

GUIDELINES
FOR FACULTY, STAFF AND STUDENTS
FOR STUDIES WITH ANIMALS ON CAMPUS

UNIVERSITY OF MARYLAND, BALTIMORE

COMPARATIVE MEDICINE PROGRAM
THE UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE
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TELEPHONE NUMBERS

Comparative Medicine Program

Academic programs (including veterinary resident training)
Research collaboration (e.g. animal model development)
Veterinary Resources and related special services

Louis DeTolla, VMD, PhD, ACLAM - Director, Comparative Medicine and Chief Veterinary Resources	6-8536
Chief, Veterinary Surgical Services	6-3703
Chief, Veterinary Medical Services and VAMC Attending	6-2684
Attending Veterinarian	6-8542
Attending Veterinarian	6-4119
Deputy Director, Veterinary Resources	6-3547
Facility Manager	6-1601

Veterinary Resources (VR)

Administrative offices	6-3540
Technical assistance	6-3540
Clinical calls for veterinary services	6-3540
Facility Manager	6-1601
Diagnostic pathology	6-8539
Purchase of animals	6-8291
FAX	6-8538

The Veterinary Resources business and administrative offices, located on the ground floor of MSTF, Rm. G-100 at 10 South Pine Street, are staffed from 8:00 a.m. to 5:00 p.m. daily.

Emergencies

During normal business hours, a veterinarian may be contacted at 6-3540. For after-hours emergencies, the veterinarian can be contacted by pager as follows:

- 2) Dial 410-748-4569 on a touch-tone phone.
 - 3) Wait for three beeps after the telephone rings.
 - 4) Enter the telephone number the veterinarian should use to call you. In case of a dialing error, press the * three times and begin again.
 - 5) When you have entered the telephone number, press the # key to transmit your message. Wait for a fast busy signal then hang up. Your call will be returned as soon as possible.

UNIVERSITY OF MARYLAND, BALTIMORE
POSITION STATEMENT
ON THE USE OF ANIMALS IN RESEARCH

The University of Maryland, Baltimore believes the responsible use of laboratory animals is essential for biomedical research into the prevention and treatment of human and animal disease. We affirm the moral obligation of our scientists to carry out this research on behalf of mankind and animals. Millions of Americans are alive today, and live healthier and more productive lives because our nation's health care professionals are able to employ safe and effective treatments including vaccines, surgical procedures and other valuable therapeutic methods developed with animal research.

These same medical advances, improving the quality of life for mankind, are also being used by veterinarians to save our cherished pets and companion animals, enhance the health of farm animals, and preserve a future for wildlife and endangered species. The benefits of animal research to human and animal health is virtually unchallengeable and is fully substantiated by the scientific literature. UM,B supports this essential research for the benefit of current and future generations.

While we continue to seek other means of testing new medicines and techniques, animals continue to be the best model for researchers attempting to cure human disease. For the most part, alternatives to animal use such as tissue and cell cultures are useful as supplements to research, but have not entirely replaced the necessity for live animal testing. Computer modeling is also a valuable adjunct to research, but cannot replace the prudent use of animals. The University of Maryland, Baltimore, however, does believe in the three R's of research animal use whenever possible, replacing, reducing, and refining. Replacing of animals with cell cultures, or vertebrates with invertebrates whenever possible; reducing the numbers used by responsible experimental design, and improved statistical inferences; and refining techniques to eliminate any possible pain or discomfort.

Researchers at UM,B share the public's concern about the responsible use of animals in research. Peer committees and stringent federal guidelines (Public Health Service Policy and Animal Welfare Act) require scientists to explore other means of experimentation before considering animal testing. All research employing vertebrates must be reviewed and approved in advance by UM,B's Institutional Animal Care and Use Committees to ensure that animal use is necessary and that high standards of humane care are observed.

In addition to ensuring the judicious use of animals, the University administration and researchers share the responsibility to safeguard the welfare of laboratory animals. UM,B's animal facilities have the highest accreditation possible and are managed by highly qualified veterinarians who specialize in laboratory animal care. UM,B's facilities meet the strict guidelines of the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC), International and inspections by the United States Department of Agriculture.

UM,B defends the right of free speech. However, our responsibilities of providing and advancing medical care to society demand that we do not capitulate to tactics of intimidation and violence which undermine our democratic traditions and threaten the principle of free scientific inquiry. Therefore, UM,B cannot tolerate such acts on University property and will not allow such acts to influence University policy. To the extent necessary, we will prosecute or discipline those who break the law or UM,B regulations.

It is essential that we continue to preserve and protect the right of our researchers to pursue knowledge for those who wait for better therapies and treatments for disease and disability, and for the good of all human and animal kind.

INTRODUCTION

Veterinary Resources (VR)

All veterinary services at The University of Maryland, Baltimore campus are provided by Veterinary Resources. Veterinary Resources maintains oversight for the acquisition, care and use of all research animals on campus. All animal facilities and the care and use programs on campus are accredited by the Association for Assessment and Accreditation of Laboratory Animal Care, International (AAALAC) and meet federal laws and guidelines for the humane and appropriate care and use of laboratory animals. Animals are housed at nine locations; each of these facilities is maintained by a staff of experienced laboratory animal technicians.

The primary mission of Veterinary Resources is to provide humane and scientifically appropriate care of research animals at The University of Maryland, Baltimore. The facilities and program of animal care and use are maintained in compliance with the Animal Welfare Act of 1966 and all subsequent revisions (regulated by the USDA), and Public Health Service (PHS) guidelines. Veterinary Resources provides service as economically as possible by having a centralized animal care staff and by wholesale purchase of feed, bedding, caging and husbandry supplies. PHS Resource Improvement Grants submitted by Veterinary Resources have also provided monies for large capital improvements on campus. Veterinary Resources is the service division of Comparative Medicine.

Comparative Medicine

Comparative Medicine was established as an Academic Program in 1989 by The Executive Committee of The School of Medicine. Faculty members in Comparative Medicine hold joint appointments in other departments. Areas of faculty expertise are in the fields of clinical laboratory animal medicine, surgery, comparative pathology, microbiology, immunology, genetics, and infectious diseases.

Comparative Medicine faculty members conduct independent and collaborative research in a variety of fields. They are available for consultation on animal research protocols, laboratory animal management, and development of grant applications proposing the use of animals. Members participate in the teaching of medical students as well as graduate and postdoctoral students. We also provide postdoctoral residency and graduate training programs for veterinarians in the fields of Laboratory Animal Medicine and Comparative Pathology.

As members of Veterinary Resources, these individuals provide veterinary supervision for husbandry and health care related to facilities management, diagnosis, treatment and prevention of intercurrent disease in research animals.

Institutional Animal Care and Use Committee

Each school has an Institutional Animal Care and Use Committee (IACUC) whose members are appointed by the Dean. The committees review all proposed animal research and animal care and use to ensure compliance with the Animal Welfare Act and PHS Guidelines.

ACCREDITATION

The University of Maryland, Baltimore has been accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC) since 1983. This allows principal investigators to meet the requirements of category 1 on PHS grant and contract applications, i.e., this accreditation should be recognized in your grant applications that require in vivo research.

MEMBERSHIPS

The Program of Comparative Medicine maintains membership in the American Association for Laboratory Animal Science (AALAS). This organization provides educational materials, meetings, and information for professional development of staff in the specific area of laboratory animal medicine. AALAS also publishes Comparative Medicine and Contemporary Topics in Laboratory Animal Science, important journals of current developments in husbandry, animal care and health-related research.

Veterinary Resources also belongs to, seeks guidance from, or is associated with the National Association for Biomedical Research, the Foundation for Biomedical Research, the Scientists Center for Animal Welfare and Americans for Medical Progress. These organizations act as spokespersons for the biomedical research community and provide education in the use of animals in research and teaching.

All veterinarians in our program are specialty trained in laboratory animal medicine.

TECHNICAL AND CONSULTATION SERVICES FOR RESEARCH PROCEDURES

The staff of Veterinary Resources will provide technical services such as blood withdrawal, administration of anesthetics, animal transportation, etc. to support investigators in their research activities. Services may also be provided for surgery, pathology and radiology. Certain services are provided on a fee-for-service basis. Inquiries and prior arrangements for these services can be arranged by contacting our office. Through pre-research consultations, budgeting for these services can be included in research grant applications.

Pre-Research Consultation

The Program, through its faculty, has as one of its missions the provision of information and advice regarding:

- a) Special caging or experimental techniques.
- b) Selection of appropriate animal species to carry out specific animal techniques.
- c) Animal models of human diseases.
- d) Anatomical and physiological peculiarities of animals used in research.
- e) Techniques of anesthesia, analgesia, chemical restraint, and dosages.
- f) Techniques of blood and other sampling and drug or chemical administration.
- g) Pathological and clinical effects of intercurrent animal disease.
- h) Estimates of animal purchase prices and future per diem rates.

We encourage such consultations prior to the preparation of grant and contract applications.

VETERINARY MEDICAL SERVICES

Clinical Medicine

When an investigator, research staff member, student, technician or any other person associated with institutional animal use believes an animal is abnormal, sick, in discomfort, or otherwise requiring aid, a call should be placed to Veterinary Resources along with the completion of an Animal Health Problem Report available through VR. A staff veterinarian will respond and take appropriate action in consultation with the investigator. It is essential that clinical calls be initiated by the investigator, student, fellow or technician at the earliest sign of the abnormality. Veterinary Resources maintains complete animal diagnostic laboratories, two aseptic surgical suites, treatment and radiographic facilities.

Pathology

Veterinary Resources performs diagnostic pathology for the purpose of identifying **intercurrent disease** in the animal population and to assist investigators in identifying protocol related problems which affect animal health and impact on successful research endeavors. Inquiries should be directed to Dr. DeTolla or the diagnostic laboratory. Animals should be submitted to the necropsy room on the ground floor of the MSTF Building as soon as possible after death or preferably for euthanasia. **Carcasses must not be frozen** (refrigerate instead). A complete description of the animal's history should be included. A preliminary diagnosis will be available following the gross examination. A final diagnosis will follow as soon as possible after histopathology, microbiology, and other diagnostic procedures.

SOURCES OF RESEARCH ANIMALS

Animals used at UM,B are purchased from commercial suppliers and dealers. There are several commercial vendors who provide rodents, rabbits, dogs, cats, farm animals and non-human primates.

Approval of sources is based on the health status, genetic quality, costs, vendor reputation, site-visits and reliability. Approved Vendors - School of Medicine (Rodents and Rabbits): Tom Morris, Jackson Labs, Charles River, Taconic, Zivic Miller (SPF only), Covance, National Institute of Aging, and National Cancer Research Center.

Investigators with specific requests for animals from sources not currently approved must contact Veterinary Resources. Veterinary Resources will contact the suppliers, conduct health status screens and make appropriate management and husbandry decisions to make every effort to accommodate the investigators needs. No animals may be brought into the School of Medicine without prior consultation and approval by Veterinary Resources. When dealing with commercial suppliers who have multiple production colonies, it is often best to try to obtain animals from the same colony to prevent differences in biological response.

No animal may be housed in UM,B facilities unless the animal ordering procedures are followed. The introduction of animals without authorization by Veterinary Resources places the facility and the research of other investigators at great risk for loss of animals and data which could jeopardize the results of research endeavors, publication and funding.

Non-human primates are obtained from commercial sources, universities, public or private primate centers. Veterinary Resources can help in locating sources for non-human primates. Anyone planning to purchase non-human primates must discuss source, history, and health status with Dr. DeTolla. Veterinary Resources will make all arrangements for shipping.

ANIMAL ORDERING AND PURCHASING PROCEDURES
SCHOOL OF MEDICINE

All requests for research animals to be delivered to the School of Medicine or School of Pharmacy must be placed through Veterinary Resources. This arrangement is necessary, in part, to assure that the proper housing is available and to assist investigators in obtaining healthy animals at reasonable costs from safe, dependable sources. All arrangements for the acquisition, transportation and receipt of animals are handled by Veterinary Resources (even if animals are no cost).

Veterinary Resources will provide purchase and animal care cost estimates.

All animal-based research requires prior approval by the relevant Institutional Animal Care and Use Committee (IACUC). To assure this, all investigators will provide a current protocol number to Veterinary Resources at the time an order is placed. Investigators must make sure that the protocol number used is correct for the procedure and species to be used.

Animal Request Forms may be obtained from the administrative offices, Room G-100, MSTF.

The procedure for ordering animals has been developed with the UM,B Division of Procurement and Supply to minimize delay and paperwork for investigators. Animal orders will be placed in the following manner:

- An Animal Request form will be completed by the investigator and forwarded to Veterinary Resources. Be sure to have complete information on type, source, and numbers of animals, and the number of the protocol approved by the Institutional Animal Care and Use Committee. Also, be sure to complete the required USDA information.
- A FAS account number and an authorized signature is required before an order can be placed.
- Orders may be faxed, hand delivered or sent through the campus mail. Telephone orders are NOT accepted. Purchase requests must be received by Veterinary Resources **by noon on the Thursday** prior to the week delivery is desired to ensure the vendor can supply the number and type of animals requested, and to ensure that Veterinary Resources has the proper housing available. An additional order fee will be charged for orders received after 12:00 noon if delivery is desired for the following week.
- Federal Law (Animal Welfare Act) requires the University to annually report the numbers of animals used in research according to the following categories:

- Number of animals to be used involving no pain or distress
- Number of animals to be used with appropriate anesthetic, analgesic, or tranquilizer administered to avoid pain or distress
- Number of animals to be used involving pain or distress without the administration of anesthesia, analgesics, or tranquilizers (requires specific justification and approval)

Please be accurate in the reporting of these numbers on the Animal Request Form.

- The animal suppliers will be telephoned by Veterinary Resources and arrangements will be made for delivery. Any unusual problems with orders will be transmitted back to the investigator. Investigators will be billed a nominal fee to offset the cost of long-distance phone calls and the facsimile machine for each order placed.
- The non-faxed Animal Request Form used by Veterinary Resources consists of four copies. Keep the pink copy for your records and return the other copies to Veterinary Resources.

The animals are delivered to the facility designated on the request form. Housing for the animals is assigned after the animals have been checked for accuracy of species and type and examined to ensure they are in good condition. Animals arriving without a Veterinary Resources purchase order number will not be accepted or allowed to enter the facility.

The majority of animals ordered by investigators are housed where the investigator requests and are received when requested. Unless you are contacted by Veterinary Resources, you may assume your animals have arrived and are being housed. The simplest way for an investigator to determine whether the animals have arrived is to visit the appropriate facility.

Investigators are encouraged to use the comments section of the animal purchase request form to provide any pertinent information. This is especially helpful when ordering pregnant animals or litters, or for animals with special requirements prior to delivery.

It is to an investigator's advantage to allow as much time as possible for vendors to supply an order. Veterinary Resources will make every effort to comply with the requests of investigators but cannot be responsible for "last minute" orders that vendors are unable to supply.

CHARGE AUTHORIZATION AND BILLING
SCHOOL OF MEDICINE

Investigators must provide a University FAS account number on a Charge Authorization form (see Appendix 6) that is signed by the investigator and the responsible administrator. This authorizes Veterinary Resources to transfer funds from the investigator's account to cover the cost of animal care and services. Investigators will be responsible for notifying Veterinary Resources of any changes in funding or expiration dates. One copy of the billing statement will be mailed to the individual whose name and address appears on the Charge Authorization form. Research protocols approved by the IACUC must be on file before an account can be opened.

PER DIEM CHARGES

Billing for per diem is based on daily animal census. The animal census is kept on a "door sheet" (sample in Appendix 6) in each housing area. These census sheets are collected on the last day of the month and the charges are calculated for each investigator's account according to the number of animals, number of days and the specified rate for each species. Veterinary Resources personnel will add incoming animals. Investigators and their staff should mark out all animals that have been used if they are not to be returned to the room. Animals born in the facility are added to the census at weaning. It is the investigator's responsibility to verify the census and perform weekly headcounts on each of their door sheets and subtract animals on the day they are used. Questions or concerns regarding census counts should be brought to the attention of Veterinary Resources as promptly as possible.

Per diem charges are calculated in accordance with the NIH Cost Analysis and Rate Setting Manual for Animal Resource Facilities. The most significant per diem charges include labor, feed and bedding, equipment maintenance costs and husbandry supplies. Each cost category is allocated on a "per-species" basis at the end of the month and individual charges are assigned. Per diems paid by the investigator are only a part of total animal care costs, which are supplemented by the Dean and the Comparative Medicine Program.

When possible, per diem charges are assessed by the Dean's office prior to the start of each fiscal year. The updated costs are sent to department chairpersons. Increases and/or decreases are based on the projected cost of care for the ensuing fiscal year. Investigators are encouraged to contact Veterinary Resources for current per diem rates. Investigators are also encouraged to contact Veterinary Resources prior to filing a grant application to obtain a "best estimate" of future per diem rates.

ANIMAL HOUSING

Location

The following areas are used for the housing of research animals. All species cannot be housed in every area. The housing areas are:

School of Medicine Animal Facilities

Medical School Teaching Facility (MSTF)
Bressler Research Building (BRB)
Howard Hall (HH)
Maryland Psychiatric Research Center (MPRC)
Health Sciences Facility (HSF)

Dental School Animal Facility

School of Pharmacy Animal Facility

Baltimore Veterans Affairs Medical Center - Animal Facility

Maryland Biotechnology Center

The facility selected for housing animals will generally be the most convenient to the investigators' laboratories, and consistent with available space, PHS requirements regarding species separation, and with other needs of the investigator.

School of Medicine Faculty

All investigators who house animals in the School of Medicine must have a primary School of Medicine Faculty appointment.

All School of Medicine faculty with laboratories in the School of Medicine must house their research animals in the School of Medicine animal facilities.

Access to Facilities

Access to the animal housing facilities for investigators and their staff can be granted only **after** a University access card I.D. badge has been obtained from the Campus Police. See your administrative staff or the Campus Police to obtain a badge.

Once an approved I.D. badge has been obtained, a memorandum on the investigator's department stationery should be sent/delivered to Veterinary Resources, Rm. G-100 of the MSTF building. The memorandum should contain the following information:

1. Name of the person requiring access
2. The facility/floor to which the person requires access
3. Social security number
4. Number from the back of the University I.D. badge

The Campus Police can update the card access system within 24 hours of a request from Veterinary Resources. The simplest way to determine whether access has been granted is to try the card reader.

Investigators are granted access only to one location (e.g., MSTF or BRB/HH) to help prevent the transmission of adventitious pathogens between facilities.

Unauthorized persons (including visitors, friends, and children) are not permitted in the facilities without the approval of Veterinary Resources. Veterinary Resources veterinary staff and professional colleagues, such as site visitors accompanying the veterinary staff, have unrestricted access to all areas of the UM,B campus where animals are held.

Amphibian and Fish Holding Areas

We prefer to house all amphibians within our centralized facilities.

Sites for housing of fish outside the centralized facilities must meet minimum standards. In general these areas must conform to the guidelines written by the Canadian Council on Animal Care as such guidelines are recognized by AAALAC. The guidelines include monitoring of water quality, appropriate husbandry and handling practices, and appropriate use of anesthetic and euthanasia methods for various species.

Written standard operating procedures, prepared by the investigator, should be available in all fish holding areas. Records of water monitoring, treatments, and husbandry procedures should also be maintained.

Guidelines and reference materials are available through Veterinary Resources.

Satellite Facilities

If animals will be housed for more than 24 hours outside of the animal facility, the area must be formally approved as a satellite area. This will require adequate justification and approval by the IACUC.

POLICIES, PROCEDURES AND GUIDELINES

Caging Policy

Due to the cost of specialized caging and an ever increasing animal census, investigators are urged to include a request for caging in all grant applications requiring the use of animals. Veterinary Resources should be contacted prior to grant application to discuss the appropriate type and quantity of caging that might be required.

Grant Application Requests for Special Caging

Previous caging policy at UM,B has been geared to provide conventional housing for laboratory animals used in research. Current budget arrangements are not necessarily able to meet the needs of investigators for special housing requirements such as microisolators, and other non-conventional caging or unusual quantities of particular caging. To meet these special requirements of individual investigators, a caging policy, effective May 1, 1991 requests that those investigators who have specific requirements include a request for funding for non-conventional lab animal caging in all grant applications to the NIH, NSF, DOD, ACS and other extramural agencies.

- The request for special caging equipment must be appropriate for the proposed research to ensure that sufficient animal housing is available for the maximum possible census at any one time during the life of the grant. Depending on the research timetable, the caging may be purchased in different years of the grant.
- Investigators should contact Veterinary Resources to discuss their potential specialized caging needs prior to the submission of a grant application (x6-3540, x6-3547).
- To insure that caging design is compatible and inter-changeable with the UM,B facility, special caging will be purchased from known vendors on behalf of investigators by Veterinary Resources. This will be done in consultation with investigators to ensure research requirements are met.

Quarantine and Stabilization of Animals

All newly received animals must be allowed a stabilization period **of at least 48 hours** prior to their use. This permits the animals to adapt to their surroundings resulting in a more stable physiological and behavioral state. Studies indicate that mice have altered immune functions and elevated corticosteroid levels for 48 hours following shipment.

Quarantine for Primates - ALL primates entering the facility must undergo a quarantine period of 10 weeks.

Quarantine for Rodents - Rodents received from other than approved sources are required to be quarantined and tested prior to release to investigators. Quarantine period is 4 to 6 weeks.

Animal Transport between Buildings

Animals should not be transported from one research building to another. Exceptional circumstances require approval by Veterinary Resources. Under no circumstances should animals other than rodents and rabbits be transported in a public elevator (freight elevators should be used). All animals that are transported should be covered in a manner to obscure public view and prevent exposure of others to animal allergens.

Breeding of Animals

Any proposed breeding requires specific approval by the IACUC.

Pets

Research animals are not pets and should not be removed from the facilities. Concerns have to do with public perception of an animal removed from a research setting, the fact that these animals have generally been procured with grant monies, liability of the University, and our need to document the disposition of research animals in accordance with federal law.

Conversely, personal pets should not be brought onto campus for treatment, or otherwise. Veterinary Resources does not operate a clinic or provide service for pet animals. In addition, certain pet animals (especially mammals) can harbor and spread infectious diseases to animals within the research facility. Only pet fish are exempted from this policy.

Pathogen Testing of Rodent Biologics

Rodent origin cell lines, tumor lines or any other biologics (e.g., body fluids) passaged through live rodents have the potential to transmit a wide range of rodent pathogens. One example is mouse hepatitis virus (MHV) which can be devastating even as a subclinical infection as it can confound experimental results, especially in immunological studies. Another example is lymphocytic choriomeningitis virus (LCM) which will interfere with experimental data and result in

rodent morbidity and mortality and is also zoonotic (i.e., may cause disease in personnel).

All animal biologics (any tissues, serum, cells, tumor, or other animal passaged materials) must be adventitious pathogen free prior to introduction into any animal. Veterinary Resources will test these biologics at no cost to the investigator.

This usually involves a serological evaluation (e.g. rodent cell line injected into a naive mouse which is subsequently assayed for antibodies to a panel of murine viral antigens).

Media Coverage Policy for Research Utilizing Animals

It is understood that publicity for research is important at the University of Maryland, Baltimore, School of Medicine and therefore should be supported and encouraged. Media coverage of animal-based research must be conducted in a socially sensitive fashion and meet all federal regulations and guidelines regarding the humane care and use of animals. It is important that media coverage be presented in a positive light and not prone to misrepresentation. Also, it should be determined if it is truly necessary to exhibit the animals or demonstrate their use or care.

Any investigator who is contacted by the media to provide information on any animal-based research should contact the Office of Media Relations (X6-7820) without delay. If it is anticipated that animals will be exhibited to the media or if a portion of the media coverage includes specific use and/or care of animals, then the Office of Media Relations will contact the Chief of Veterinary Resources and the IACUC Chair for their recommendations.

The media event should not proceed until these persons (or their designees) are satisfied that all has been done to ensure that media coverage will be conducted appropriately.

A representative from Veterinary Resources and/or the IACUC may be present during the event and have authority to make any necessary changes to protect the investigator and University from misrepresentation.

Monoclonal Antibody Production Guidelines

Monoclonal antibodies should be produced in tissue culture. Ascites production should be done only if tissue culture methods cannot be used or are inadequate. IACUC requires justification for ascites production.

Tissue culture support for the production of monoclonal antibodies is available through Veterinary Resources. This is provided as a fee-for-service activity and includes production of

monoclonal supernatants in standard or serum - free media, roller bottle culture, or hollow-fiber generation for larger quantities of antibodies.

All hybridomas must be Mouse Antibody Production (MAP) tested for adventitious pathogens (e.g. murine viruses, mycoplasma) that could interfere with experiments or cause morbidity/mortality in individual rodents and/or place the animal facility at risk. All testing is provided by Veterinary Resources free of charge.

Experiments Involving Biohazards

No hazardous agents (infectious, oncogenic, radioactive or chemical) may be used in any animal facility without being cleared by the IACUC. The use of radioactive materials requires additional approval by Radiation Safety (x6-6281). The Director of EHS is a member of our SOM IACUC and reviews all protocols for hazards along with the full committee. The Institutional BioSafety Committee (IBC) also reviews for role of recombinant DNA and Select Agents. If special caging and care are required, Veterinary Resources must be contacted well in advance (prior to submitting an animal protocol is recommended).

The veterinary faculty and facilities personnel of Veterinary Resources are available for consultation and advice on matters relevant to animal housing, care and use when biohazard agents are proposed.

At the campus level, The Office of Environmental Health and Safety (x6-7055) and the UM,B Biohazard Committee (IBC) oversee all experimentation and use of biohazardous agents. See the EHS handbook for further information at www.ehs.umaryland.edu/ .

If radioactive substances, infectious organisms, toxic chemicals, or chemical carcinogens are to be used in-vivo, the following points must be addressed in your protocol to the IACUC: The IACUC form also requires the implementation of an IN Vivo hazardous reference sheet.

- ABL level (1, 2, or 3) for infectious agents.
- Concentration
- Route of administration
- Duration of exposure
- Length of time animals will be kept following exposure
- Room location where agent is administered
- Location of animal housing post exposure
- Method of animal disposal

We must protect the health of our employees and others. Those who attend to the care and housing of your animals may not be familiar with the nature of hazards being used. Therefore, we require the necessary information on the agent to best safeguard those who work with the animals. (See Occupational Health Program)

Survival Surgical Procedures

The Institutional Animal Care and Use Committees have set minimum standards for animal operating rooms and laboratories in which surgery is performed. The standards are based on the NIH Guide for the Care and Use of Laboratory Animals. Adherence to these guidelines is necessary for compliance with the standards of accreditation by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC). The standards are meant to ensure that surgical procedures are performed in an appropriate environment using good surgical techniques.

These standards apply to all mammalian species, including rabbits, but excluding rodents. Aseptic technique (e.g., surgical gloves, mask and sterile instruments) should be used for surgical procedures on rodents such as rats and mice. Rodent surgical areas may be a separate room or portion of a room. The area should be clean and orderly and should not be used for any other purpose during the time of the surgical activity. Animal housing areas may not be used for surgical procedures.

For all rabbits and higher species, designated survival surgical areas are required and should be used only for that purpose. Use of the area for other purposes such as office space and equipment and supply storage, except for surgical and research equipment, is not acceptable.

Non-survival surgical procedures may be performed in general purpose laboratories provided the rules outlined below are followed:

- a) There must be no eating, drinking or smoking in the laboratory during the surgical procedure.
- b) All equipment and surfaces within the room must be kept clean.
- c) The surgical area should be free of non-essential equipment and supplies.

The use of a survival surgical area for non-survival surgery is satisfactory, provided the rules regarding survival surgery are followed, and the room is properly sanitized following the procedure.

Any other laboratory outside of those designated for survival surgery CANNOT be used for survival surgical procedures in animals other than rodents. Approved surgical areas are in the Medical School Teaching Facility and the Bressler Research Building.

Aseptic Technique

Aseptic technique, including aseptic preparation of the skin, sterilization of instruments, and wearing sterile gloves and masks (gowns and caps when appropriate), is necessary when performing survival surgery on all animals. The IACUC provides guidelines on aseptic surgery. Operating

suites should not be used for eating, drinking or smoking. Personnel performing the surgery should have formal training in operative procedures and aseptic technique or have acceptable career experience approved by the IACUC.

Anesthetics and Analgesics

Information concerning types, dosages and routes of administration of anesthetics and analgesics is available from members of the Program. Also see Appendix 3.

Anesthetic techniques and use of post-operative analgesia should be in accordance with current methods in the literature and approved by the IACUC. Inquiries may be directed to Veterinary Resources. Records must be maintained of the anesthetics used, amounts, dates, procedures and animal species. If volatile anesthetic gases are used, a gas evacuation and scavenging system is necessary.

Analgesic usage - rule of thumb - if any particular procedure performed on animals would cause pain or discomfort if performed on a human then the animal should receive similar consideration in the form of analgesics. Guidelines for the Recognition and Alleviation of Pain and Distress in Rodents and Rabbits are included in Appendix 12.

Post-Operative Care

The investigator is primarily responsible for postoperative care and record keeping for animals until the animal is eating, drinking, and behaving normally. Immediate postoperative care should be provided in a dedicated recovery area with close observation and the animal should not be left until it can reach sternal recumbency. In the days following the procedure, the animal should be monitored and observed, as necessary, to insure the animal is recovering normally. Analgesics should be administered if there is any question of pain; incisions should be checked daily; bandages should be changed when wet, soiled, or coming off; supportive treatment should be provided when indicated (parenteral fluids, antibiotics); and sutures should be removed (7-14 days generally). For all species (except rodent), individual surgical records and post procedural records must be made and kept by the investigator.

Forms for recording of surgical procedures and post operative care are available through Veterinary Resources. This record keeping is necessary to document our compliance with the USDA Animal Welfare Act and PHS (NIH) requirements for post procedural care of animals.

Multiple Major Surgical Procedure

Major surgery is defined as surgery which penetrates and exposes a body cavity or produces substantial impairment of physical or physiologic function.

Multiple major survival surgery is described as more than one major survival surgical procedure performed on a single animal.

Multiple major survival surgical procedures may be performed on the same animal only if they are related components of a project and have been reviewed and approved by the IACUC. Multiple major survival surgery on animals for economic purposes alone is not acceptable according to the NIH Guide.

Euthanasia

Proper methods of euthanasia (see AVMA Panel on Euthanasia - <http://www.avma.org/resources/euthanasia.pdf>) should be used at the termination of the experiment. The methods used should be documented. A record must be kept of the amounts, date, and animal species when restricted drugs such as sodium pentobarbital are used for euthanasia.

Personal Protective Equipment Program for Workers with Macaque Monkeys

Training is required on the use of protective equipment for all who work with macaques or macaque tissues. This training is provided by the Veterinary Resources (VR) veterinarians.

Macaque monkeys present a risk to employees from natural infection with Herpes B virus (other terms used Cercopithecine herpes virus 1, Herpes virus simiae, and B-virus). This latent infection in macaques is commonly fatal to humans that become infected. Humans have been infected from bites, scratches, splashes to the eye and from tissues of macaque monkeys.

It is the investigator's responsibility to make sure that each person under their employ receives this training and to notify Veterinary Resources of new employees who need training.

Prolonged Restraint Policy

Brief physical restraint of animals for examination, collection of samples, and a variety of other clinical and experimental manipulations can be accomplished manually or with devices such as restraint stocks or squeeze cages. It is important that such devices be suitable in size and design for the animal being held and operated properly to minimize stress and avoid injury to the animal.

Prolonged restraint of any animal, including the chairing of non-human primates, should be avoided unless essential to research objectives. Less restrictive systems, such as the tether system or the pole and collar system, should be used when compatible with research objectives. The following are important guidelines for the use of restraint equipment:

- o Animals to be placed in restraint equipment should be conditioned to such equipment prior to initiation of the research.
- o The period of restraint should be the minimum required to accomplish the research objectives. Prolonged restraint for any reason must be approved by the IACUC committee.

- o Restraint chairs or similar devices are not to be considered "normal" methods of housing, although they may be required for specific research objectives.
- o Restraint chairs or similar devices must not be used simply as a convenience to investigators in handling or managing animals. When such devices are used, their use must be specifically approved by the IACUC committee.
- o Attention must be paid to the possible development of lesions or illnesses associated with restraint, including contusions, decubital ulcers, dependent edema, and weight loss. If these or other problems occur, veterinary care must be provided to treat the animal, which if necessary must be temporarily or permanently removed from the restraint device.

Guidelines for Aseptic Surgery on Rodents

The following guidelines are consistent with our accrediting organization's (AAALAC International) interpretation of the Animal Welfare Act regulations and PHS guidelines which provide satisfactory aseptic conditions as indicated below. Investigators who feel that their vertebrate animal experiments require significant exceptions to these guidelines will need to justify these exceptions in their animal protocol. Otherwise, investigators will be expected to follow these guidelines.

1. Surgery should be conducted on a clean, uncluttered lab bench or table surface. The surface should be wiped with a disinfectant before and after use and/or covered with a clean drape.
2. Hair should be removed from the surgical site with clippers or a depilatory. The surgical site should be treated first with an antiseptic scrub (chlorhexidine or povidone iodine scrub) and rinsed with alcohol.
3. All instruments should be sterilized, but the method of choice may be determined by the surgical instruments or devices being used. Steam sterilization may be accomplished by autoclaving at 121° C for 20 minutes. Gas sterilization with ethylene oxide is an alternative for items which will not withstand high temperature. Acceptable techniques for cold sterilization include soaking in 2% glutaraldehyde for ten hours, in 8% paraformaldehyde for 18 hours, or in 6% stabilized hydrogen peroxide for six hours.
4. The surgeon should wash his/her hands with an antiseptic surgical scrub preparation and then aseptically put on sterile gloves. If working alone, the surgeon should have the animal anesthetized and positioned and have the first layer of the double-wrapped instrument pack opened before putting on sterile gloves.
5. The surgeon should wear a surgical face mask. A surgical cap and gown are

recommended, but not required.

6. Multiple surgeries present special problems. After the first surgery, the sterilized instruments may be kept in a cold sterilant. Hot bead sterilizers are also acceptable to use between animals. Sterile gloves should be changed between surgeries if the surgeon touches nonsterile surfaces.
7. The abdominal or thoracic body wall should be closed with absorbable suture material. The skin should be closed with staples or with a nonabsorbable suture material in a simple interrupted pattern. Skin sutures or staples should be removed 7 to 10 days after surgery.
8. Rodents should be recovered from anesthesia in a warmed environment. Because of the rodent's high surface area to volume ratio, they are particularly susceptible to heat loss (and overheating). Prevention of heat loss is therefore most desirable and may be accomplished by the placement of a dry cloth or pad under the animal during surgery. Warm water circulating heating pads are ideal for providing supplementary heat, if needed. Electrical heating pads should not be used as they can cause thermal burns and subsequent dermal necrosis. Heat lamps may be useful, but a thermometer should be placed near the animal to determine appropriate temperatures. Recovery on clean, dry bedding is sufficient for short procedures.
9. Antibiotics are not given routinely after surgery unless justified by the investigator. Antibiotics should not be used as a substitute for proper aseptic technique.
10. Analgesics should be used with all surgeries and whenever the potential for pain exists. Pain in rodents may be identified by observing the animal's reluctance to move about, eat or drink and vocalization with handling. It is best not to wait for evidence of pain before giving analgesics. Buprenorphine 0.05-0.1 mg/kg SQ is a safe and effective analgesic for rodents and should be given at the time of surgery and then every 8-12 hours. Lidocaine applied topically to the skin incision provides preemptive analgesia and may be sufficient for minor surgical procedures.

Questions about aseptic or surgical technique may be addressed to Veterinary Resources staff by calling 706-3540.

REFERENCES:

- a. Guide for the Care and Use of Laboratory Animals, U.S. Dept. of Health and Human Services, Public Health Service, National Institutes of Health, Revised 1996.
- b. Simmons, B.P., "CDC Guidelines for the Prevention and Control of Nosocomial Infections," American Journal of Infection Control, Vol. 11,

No. 13, June 1983.

- c. Wright, E.M., *et al.*, "Animal Pain: Evaluation and Control," LAB ANIMAL, Vol. 14, No. 4, May/June 1985.
- d. Harkness, J.E., Wagner, J.E., The Biology and Medicine of Rabbits and Rodents, 4th edition, Lea and Febiger, 1995, Philadelphia.
- e. Block, S.S., Disinfection, Sterilization, and Preservation, 3rd edition, Lea and Febiger, 1983, Philadelphia.

Standard Immunization Methodology/Practices

Veterinary Resources - School of Medicine
University of Maryland, Baltimore

RABBIT (polyclonal antibody production)

Initial Injection

- Shave site area
- Antiseptic prep, alcohol or betadine
- Complete Freund's Adjuvant (CFA) + protein 1:1 (total 1 ml volume)
- 0.1 ml SQ or IM per site
0.05 ml ID per site
maximum 10 sites, at least one inch separation of sites

Foot pad injections are not acceptable for any species.

Boost(s)

Incomplete Freund's Adjuvant + protein -- same regimen as above.

Blood sampling: maximum amount 1% of body weight (i.e., 3 kg rabbit - 30 ml) at minimum 2 week intervals.

Methods - either marginal ear vein or central artery, by venipuncture or cut down.

Droperidol (2.5 mg/kg) is recommended as a vasodilator + tranquilizer. Topical xylene is acceptable, but requires thorough washing afterward.

Terminal Exsanguination requires complete anesthesia (ketamine and xylazine at 50 mg/kg and 5 mg/kg respectively IP, recommended) and may be performed through ear vein/artery or by cardiac puncture.

Approved method of euthanasia should follow, such as pentobarbital, 100 mg/kg.

MICE - monoclonal antibody production

If Pristane priming is used, the recommended amount is 0.2 ml. intraperitoneal.

CFA should never be given intraperitoneally in any species.

Mice should be observed daily from the onset of ascites and tapped when appropriate.

They should be tapped only twice (the first tap will usually yield the most antibody). The second tap should be a terminal procedure and the mouse should be euthanized immediately prior to the tap.

Mice found moribund or in respiratory distress should be euthanized immediately by approved methods.

Blood sampling: maximum 1% of body weight (i.e., 30 g mouse -- 0.3 ml) at minimum 2 week intervals.

Tail vein/artery venipuncture or laceration.

Retro-orbital bleeding requires sedation of mouse.

Inhalation anesthesia with Isoflurane used with a precision vaporizer provides appropriate short term anesthesia but must be used in fume hood or with other scavenging provisions.

Cardiac puncture - only under deep anesthesia and as a terminal procedure.

Approved methods for euthanasia of mice include CO₂ asphyxiation followed by cervical dislocation, overdose of anesthesia or anesthesia followed by physical means. These guidelines are accurate as the date of this paper. It is recommended you still check the manufacturer's package insert in case changes have occurred with their products.

- Mouse-Immunize 5 mice per antigen.

a) Immunization

Injection sites are prepped with surgical scrub (Betadine or chlorhexidine), rinsed with isopropyl alcohol then allow to air dry. Each mouse is hand-restrained and injected subcutaneously (SC) using a 21 g needle. Adjuvants will be selected on the needs of the study. One of three adjuvants: Titer Max Gold® (TMG), Ribi Adjuvant System® (RAS) and Freund's Complete Adjuvant (FCA) may be selected as the adjuvant to be utilized with a specific antigen.

FCA injection is prepared by mixing 50 µl of antigen in 200 µl of FCA (250 µl total) per mouse. The 100 µl of the mixture is injected SC in two sites along the dorsum of the back separated by at least 2.5 cm.

TMG: mix antigen and adjuvant in a 50:50 ratio to provide a total volume of 100 ul of mixture per mouse. Inject 100 ul of mixture SC in one site in the dorsal neck region.

RAS: Reconstitute 1 vial of R-700 emulsion by injecting 2 ml of sterile saline containing antigen to provide 0.05-0.25mg of antigen per ml of saline. Inject 0.1 ml SC in two separate sites along the dorsal back region for a total of 0.2 ml per mouse.

Booster immunizations are given at 3-4 week intervals. Immunization sites are to be prepped and injected as above. If FCA was used initially, Freund's Incomplete Adjuvant (FIA) in the same ratio, volume and location as the initial injection is used for booster immunizations. If TMG or RAS was used, they are repeated as per their initial injections.

Blood collection for titer determination will be accomplished by tail or retro-orbital bleeds. A maximum of 1% of body weight (i.e. 0.3 ml for a 30 gm mouse) may be collected for testing. Hemostasis will be aided by application of direct pressure utilizing a sterile 2x2 gauze at the tail resection site or gently over the closed lids of the eye that was bled. General anesthesia for the collection procedure will be administered using Isoflurane, Sevoflurane or Halothane and the appropriate anesthetic vaporizer. A scavenging system to remove anesthetic gas will be utilized to protect working personal from exposure to the anesthetic gas.

For terminal blood collection by cardiac puncture, animals will be placed under general anesthesia as above and exsanguinated. Cervical dislocation will be performed following blood collection to assure euthanasia while under anesthesia.

- Rat-Immunize 4 rats per antigen.

Initial skin preparation is as in "a)" above. If FCA is chosen, mix as above to provide 250 ul per rat and administer 100 ul SC in two sites along the dorsal lower neck and mid back region separating injections by a minimum of 2.5 cm. TMG is mixed with antigen in a 50:50 ratio to provide a total volume of 200 ul per rat. 100 ul is injected intramuscular (IM) in each quadriceps muscle. RAS is reconstituted as above with antigen in sterile saline to provide desired antigen concentration. Administer two SC injections of 0.2 ml of emulsified mixture dorsally in the lower neck region.

Booster injections are to be made at 3-4 week intervals. Site preparation is as with initial injections. If FCA was used initially, FIA is for subsequent injections at the same ratio, volume and location as FCA was initially. TMG and RAS are repeated as the initial injections under this section.

Blood samples may be collected for titer determination by tail or retro-orbital bleeds under inhalant anesthesia as in "a)" above. A maximum of 1% of body weight (i.e. 3 ml for a 300 gm rat) may be collected. Hemostasis will be aided by application of direct pressure utilizing a sterile 2x2 gauze at the tail resection site or gently over the closed

lids of the eye that was bled.

For terminal blood collection by cardiac puncture, general anesthesia will be administered by inhalants as described or by injection of ketamine (80mg/kg) / Xylazine (5mg/kg) IP.

Euthanasia will be assured by injection of 100 mg/kg of pentobarbital IP while under anesthesia.

- Rabbit- Immunize 3 rabbits per antigen.

Injection sites are prepped with surgical scrub (Betadine or chlorhexidine), then rinsed with isopropyl alcohol and allowed to air dry.

FCA is mixed with the antigen in a 50:50 ratio to a total volume of 0.5 ml per subject. A volume of 0.1 ml will be injected SC in the prepped areas on the dorsum of the back separated by a minimum of 2.5 cm between sites for up to 5 injections total.

TMG is mixed in a 50:50 ratio with the antigen to provide 400 ul volume of mixture total per rabbit for SC injections or 200 ul for IM injections. For SQ administration, inject 100 ul in 4 separate locations along the back. For IM administrations, inject 100 ul in each quadriceps muscle.

RAS: Reconstitute Emulsion R-730 with 2 ml saline as above containing 0.05 mg to 0.25 mg of antigen per ml to provide desired antigen concentration . Inject 0.25 ml SC in four sites, 2 near the base of the neck over the shoulders and 2 dorsally in the mid back region.

Booster immunizations to FCA are to use FIA in the same volumes ,ratios and site distributions as the initial injections. TMG or RAS are repeated as the initial injections were given.

Blood samples will be collected by bleeding of ear veins (central or marginal). Up to 5 mls may be collected per animal. Hemostasis will be aided by applying direct pressure with a sterile 2.2 gauze sponge over the vena puncture site of the ear. Acepromazine at 1 mg/kg IM or Droperidol at 0.5 mg/kg SC are to be injected a minimum of 10 minutes prior to blood collection to provide both sedation and mild vasodilatation to ease collection. Soft commercial, veterinary restraint bags will be utilized for the collection procedure to ease positioning and provide protection of the animal.

For terminal blood collection, animals will be anesthetized with 40 mg/kg Ketamine and 5mg/kg Xylazine IM. Blood will be collected by cardiac puncture once a level of general anesthesia is achieved. Euthanasia will be assured by an injection of pentobarbital IV at a dose of 100mg/ kg while under anesthesia.

Protection of the Animal Facility from Outbreaks of Adventitious Pathogens

The inadvertent introduction of pathogens and parasites into an animal facility can cause a significant disruption of research in terms of wasted time and dollars and unwanted effects on experimental systems. Therefore, it is imperative that all investigators carefully consider the source of research animals and biologic materials introduced to the animals. **All research animals at UM,B are ordered from vendors that have been approved by Veterinary Resources.** Vendors are approved based on their ability to provide animals that are reliably free of pathogens that can spread to other animals in the facility and hence adversely affect ongoing research projects. Other sources of animals, including other universities, pharmaceutical companies, or transgenic laboratories that are not currently on the approved list must be individually contacted by Veterinary Resources to provide health status and related information on the proposed animals to be delivered to our campus before any animals from those sources are shipped (includes UM,B, BVAMC or IHV/MBC.)

All animal procurement is done by Veterinary Resources. If animals are not from the approved vendor list, Veterinary Resources will contact the source to obtain health status information. Normally only animals believed to be pathogen-free are accepted. Non-approved vendor animals go into quarantine in any case. If animals are not pathogen-free, we make recommendations to rectify this with the source/investigator. **Absolutely no animals may be placed in the facility without prior approval from Veterinary Resources.** Any animals delivered to the School of Medicine without prior approval of Veterinary Resources will be rejected on arrival.

It is equally important that all animal biologics (any tissues, serum, cells, tumors or animal passaged materials) be adventitious pathogen-free prior to their introduction into any of the animals housed in our facilities. **Veterinary Resources will test these biologics for adventitious pathogens at no cost to the investigator.** This usually involves a serological evaluation (e.g. rodent cell line injected into a naive mouse which is subsequently assayed for antibodies to a panel of murine viral antigens).

Any investigator planning to administer animal biologics to a research animal must contact Veterinary Resources for approval prior to the use of such biologics. Testing of biologic materials normally requires 4-6 weeks to complete. Previous data on adventitious pathogen testing can be reported to Veterinary Resources for review and approval.

The forms for animal ordering and testing of biologics (Technical Services) are included in Appendix 6. Any questions regarding animal ordering should be directed to Mr. Morris Shannon or Dr. Louis DeTolla, Veterinary Resources.

In addition, investigators should limit their animal work to a single animal facility in order to decrease the chances of fomite transfer of infectious agents. All members of a single investigator's laboratory should only need access to one of the following facilities - MSTF, BRB/HH, HSF, BVAMC, MPRC, Dental School, School of Pharmacy or IHV/MBC. Any

exceptions must be approved in advance by Dr. Louis DeTolla, Veterinary Resources. Whenever possible, investigators should also limit their activities to areas in which their animals are housed or to common procedural areas.

This document has been prepared by the IACUC Subcommittee on Pathogens. The committee has established that any failure of the investigator=s laboratory to abide strictly by the above directions could lead to a suspension or permanent loss of ability to utilize UM,B, BVAMC or IHV/MBC animal facilities. Willful disregard of these rules will result in permanent loss.

LAWS AND REGULATIONS APPLICABLE TO RESEARCH UTILIZING ANIMALS

Federal Law

Universities and the institutions or organizations which carry out animal-based research or teaching fall under the "Animal Welfare Act" (Public Law 89-544, 1966 and subsequent amendments including Public Law 99-158, 1985). Complete copies of the Act, Amendments and Regulations are available at the USDA Website: www.nalusda.gov/awic/legislat/usdaleg1.htm. In essence, the Act mandates unannounced inspections by officials of the U.S. Department of Agriculture to ensure compliance with regulations for humane care of animals used in research, their housing, and medical care including "the appropriate use of anesthetic, analgesic, or tranquilizing drugs, when such use would be proper in the opinion of the attending veterinarian at the research facility." The objective of the legislation is to "effectively minimize the pain and discomfort of the animals while under experimentation." Annual reports are required which Veterinary Resources prepares on behalf of our institutions.

All scientists at UM,B must comply with the Animal Welfare Act. The Act covers nonhuman primates, dogs, cats, rabbits, guinea pigs, hamsters, and aquatic mammals and any other warm-blooded animal used for biomedical research (except laboratory mice, rats and birds at the present time).

Enforcement of federal law is carried out by veterinary inspectors of the U.S. Department of Agriculture who make unannounced site visits. Reports filed by these inspectors are available to the public under the Freedom of Information Act.

Public Health Service - National Institutes of Health

The Office of Laboratory Animal Welfare (OLAW, formerly Office for Protection from Research Risks, Division of Animal Welfare) at the National Institutes of Health Public Health Service Policy on Humane Care and Use of Laboratory Animals was promulgated in 1985 and most recently revised in October, 2000. The complete policy with all updates can be found at <http://www.grants.nih.gov/grants/olaw/olaw.htm>. Several significant changes occurred in the 1996 revision of the 1979 policy.

The policy requires that each institution receiving PHS funds for research involving animals submit detailed information in an Animal Welfare Assurance letter regarding the institution's program for the care and use of animals.

Awardee 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 direct or supervise the program. Institutions are also required to designate

clear lines of authority and responsibility for those involved in animal care and use in PHS-supported activities.

The policy defines the role and responsibilities of Institutional Animal Care and Use Committees (IACUC) and requires the involvement of such committees in all aspects of PHS-supported research at those institutions. The policy requires that Institutional Animal Care and Use Committees 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 nonscientific area.

The policy requires Institutional Animal Care and Use Committees to review and approve those sections of applications for PHS funds that relate to the care and use of animals before PHS funds may be awarded.

Institutions that are not accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC) are required to conduct a self-assessment of the institution's program, based on the Guide for the Care and Use of Laboratory Animals, 1996. Significant deficiencies in the institution's program must be identified and the institution must adhere to an approved plan and schedule for correction of the deficiencies. Such institutions are assigned to category 2 on PHS grants and contracts.

NIH PRINCIPLES FOR USE OF ANIMALS

(Federal Register, May 20, 1985, Vol. 50, No. 97, Office of Science and Technology Policy.)

These principles were prepared by the Interagency Research Animal Committee. This Committee, established in 1983, serves as a focal point for federal agencies' discussions of issues involving all animal species needed for biomedical research and testing. The committee's principal concerns are the conservation, use, care, and welfare of research animals. Its responsibilities include information exchange, program coordination, and contributions to policy development.

Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research and Training.

The development of knowledge necessary for the improvement of the health and well-being of humans, as well as other animals, requires in vivo experimentation with a wide variety of animal species. Whenever U.S. Government agencies develop requirements for testing, research, or training procedures involving the use of vertebrate animals, the following principles shall be considered; and whenever these agencies actually perform or sponsor such procedures, the responsible institutional

official shall ensure that these principles are adhered to:

The transportation, care, and use of animals should be in accordance with the Animal Welfare Act (7 U.S.C. 2131 et seq.) and other applicable Federal laws, guidelines and policies.

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.

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 vivo biological systems should be considered.

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.

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.

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.

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.

Where exceptions are required in relation to the provision of these Principles, the decisions should not rest with the investigators directly concerned but should be made, with due regard to Principle 2, by an appropriate review group such as an institutional animal research committee. Such exceptions should not be made solely for the purposes of teaching or demonstration.

INSTITUTIONAL REVIEW OF ANIMAL PROTOCOLS

Protocol Submission

Research activities which use vertebrate animals require review and approval by the appropriate Institutional Animal Care and Use Committee (IACUC). To accomplish this, all investigators must submit experimental protocols on the Animal Research Form (Appendix 2). Completed forms should be submitted to the appropriate IACUC as indicated below:

School of Medicine – ACUO Manager – extension 6-4365

Dental School - IACUC Chair – extension 6-7936

School of Pharmacy - IACUC Chair – extension 6-8295

Animal care committee approval is necessary for all purchases and use of vertebrate animals used in research at UM,B, and all investigators will be required to provide protocol approval numbers at the time of ordering animals and arranging for billing.

For all SOM IACUC issues, please see the Animal Care and Use Office (ACUO) website.

TRAINING FOR INVESTIGATORS AND STAFF

Training and education for investigators, research staff, technicians, and students is available through the Animal Care and Use Office and is provided in several ways.

PI Required Training by the IACUC

The Animal Care and Use Office (ACUO) requires all Principle Investigators (PI) that will work with animals to review the AALAS workbook entitled “Working with the IACUC: Writing an Animal Protocol” and complete the enclosed exam. The exam is returned to the ACUO, graded and a score of 84% minimum is required to be allowed to write and submit a protocol. If not, review with a staff member of the ACUO and retesting is required prior to acceptance or any submitted protocol for review. Copies of exams are kept on file by The ACUO, this serves as documentation of training on the subjects listed below.

The work book covers the basics of

- Federal mandates
- Protocol requirements
 1. Unnecessary duplication of studies.

2. The “Three R’s” Reduce, Replace, Refine
 3. Justification for use of animals/alternative consideration, species selection
 4. Alternatives to painful procedures
 5. Use of analgesics, anesthesia
 6. Endpoints
 7. Personal Training
 8. Euthanasia
- Occupational Health and Safety
 5. Use of Hazardous agents
 - Animal care
 1. Group housing for social animals
 2. Prolonged restraint
 3. NHP Enrichment.
 4. Food and water restriction
 5. Reporting of inappropriate animal use
 - Surgery
 1. Classification, major vs minor
 2. Surgery facilities (rodent vs covered sp.)
 3. Intra operative monitoring
 4. Post operative pain control
2. The Veterinary Resources Department (VR) of the School of Medicine provides a bi-yearly lecture on “The Basics of Animal Use in Research”. Dr. Ned Kriel presents a Power Point lecture covering the basic inception or regulatory laws, IACUC/AAALAC/AWA development. Regulatory bodies and their functions. Consideration of Alternatives to animal use prior to protocol submission, experimental plan to minimize animals used, experience or training required to use animals as per planned procedures. Consideration of painful/ distressing procedures and “designing a plan” (alternative procedure, analgesics even if animal “doesn’t appear painful” for surgery of any type) to reduce/control pain or eliminate either. Alternative endpoints as requirements for protocol approval. Euthanasia considerations for established or alternative endpoint occurrence.
 3. The VR department provides humane handling courses for all species of animal utilized in by investigators at the University of Maryland School of Medicine.
This training is offered multiple times yearly and on as needed basis to PIs or their staff (or new staff members) for additional information/ experience when working with specific species based on an IACUC approved training protocol. Drs. Kriel , Shipley and Kolappaswamy have provided these courses with document attendance.
This course provides

- Methods of identification and Regulatory requirements (IACUC and USDA as applicable)
 - Basic methods to confine, grasp and restrain respective species to reduce animal stress and protect the personal handling the animal
 - Administration methods of medications or test substances: PO, IM, SQ, IV and IP when appropriate.
 - Anesthetics: injectable and Inhalant. Selection based on procedure need not convenience for PI
 - Responsibility for DEA controlled anesthetics, scavenging of inhalant anesthetics.
 - Anesthesia monitoring to assure adequate levels to prevent pain until recovery.
 - Analgesic administration prior to end of anesthesia for recovery from painful procedures.
 - Blood collection by species
 - Aseptic consideration per species
 - Euthanasia methods and tissue collection.
4. Specialized training e.g.
- Rabbit Laparotomies
 - Rodent Telemetry implantation
 - Other specialized training such as footpad injections, ear punching, tail vein injections, terminal cardiac puncture in rodents as well as surgical and anesthesia training using larger species.

Investigator/Departmental IACUC Training

In addition to the required training, individual or departmental IACUC training is available upon request. Either the ACUO Manager and/or IACUC Chairman will present an introductory overview of the IACUC allowing ample time for questions and answers.

IACUC Resource Library

The ACUO maintains a resource library available to all University employees consisting of periodicals, regulatory guidance documents and regulatory conference proceedings/educational resources.

Baltimore Veteran Administration Medical Center (BVAMC):

Individual or group instruction is provided to new investigators, their research staff and visiting personal covering the procedures to be followed in the BVAMC animal facility. All VA investigators may take part in

classes on “Humane Handling and Use of Laboratory Animals” sponsored by the UMB Veterinary Resources staff. They include both wet lab and lecture portions designed to familiarize animal users with common techniques used in rodents and rabbits. (See SOM description for specific content information.)

Initial animal procedures by the investigative staff post training are monitored by Virginia Bohrer to provide assistance for: anesthesia, help researchers locate additional materials if needed and to validate additional training is not required.

Dr. Kriel and Veterinary Resources staff are available to train or consult with any research personnel unfamiliar with any techniques/equipment or anesthetics related to animal use in research protocols. These training sessions can be tailored for specific individuals or group staff as needed.

Personnel Training for Specific Procedures

Training of Staff involved with the use of hazardous agents in animals

Training for all staff is provided by the Environmental Health and Safety (EHS) office regarding hazardous agents. Specific training includes Blood Borne Pathogens, Radiation Safety, Chemical Safety, and Waste Management as well as specific 2-3 day courses in ABSL practices.

All animal care personnel and supervisory staff are trained by the facilities manager in the proper implementation of biohazard safeguards before working with animals exposed to hazardous agents.

Individual standard operating procedures are written and posted for each study using a hazardous agent. Special language, incorporating a synopsis of the SOP, is generated with each animal order and posted near the specified biohazard room. Monitoring of husbandry practices is conducted by the Veterinary Resources staff, Environmental Health and Safety, and the IACUC to assure the safeguards are being maintained.

The BVAMC Research Service conducts annual mandatory training classes in: laboratory safety, handling blood-borne pathogens and sharps disposal, animal facility procedures and safety, use of radioactivity, accident reporting, MSDS training, emergency procedures, and waste disposal. Attendance at these classes is required of all research personnel.

The PI of each IACUC approved protocol is responsible for training of their staff. Also, the qualifications and experience of the PI plus all proposed staff in the project are evaluated by the IACUC, EHS and for recombinant DNA

or select agents by the IBC. All PI carrying out hazardous procedures in animals are highly qualified doctoral level scientists with very specific expertise in the agent they are working with.

Educational program(s)-zoonoses:

The EHS website contains registration and training for the campus Occupational Health and Safety Program. This website is updated as needed to address common workplace issues. The program is also available to all new employees when they receive the campus orientation. All personnel entering the animal facilities must register on this site under ‘Animal Workers Risk Assessment’ and verify online that they have reviewed the document on zoonosis and personal hygiene. This serves as documentation of training.

Veterinary Resources conducts continuing Personnel Protective Equipment training for all new employees at the time of hire that will be working with macaques, and for all laboratories adding macaque work to their procedures. In addition, visiting scientists are trained on an as needed basis if they will be conducting work with macaques or macaque tissues. Veterinary Resources also provides zoonosis training in AALAS structured courses for the animal care staff. Documentation kept by Veterinary Resources. General hygiene practices are also covered in these courses.

An annual safety course (MARCE-Biodefence and Emerging Pathogens, EHS, CVD and Veterinary Resources) in the use of select agents is given on-campus which includes presentations on Animal Biosafety (ABSL) and research with zoonotic agents, as well as with naturally occurring agents. Documentation is kept by EHS.

The BVAMC Research Service conducts annual mandatory training classes in: laboratory safety, handling blood-borne pathogens and sharps disposal, animal facility procedures and safety, use of radioactivity, accident reporting, MSDS training, emergency procedures, and waste disposal. In addition, educational seminars are presented to janitorial and engineering staff to provide them with the information necessary for them to perform their duties safely in the animal facility. These seminars focus primarily on the BSL3 agents and have been presented by the respective laboratory directors.

Personnel performing surgery:

Individuals must have experience with the specific surgical procedure and in the species in which it will be performed. Training is often carried out by the principal investigator or other experienced persons in the laboratory.

Training is also provided by the veterinary staff. Most surgery in large animals is carried out by M.D.s who are highly experienced in the particular procedure. In cases where the IACUC is concerned about PI experience in the specific surgery they will require the PI to receive training from the veterinary surgeons in Veterinary Resources.

Personnel performing anesthesia:

Individuals must be experienced with the use of the particular anesthetic and the species in which it will be used. Training may be provided by the principal investigator or the veterinary staff, or carried out directly by Veterinary Resources.

Personnel carrying out euthanasia procedures:

Individuals must be experienced with the euthanasia procedure in the particular species. Training may be provided by the principal investigator or the veterinary staff.

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Institutional Animal Care and Use Committees Phone Numbers

School of Medicine

Chairperson

Larry D. Anderson, Ph.D.
Associate Professor of Anatomy
Department of Anatomy

x6-3989

Manager

Angela Peiser

x6-4365

FAX x6-4189

Dental School

Chairperson

x6-7936

School of Pharmacy

Chairperson

X6-8295

Guide to Drugs Commonly Used in Laboratory Animals

Please note:

The safe and effective use of any anesthetic agent requires knowledge and experience in anesthesiology. The veterinarians are available to help with choices of anesthetics, analgesics, or tranquilizers that are most appropriate for your needs.

The following dosage tables are provided to familiarize the reader with commonly used agents in laboratory animal medicine.

The dosages have been obtained from reliable texts, publications, or manufacturer's recommendations. These are accurate to the best of our knowledge and experience, but we claim no responsibility for any eventuality in use.

TRANQUILIZERS
(mg/kg except as noted)

Agent	Route	Cat	Chicken	Dog	Gerbil	Goat/ Sheep	Guinea Pig	Hamster	Mouse	Pig	Primate	Rabbit	Rat
Acetylpromazine maleate (Acepromazine)	IM	1.0-2.0		.5-1.0									
	IV	1.0-2.0		.5-1.0		.05-0.1	5-10		1-2	0.2-1.0	0.2-0.5	1.0	1.2
	PO	1.0-2.0		.5-1.0									
	SC	1.0-2.0		.5-1.0									
Diazepam (Valium) (DEA)	IM									2.0	0.5		
	IP				10								
	IV	0.5		0.5							0.5		
	PO	1.0		1.0									
Droperidol*	IM											0.5	
	IV											0.25	
Fentanyl citrate and Droperidol (Innovar-Vet) ml/kg (DEA)	IM			.075-.14			.08-.66			0.1		.15-.17	.13-.16
	IV			.075-.14									
Ketamine hydrochloride	IM	11								20-33	10-12	40	
Xylazine (Rompun)	IM	2		2**								2-4	
	IV	1		1		.22/.11							
	SC	2		2**								2-4	

DEA - requires Drug Enforcement Agency Registration Number to purchase

*Useful for bleeding rabbits due to peripheral vasodilation effect

**Causes emesis

ANALGESICS
(mg/kg except as noted)

Agent	Route	Cat	Chicken	Dog	Gerbil	Goat/ Sheep	Guinea Pig	Hamster	Mouse	Pig	Primate	Rabbit	Rat
Acetylsalicylic acid (Aspirin)	IP PO SC			25 Bid			86		120	10-20 Qid	25 Bid	100	100 20
Buprenorphine* (DEA)	IM IV SC	.005-.01 .005-.01 .005-.01		.01-.02 .01-.02 .01-.02		.005	.05 .05		.05-0.1	.05-0.1	.01-.03	.01-.05 .01-.05 .01-.05	.01-.05
Butorphanol tartrate (Torbugesic)	IM SC IV	0.2-0.4 0.2-0.4 0.1-0.2		0.1-0.4 0.1-0.4 0.1-0.2					1-5			0.1-0.5 0.1-0.5	2.0
Fentanyl (DEA)	IM IV									.02-.05 .02-.05			
Fentanyl citrate and Droperidol (Innovar-Vet) ml/kg (DEA)	IM IV			.075-.14 .075-.14			.08-.66					.15-.17	.13-.16

DEA - requires Drug Enforcement Agency Registration Number to purchase

*Most clinically useful for many species due to its long duration of action

ANALGESICS
(mg/kg except as noted)

Agent	Route	Cat	Chicken	Dog	Gerbil	Goat/ Sheep	Guinea Pig	Hamster	Mouse	Pig	Primate	Rabbit	Rat
Meperidine (Demerol) (DEA)	IM	3		5-10	2	2-10	10-20	2	10-20	4-10	2-4	10	10-20
	IP												
	IV	2		2								10	
	SC	2.2-4.4		5-10	2	2-10	10-20	2	10-20		2-4	10	10-20
Methyl morphine (Codeine) (DEA)	PO	1-2		2.2									
	SC			5									
Morphine sulfate (DEA)	IM	.01		2-4			2-5				1-2	2-5	
	IV			4							1-2	2	
	PO			11							1-2		
	SC	.01		2-4	1.5-4.5		2-5		2-5		1-2	2-5	2-5
Oxymorphone hydrochloride (Numorphan) (DEA)	IM	.1-.2		.1-.2						.15	.15		.25-.5
	IV	.1-.2		.1-.2						.075	.075		
	SC	.1-.2		.1-.2									
Pentazocine (Talwin) (DEA)	IM	2		2.2-3.3						1.5-3.0			
	IV	2										5	
	SC	2							10				10
Phenylbutazone (Butazolidin)	IP				100		150	100	150				
	IV					2.5				2.5		100	
	PO	20		20		4-8				10-20		30-100	
	SC								150				25-100

DEA - requires Drug Enforcement Agency Registration Number to purchase

INJECTABLE ANESTHETICS
(mg/kg except as noted)

Agent	Route	Cat	Chicken	Dog	Gerbil	Goat/ Sheep	Guinea Pig	Hamster	Mouse	Pig	Primate	Rabbit	Rat
Chloral Hydrate	IP IV				100-300		400	270-360	400			200	300-400 ^a 100-300
Chloropent ^b (mg/kg) (DEA)	IM IP		2.0-2.5										2.2-2.5

DEA - requires Drug Enforcement Agency Registration Number to purchase

^a Concentrated solutions (300 mg/ml) can cause adynamic ileus and death

^b Previously known as Equithesin. A 500 ml aqueous solution contains 21.3 gms chloral hydrate, 10.6 gms magnesium sulfate and 4.8 gms pentobarbital

INJECTABLE ANESTHETICS
(mg/kg except as noted)

Agent	Route	Cat	Chicken	Dog	Gerbil	Goat/ Sheep	Guinea Pig	Hamster	Mouse	Pig	Primate	Rabbit	Rat
Inactin (Malonyl-thioruea)	IP												80
Ketamine hydrochloride plus Acetylpromazine	IM	20-30			75	20	125	150	100	20-33	10-12	50	60-90
		.2-.5			3	0.1	5	5	2.5	1.0	.2-.5	1.0	1-2
Ketamine hydrochloride plus Xylazine	IM	15			50	11	40	200				50	40-80
		1			2	^c	5	10				5	5-10
Pentobarbital Sodium ^{d,f,g} (Nembutal) (DEA)	IP						30-40	50-90	40-60			30-40	30-50
	IV	30-35 ^e	30	30-35	35	30	30-45	30	40-70	20-30 ^e	25-30 ^e	20-45 ^e	10-50
Thiamylal Sodium (Surital) (DEA) ^d	IP								25-50			30-40	25-50
	IV	17.5 ^e		17.5	30	20-25	20	20	25-50	10 ^e	22-25 ^e	20-50 ^e	25-50
Thiopental ^d (Pentothal) (DEA)	IM						55						40
	IP				40		20-25	40	50			40	20-48
	IV	17.5 ^e		17.5	30	20-25	20	20	25-50	10 ^e	22-25 ^e	20-50 ^e	20
Tribromoethanol (Avertin)	IP								0.02ml/gm				

DEA - requires Drug Enforcement Agency Registration Number to purchase

^c Mixed with .22 mg/kg xylazine (goat) or .11 mg/kg xylazine (sheep)

^d Intravenous barbiturates are given to effect, also perivascular infiltration will result in slough of tissue

^e Often easier to immobilize with ketamine hydrochloride prior to intravenous administration

^f Prolonged anesthesia, hypothermia, narrow margin of safety with rodents

^g Maintenance with IV drip preferred to repeated bolusing

ANTICHOLINERGIC PREANESTHETICS
(mg/kg except as noted)

Agent	Route	Cat	Chicken	Dog	Gerbil	Goat/ Sheep	Guinea Pig	Hamster	Mouse	Pig	Primate	Rabbit	Rat
Atropine sulfate*	SC	.05		.05	.04		.05	.04	.04	.04	.05	0.2**	.05
	IM	.05		.05						.04	.05		
	IV												

* Generally administered 15-30 minutes prior to induction of anesthesia

** Effects may be unpredictable due to variable levels of atropinase

Inhalation Anesthetics

Isoflurane

All Species: Rapid induction, rapid recovery.

Rodents: Nose cone or bell jar generally used, can easily overdose by this open method;

Rabbits, Dogs, Cats, Primates, Sheep, Goats, Swine: Requires the use of an anesthesia machine with a precision vaporizer and endotracheal intubation. Method of choice for larger species.

Because of their hazardous potential all inhalant anesthetics should be used in such a way as to minimize their release into the work area. Anesthetic machines should be properly scavenged and bell jars or similar containers should only be used in properly ventilated hoods.

The use of **ether** for anesthesia or euthanasia is not normally permitted because of the risk of explosion and because of its irritating effects on animal respiratory passages. Investigators should use an alternate agent when scientifically possible. Use of ether requires appropriate justification and specific approval by the IACUC and adherence to safety procedures.

Anesthetics for Amphibia and Fish

Amphibia

Pentobarbital sodium	60 mg/kg SC in dorsal lymph sac
Hexobarbital	120 mg/kg SC in dorsal lymph sac
Ethanol	immersion in 10% solution
Tricaine Methanesulfate (MS 222)	immersion in solution containing 100 mg/L, maintain by moist cloth contact with solution, recovery at 22-26 ⁰ C, keep moist

Fish

Tricaine Methanesulfate (MS222)	immersion in solution containing 50-100 mg/L
Ketamine hydrochloride plus Xylazine hydrochloride	1:1 combination

Antimicrobial Drug Dosages for Common Laboratory Animals

Abbreviations used:

BW.....body weight	PO.....oral
sid....once a day	IM.....intramuscular
bid....twice a day	IV.....intravenous
tid....three times a day	IP....intraperitoneal
qid....four times a day	SC.....subcutaneous
q4h....every four hours	

MICE, RATS, GERBILS, HAMSTERS:

(The Biology & Medicine of Rabbits & Rodents - 4th Edition - Harkness & Wagner)

Ampicillin/Amoxicillin	6 mg/kg tid SC for 5 days
Enrofloxacin (Baytril)	5-10 mg/kg bid PO or IM <u>or</u> 50-200 mg/l drinking water for 14 days
Gentamicin	2-4 mg/kg q 8-24 h SC, IM - maintain hydration; nephrotoxic and ototoxic
Trimethoprim + Sulfadiazine	30 mg/kg bid PO

GUINEA PIGS: (4th edition - Harkness & Wagner)

Enrofloxacin (Baytril)	5-10 mg/kg bid PO or IM
Gentamicin	2-4 mg/kg q 8-24 h SC or IM - maintain hydration; albino guinea pig especially susceptible to nephro- and ototoxicity
Trimethoprim + Sulfadiazine	30 mg/kg bid

RABBITS: (4th edition Harkness & Wagner)

Ampicillin	6 mg/kg ml q 8 h SC for 5 days
Enrofloxacin (Baytril)	5-10 mg/kg body weight q 24 h for 5 days, IM or PO
Gentamicin	2 mg/kg bid, IM or IV

Metronidazole (Flagyl)	35-50 mg/kg/d PO (divided bid)
Trimethoprim + Sulfadiazine	0.2 ml/kg SC of 240 mg/ml solution, or 0.5 ml/kg sid PO of oral suspension

NON-HUMAN PRIMATES - (Formulary for Laboratory Animals - Hawk & Leary)

Amoxicillin	11 mg/kg bid PO or 11 mg/kg sid SC or IM
Enrofloxacin (Baytril)	5 mg/kg body weight q 24 h for 5 days, IM or PO
Gentamicin	2 mg/kg bid, IM or IV
Metronidazole (Flagyl)	35-50 mg/kg/d PO (divided bid)
Trimethoprim + Sulfadiazine	0.2 ml/kg SC of 240 mg/ml solution, or 0.5 ml/kg sid PO of oral suspension

DOG: (Current Veterinary Therapy - Kirk XIII)

Amoxicillin	10-20 mg/kg q 8-12 h IM, SC, PO
Cephalothin sodium (Keflin)	10-30 mg/kg q 4-8 h IV, IM
Cephalexin (Keflex)	10-30 mg/kg q 6-12 h PO
Clindamycin (Antirobe)	11 mg/kg q 12 h PO or 22 mg/kg q 24 h PO
Enrofloxacin (Baytril)	2.5-5 mg/kg q 12 h PO, IM or 5 mg/kg q 24 h PO, IM
Erythromycin	10-20 mg/kg q 8-12 h PO
Gentamicin	2-4 mg/kg q 6-8 h IV, IM, or SC or 6 mg/kg q 24 h
Penicillin G, procaine	20,000-40,000 u/kg q 12-24 h IM
Trimethoprim and sulfadiazine (Tribrissen)	15 mg/kg q 12 h IM, PO or 30 mg/kg q 12-24 h PO

CAT: (Kirk XIII)

Amoxicillin	10-20 mg/kg q 8-12 h IM, SC, PO
Cephalothin sodium	10-30 mg/kg q 4-8 h IV, IM
Cefadroxil (Cefa-Drops, Cefa-Tabs)	2
Clindamycin (Antirobe)	5.5 mg/kg q 12 h or 11 mg/kg q 24 h PO
Enrofloxacin (Baytril)	2.5-5 mg/kg q 12 h PO, IM or 5 mg/kg q 24 h PO, IM
Gentamicin	3 mg/kg q 8h IV; q 6 h IM, SC
Penicillin G, procaine	20,000-40,000 U/kg q 12-24 h IM
Trimethoprim + sulfadiazine (Tribrissen)	15 mg/kg q 12 h IM, PO or 30 mg/kg q 12-24 h PO

SWINE: (Current Veterinary Therapy 4 - Food Animal Practice - Howard)

Ampicillin	4-10 mg/kg IM or IV
Enrofloxacin	2.5 mg/kg q 24 h IM*
Erythromycin (Erythro-100-200)	2-5 mg/kg IM, SC
Oxytetracycline	6-11 mg/kg IV or IM 10-20 mg/kg q 6 h PO
Penicillin	
Pen G, procaine	40,000 units/kg q 24 h IM
Pen G + Pen benzathine	40,000 units/kg once
Tribrissen	30 mg/kg daily orally
Tylosin (Tylan)	2-4 mg/kg IM

*Leman - Diseases of Swine

Useful Web Links/References

AVMA Panel on Euthanasia

(<http://www.avma.org/resources/euthanasia.pdf>)

Institutional Animal Care and Use Committee Policies
and Procedures Manual

(<http://medschool.umaryland.edu/ors> -
click on IACUC, then IACUC Manual)

Good Laboratory Practices (FDA/EPA)

(<http://glpguru.com> and <http://glpguru.com/resources.html>)

Endangered Species Act/CITES

(<http://endangered.fws.gov/policies/index.html>)

ILAR

(<http://nationalacademies.org>)

Report of the ACLAM on Adequate Veterinary Care in Research, Testing and Teaching

(<http://aclam.org/adequate.html>)

Live Animals Regulations (IATA - International Air Transportation Association)

(<http://www.iata.org/cargo/live.htm>)

USDA and USPHIA Animal Importation Regulations

(<http://www.aphis.usda.gov/vs/sregs>)

Recombinant DNA Guidelines

(<http://www.nih.gov>)

Controlled Substances Act/DEA Regulations

(<http://www.usdoj.gov/dea/pubs/csa.htm>)

Federal Freedom of Information Act

(<http://www.foia.state.gov>)

Institutional Administrator=s Manual for Laboratory Animal Care and Use (OLAW/NIH)

(<http://grants.nih.gov/grants/olaw>)

Good Manufacturing Practices (FDA)

(<http://www.fda.gov/cdrh/devadice/32.html>)

Animal Welfare Act

(<http://www.aphis.usda.gov/ac/publications.html>)

USDA Animal and Plant Health Inspection Animal Care Policy Manual

(<http://www.aphis.usda.gov/ac/polmanpdf.html>)

Guide for the Care and Use of Laboratory Animals

(<http://www.aalas.org/education/publications/publications.htm>)

Public Health Service Policy on Humane Care and Use of Laboratory Animals

You can order a copy by e-mail OLAW@od.nih.gov

or download <http://grants.nih.gov/grants/olaw/references/phspol.htm>

ANIMAL CENSUS REPORTING SHEET

MONTH _____ ROOM _____ SPECIES _____

TECH _____ BEGINNING BALANCE _____

DAY	IN(+)	OUT(-)	DEAD(-)	INITIALS	COMMENTS
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
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21					
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23					
24					
25					
26					
27					
28					
29					
30					
31					

_____ INVESTIGATOR _____ DEPT _____ PHONE _____

AUTHORIZATION TO SET UP ANIMAL SERVICES CHARGE ACCOUNT

I authorize Veterinary Resources to set up a new Animal Services charge Account to be billed to the following FAS account for services rendered for the purchase and care of research animals and related technical services.

Principal Investigator: _____

Department: _____

Mailing Address: _____

Phone: _____ *Fax:* _____

E-mail: _____

New FAS Account: _____

Replace Account: _____

Begin using this account on: _____

Expire this account on: _____

Duration type of funds (contract, grant, revolving, etc.)

---- 1 year

---- 2 years

---- 3 years

---- 4 years

---- 5 years

Only one copy of the project billing charges will be sent to the department. Please indicate the appropriate person designated to receive this statement below:

Name: _____

Department & Address: _____

Approved signature authorizing account to be charged:

Administrator *Phone* _____ *Date* _____

Principle Investigator *Phone* _____ *Date* _____

Please keep a copy and forward to:

Nicole Paulinski
Veterinary Resources
G100 MSTF
phone: 6-1425 fax: 6-8538

UM, B
VETERINARY RESOURCES
TECHNICAL SERVICES REQUEST FORM

DATE _____

INVESTIGATOR _____

DEPARTMENT _____

PHONE _____

REQUEST SUBMITTED BY _____ (PLEASE PRINT)

AUTHORIZED SIGNATURE _____

D E S C R I P T I O N O F S E R V I C E

REQUESTED: _____

COMPLETION DATE REQUESTED _____

(PLEASE GIVE AT LEAST 24 HOURS NOTICE)

SPECIES _____ ROOM # _____

ANIMAL ID # _____

1 - Veterinary Resources Copy 2 - Requestor=s Copy