monitoring the animals' environment, purchase of live vertebrates, cost accounting and budgeting, training of technical personnel who are responsible for daily animal husbandry, maintenance of all records relevant to approved animal use protocols for the ACUC, and consultation and service in all phases of animal care and use at Cal Poly. The University Veterinarian is responsible for providing veterinary care and supervising the Facilities Coordinator.

A. General Considerations When Using Animals

It is the responsibility of each investigator using animals to ensure that they and their staff (research or teaching assistants or graduate students) are informed about the current complex legal and bureaucratic environment in which animals are used. These complexities stem from Federal laws and policies and include institutional policies and procedures. Questions concerning these issues should be directed to the Chair of the Animal Care and Use Committee. Investigators must also be knowledgeable about the animal species and the techniques they use in their teaching and research. The University Veterinarian or the Lab Animal Facility Coordinator should be consulted if questions arise. The following is intended as a general summary of the administrative responsibilities associated with the use of animals in research and teaching at Cal Poly University.

Overview of administrative procedures involved in the use of animals.

- Before animals can be used, a “Protocol Approval Application” must be submitted to, and approved by, the ACUC. This requirement applies to studies of vertebrate animals in their natural environment ("Field Studies") even if the animals are only trapped and released. It does not apply to the observation of animals in the field.
- Faculty members must also complete the Core Education program.
- Before animals may be purchased, an “Animal Purchase Request” must be submitted to, and signed by, the Facilities Coordinator. This is to assure that the Lab Animal Facility (LAF) is prepared to receive the animals and that animals are only acquired for use in approved protocols.
- Special procedures are required when the animals are not housed in the animal facility or not acquired through University or Foundation purchasing.

- Animals captured in the wild may NOT be brought onto campus or into any University facility without prior approval of the Facilities Coordinator and approval of an Animal Use Protocol by the ACUC.
- Any significant changes to the protocol must be approved by the ACUC (see list of examples of significant changes in section V.E.).
- The ACUC must be advised *in writing* before any graduate or undergraduate student becomes involved in research or as a paid teaching assistant in a course utilizing live vertebrate animals in laboratory exercises. The nature of student training will be determined by the ACUC at the time a protocol is approved and may include viewing the 40-minute ACUC Introductory video, completion of the entire three-hour Core Education Video Series, or training in specific procedures involved in the Animal Use Protocol.
- Protocols must be reviewed annually, and this is achieved by completing a simple form distributed by the ACUC.

There can be very significant legal consequences for investigators and for the institution if the Animal Care and Use Program is not complied with. The PHS Policy requires institutions to report promptly the circumstances and actions taken in the following instances: 1) any serious or continuing non-compliance with PHS Policy; 2) any serious deviation from the provisions of the NIH Guide; 3) any temporary or permanent interruption of any activity by the ACUC. Serious noncompliance with PHS Policy includes: 1) conducting an animal-related activity without appropriate ACUC review and approval; 2) conditions that jeopardize the health or well-being of an animal. Solution of the problem does not dismiss the institutions obligation to file a report with OPRR. The Animal Welfare Act requires that the Institutional Official inform USDA, and the Federal Funding Agency funding the activity, if the ACUC suspends an activity involving animals.

B. Preparation of a Protocol Approval Application (PAA)

1. Who Must Submit a Protocol Approval Application

All instructional and research use of live vertebrates at Cal Poly by faculty, students, or staff (including studies of unconfined animals in the field) requires the submission of a "Protocol Approval Application" to the Animal Care and Use Committee (ACUC). The only exclusion to this policy is the teaching of "industry standards" for the care and use of farm animals (including rabbits, horses, poultry, swine, goats, cattle, and sheep) for which "industry standards" of care and use are defined in the "*Guide For The Care And Use Of Agricultural Animals In Agricultural Research And Teaching*."

All animal-related activities supported by NIH or NSF must be approved by the ACUC, and *must be conducted at an institution that has an Assurance with OPRR/NIH*. When both the PHS Grantee and it contractor hold OPRR-approved assurances, some latitude is allowed in determining which ACUC will review the proposal. However, the institution which subcontracts or subgrants any animal activity retains partial accountability for providing effective oversight mechanisms to ensure compliance with the PHS Policy. The grantee or prospective grantee must be sure activities proposed to take place at another OPRR-approved institution have been reviewed by the ACUC at that institution.

2. **General information about the Protocol Approval Application** - Investigators with questions regarding protocol preparation are encouraged to contact the ACUC Chair and/or the University Veterinarian. Careful and thorough preparation of protocol applications facilitates the review process and reduces the chance of delay in initiating projects and in review of applications by the ACUC.
   a. The Protocol Approval Application is available as word processor file (Word, Wordstar, and WordPerfect) and as an ASCII file on IBM-compatible diskettes and as Microsoft Word and ASCII files on Macintosh-compatible diskettes from the LAF Office and from the chair of the ACUC. It is also available as a printed form from the ACUC chair, although this method of submission is discouraged.

   b. The completed Protocol application should be forwarded to the ACUC chair as a wordprocessor file attached to an email or on a 3.5" diskette. If both of these methods are impossible it is permissible to submit the Protocol application as a hard copy. If this is the case, submit an original and 9 copies of the form to the ACUC chair. In order to provide clear, legible copies, it is recommended that you use a BLACK pen or typewriter. Any necessary signatures should be written in black ink.

   c. If you are submitting a hard copy, it is recommended that you review your application with the ACUC chair before making the required number of copies. This will avoid waste should modifications to your application be necessary.

   d. Cal Poly has been advised by the Chancellor's Office that records such as this application are considered "public records" and are subject to disclosure upon legal request by the general public through the Freedom of Information Act. However, the names of University employees may be deleted from material released and certain other modifications to the form made under certain circumstances where disclosure would place the employee in danger or subject them to harassment. Before this application is released under these provisions, you will be informed.

3. **Special Instructions For Applications Being Prepared With A Computer:**
   a) In preparing your application, *please delete all irrelevant Sections from Part VIII before submitting your application*.

   b) When preparing your Application, please make it obvious what text constitutes your responses to the questions. One way to do this would be to use a different font (e.g. **bold** or *italics*) for your responses.

   c) If submitting as a hard copy, please be sure the first page of your application ends with the line for signature of the ACUC chair (e.g. do <u>not</u> include any of Part I of the application form on page 1).

4. **Specific Instructions for Parts I through VIII.**
   a. COVER PAGE: If at all possible, please provide a title of less than 80 characters.

   b. **Part I. Justification of the choice of Species.** Be sure to explicitly account for the number of animals to be used (e.g. "A total of sixty animals used in three experiments, one for variable A, and two replicates of variable B, each involving

10 controls and 10 experimentals"). The ACUC understands that a sufficient number of animals must be used in most cases to obtain statistically significant results in research and that this is frequently not the objective with uses of animals in teaching.

c. **Part II. Rationale for proposed use of animals.** Your justification should be long enough to provide an understanding of why this use of animals is being conducted. It should be written in layman's terms so it can be understood. If Cal Poly were to become the victim of animal rights terrorist activity, this Part might be released to the public to explain the importance of the research being conducted.

d. **Part III. Description of proposed use of animals.** This part should be 1/2 to 2 pages in length, maximum. The most important information to include is a clear and complete picture of what will be done to the animals. It should also give a clear overview of the entire experiment so the scientific merit of the experiment can be evaluated. You may be able to save time and paper by not including in Part III any details that are called for in one of the Sections of Part VIII. If this protocol is for a laboratory exercise and you have prepared a detailed protocol for your students, you may attach and write "see attached lab exercise" in place of Part III if it satisfies the intent of this section.

e. **Part IV. Procedures to limit discomfort, pain or distress.** Ask for help from the ACUC chair or University Veterinarian if you need help determining the Pain Class, or it you think the answer is Pain Class C. If your protocol involves Pain Class C you must also submit Section VIII 3, justifying this procedure and Section VIII 4, identifying alternatives to death as an end point.

f. **Part V. Method of Euthanasia.** All applications must include this section on euthanasia, even if euthanasia is not the intended means of disposal of animals following the protocol. Death MUST be assured in a positive manner and the method of euthanasia should comply with the most recent recommendations of the *American Veterinary Medical Association (AVMA) Panel on Euthanasia*. A copy of the report of the AVMA Panel is available in the Lab Animal Facility and should be consulted if there is any doubt. The University Veterinarian must be consulted if the proposed method does not comply.

g. **Part VI. Alternatives to the use of live animals.** According to Federal Regulations, alternatives must be considered. See Appendix G for resources to consult in your search for alternatives. If your proposed use of animals is a Pain Class B or C procedure you will have to provide information about your search. Alternatives have been broadly defined to include:

1). **Replacement**: Substitution of insentient material for animals or substitution of a lower species, which might be less sensitive to pain and distress, for a higher species

2) **Reduction:** Reduction in the numbers of animals used to obtain information of a certain amount of precision.

3) **Refinement:** Decrease in the incidence or severity of pain and distress of those animals that are used.

The Animal Welfare Information Center (AWIC) at the National Agricultural Library has responsibility for assisting with the identification of Alternatives. AWIC should be consulted, and can be reached by several different means:

Telephone: (301) 504-6212
Internet: http://www.nal.usda.gov/awic/

There are numerous other sources of information which are listed in Appendix G. The LAF Office also maintains a file of sources of information on alternatives.

h. **VII. Unnecessary Duplication.** Federal regulations prohibit unnecessary duplication of animal uses. The ACUC recognizes that duplication may, sometimes be necessary, such as in pilot projects, or during educational lab exercises. There should be some substantial basis for the assertion that the proposed research does not duplicate previous work. One such basis might be an extensive literature review involving computerized data bases. AWIC (see above) can be of assistance in this regard.

i. **Part VIII.** In this part of the application, you are asked to determine which of the 16 following Sections are relevant to your project, and *submit only the relevant Sections*. If you cannot decide whether a Section is relevant based on the short titles included in this table, you should read the questions asked in the Section of the application. If information requested in the Section repeats information you provided in Part III, please provide the information again in the Section and do not state something like "see Protocol in Part III". If you decide that a Section is relevant to your project, you must submit answers to ALL of the questions in that Section. If you are using the "hard copy" version of the form, submit all pages that include any part of any relevant Section, and do not submit copies of any pages that you haven't written something on.

3. Timetable for Protocol Submission

a. NIH and NSF Applications: Both NIH and NSF require verification that an applicant requesting funds for animal research has an approved animal use protocol for the proposed project. This verification must be received within 60 days after the agency's application receipt deadline. To allow sufficient time for protocol review and verification of approval, applicants should submit protocols to the ACUC no later than two weeks after the funding agency's proposal submission deadline. If verification of ACUC approval is not received by funding agencies within the allotted 60 days, the application will be considered incomplete and may be deferred to the next review cycle.

b. Other Research and Teaching Protocols: All other protocols must be submitted at least ten (10) days before the use of animals is to begin. This lead time is required because all ACUC members must be given one week in which to read the protocol (see Expedited Review, below). It should be noted that approval may take longer than ten days if the PAA is incomplete or if any member of the ACUC requests that the application be reviewed at a meeting of the full ACUC.

4. Protocol Review Process

a. Investigators submitting animal use protocols for the first time are encouraged to submit a draft copy for an initial screening by the ACUC Chair for preliminary review. This first review ensures the application form has been accurately and completely filled in. Animal use procedures must meet NIH standards and comply with requirements of the Animal Welfare Act and Cal Poly guidelines and policies. In most cases, this preview process substantially decreases the amount of time needed for the ACUC review process.

b. Following this preliminary review, the ACUC Chair will contact the applicant by letter or phone if clarifications or revisions are necessary (a significant number of the protocols received require some clarification or revision).

c. The applicant sends a word processor file of the Protocol Application to the ACUC chair (either as an email attachment or on a diskette). Alternatively, the applicant delivers NINE COPIES PLUS THE ORIGINAL to the ACUC Chair. The protocol will be distributed to all ACUC members for Committee Review at its quarterly meeting unless an Expedited Review is requested.

d. **Committee Review**: Whenever possible, protocols/changes will be distributed to committee members in advance of the scheduled meeting and listed on the Agenda. If necessary, protocols/changes may be distributed at the meeting, providing all members agree that there is sufficient time to carefully consider the application. Protocols/changes must be approved by a majority of the members present at the meeting.

e. **Expedited Review:** When necessary, protocols/changes may be reviewed by the ACUC Chairman and one other committee member, selected by the Chairman. The other committee member should be one with relevant expertise and no conflict of interest. All members of the committee will be provided with copies of the Protocol Application and told what committee member has been asked to review the Application. The second committee member reviewing a Protocol Application should communicate his/her recommendation regarding the Protocol Application to the ACUC chairman by phone, email, or in writing. At least one full week (seven days) shall pass between distribution of the Protocol Application and its approval. Committee members will have the option of requesting that the Application be reviewed by the Committee Review process described above, or of communicating questions or concerns regarding the protocol to the ACUC chairman. The ACUC chairman shall report all questions or concerns, and steps taken to resolve them, to the committee at its next regular meeting.

f. **Notification of Protocol Approval**: If the protocol is approved by the committee, the ACUC chair will inform the faculty member by phone or by email. Formal notification will also be forwarded to the University's Responsible Institutional Official and the faculty member in writing. If the protocol application was submitted as a word processor file, the ACUC chair will provide the faculty member with a copy of the first page of the Protocol Application which must be signed and returned before the protocol can receive final approval.

C. Acquisition of Animals and Supplies

All arrangements for acquiring and housing live vertebrates from any source must be made through the LAF Office; arrangements for housing must be made before an order will be placed. Animals may not be purchased or otherwise acquired until a fully approved protocol is on file and the LAF Coordinator is notified.

1. **Ordering Animals -** All animal orders must be initiated by the LAF Office (Monday-Friday, 8 AM - 4 PM) in order for the correct paperwork and backup documentation to be completed. No animal orders will be processed until a fully approved protocol is on file and an "Animal Purchase Request" has been filed with, and signed by the Facilities Coordinator.

   In general, common laboratory species and strains can be obtained within five (5) working days. Procurement of mammals other than rodents and less common strains or species of rodents may require more time. Delivery of animals is affected by vendor location and by vendor shipping policies. For example, it takes longer to obtain animals from East Coast vendors, and delivery from these suppliers is more likely to be delayed by weather conditions. Orders are placed for delivery on Monday through Thursday whenever possible to prevent problems associated with delivery on weekends and holidays.

   Orders for animals from commercial vendors should be placed by completing an Animal Order and Delivery Request form; delivering the form along with a completed purchase requisition to the LAF Office. The LAF coordinator will approve Animal Orders and forward the purchase order to University Purchasing. Special instructions for ordering and/or housing of the animals are to be included in the space provided on the Animal Order form. NOTE: Arrangements for animals coming from other institutions (whether they are purchased or not) must first have the approval of the LAF Coordinator and the University Veterinarian before delivery can be made. In such cases, a Protocol for Animal Use will be necessary.

2. **Wild-caught animals -** The Facilities Coordinator will contact the faculty member who holds the protocol to establish procedures for notifying the Facilities Coordinator of intended arrival dates of any animals to be housed in the animal facility and to confirm plans for quarantine and special diets. If exotic or other animals from nature are to be used, arrangements for any necessary quarantine must be made through the LAF Office before animals are returned to campus. The investigator is responsible for determining if permits (such as US Fish and Wildlife or California Department of Fish and Game) are required, and any necessary permits must be obtained before animals are acquired. The LAF Office can help investigators to determine whether permits are needed and assist in obtaining them.

3. **Wild Nocturnal Rodents of the genus *Peromyscus***, especially *Peromyscus maniculatus*, the Deer Mouse, should be treated as though they are potentially infected with the Sin Nombre strain of the Hanta virus, a pathogen that produces Hanta Virus Pulmonary Syndrome, a disease with a ca. 50% mortality rate in normal healthy adult humans. Full details of dealing with situations in which these animals may be trapped are covered in a SOP available in the LAF Office. In general, personnel should be briefed on hazards by the University Veterinarian and provided with respirator masks. When returned to the campus, all mice will be quarantined in micro-isolator cages upon arrival. Serum will be collected by the

Facilities Coordinator or University Veterinarian and submitted to the State Diagnostic Lab for testing for the presence of Hanta virus antibodies. Should a test be positive the animal will be euthanized and all other animals housed in the same quarantine will be tested for Hanta virus two weeks later to ensure negative status.

4. **Ordering of Drugs and Medical Supplies -. -** The LAF Coordinator and the University Veterinarian will assist, whenever possible, in ordering other animal study-related items such as drugs, medical and surgical supplies. Investigators requiring special care, equipment, supplies for their animals, or exemptions from standard animal care procedures should inform the LAF Office so that appropriate arrangements can be made.

D. Procedures for controlling animal usage

The following procedures will be used to ensure positive control of the number of animals used under approved protocols. Animals housed in building 92 will be subject to the regular census process in that facility and all animals used will be charged against the appropriate protocol. When the animals are not housed in building 92 of the Laboratory Animal Facility their use will be accounted for by using a quarterly report.

1. **Requirement for Quarterly Animal Use Reports for animals not housed in Building 92.** The Facilities Coordinator will contact each faculty member at the end of each academic quarter (including summer) for a report of the number of animals used under the protocol during the preceding three months. This report will be submitted in writing on the form provided by the ACUC. When 90% of the authorized number of animals have been used, the Facilities Coordinator will advise the faculty member holding the Protocol, and the chair of the ACUC.

E. Changes to Approved Protocols

All significant changes to approved protocols must be approved by the ACUC, by one of the two processes utilized for approval of new protocols (Committee Review or Expedited Review). Significant Changes to a protocol include, but are not limited to the following:

1. Changes in the objectives of a study.
2. Switching from non-survival to survival surgery.
3. Changes in the degree of invasiveness of a procedure or the amount of discomfort experienced by an animal.
4. Changes in the species (or strain in special cases) or increases of more than 10% in the number of animals to be used.
5. Changes in the personnel responsible for supervising and/or training others in animal procedures. The ACUC must be advised of the addition of students to protocols, but this does not constitute a significant change requiring prior ACUC approval.
6. Changes in anesthetic agent(s), the use or withholding of analgesics.
7. Changes in methods of euthanasia.
8. Duration, number, or frequency of procedures performed on an animal.

Persons contemplating changes to approved protocols should consult the ACUC Chair or University Veterinarian if there is any reason to suspect that the change might be considered “significant.”

F. Use of Hazardous Agents and Controlled Substances

1. **Toxic and Hazardous Chemicals --** To protect animals and humans if toxic, hazardous, or radioactive agents will be used, the appropriate part of the Protocol Approval Application must be completed. The use of radioactive agents must be approved by both the Radiation Safety Committee and the ACUC. Experimentation involving the use of toxic or hazardous agents may necessitate the development of special Standard Operating Procedures (SOPs) through a collaboration between the ACUC, the responsible faculty member, and staff of the Environmental Health and Safety Department. Investigators must realize that many (historically) used (in biomedical research) substances are now known to be potentially hazardous. Volatile organic solvents (e.g., xylene, acetone, DMSO) may have hepatotoxic actions if inhaled, or could exhibit rapid pericutaneous absorptive properties. The latter property not only produces internal exposure to the solvent, but also to substances on the skin which dissolve in the solvent. The weighing of potentially hazardous substances (e.g., paraformaldehyde, barbital, urethane) should be performed under a hood with gloves. Investigators should familiarize themselves with the potential health hazards associated with any chemicals used in laboratory animal research by reviewing the appropriate Material Safety Data (MSD) sheet. This information is available on the Internet: http://www.ilpi.com/msds/ . The Environmental Health and Safety Department should be consulted in the design of safe handling procedures for potentially hazardous substances.

   Animals exposed to hazardous agents must be clearly identified on the external door to the room housing the animals, as well as on the cage or cage rack; animal wastes and animal carcasses must be disposed of according to procedures established by the ACUC with the approval of the campus Office of Environmental Health and Safety. For information about the appropriate use and disposal of hazardous agents, contact the Office of Environmental Health and Safety.

2. **Controlled Substances** -- Orders for controlled substances for use in animal studies must be initiated through the designated purchasing authority of the requester's respective department. When a purchase requisition for controlled substances is initiated, the designated purchasing authority contacts the authorized Purchasing Agent in the campus Purchasing Department, who then places the order following federal Drug Enforcement Agency (DEA) regulations. The order is then delivered to the original requester's department. The DEA requires that all controlled substances be stored in a secure locked cabinet, and that an aliquot log be maintained by the user accounting for the entire volume of each drug received. This log should be in a numbered, bound notebook and be available for review by the ACUC during semiannual program reviews and facilities inspections. The log should provide the following information for each bottle of drug received:

   - name, size and concentration of drug;
   - name of manufacturer, lot number, and date of expiration;
   - date and volume of each aliquot dispensed;
   - name of person dispensing drug and purpose for which dispensed;
   - animal identification numbers or reference to data books showing which animals and number treated should be included, if possible.

Outdated or unused controlled substances should be delivered to the Department of Environmental Health and Safety so they can be disposed of appropriately.

3. **Pathogenic Organisms --** Protocols involving any use of pathogenic organisms must be reviewed by the Microbiology/Infectious Disease Safety Committee before they can be approved by the ACUC. When such protocols are submitted to the ACUC, they will automatically be forwarded by the ACUC Chair to the Chair of the Microbiology/Infectious Disease Safety Committee and the results of this review will be forwarded to the ACUC.

4. **Recombinant DNA** -- Protocols involving the used of recombinant DNA technology will have to be reviewed by a duly constituted and authorized Institutional Biosafety committee at a neighboring institution such as City of Hope. Faculty considering the development of such protocols should consult with the chair of the ACUC for more information.

G. Anesthesia and Analgesia

1. **Procedures --** Animal procedures are reviewed by the University Veterinarian and the ACUC to ensure that proposed anesthetics and analgesics are appropriate for the species and research objectives. The LAF Coordinator and the University Veterinarian are available to provide consultation about, assistance with, or training in the proper administration and use of anesthetics and analgesics.

   The *Guide* requires that any proposal to conduct painful procedures without anesthesia or analgesia must be approved by the ACUC. Such procedures must be supervised directly by the responsible investigator. Guidelines for anesthesia, analgesia and tranquilization can be obtained from the LAF Coordinator or University Veterinarian.

H. Surgery and Postsurgical Care

1. **Definitions.**
   a. *Non-survival surgery* is defined as any surgery in which the animal will not regain consciousness. Such procedures require the same anesthesia as survival surgery but may be performed in a suitably located and equipped laboratory, subject to ACUC evaluation and approval.

   b. *Survival surgery* is defined as surgery on an animal that is expected to recover from anesthesia.

   c. *Major surgery* is defined as any surgical intervention that penetrates a body cavity or has the potential for producing a permanent handicap in an animal that is expected to recover. Examples include but are not limited to; thoracotomy, laparotomy, craniotomy, joint replacement, and limb amputation.

   d. *Minor surgery* is any operative procedure in which a major body cavity is not exposed and that causes little or no physical impairment. Examples include surgical procedures in which only skin,mucous membranes, or muscle tissues are incised (e.g., vascular cutdown for catheter placement or implanting devices in subcutaneous tissue).

e. *Surgical sutures* in survival surgery should not remain in place longer than 7-10 days.

2. Survival Surgery in non-rodents.

a. Major surgical procedures on mammals other than rats and mice must be conducted in dedicated surgical facilities intended for that purpose, using aseptic techniques. These techniques include wearing sterile surgical gloves, gowns, caps and face masks; using sterile supplies and instruments; and maintaining an aseptically prepared surgical field. Appropriate medical records must be maintained throughout the surgery and recovery.

b. Minor surgical procedures on mammals may be performed in a suitably located and equipped laboratory area, subject to approval by the ACUC. Appropriate aseptic technique for these procedures includes a clean uncluttered work area, preparation of the surgical site including clipping of the hair, disinfecting of the skin and draping of the surgical site with sterile drapes; the use of sterile supplies and instruments; and the use of sterile gloves and a surgical mask by the surgeon and any assistants working in the surgical field. Aseptic surgical procedures should only be performed by a well-trained team.

c. Pre-surgical care: Food should be withheld overnight prior to anesthesia and surgery to prevent vomiting, aspiration, and problems associated with a distended intestinal tract. Water should be withheld only several hours prior to anesthesia.

d. Post-surgical care should include observation of the animal to ensure uneventful recovery from anesthesia and surgery. The animal may be returned to its cage; however, no food or water should be left in the cage until the animal is fully conscious. The animal must be monitored until it regains normal postural reflexes, is capable of holding its head up, and normal swallowing reflexes have returned. The animal should be kept warm and dry. Fluids, analgesics, and antibiotics should be administered as required. Surgical wounds should be kept clean, and bandages or wound dressings changed as frequently as necessary to keep them clean and dry. Subsequent care may include supportive fluids, analgesics, and other drugs as required; monitoring the animal daily for body temperatures; clinical observations for signs of pain, abnormal behavior, appetite and excretory functions; providing adequate care of surgical incisions; and maintaining appropriate medical records. More information can be obtained from the University Veterinarian.

e. CAUTION: Use of heat lamps and electric heating pads can result in burns or hyperthermia in animals that are anesthetized or otherwise unable to escape from the heat. Close observation is required, and use of circulating warm water blankets is recommended whenever possible.

f. ACUC policy requires written documentation of all survival surgical procedures, including the types and amounts of anesthetic, analgesic or tranquilizing drugs used. An SOP and standard form for Surgical and Anesthesia Records are available from the LAF Office and should be used for all survival surgical procedures. This documentation becomes part of the permanent record

kept by the investigator, and is subject to inspection by the USDA veterinary inspectors and the ACUC during its semi-annual inspections of animal facilities and animal study areas. In addition, all manipulation and drug use in all animals should be recorded on the cage card, or made available to the LAF Coordinator.

3. Survival Surgery in Rodents

This policy is a reflection of the NIH Guidelines. In order to reduce sub-clinical infections and decrease inflammatory responses, it is obvious that the most optimal surgical procedures available should be used. These guidelines are minimal standards and will not necessarily protect against postoperative infections or decrease the inflammatory responses.

a. FACILITY: A separate facility for rodent surgery is not necessary. A rodent surgical area can be a room or portion of a room that is easily sanitized. The immediate surgical area should not be used for other purposes during the time of surgery. Surgery should be conducted on a clean, uncluttered lab bench or table. The work surface should be wiped with a disinfectant before and after use or covered with a clean drape.

b. PREPARATION OF ANIMAL: Hair should be removed from the surgical site and the skin should be scrubbed/cleansed with antiseptics.

c. PREPARATION OF SURGEON: The surgeon will wear clean laboratory garments. Hands should be washed with an antiseptic surgical scrub preparation and [sterile] surgical gloves will be worn. Once gloves are in place, they should touch nothing except the prepped portion of the animal and sterile instruments.

d. INSTRUMENTS: Surgical instruments will be sterilized, using steam (autoclaving), gas or chemical methods.

e. POSTSURGICAL CARE: Post surgical care should include observing the animal to ensure uneventful recovery from anesthesia and surgery; administering analgesics as required; providing adequate care for surgical incisions; and maintaining appropriate medical records. A minimum appropriate record consists of clearly recording on the cage card the type of surgical procedure performed, the date of the procedure, and initials of person who performed the procedure. In the event that infections or complications ensue, the University Veterinarian will review the entire surgical procedure (facility; preparation of the animal, surgeon, and instruments; and post surgical care) and offer suggestions and training to prevent complications.

f. SEQUENTIAL SURGERIES: Sequential surgeries on multiple animals present special problems. After the first surgery, the sterilized instruments should be kept in a sterile tray containing 70-80% ethyl or isopropyl alcohol or other chemical disinfectant. The disinfectant should be replaced when contaminated with blood or other body fluids. Sterile gloves should be changed between surgeries if the surgeon touches non-sterile surfaces; alternatively, surgeons may wipe their gloves for one minute with sterile gauze pads soaked in alcoholic chlorhexidene antiseptic or betadine antiseptic.

g. TRAINING: Training will be provided by the University Veterinarian. In addition, everyone must perform one surgery under the observation of the University Veterinarian.

h. ANESTHESIA, ANALGESIA AND EUTHANASIA: A list of recommended methods, agents and their doses is available from the University Veterinarian.

I. Immunological Procedures

1. Bleeding Techniques

a. Cardiac bleeding requires general anesthesia. This technique should generally be limited to terminal collections due to the danger of cardiac tamponade or pulmonary hemorrhage and pneumothorax. Safer, alternative techniques for obtaining repeated large volumes of blood are available for rabbits (1,2).

b. Orbital bleeding requires specific justification on the Protocol Approval Application. The qualifications and experience of the person(s) executing the procedure must also be presented. Anesthesia must be used for all species.

c. Use of topical irritants such as xylene to dilate vessels of the ear pinna of rabbits is discouraged. If used, the irritant must be immediately removed after bleeding (alcohol followed by soap and water) and a soothing lotion such as Alpha-Keri® applied. Vessels can generally be adequately dilated by increasing body temperature by use of a heat lamp or by increasing room temperature. A tranquilizer such as Innovar-Vet® also works well.

d. Use of suction devices applied to the ear is generally unnecessary and is discouraged because it may damage the tympanic membrane.

e. Use of commercially available rabbit restraint devices is acceptable provided adequate care is taken to prevent injury. Use of a tranquilizer may eliminate or reduce the need to use restraint devices.

f. The volume of blood removed at any one bleeding should not exceed 1.5% of body weight, assuming 1 ml blood weighs 1 gram (see Appendix for more details). In healthy rabbits, this procedure may be repeated weekly over a two month period without serious hematological consequences. Rabbits should then have a rest period of at least 30 days before resumption of bleeding. More severe or more frequent bleeding requires monitoring of hematocrit, hemoglobin and total plasma protein.

g. REFERENCES: Droperidol-Fentanyl as an Aid to Blood Collection in Rabbits. Tillman, P. and Norman, C. *Laboratory Animal Science* 33(2), April 1985. Hematological Response of Rabbits to Chronic, Repetitive, Severe Bleeding for the Production of Antisera. Nerenberg, S.T. et al. *Journal of Immunological Methods* 24:19-24, 1978.

2. Freund's Adjuvant

Improper or unnecessary use of Freund's adjuvant may cause inflammation, induration or necrosis in laboratory animals. The following policy is intended to eliminate, or reduce to a minimum, animal discomfort associated with the use of this

agent in research. Departures from this policy will require adequate justification to the Committee.

a. Before using Freund's complete adjuvant, consider the use of the incomplete or another adjuvant.

b. Complete Freund's adjuvant should be used only for the first (priming) antigenic dose. Use of two or more doses of the complete adjuvant must be justified and is rarely warranted. If more than one dose must be used, an interval of at least 3 weeks should be allowed between doses.

c. The use of complete Freund's adjuvant is an important biologic resource for investigators which should be used responsibly and with care to avoid or minimize the adverse effects of excessive inflammation. Undesirable and painful side effects such as large inflammatory lesions or tissue necrosis can be effectively reduced or eliminated by the use of appropriate routes of administration, adequate separation of injection sites, and the use of a small amount of inoculum per site. Experience has shown that, for example, 0.05 ml intradermally in rabbits, 0.l ml subcutaneously in rodents, and up to 0.5 ml intramuscularly in large farm animals per site have produced favorable results, while minimizing undesirable side effects. Complete Freund's adjuvant is usually only necessary for the initial immunization with incomplete Freund's being the adjuvant of choice for subsequent immunizations. Non-inflammatory adjuvants or adjuvants known to produce less intensive inflammatory responses which are nonetheless capable of eliciting a humoral antibody response should be considered when possible.

d. The inoculum containing the adjuvant should be divided into fractions so that no more than 0.l ml is injected per site for rabbits and 0.05 ml for mice.

e. Injections should be subcutaneous or intraperitoneal rather than intradermal, or intramuscular unless sufficient justification is provided. Intradermal injections may result in skin necrosis and sloughing. Intramuscular injections may result in temporary or permanent lameness. Use of footpad injections is not recommended. Injection of rear footpads in mice may be permitted if other sites do not produce significant antibody titers to weak antigens. For studies tracing the fate of injected antigens, it is suggested that injections be made subcutaneously in areas drained by particular lymph nodes such as the axillary or inguinal.

f. The inoculum should be free of extraneous microbial contamination. Millipore® filtration of the antigen before mixing with adjuvant is recommended when possible.

g. Injection sites should be clean and free of debris and contamination likely to result in infection but need not be aseptically prepared.

3. Monoclonal Antibody Production

There is evidence that the mouse ascites method of monoclonal antibody production causes discomfort, distress, or pain. Practical *in vitro* methods exist which can replace the ascites method in many experimental applications without

compromising the aims of the study. Accordingly, the ACUC will critically evaluate the proposed use of the mouse ascites method. Prior to approval of proposals which include the mouse ascites method, the ACUC must determine that (i) the proposed use is scientifically justified, (ii) methods that avoid or minimize discomfort, distress, and pain (including *in vitro* methods) have been considered, and (iii) the latter have been found unsuitable. Information on *in vitro* methods is available in the LAF Office.

J. Euthanasia

The NIH *Guide* defines euthanasia as "the procedure of killing animals rapidly and painlessly." Campus euthanasia guidelines follow those established by the most recent *American Veterinary Medical Association Panel on Euthanasia* (a copy can be obtained from the LAF Office). Proposed euthanasia techniques must be evaluated and approved by the University Veterinarian and the ACUC during review and approval of animal use protocols.

Euthanasia should be carried out by personnel properly trained in the procedure being used. While decapitation on small rats and cervical dislocation on mice may be humane when administered by properly trained personnel, animal use protocols proposing these techniques without sedation or anesthesia must include the rationale justifying such techniques. Measures should be taken to ensure that euthanasia is performed in a way that minimizes reactions from other animals that may be present. Proper euthanasia technique includes a follow-up examination to confirm the absence of a heartbeat for a designated period of time. Cessation of breathing is not considered sufficient, since, with some euthanasia techniques, heartbeat may be maintained after visible respiratory movements have ceased. Decapitation, cervical dislocation or thoracotomy should be used after injection of euthanizing drugs to ensure that animals do not revive. Instruction on proper euthanasia techniques can be obtained from the LAF Coordinator or the University Veterinarian.

1. Field Studies - Unplanned Euthanasia

Many field studies do not include intentionally killing animals but some procedure must be specified for dealing with animals that are accidentally incapacitated and must, therefore, be killed for humane reasons. Under these circumstances thoracic compression or cervical dislocation may be specified as the means of euthanasia if the animals being studied are small rodents, no bigger than ground squirrels (ca. 300 g). However, all personnel who may need to perform this procedure must be properly trained and demonstrate their mastery of the technique to the Facilities Coordinator. Animals used for these demonstrations will be laboratory rodents scheduled for euthanasia and will be partially disabled with an approved method of euthanasia such as carbon dioxide.

K. Reporting Deficiencies in Animal Care and Treatment

1. Procedures

Any complaint by faculty, staff or students regarding the care and use of animals in instruction or research or charges of animal abuse at Cal Poly should be directed to any of the following: 1) the Chair of the Animal Care and Use Committee; 2) the University Veterinarian; or, 3) the Deans of the Colleges of Arts, Agriculture, or Science. Charges should be made in writing and signed by the complainant but may be made verbally. Charges initially directed to a College Dean or the University

Veterinarian will be forwarded to the Chair of the ACUC. Complaints will be kept confidential and anonymous, if requested. An initial review of the concerns will be conducted by a subcommittee of the ACUC composed of the ACUC Chair and the University Veterinarian. The ACUC Chair will keep persons expressing concerns informed of the progress of the investigation. After notification of and discussion with the Associate Vice President for Faculty Affairs (the Institutional Official responsible for the animal care program), the problem will be taken to the ACUC who will make a recommendation to the Associate Vice President for Faculty Affairs. The Office of the Associate Vice President for Faculty Affairs will maintain a file documenting the complaint, the review, and action taken to rectify any problem(s) identified, and will also file the required reports, if necessary, to government agencies. If the complaint is directed against the Chair of the Animal Care and Use Committee or the University Veterinarian, the initial report should be forwarded to the Associate Vice President for Faculty Affairs who will select the members of the ACUC to serve on the subcommittee. The entire process will be conducted in a manner that is consistent with Chapter D of The Institutional Animal Care and Use Guidebook (NIH Publication 92-3415).

2. **Publicizing the Whistle-blower program**
   In an effort to be sure that everyone who might become concerned about the treatment of animals is aware of the manner in which they can make their concerns known to someone empowered to act upon them, and to advise them of the legal protections they are guaranteed, the information in the following section is presented in two ways: 1) a poster is placed prominently in all research and teaching laboratories, and other such locations, where animals are used in approved protocols; and, 2) the same announcement is distributed as part of the course materials by faculty in all courses for which animal use protocols have been approved.

The Proper Treatment of Laboratory Animals

The University and its administrators have made significant efforts to assure proper treatment of animals. All uses of vertebrate animals in research and instruction at California State Polytechnic University, Pomona, have been approved by the Animal Care and Use Committee.

Situations may arise for various reasons that deviate from approved protocols and campus policy (either mistreatment of animals or noncompliance with an approved animal use protocol). If you have been unsuccessful in speaking with the person or persons involved, or if you feel uncomfortable speaking with these individuals, please take your cares and concerns to the appropriate responsible persons:

Dr. Donald F. Hoyt, Chair, Animal Care and Use Committee, 869-5461
Dr. Steven J. Wickler, University Veterinarian, 869-2155

or, if you feel the need for a higher authority, go to your college Dean:

COLLEGE OF ARTS: 869-3500
COLLEGE OF AGRICULTURE: 869-2200
COLLEGE OF SCIENCE: 869-3600

IN DOING SO YOU ARE ASSURED OF THE FOLLOWING:

1) The Administration of California State Polytechnic University, Pomona, has a true desire to investigate allegations of mistreatment or noncompliance and has adopted this reporting mechanism to facilitate these reports.

and

2) You are protected from detrimental consequences of this report by Federal Regulations, specifically: Title 9 of the Code of Federal Regulations, Part 2, Subpart C 2.32 (c) (4), administered by the United States Department of Agriculture.

L. *Salmonella* and Reptiles

1. **Explanation of risk and symptoms of infection.**
   Salmonellosis is a zoonotic form of gastroenteritis that is most commonly contracted through oral ingestion (e.g. contaminated chicken products). However, reptiles commonly carry the disease and transmission can occur through open cuts, splashing of contaminated material into the eyes or through inhalation of sprayed contaminated solutions. Symptoms include muscle aches, headache, nausea, vomiting and diarrhea and usually last for 2-4 days. Antibiotics are not normally used to limit the duration or severity of the disease. In some people the disease can be quite severe, leading to septicemia, death or spontaneous abortion.

2. **People who should avoid contact with reptiles**
   THE FOLLOWING CATEGORIES OF PEOPLE SHOULD AVOID ALL CONTACT, DIRECT OR INDIRECT, WITH ANY REPTILE AS THE RISK OF SERIOUS, SYMPTOMATIC INFECTION IS GREATLY INCREASED:
   a. Women who are pregnant (due to threat to the fetus).
   b. Anyone with HIV/AIDS or other immunodeficiency disorders.
   c. Anyone who has transplant surgery or is on anti-rejection therapy.
   d. Anyone who is on any drug which suppresses or alters immune function including: steroids, cancer chemotherapy, biological response modifiers and others.
   e. Anyone receiving radiation treatment.
   f. Infants and children up to five years of age.
   g. Elderly, frail, or people with poor nutritional status.

   (If in doubt about any condition or treatment you or a household member is undergoing consult your physician as to its effect on immune status. If in doubt about any disease or disorder you or a household member may have with respect to its effect on immune status also discuss with your physician.)

3. **What to do to avoid becoming infected with *Salmonella* from reptiles:**
   a. Wash hands with soap and hot water for at least 30 seconds after handling reptiles. Antibacterial soap is preferable.
   b. Do not handle any reptile or their caging if you have open cuts or sores on your hands (rubber gloves are recommended).
   c. Avoid splashing when washing reptile enclosures (consider goggles or face mask when washing).
   d. Do not share caging or temporary housing containers, wash tubs, etc. among species unless disinfected.

e. Use disinfectant lotions, sprays or other similar products whenever reptiles are going to be handled in the field or class room.

4. Some additional things to remember about reptiles and *Salmonella*:

a. A high proportion of reptiles are asymptomatic carriers of *Salmonella*.
b. Attempts to eliminate *Salmonella* with antibiotics are usually unsuccessful and produce strains that are resistant to the antibiotic.
c. Reptiles can become infected through transovarial transmission.

M. Food or Fluid Restriction

When experimental situations require food or fluid restriction, at least minimal quantities of food and fluid should be available to provide for development of young animals and to maintain long-term well-being of all animals. Restriction for research purposes should be scientifically justified, and a program should be established to monitor physiologic or behavioral indexes, including criteria (such as weight loss or state of hydration) for temporary or permanent removal of an animal from the experimental protocol. Restriction is typically measured as a percentage of the ad libitum or normal daily intake or as percentage change in an animal's body weight.

Precautions that should be used in cases of fluid restriction to avoid acute or chronic dehydration include daily recording of fluid intake and recording of body weight at least once a week-or more often, as might be needed for small animals, such as rodents. Special attention should be given to ensuring that animals consume a suitably balanced diet because food consumption might decrease with fluid restriction. The least restriction that will achieve the scientific objective should be used. In the case of conditioned-response research protocols, use of a highly preferred food or fluid as positive reinforcement, instead of restriction, is recommended.

N. Protocols Involving Death as a Potential Endpoint

Legal, regulatory and moral responsibilities mandate that experiments conducted on animals be done with minimum pain and distress or suffering to animal subjects. For these reasons, investigators are encouraged to administer euthanasia in "death as an endpoint" experiments prior to actual death of the animals. An Investigator can judge and should perform euthanasia on moribund animals based on objective signs of dying depending on experience with the animal model, professional judgment, and the experimental protocol.

The guidelines indicate that animals found moribund should be euthanized. Inconvenience or increased costs alone are not justifiable reasons to withhold euthanasia on moribund animals. Investigators are expected to make good-faith efforts to justify their endpoints, and euthanize animals found moribund in a particular study. During the course of a disease there will be critical time points at which morbidity or mortality will be expected to occur. The Investigator will be required to personally assure that experimental animals are monitored. Monitoring will be made at a minimum of once per day or more frequently dependent upon the severity of symptoms and should be defined by the protocol. Monitoring will include weekends and holidays.

Some of the known signs of illness or dying which may be applied are shown below. The use of such information is encouraged with the understanding that the combination of signs indicating euthanasia may vary with the experimental end point. **Our goal is that investigators present criteria in their IACUC Protocols** that differentiate between

animals that are found morbid (i.e., affected with disease or illness) and those which are found moribund (i.e., in the state of dying), and that will be used as indicators that euthanasia is required.

The following list of criteria should be considered as partial, as there may be symptoms not listed here or it may require a combination of symptoms before establishing end point morbidity.

Signs for judging morbidity (disease/illness)

1. rapid breathing rate
2. breathing rate very slow, shallow, and labored
3. rapid weight loss
4. ruffled fur (rough hair coat)
5. hunched posture
6. hypothermia or hyperthermia
7. ulcerative dermatitis or infected tumors
8. inappetence
9. diarrhea or constipation

Signs for judging the moribund condition (state of dying)

1. signs for morbidity plus:
2. impaired ambulation (unable to reach food or water easily)
3. evidence of muscle atrophy or other signs of emaciation (body weight is not always proportionate)
4. any obvious prolonged illness including such signs a lethargy (drowsiness, aversion to activity, lack of physical or mental alertness), prolonged inappetence, bleeding, difficulty breathing, central nervous system disturbances, or chronic diarrhea or constipation
5. inability to remain upright

*** The veterinarian has the authority to euthanize animals if the investigator is unavailable.**

VI. Laboratory Animal Facility: Policies & Procedures

A. Animal Housing

The LAF Office, under the direction of the Facilities Coordinator, provides housing and care for all vertebrates in Buildings 8 and 92. Daily animal care is the responsibility of animal care assistants who work under the direction of the LAF Coordinator. In order to comply with the Animal Welfare Act, animals may not be housed in research or classroom laboratories or any study areas for periods longer than 12 hours without prior approval from the LAF Office and the ACUC.

Animals are housed in cages designed to provide a comfortable environment that contributes to their well-being while minimizing variables that can modify an animal's response during experimentation. Environmental factors such as temperature and humidity ranges, room air exchange rates, lighting, noise levels, and even odors, are considered in housing the various species.

Consultation on animal selection and use, as well as routine veterinary care, are provided without charge to the investigator. Limited animal research services such as injections, blood collection, and anesthetic/surgical services are also provided.

B. Husbandry Practices

1. **Caging --** The LAF Coordinator is responsible for selection of appropriate cages for all animals housed, and for ensuring that housing conforms to NIH *Guide* standards and Animal Welfare Act requirements while meeting research needs. The LAF Coordinator is also responsible for maintaining cages in good repair. Investigators who require special housing should contact the LAF Coordinator or the University Veterinarian to discuss their needs. **NOTE: animals may be housed only in approved cages.** Exceptions to NIH *Guide* standards must be justified on the basis of experimental or species requirements.

2. **Environmental Factors**
   a. Temperature and Humidity: The *Guide* defines requirements for the proper maintenance of laboratory animals. Environmental factors such as temperature and humidity must be carefully monitored because they affect metabolism and behavior; improper temperature and humidity levels may adversely affect research results. There is a marked difference in temperatures recommended for various species. The LAF Office is responsible for monitoring and maintaining appropriate temperature and humidity in animal facilities.

   b. Micro- and Macro-environments: The design of the cage or primary enclosure can greatly influence the animal's environment. The environment in the cage (the micro-environment) may differ from the environment of the animal room (the macro-environment). For example, some of the newer caging systems for rodents incorporate a microbiological barrier. This may result in higher temperatures, humidity, carbon dioxide and ammonia levels in the cage than in the room. Because such factors may adversely affect research results as well as animal health, they should be considered in experimental design and animal housing.

   c. Ventilation: The long-accepted ventilation guideline of 10-15 room air changes per hour is based on the observation that this figure provides sufficient ventilation to keep odors below objectionable levels. Heating, ventilation and air conditioning (HVAC) systems in animal facilities require constant monitoring to assure proper ventilation and appropriate temperature and humidity levels. Anyone noticing any departure from appropriate levels should report the information to the LAF Office immediately. Facility problems noted after working hours should be reported to the LAF Coordinator (beeper number: 909-613-4071).

   d. Illumination: The lighting in an animal room must meet several needs. It must meet the animals' biological needs with regard to quantity and periodicity, and must also provide adequate illumination for daily observation and care of the animals. In addition, lighting should be sufficient to ensure safe working conditions for animal care personnel. The LAF Office is responsible for maintaining light cycles in animal housing areas. Regular diurnal light cycles are provided by time-controlled lighting systems in most facilities. Special

research needs which require departures from normal light cycles can be arranged through consultation with the LAF Office.

3. **Feed --** Standardized commercial diets are available for most laboratory species. The LAF Office is responsible for providing appropriate diets and for ensuring that food is fresh and free from contaminants. For special research needs, certified diets that have been assayed for commonly encountered environmental contaminants may be required. The LAF Office can assist with selection of specialized diets and provide information on their availability.

4. **Bedding --** Laboratory grade hardwood chips are the standard bedding material provided by the LAF Office. It has been documented that aromatic hydrocarbons from pine shavings or cedar bedding can induce production of hepatic microsomal enzymes. Accordingly, such bedding may be inappropriate for animals involved in certain kinds of experiments. Other types of bedding, such as corn cobs, absorbent alfalfa pellets, cellulose chips and paper, are available on request.

5. **Sanitation**
   a. Cleanliness: The Animal Welfare Act and the *Guide* have guidelines established for the frequency of cleaning animal rooms and for changing cages. In some cases, frequent cage cleaning may be disruptive to research objectives, as in the case of reproductive studies where frequent changes may eliminate pheromones necessary for reproduction. Adding a small portion of bedding from the soiled cage to the fresh cage may prevent such problems while maintaining acceptable sanitation levels. Cleaning schedules can be altered to accommodate special research needs by arrangement with the LAF Office.

   b. Waste Disposal: Radioactive and other biohazardous carcasses and animal wastes must be disposed of according to procedures established by the campus Office of Environmental Health and Safety. All other animal carcasses and wastes (with the exception of purchased preserved animals) are disposed of by the LAF Office. Procedures for storage and removal of animal carcasses can be found in Section V. of this handbook.

   c. Vermin Control: The presence of pests in animal facility rooms can result in contamination of feed and bedding, and the introduction of disease. The LAF Office is responsible for the pest control program in the animal facilities. The LAF Office may periodically require the assistance of the campus Facilities Management in vermin control. Pesticides are used in animal areas only when necessary, and then only after consultation with the University Veterinarian and the investigator(s) whose animals will be exposed.

C. Animal Identification and Record Keeping

The Animal Welfare Act and the *Guide* require appropriate identification of animals and maintenance of animal records. Accepted methods of animal identification include room, rack, and cage cards; collars and bands; ear notches and tags; implantable microchips; tattoos, etc. Toe clipping is only acceptable for infant rodents and lower vertebrates when other methods of identification cannot be used. NOTE: This method must be approved by the ACUC before it is attempted.

Cage cards supplied by the LAF Office have been designed to satisfy the Animal Welfare Act requirements. Research or other data may be placed on the back of this card

or on a second card in the holder behind the identification card. However, the completed LAF card must be visible on all animal cages at all times.

Investigators are responsible for maintaining, and updating, appropriate cage card records on rabbits and rodents. Cage or rack cards should indicate, at a minimum, the protocol number, the source of the animal, strain or stock (if pertinent), and names and phone numbers of responsible investigators. Written records of procedures, drug use, illnesses and injuries, and date of death, euthanasia, or disposition should be noted on the cage card. LAF support staff monitor the animals and their respective cards on a daily basis -- the importance of maintaining and updating the cards cannot be emphasized enough.

These records also serve a means of communication between the investigator and animal care personnel. All animal manipulation and drug use, as well as objective observations on health status, should be recorded by both animal user and animal care personnel.

All animal health records must be maintained for three (3) years and are subject to inspection by the USDA, granting agency (NIH, NSF and others) site visitors, and the ACUC.

D. Animal Health Practices in the Lab Animal Facility

1. Preventive Medicine

a. Animal Procurement: Newly acquired animals can trigger an outbreak of disease into established colonies. In addition, production colonies maintained by suppliers occasionally experience outbreaks of disease. The LAF Coordinator monitors animal health quality from different suppliers and maintains quality control data furnished by vendors. This information can be provided to investigators to assist in choosing appropriate sources of animals.

   To minimize the possibility of introducing disease into campus animal facilities, all arrangements for acquiring and housing live vertebrates must be made through the LAF Office. For information on ordering animals, refer to Section V of this handbook.

b. Quarantine and Stabilization: A quarantine period is necessary to minimize the introduction of disease into established colonies. The extent of the quarantine period is determined by the species and by knowledge of the animal's source and previous health history. New arrivals of animals, regardless of source, should be allowed a stabilization period before use (usually a period of 5 days). Such a period allows the animal to recover from shipping stress, adapt to its new surroundings, and become physiologically stable. Terminal procedures may or may not require a stabilization period.

c. Separation of Species: Physical separation of animals by species is required. This separation can be accomplished by housing different species in micro-isolator cage units, in specially ventilated isolation chambers, or in separate rooms. When animals of the same species are obtained from multiple sources, their microbiological status may differ, in which case separate housing is advisable.

2. Surveillance, Diagnosis, Control and Treatment of Disease

LAF personnel check all animals at least once daily, including weekends and holidays, for signs of illness, injury or abnormal behavior (see Section IX, Appendices C and D). The observations are reported to the LAF Coordinator, who passes the information on to the University Veterinarian who, along with the investigator, decides what course of action to take. In cases where such observation will interfere with experimental objectives, prior arrangements must be made with the LAF Coordinator to ensure adequate monitoring of animals and environmental systems.

3. Emergency Care

Any health problem noted by anyone at any time, including evenings, weekends and holidays, should be immediately reported to the LAF Coordinator or the LAF personnel (an alternate contact would be University Police, who will then attempt to make contact with LAF personnel). The LAF staff must also be notified of facilities malfunctions (e.g., excessively hot or cold animal rooms) which appear to directly threaten animal health, whether or not Facilities Management has been notified.

E. Animal Waste and Carcass Disposal

1. Animal Bedding

All soiled animal bedding material is recovered from cages and pans in the dirty cage washing area of the LAF facility. It is collected in plastic bags in a safe and sanitary manner. The collected bags are then placed in dumpsters for collection by a licensed waste disposal company. Any animal bedding exposed to hazardous materials must be rendered safe by sterilization, decontamination or other appropriate measures before disposal. It is the investigator's responsibility to ensure that the LAF staff is aware that biohazardous agents are being used.

2. Carcass Disposal

The standard procedure at this institution is to place all carcasses (with the exception of preserved materials) in paper or plastic bags and freeze them until collected by LAF personnel. Identification (name of person responsible for animal, and ACUC Protocol Number) must be included on the bag. Syringes, needles, petri dishes, scalpels or razor blades must not be placed in the bags with the carcasses. All carcasses are then collected and stored in the main LAF carcass freezer until arrangements are made by the LAF Office to have the animals incinerated. All animals exposed to toxic or hazardous materials must be bagged in special biohazard plastic bags and appropriately labeled (biohazard bags are not to be used for non-hazardous animal carcasses). These are kept separate from the other collected carcasses and, through arrangements made with the campus Environmental Health and Safety Office, are disposed of.

Under no circumstances are any animal carcasses or preserved animals to be put into the general trash collection system of the university.

F. Transportation of Animals On Campus

In planning the route by which animals will be transported between laboratories and the animal housing areas or other laboratories, care should be taken to minimize time spent in public areas, including common hallways or lobbies. Passenger (non-freight) elevators should be avoided if at all possible. Efforts must be taken to reduce the amount of stress the animal undergoes while being transported, and minimal exposure of the

animals to unfamiliar areas will be beneficial. Moreover, any additional stress may add an unwanted variable to a research project.

Animals should be transported in approved cages that will prevent their escape and minimize stress. Carrying the animals in your arms or in open boxes is not acceptable. For transportation of rodents to other buildings on campus, it is recommended that filtered or micro-isolator cage units be used whenever possible.

G. Removal of Animals From Campus

Animals may not be removed from this institution without prior specific permission from the LAF Coordinator, the University Veterinarian and the ACUC. When animals are to be shipped, all shipments, regardless of whether or not they are to be returned, must be coordinated through the LAF Coordinator to ensure that proper health certificates (federal and/or state) are completed. The LAF Coordinator, after consulting with the University Veterinarian, will make the necessary shipping arrangements, and will see to it that approved shipping containers are used.

H. Animal Bites or Other Animal - Related Injuries

In the event of an animal bite or other animal - related injury, administer first aid (wash the wound thoroughly with soap and water) and report the injury promptly to the designated person (supervisor, instructor, employer, etc.) in charge. Report to the Student Health Center on campus if additional treatment is deemed necessary by the designated person in charge. Complete either the Cal Poly Employee Accident Report form or the Cal Poly Student and Visitor Accident Report form and submit it to the designated person, who is required to submit the form to the respective authorities indicated on the form within 24 hours.

In the event of an animal bite after-hours and/or on weekends, call the LAF Coordinator, or University Police (who will contact the LAF Coordinator). If the animal is still alive, it should not be destroyed. It should be placed in quarantine and the University Veterinarian notified. If the animal is dead, tissues will be collected and submitted to the proper authorities for further evaluation. Under most circumstances, rabbits and rodents raised for research purposes do not need to be quarantined.

I. Pets in Animal Facilities, Labs or Offices

Pet animals (including rabbits or rodents) are not allowed in animal facilities, laboratories or offices unless approved by the LAF Coordinator and the University Veterinarian.

J. Security

Certain security measures have been established to protect the animals used in instruction and research at Cal Poly. Cooperation from all concerned in enforcing these measures is essential.

1. **Entrance into Animal Housing Facilities**
   Entrance into all animal facility rooms is subject to the authorization of the Lab Animal Facility Coordinator or the University Veterinarian. Under no circumstances are students, staff or faculty to give tours through the LAF facilities without the consent and approval of the LAF Coordinator.. The LAF Office will initiate key acquisition cards to individual faculty and staff who need to gain

entrance. Keys should never be loaned. It is a criminal offense to duplicate any keys to the LAF facilities, as well as any other building or room at this institution.

2. **Visitors**
In an effort to protect animals and minimize any possibility of disease transmission, visitors -- including family members and friends -- are not allowed in LAF facilities without prior approval by the LAF Coordinator. Tours of the LAF facilities are scheduled and conducted by the LAF Coordinator or University Veterinarian when requested.

3. **Photographs or Videotapes of Animals**
The use of live animals in instruction and research is a very sensitive and emotional issue. Therefore, animal users are urged to consider all possible interpretations of pictures of animals taken for documentation or publication. The LAF Coordinator and the University Veterinarian are available to advise in the use of photographic materials and to review such materials for anything that might be misinterpreted by the general public.

Under no circumstances should photographic equipment be taken into LAF facilities without the specific prior approval of the LAF Coordinator or the University Veterinarian. Instructors are advised to exercise caution when allowing photographs of any laboratory exercise(s) involving animals.

4. **Inquiries Regarding Animal Use**
Faculty, staff and students are advised not to attempt to answer questions from individuals not affiliated with Cal Poly regarding animal care and use at this institution. All questions should be referred to the LAF Coordinator or the University Veterinarian. Inquiries from members of the media should be directed to the Office of News and Publications, who will clear interviews with Cal Poly faculty and staff. The LAF Coordinator should be kept informed of all such requests for information and, when possible, provided with the name, address, telephone number, and affiliation of the individual(s) making the inquiry. The LAF Coordinator, the University Veterinarian or other designated personnel informed on the issues will answer questions from individual(s) and explain the institutional policy on the care and use of animals.

5. **Threats Related to Animal Use**
All Cal Poly faculty, staff and students, and all LAF personnel should immediately report all threats, whether written or verbal, to the University Police (3070 or 911) and the LAF Coordinator. The University Police will advise threatened individuals on security measures, and will otherwise take action the University Police Chief deems appropriate.

6. **Demonstrations**
In the event of a demonstration on campus related to instructional or research animal use, all Cal Poly personnel should avoid any activity that would jeopardize the health and safety of the animals, avoid any action that may result in or encourage belligerence or the disruption of routine animal care activities, and follow the directions of the University Police.

7. **Break-ins, Theft, and/or Acts of Vandalism**
Anyone discovering a break-in, theft, and/or act of vandalism in any LAF housing area or LAF support area should inform the University Police immediately (x-911). University Police will notify the LAF Coordinator and the Director of Animal Care.

The area should not be cleaned or otherwise disturbed until permission is received from the individual responsible for the investigation.

VII. Animal Health and Veterinary Services

A. Routine Health Care

Veterinary care is an essential part of an animal care program. Adequate veterinary care is provided by the University Veterinarian and the staff of the LAF and consists of:

1. Observing all animals daily to assess their health and welfare;
2. Using appropriate methods to prevent, control, diagnose, and treat diseases and injuries;
3. Providing guidance to users regarding handling, restraint, anesthesia, analgesia, and euthanasia; and
4. Monitoring surgery programs and postsurgical care.
   Veterinary care is the responsibility of a veterinarian who has training and experience in laboratory animal science and medicine. Daily observation of animals is performed by a member of the LAF staff qualified in such matters. Information on problems in animal health, behavior and well-being is promptly conveyed to the University Veterinarian who decides on the course of action to be taken, usually after consultation with the principal investigator.

B. Emergency Health Care

A mechanism has been established to provide emergency care at any time an animal health problem is noted. The LAF Office should be contacted (909-869-4955) during normal working hours (Monday - Friday). At any other time, including evenings, weekends and holidays, contact University Police (909-869-3070) so that the appropriate person can be notified. This information shall also be posted in the hallway of the LAF.

C. Reporting Sick Animals

An animal observed to be ill or exhibiting abnormal behavior should be reported to LAF personnel as soon as possible so that it may be examined by the LAF Coordinator and, if necessary, the University Veterinarian. For your information, an “Examination of Animals” check list and a Physical Examination of Rodents check list can be found in Section IX, appendices C and D of this handbook.

Inconsistent experimental results may suggest an underlying disease problem in the animal(s) used. In addition to seeking possible causes for the inconsistencies, please consult with the LAF Coordinator and/or the University Veterinarian for additional help.

D. Zoonotic Diseases

About 200 diseases are transmitted from animals to humans or are common to man and animal such as toxoplasmosis, lymphocytic choriomeningitis, salmonellosis, rabies, hemorrhagic fever, chlamydiosis, typhus, leptospirosis, plague, mycoses, etc. However, the chances for contracting these diseases are almost eliminated by the university's policy of purchasing disease-free animals from reliable vendors, following good sanitation and hygiene practices, and following a comprehensive veterinary care program which includes a quarantine period, disease prevention and control, and an animal health surveillance system. A separate handout is available in the LAF.

E. Quarantine Procedures

Animals are quarantined upon arrival at the university for a period of time dependent upon the species, source, and health status, and the use for which they are intended. They are released from quarantine at the discretion of the University Veterinarian. Principal investigators should allow for this period when ordering animals.

F. Necropsy and Diagnostic Laboratory Services

Faculty who plan to have these services performed on animals in conjunction with their research should discuss these plans with the University Veterinarian at the time they are writing their protocols. Routine necropsies for surveillance purposes are performed only on representative animals from colonies kept longer than one academic year (nine months). Laboratory diagnostic work can be arranged for by consultation with the University Veterinarian.

G. Technical Assistance and Veterinary Services

All requests for technical assistance and veterinary services are to be submitted to the LAF Office. Requests (by phone or in writing) for these services should be submitted in a timely manner to ensure that the animal(s) are correctly identified and the drugs and supplies are on hand.

VIII. The Cal Poly Training Program

In order to meet legal requirements while also serving broad educational objectives, the university has instituted a training program on animal use in instruction and research. This training program is structured as follows.

A. The Core Program.

The ACUC has established a "Core Education Program" for the faculty, graduate and undergraduate students involved in approved protocols. All faculty and staff involved with teaching and/or research protocols are required to view a set of videotapes covering the Core Module described in "Education And Training In The Care And Use Of Laboratory Animals - A Guide For Developing Institutional Program," developed by ILAR and published by the National Academy Press. The videotapes must be viewed under the supervision of the Facilities Coordinator in Building 92.

Cal Poly is committed not only to the training of Faculty and Research Staff, but just as importantly to students both graduate and undergraduate. Towards this end, the Animal Care and Use Committee has approved many classroom exercises involving the use of laboratory animals. Incorporated into the laboratory setting of all such classes is an introductory lecture on generalized procedures for handling of laboratory animals and protocol for student use of facilities, given by the Facilities Coordinator or the responsible faculty member. Students involved in research protocols may be required to view the ACUC Core Education video series. This is determined on a case-by-case basis by the Animal Care and Use Committee. They also receive individual training from their faculty supervisor, who is responsible for providing the training and reporting it to the ACUC (see below). Mandatory training is also given for specific procedures such as aseptic surgery in the rodent. This is done through a video produced by Dr. Wickler. The video can be supplemented on an individual basis by either Dr. Wickler or the Facilities Coordinator. When faculty or students are required to view the video series they must sign a form indicating that they have viewed and understand the content of the videos and this form is returned to the office of the Facilities Coordinator. No surgery is

permitted prior to this training. Training for more sophisticated procedures is done on an as-needed basis along with one-on-one instructions to individuals by Dr. Wickler.

The ACUC has also developed a forty-minute Introductory Video that covers a brief introduction to: the federal regulations and policies governing the animal care program, ACUC responsibilities and protocol review process, housing and husbandry, and occupational health and hygiene. This video is intended to be shown in classes where students are involved in active use of animals, especially students in advanced classes who must submit protocols covering term projects involving research on animals. This video may also be used in place of the Core Education video series when the ACUC determines that it is appropriate (e.g. where students have limited physical contact with animals or their contact occurs under immediate supervision of trained personnel.)

B. Protocol-specific training program and reporting requirements.

Faculty are responsible for training all personnel in all procedures they will use as part of an approved protocol. Reporting student/staff training involves the use of a form entitled "Beginning of training of additional personnel." Copies of this form are provided to animal users when they are notified that a protocol has been approved. The form contains all of the protocol-specific information (e.g. Protocol number and title) required on the form and specifies the additional information required on each student, including a place for the student to sign, affirming that the information provided on the form is correct. It is recommended that the user retain the blank originals of these forms and make photocopies on which they submit the required information for every individual student who becomes involved in the protocol. This facilitates the submission of these forms for other students. Faculty may also report student training by memo, providing all the requested information, including the signature of the student, is included.

1. **Summary of student/staff training procedures for research protocols:**
   a. File the form entitled "Beginning of training of additional personnel." No person should be involved in the use of animals until this form has been filed with the ACUC. This form need NOT be filed for any student or staff person who signed the original protocol application.

   b. Begin training the student/staff: In addition to training the student in all components of the protocol that he/she will be using, the student MUST complete any additional training that has been required by the ACUC. If this involves the Introductory Video ("short video") or the four-part CORE educational series, the students should contact the Facilities Coordinator (x4955) in the Laboratory Animal Facility (LAF) to make arrangements to view the videos. Neither of these videos need be repeated if a student becomes involved in another Animal Use Protocol.

2. **Training procedures for teaching protocols.**
   Protocols for uses of animals in teaching will NOT require either of these forms UNLESS a student (presumably a graduate student) is serving as a lab instructor with responsibility for the proper execution of the protocol during a lab exercise.

C. Animal Husbandry Certification.

LAF staff, and students caring for animals on a volunteer basis, receive extensive training in all relevant procedures from the Facilities Coordinator. A record of the procedures each individual has been taught is kept by the Facilities Coordinator. Faculty

who have assumed responsibility for supervising their own rodent colony are provided with a Standard Operating Procedure (SOP) developed by the Facilities Coordinator and University Veterinarian.

IX. Appendix

A. Lab Animal Facility Crisis Plan

The following crisis plan was developed in cooperation with the campus University Police. This plan is meant to serve as a guideline in the event of an emergency in which the Lab Animal facilities are involved.

1. Information:

As soon as someone in the Lab Animal Facility Office (909) 869-4955 is notified of a problem, fill out the following:

DATE_____ TIME_____.
LOCATION_____.
NATURE OF INCIDENT (fire, explosion, etc.)
_____.
_____.
_____.
_____.

KNOWN INJURIES_____.
_____.
_____.
_____.

2. Notification:

The campus offices listed below should be called and read the account as noted above.

TIME CALLED	OFFICE	PHONE
_____	University Police	(909) 869-3070
_____	News and Publications Office	(909) 869-3342
_____	Emergency Services Coordinator	(909) 869-6981
_____	Associate Vice President Faculty Affairs	(909) 869-3406

3. Coordination

The Associate Vice President for Faculty Affairs shall be the principal decision-maker regarding the release of information. If there are several agencies involved (campus police, city fire department, paramedics, public information office, campus safety office, etc.), ground rules will be established by University Police as to what information should be released, and by which jurisdiction. Each jurisdiction should speak only to its area of expertise -- i.e., fire department should speak only about cause of fire, equipment used to fight it, suppression time, etc. The Associate Vice President for Faculty Affairs should be the only one to answer questions such as whether procedures were being followed, what the damage estimate is (fire departments may not make good guesses on university equipment).

The Cal Poly Director of News and Publications, working in association with the Director of Animal Care, should coordinate any University response -- will classes in this building be canceled, is student discipline involved, is the President deeply saddened by this tragedy, etc. Police should speak to police issues only.

4. Spokesperson

In a crisis, the more people who speak the more chance there is that conflicting information will be released -- the fire department says its arson, the office of Environmental Health and Safety says its a spill, a student by the side of the road says its a prank gone bad, etc.

It is important that a key spokesperson be identified as quickly as possible. The Director of News and Publications shall be the exclusive spokesperson for news media in cases involving the Animal Care and Use Committee (ACUC) or animal subjects unless the Associate Vice President for Faculty Affairs directs otherwise.

All information from any source should be directed to that one person, preferably in writing, including, for example, damage estimates, descriptions of the toxic qualities of the spill, current information about the condition of anyone injured, etc.

5. Education

In any crisis, look for an opportunity to educate or learn from a situation. If a person was following procedures but tripped and fell with a toxic chemical, get an expert to discuss all the properties of the chemical and review any correct actions the person took -- took a shower immediately, contained the spill -- models of the kind of behavior that prevent accidents from being tragedies.

If the university was the victim of protesters attacking buildings, or of an arsonist or criminal behavior, or of an act of God such as an earthquake or a flood, identify someone whose work was affected, and make that person's account of what they were working on and why it was important as much a part of the information released as the damage estimate.

6. Message

In the event of an attack on the University Animal Care facilities, the individual selected as spokesperson will affect the message delivered. If the person is in law enforcement, the message will focus on the amount and kind of damage, and the criminal nature of the action.

B. Examination of Animals

1. Check List A -- Observation Examination

    1. Cage Condition -- Cage Card Information
    2. Excreta in Pan/Cage
    3. Feed and Water Consumption
    4. Posture of Animal
    5. Breathing
    6. Behavior
    7. Hair Coat
    8. Eyes, Ears, Nose and Mouth
    9. Neck, Body, and Tail
    10. Locomotion -- Extremities
    11. Anal/Genital Area
    12. Injury/Incisions

2. Check List B -- Physical Examination ("Hands On")
    1. Weigh Animals -- Record
    2. Examine Eyes and Mucous Membranes
    3. Examine Teeth -- Incisors and Cheek Teeth
    4. Examine Ears and Ear Canal
    5. Palpate Extremities
    6. Palpate Major Lymph Nodes
    7. Examine Hocks, Footpads, and Toe Nails
    8. Examine Genitalia and Anal Regions
    9. Palpate Entire Body, Especially Neck and Abdomen
    10. Listen to Lungs and Heart if Indicated

C. Physical Examination of Rodents

Observation	Acceptable	Questionable
Haircoat	Smooth, glossy	Dull, rough, loose or stained hair
Eyes	Clear, open, “bright” no discharge	Puffy, partly closed, pink rings, discharge, ulceration
Nose	No swelling, no discharge	Discharge - clear, yellowish pus, "bloody"
Ears	Clean, pink	Scaly, dirty, yellowish
Breathing	Smooth, regular, unlabored	Wheezing, rales, labored
Stools	Regular, formed, "natural" color	Soft, loose, bloody, dark, light
Abdomen	Good tone, no palpable abnormalities	Palpable masses, distended, flaccid
Behavioral	Exploring, grooming, playing	Fighting, off in corner
Postural	Head, back tail	Arched back, head tilted
Extremities - Locomotion	Gait, weight-bearing	Circular motions, limping, staggering
Tail	Clean, smooth	Rough, scaly, stained
Injury	No lacerations, no infections	

D. Blood Withdrawal Determination Formula

A Formula For Determination Of Safe Blood Withdrawal Amounts*

A general formula to determine a safe volume of blood that can be withdrawn is as follows: Multiply the weight of the animal (in grams) X .06 (6% animal weight is blood) X .20 (percentage of blood that can be lost without causing hypovolemic problems to the animal) = Volume that can be withdrawn (in ml).

Weight of animal (in grams) X .06 X .20 = Vol. in ml

With this formula, approximately 50 ml of blood could be safely withdrawn from a rabbit weighing 4.5 kilograms:

4500 X .06 = 270 ml (Total Blood Volume) X .20 = 54 ml.

Approximately 3 ml of blood could be safely withdrawn from a rat weighing 250 grams:

250 X .06 = 15 ml (Total Blood Volume) X .20 = 3.0 ml.

Determining hematocrit is a good guide to the frequency of bleeding, as a decrease in the packed cell volume may indicate anemia.

This formula limits blood collection to 20% of an animal's total blood volume for any three week period. If the entire allotment is withdrawn from an animal at one time, then that animal is allowed a sufficient amount of time to recover (depending on the species). In this circumstance, investigators are also encouraged to replace the withdrawn blood with appropriate fluids (e.g., sterile 0.9% saline or normal electrolyte solutions) on an equal volume basis, via any parenteral route. This serves to minimize the effects of rapid blood loss on the physiological state of the animal.

* Based on formulation in Manual for Assistant Laboratory Animal Technicians, AALAS Publication No. 84-1, 1984, pp.123

E. Personnel responsible for the Cal Poly Animal Care and Use Program

1. Responsible Institutional Official

Debra A. Brum, **Associate Vice President for Faculty Affairs**
PHONE: 909-869-3406
email: DABRUM@CSUPOMONA.EDU
FAX: 909-869-6788

2. Animal Care and Use Committee

Kenneth A. Gruber, **ACUC Chair**, Director of Research & Sponsored Programs
PHONE: 909-869-2954
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Donald F. Hoyt, Professor, Biological Sciences
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FAX: 909-869-4396

Steven Wickler, **University Veterinarian** and Professor, An. & Vet. Sci.
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Kim Overhulse, **Coordinator, Lab Animal Facility**
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David Larson, Director, Center for Christian Bioethics
Loma Linda University, Loma Linda, CA 92350
PHONE: 909-558-8103

David Patterson, Director, Environmental Health & Safety
PHONE: 909-869-3695
email: DLPATTERSON@CSUPOMONA.EDU
FAX: 909-869-4698

John Trei , Associate Dean of Agriculture
PHONE: 909-869-2203
email: JETREI@CSUPOMONA.EDU
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Glenn Stewart, Professor, Biological Sciences
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F. Basic Biologic and Physiologic Values of Common Species

(from The Biology and Medicine of Rabbits and Rodents, 3rd Edition, by J. E. Harkness and J. E. Wagner)

1. Rat - Basic Biologic and Physiologic Values

Adult body weight:	450-520 g
Adult body weight: female	250-300 g
Birth weight,	5-6 g
Body surface area (cm^2)	10.5 (wt. in grams)$^{2/3}$
Body temperature	35.9 - 37.5° C
Diploid number	42
Life span	2.5 - 3.5 yr.
Food consumption	10 g/100 g⋖day
Water consumption	10 - 12 ml/100 g⋖day
GI transit time	12 - 24 hr
Breeding onset: male	65 - 110 days
Breeding onset: female	65 - 110 days
Cycle length	4 - 5 days
Gestation period	21 - 23 days
Postpartum estrus	fertile
Litter size	6 - 12
Weaning age	21 days
Breeding duration	350 - 440 days
Young production	4 - 5 /mo.
Milk composition	13.0% fat, 9.7% protein, 3.2% lactose
Respiratory rate	70 - 115 /min
Tidal volume	0.6 - 2.0 ml
Oxygen use	0.68 - 1.10 ml/g⋖hr
Heart rate	250 - 450 /min
Blood volume	54 - 70 ml/kg
Blood pressure	84 - 134 /60 mm Hg
Erythrocytes	7 - 10x10^6 /mm^3
Hematocrit	36 - 48%
Hemoglobin	11 - 18 g/dl
Leukocytes	6 - 17x10^3 /mm^3
Neutrophils	9 - 34%
Lymphocytes	65 - 85%
Eosinophils	0 - 6%
Monocytes	0 - 5%
Basophils	0 - 1.5%
Platelets	500 - 1300x10^3 /mm^3
Serum protein	5.6 - 7.6 g/dl
Albumin	3.8 - 4.8 g/dl
Globulin	1.8 - 3.0 g/dl
Serum glucose	50 - 135 mg/dl
Blood urea nitrogen	15 - 21 mg/dl
Creatinine	0.2 - 0.8 mg/dl
Total bilirubin	0.20 - 0.55 mg/dl
Serum lipids	70 - 415 mg/dl
Phospholipids	36 - 130 mg/dl
Triglycerides	26 - 145 mg/dl
Cholesterol	40 - 130 mg/dl
Serum calcium	5.3 - 13.0 mg/dl
Serum phosphate	5.3 - 8.3 mg/dl

2. Mouse - Basic Biologic and Physiologic Values

Adult body weight: male	20-40 g
Adult body weight: female	25-40 g
Birth weight	0.75-2.0 g
Body surface area (cm^2)	10.5 (wt. in grams)$^{2/3}$
Body temperature	36.5-38.0° C
Diploid number	40
Life span	1.5-3 yr.
Food consumption	15 g/100 g⋖day
Water consumption	15 ml/100 g⋖day
GI transit time	8-14 hr
Breeding onset: male	50 days
Breeding onset: female	50-60 days
Cycle length	4 - 5 days
Gestation period	19-21 days
Postpartum estrus	fertile
Litter size	10-12
Weaning age	21-28 days
Breeding duration	7-9 mo.
Young production	8 /mo.
Milk composition	12.1% fat, 9.0% protein, 3.2% lactose
Respiratory rate	60-220 /min
Tidal volume	0.09-0.23 ml
Oxygen use	1.63-2.17 ml/g⋖hr
Heart rate	325-780 /min
Blood volume	76-80 ml/kg
Blood pressure	113-147/81-106 mm Hg
Erythrocytes	7.0-12.5 x10^6 /mm^3
Hematocrit	39-49%
Hemoglobin	10.2-16.6 mg/dl
Leukocytes	6-15 x10^3 /mm^3
Neutrophils	10-40%
Lymphocytes	55-95%
Eosinophils	0 - 4%
Monocytes	0.1-3.5%
Basophils	0 - 0.3%
Platelets	160-410 x10^3 /mm^3
Serum protein	3.5-7.2 g/dl
Albumin	2.5-4.8 g/dl
Globulin	0.6 g/dl
Serum glucose	62-175 mg/dl
Blood urea nitrogen	12-28 mg/dl
Creatinine	0.3-1.0 mg/dl
Total bilirubin	0.1-0.9 mg/dl
Cholesterol	26-82 mg/dl
Serum calcium	3.2-8.5 mg/dl
Serum phosphate	2.3-9.2 mg/dl

3. Rabbit - Basic Biologic and Physiologic Values

Adult body weight: male	2-5 kg
Adult body weight: female	2-6 kg
Birth weight	30-80 g
Body surface area (cm^2)	9.5 (wt. in grams)$^{2/3}$
Rectal temperature	38.5-40.0° C
Diploid number	44
Life span	5-6 yr. or more
Food consumption	5 g/100 g⋖day
Water consumption	5-10 ml/100 g⋖day or more
GI transit time	4-5 hr
Breeding onset: male	6-10 mo.
Breeding onset: female	4-9 mo.
Cycle length	induced ovulator
Gestation period	29-35 days
Postpartum estrus	none
Litter size	4-10
Weaning age	4-6 wk
Breeding duration	1-3 yr.
Young production	2-4 /mo.
Milk composition	12.2% fat, 10.4% protein, 1.8% lactose
Respiratory rate	30-60 /min
Tidal volume	4-6 ml/kg
Oxygen use	0.47-0.85 ml/g⋖hr
Heart rate	130-325/min
Blood volume	57-65 ml/kg
Blood pressure	90-130/60-90 mm Hg
Erythrocytes	4-7 $x10^6$ /mm^3
Hematocrit	36 - 48%
Hemoglobin	10.0-15.5 mg/dl
Leukocytes	9-11 $x10^3$ /mm^3
Neutrophils	20-75%
Lymphocytes	30-85%
Eosinophils	0 - 4%
Monocytes	1 - 4%
Basophils	2 - 7%
Platelets	250-270$x10^3$ /mm^3
Serum protein	5.4-7.5 g/dl
Albumin	2.7-4.6 g/dl
Globulin	1.5-2.8 g/dl
Serum glucose	75-150 mg/dl
Blood urea nitrogen	17.0-23.5 mg/dl
Creatinine	0.8-1.8 mg/dl
Total bilirubin	0.25-0.74 mg/dl
Serum lipids	280-350 mg/dl
Phospholipids	75-113 mg/dl
Triglycerides	124-156 mg/dl
Cholesterol	35-53 mg/dl
Serum calcium	5.6-12.5 mg/dl
Serum phosphate	4.0-6.2 mg/dl

4. Golden Hamster - Basic Biologic and Physiologic Values

Adult body weight: male	85-130 g
Adult body weight: female	95-150 g
Birth weight	2 g
Body surface area (cm^2)	10.5 (wt. in grams)$^{2/3}$
Body temperature	37-38° C
Diploid number	44
Life span	18-24 mo.
Food consumption	>15 g/100 g⋖day
Water consumption	>20 ml/100 g⋖day
Breeding onset: male	10-14 wk
Breeding onset: female	6-10 wk
Cycle length	4 days
Gestation period	15-16 days
Postpartum estrus	infertile
Litter size	5-9
Weaning age	20-25 days
Breeding duration	10-12 mo.
Young production	3 mo.
Milk composition	12.0% fat, 9.0% protein, 3.4% lactose
Respiratory rate	35-135 /min
Tidal volume	0.6 - 1.4 ml
Oxygen use	0.6 - 1.4 ml/g⋖hr
Heart rate	250 - 500 /min
Blood volume	78 ml/kg
Blood pressure	150 /100 mm Hg
Erythrocytes	6 - 10x10^6 /mm^3
Hematocrit	36 - 55%
Hemoglobin	10 - 16 g/dl
Leukocytes	3 - 11x10^3 /mm^3
Neutrophils	10-42%
Lymphocytes	50-95%
Eosinophils	0 - 4.5%
Monocytes	0 - 3%
Basophils	0 - 1%
Platelets	200 - 500x10^3 /mm^3
Serum protein	4.5 - 7.5 g/dl
Albumin	2.6 - 4.1 g/dl
Globulin	2.7 - 4.2 g/dl
Serum glucose	60 - 150 mg/dl
Blood urea nitrogen	12-25 mg/dl
Creatinine	0.91 - 0.99 mg/dl
Total bilirubin	0.25 - 0.60 mg/dl
Cholesterol	25-135 mg/dl
Serum calcium	5-12 mg/dl
Serum phosphate	3.4-8.2 mg/dl

5. Guinea Pig - Basic Biologic and Physiologic Values

Adult body weight: male	900-1200 g
Adult body weight: female	700-900 g
Birth weight	70-100 g
Body surface area (cm^2)	9.5 (wt. in grams)$^{2/3}$
Body temperature	37.2-39.5° C
Diploid number	64
Life span	4-5 yr.
Food consumption	6 g/100 g⋖day
Water consumption	10 ml/100 g⋖day
GI transit time	13-30 hr
Breeding onset: male	600-700 g (3-4 mo.)
Breeding onset: female	350-450 g (2-3 mo.)
Cycle length	15-17 days
Gestation period	59-72 days
Postpartum estrus	fertile, 60-80% pregnancy
Litter size	2-5
Weaning age	150-200 g 14-21 days
Breeding duration	18 mo. to 4 year
Young production	0.7 - 1.4 /mo.
Milk composition	3.9% fat, 8.1% protein, 3.0% lactose
Respiratory rate	42 - 104 /min
Tidal volume	2.3 - 5.3 ml/kg
Heart rate	230 - 380 /min
Blood volume	69-75 ml/kg
Blood pressure	80-94 /55-58 mm Hg
Erythrocytes	4.5-7.0 x10^6 /mm^3
Hematocrit	37 - 48%
Hemoglobin	11-15 g/dl
Leukocytes	7-18 x10^3 /mm^3
Neutrophils	28-44%
Lymphocytes	39-72%
Eosinophils	1-5%
Monocytes	3-12%
Basophils	0 - 3%
Platelets	250 - 850x10^3 /mm^3
Serum protein	4.6 - 6.2 g/dl
Albumin	2.1 - 3.9 g/dl
Globulin	1.7 - 2.6 g/dl
Serum glucose	60-125 g/dl
Blood urea nitrogen	9.0 - 31.5 mg/dl
Creatinine	0.6 - 2.2 mg/dl
Total bilirubin	0.3 - 0.9 mg/dl
Serum lipids	95-240 mg/dl
Phospholipids	25-75 mg/dl
Triglycerides	0-145 mg/dl
Cholesterol	20-43 mg/dl
Serum calcium	5.3-12 mg/dl
Serum phosphate	3.0-7.6 mg/d

G. Resources for Finding Alternatives to Use of Animals.

Adjuvants and Antibody Production. ILAR Journal, national Research council, Institute of Laboratory Animal Resources, Volume 37, Number 3, pp.92-152, 1995 (available in office of the Laboratory Animal Facility).

The entire NIH Report on Adjuvants is available on-line at:
http://grants.nih.gov/grants/oprr/dc98-01.htm

Alternatives to the use of Live Vertebrates in Biomedical Research and Testing. A bibliography with abstract prepared by the Toxicology and Environmental Health Information Program, Specialized Information Service, National Library of Medicine, NIH. This documents is updated quarterly. To receive the latest copy or be placed on the mailing list call 301-496-1131. Also available on-line at http://sis.nlm.nih.gov/altaniml.htm.

Altweb is a world wide web site devoted to replacement, reduction and refinement alternatives for research and testing, maintained by the Johns Hopkins Center for Alternatives to Animal Testing (CAAT). The site is http://altweb.jhsph.edu/

Information Resources for Adjuvants and Antibody Production: Comparisons and Alternative Technologies, Resources Series No. 3. March 1997, available from the Animal Welfare Information Center (AWIC), NAL. USDA, 10301 Baltimore Boulevard, Beltsville, MD 20705. Also available on-line at http://www.nal.usda.gov/awic/pubs/antibody/.

NIH Plan for the Use of Animals in Research, October 1993. Copies available from the Office of Laboratory Animal Research, OER, NIH, 9000 Rockville Pike, Building 1, room 252, Bethesda, MD 20892.

Office for Protection from Research Risks (OPRR) laboratory animal welfare web page available at: http://grants.nih.gov/grants/oprr/oprr.htm.

A report on Validation and Regulatory Acceptance of Toxicological Test Methods, NIH Publication No. 97-3981, available from the Center for Evaluation of Alternative Toxicological Methods, NIEHS, P.O. Box 12233, Research Triangle Park, North Carolina 27709-12233. Also available on-line at http://ntp-server.niehs.nih.gov/htdocs/ICCVAM/ICCVAM.html