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I- INTRODUCTION

A- Purpose

The purpose of this handbook is to familiarize the reader with the:

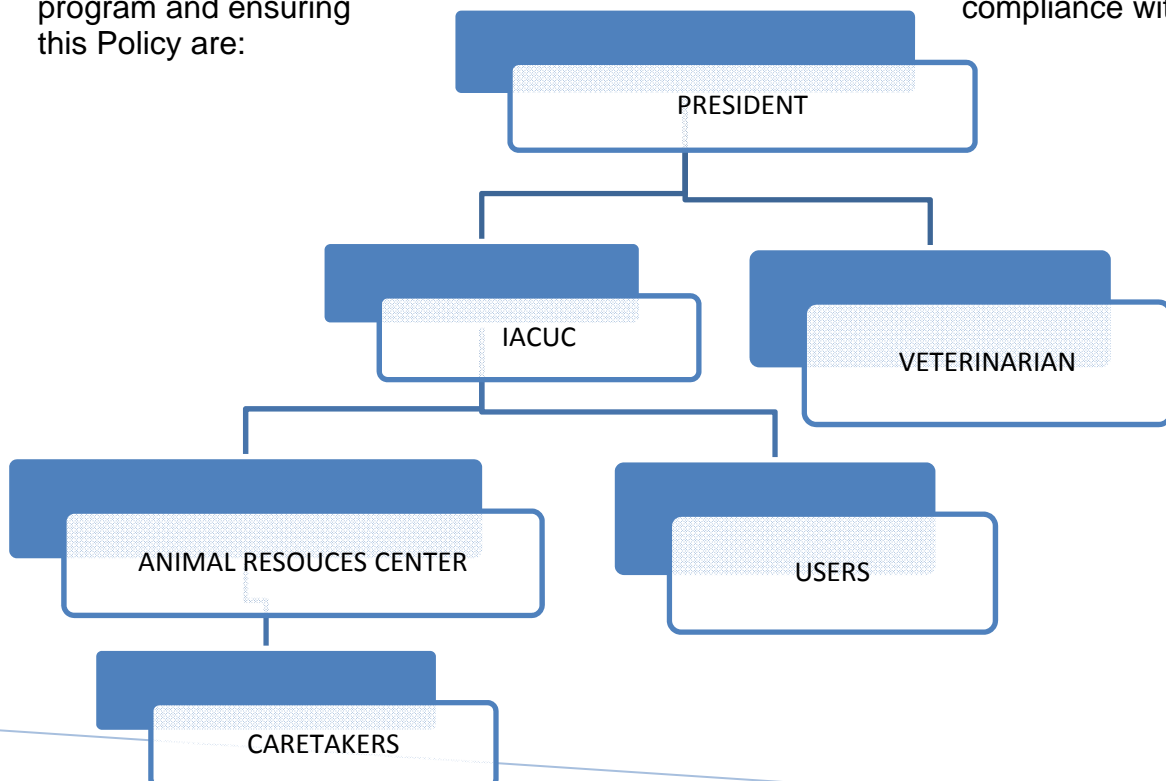
1. organization and function of the Animal Resources Center (ARC),
2. policies governing the use of laboratory animals in research and teaching at the Universidad Central del Caribe (UCC), and
3. services available at these facilities.

B- Description and Floor Plan

The UCC Animal Resources Center, located in the basement of the Basic Sciences Building, occupies 7,700 sq. ft. It provides housing for aquatic animals and small rodents. In addition, it is equipped with specialized areas for the following services: rooms for specific uses as stock and treatment, necropsy, quarantine, clean cages, bedding diet, cage washing, food and storage. The facilities also include an area for sterilization. There is also a space designated for an administrative office and storage of dead animals.

II- ORGANIZATION

A- The lines of authority and responsibility for administering the animal care program and ensuring compliance with this Policy are:



ANIMAL RESOURCES CENTER (ARC)

The Animal Resources Center is under the administration of the President of the University. The personnel of the unit consist of a supervisor, a part-time consulting veterinarian, and one full-time and one part-time animal caretaker. An Institutional Animal Care and Use Committee (IACUC) have been established to advise the President on matters concerning animal usage and care. The IACUC is composed of a representative from the basic sciences departments, a representative of the medical school research committee, a consulting veterinarian, a UCC student representative, and a representative of the community. The Institutional Committee is responsible for reviewing all research and teaching protocols that use live animals for compliance with NIH (National Health Institute) policies and the appropriate federal and commonwealth laws. Users of the ARC may express their needs, recommendations, or complaints to the Animal House Supervisor on routine affairs or to the IACUC on more formal matters.

B- Functions of ARC

The major functions of the Animal Resources Center are to care for the animals and provide information concerning the purchase, basic husbandry, quarantine, veterinary medical care of laboratory animals used in research and teaching programs of the Universidad Central del Caribe, as well technical assistance, advice, and consultation dealing with animals utilized for research programs by making readily available animal materials and products and animal husbandry supplies.

III- POLICIES, REGULATIONS, AND STANDARDS RELATING TO THE CARE AND USE OF LABORATORY ANIMALS

A. National Regulations

1. Animal Welfare Act

The Animal Welfare Act (AWA), Public Law 89-544, and its amendments regulate the transportation, purchase, sale, housing, care, handling, and treatment of animals used for research, testing or teaching, for exhibitions, and sold as pets. The Act specifically includes dogs, cats, nonhuman primates, guinea pigs, hamsters, rabbits, and any other warm-blooded animals that are being used or are intended to be used for research, testing, teaching, experimentation, exhibition purposes, or as pets. Specifically exempted from the AWA are birds, rats of the genus *Rattus*, mice of the genus *Mus*, horses and other farm animals used for food or livestock and poultry used for the improvement of animal nutrition, breeding, management,

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

The Institutional Animal Care and Use Committee must be composed of at least three members to include a veterinarian with special training in laboratory animal medicine/science, a person not affiliated with the institution other than by his/her committee membership, and a Chairman. This committee is responsible for review of all protocols using animals to ensure that they meet criteria listed in the AWA. In addition, the committee must conduct semiannual inspections of all animal study areas and animal facilities to ensure that the use of animals does not deviate from the approved protocol and the institution's program description. The importance of this requirement is underscored by the fact that the Chief Executive Officer of the Institution must certify that the attending veterinarian and the Institutional Animal Care and Use Committee have the authority to enter any animal area at any reasonable time.

The AWA is administered by the United States Department of Agriculture (USDA), specifically the Regulatory Enforcement and Animal Care (REAC) component of the Animal and Plant Health Inspection Service (APHIS). Research facilities are subject to unannounced inspections by USDA veterinarians and are required to furnish annual reports that include, in addition to other information and assurances, the common names and numbers of animals being used. These must be categorized by procedures; e.g., (a) no pain, distress or use of pain-relieving drugs; (b) pain or distress for which appropriate anesthetic, analgesic, or tranquilizing drugs were used appropriately during research and testing and that the principal investigator has considered alternatives to painful procedures.

Noncompliance with the USDA standards for the humane care, use, and transportation of animals may lead to substantial fines and/or suspension of animal research activities.

1. United States Department of Agriculture (USDA)

The UCC ARC is registered under the Animal Welfare Act as a Class R research facility with the certificate # 94-R-0009 and customer # 869.

2. *Public Health Service Policy on Humane Care and Use of Laboratory Animal* (NIH Policy)

<http://grants.nih.gov/grants/olaw/references/PHSPolicyLabAnimals.pdf>

The Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals incorporates the changes in the Public Health Service

Act (PHS Act) mandated by the Health Research Extension Act of 1985, Public Law 99-158. The PHS Policy requires that each institution receiving PHS funds for activities involving animals submit detailed information regarding the institution's program for the care and use of ALL live vertebrate animals to the Office of Laboratory Animal Welfare (OLAW). This information is in the form of an Animal Welfare Assurance, and it must be updated annually and completely revised every five years. Significant changes in existing Assurance status or significant problems encountered in implementing this policy must be reported immediately to the OLAW.

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

The Policy clearly defines the role and responsibilities of Institutional Animal Care and Use Committees in all aspects of PHS-supported research. The committee must be composed of at least five members to include an individual not affiliated with the institution, a veterinarian who has program responsibilities and 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 that the Institutional Animal Care and Use Committee review and approve those sections of PHS grant applications that relate to the care and use of animals before funds can be awarded. Institutions are required to conduct semiannual self-assessments of the program. Both major and minor deficiencies in the institution's program must be identified and it must adhere to an approved plan and schedule for correcting major deficiencies.

An institution's failure to comply with these policies may lead to various actions including the termination of support for all grants and contracts involving animals.

3. Guide for the Care and Use of Laboratory Animals

In 1963, NIH and the National Academy of Sciences Institute for Laboratory Resources (ILAR) published the first edition of the Guide for the Care and Use of Laboratory Animals (the Guide). The current Guide was revised in 1996. The purpose of the Guide is to assist institutions in caring for and using animals in ways judged to be scientifically, technically, and humanely appropriate. It is a long-standing National Institutes of Health (NIH) policy that grantees and contractors using live vertebrate animals in projects or activities supported by NIH should be guided by the recommendations in this publication.

4. *Policies of Various Granting Agencies*

Most granting agencies have established policies for the care and use of laboratory animals. Investigators should understand fully the requirements of each agency from which they seek funds. The Office of Grants Management or the office of the Institutional Animal Care and Use Committee may be contacted for specific information.

5. *American Veterinary Medical Association Guidelines on Euthanasia*

Methods of euthanasia recommended by the American Veterinary Medical Association (AVMA) Guidelines on Euthanasia (revised 2007) are accepted by both the PHS Policy and the Animal Welfare Act as standard methods of euthanasia.

http://www.avma.org/issues/animal_welfare/euthanasia.pdf

6. *Use of Controlled Substances*

Potentially addictive or habituating drugs for human or animal use are classified under federal and state law. Examples of controlled substances include barbiturates and narcotics. The Department of Justice, Drug Enforcement Administration (DEA), enforces this law and requires appropriate security and record management of these substances. If your need more information, please refer to Dr. Hector Maldonado, Pharmacology Department.

B- Local Regulations

1. *Department of Environmental and Natural Resources*

This governmental department of the Commonwealth of Puerto Rico is in charge of the implementation and formulation of public environmental policy and for the protection and conservation of the natural, environmental, and energy resources of Puerto Rico.

http://www.drna.gobierno.pr/biblioteca/reglamentos_folder/6765.pdf

C. Institutional

1. Committee

The PHS Policy and the Animal Welfare Act require the establishment of a committee, referred to by the generic name of Institutional Animal Care and Use Committee (IACUC), whose function is to ensure that the care and use of animals is appropriate and humane. The Institutional Animal Care and

Use Committee (IACUC) carry out the responsibilities of the IACUC at Universidad Central del Caribe.

Committee membership includes a Doctor of Veterinary Medicine with experience in laboratory animal science and medicine, an individual whose primary concerns are in a nonscientific area and who is not otherwise affiliated with the Institution (the "outside member"), and practicing scientists experienced in research involving animals. Members are appointed by the President of the Universidad Central del Caribe.

The committee meets at least twice a year (February and August) and is responsible for monitoring the Institution's animal care and use program, performing the semiannual inspection (February and August) of the Institution's animal use areas, and ensuring that there are no deviations from approved animal use protocols that adversely affect animal welfare. This committee is authorized to suspend an activity involving animals if it determines that the activity is not being conducted in accordance with applicable provisions of the Animal Welfare Act, the Guide, and the PHS Policy.

This committee also reviews and approves, requires modifications in, or withholds approval of all protocols related to the care and use of animals at the Universidad Central del Caribe.

2. Training Programs

All personnel are required to acquire training before working with animals. A variety of training programs are available to personnel who care for or use laboratory animals. Lectures based on the information in this handbook are offered as needed for all personnel who use animals in research. In addition, specie specific "hands-on" training is also available for personnel.

The ARC Animal Care Technicians participate in continuing education sessions as well as on-the-job training programs. Research technicians whose jobs involve animal care should participate in an in-house continuing education program.

3. Reporting Deficiencies in Animal Care and Treatment

Any complaints or concerns by a Universidad Central del Caribe employee regarding the care and use of laboratory animals at this Institution should be made to the Supervisor of the Animal Resources Center either verbally or in writing. If the complaint is directed against the ARC, the report should be made to the Chairman of the Institutional Animal Resources Center Advisory Committee (IACUC).

Confidentiality will be maintained upon request. The ARC Supervisor (or IACUC Chairman) will keep the individuals expressing concerns informed of the actions taken. The IACUC or the ARC Supervisor will conduct an initial

review of the concerns. After notification of the issue and discussion with the Chairman of the IACUC, the problem may be taken before the IACUC for full review. The person who is the subject of the complaint will be notified in writing of the concerns expressed and allowed to respond. The IACUC will maintain a file documenting the complaint, the review, and the actions taken to rectify any problem(s) identified.

IV- OPERATING RULES AND POLICIES

A- Use of the Facility

In general, most laboratory space and animal rooms within the ARC are for common use. Exclusive use of space within the animal facilities must have prior approval of the ARC supervisor and of the IACUC. Use of the facilities by non-institutional researchers must be recommended by the IACUC before consideration by the President of UCC.

Utilization of animals or facilities in any formal research and teaching protocol requires prior approval and authorization from the Institutional Animal Care and Use Committee (IACUC).

B- Hours of Operation

Personnel Work Schedules

Animal Caretakers

8:00 am - 12:00 - 1:00 – 4:30 pm Monday thru Friday
8:00 am - 1:00 p.m. Sundays

Supervisor

8:00 am – 4:30 p.m. Monday – Friday

C- Emergencies

Any abnormal situation observed or related at the animal facility should be notified immediately to:

Ms. Betzaida Torres (Supervisor)	787-798-3001 ext. 2096	(Office)
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	787-743-6189	(Home)
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Prof. Zilka Rios (Pres. IACUC)	787-798-3001 Ext. 2082	(Office)
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D- Security

Certain security measures have been implemented to protect faculty, staff, equipment, and the animals used in biomedical research at the Universidad Central del Caribe. Cooperation in enforcing these measures is essential.

During normal working hours (8:00 a.m. – 4:30 p.m.) access to the Animal Resource Center will be through the doorway marked “ENTRANCE” in the basement of the Basic Sciences Building. All other doors will be locked at all times. Animal rooms will be unlocked during normal working hours, except animal rooms containing radioactive, biohazard material or immunosuppressed animals, which must be locked at all times. Store rooms, labs, etc. will be kept locked except when in use.

In order to provide access to the Animal Resource Center to users during nonworking hours, two keys to the main entrance and the animal area will be given to each academic department. The security of this key will be the responsibility of the department chairman. Entrances into animal housing facilities are secured at all times by an electronic code system. All persons who require the use of the Security Access Code (See Appendix 1) must be listed on approved and active protocols. Research personnel are responsible for relocking the rooms. Loaning of keys requires ARC permission. Any person or activity in the animal facilities that appears inappropriate and/or suspicious should be reported immediately to the Animal Resources Center and/or to a UCC security officer.

All rooms within the Center will remain unlocked during nonworking hours except for the following special areas:

	Room #
* Food storage	014
* Stock & Treatment	015
* Clean cage & bedding	018
* Cage & rack washer	027
* Waste	031
* Quarantine	032
* Animal Room	016

Access to these special areas during nonworking hours must be requested in advance. During nonworking hours the security guard will also have access to the Animal Resources Center. Any user who enters the Center during nonworking hours must sign the register that will be located near the main entrance of UCC.

Students of the UCC School of Medicine that take elective courses must follow the rules established by the ARC and must have an identification card. Also the chairman of the department supervising the course is responsible for providing a list of the students that will need access to a particular area at least one week before the beginning of the course.

1-Security Cameras (See Policy Appendix #2, Pending approval)

2-Visitors

In an effort to protect research animals and minimize any possibility of disease transmission, visitors, curiosity seekers, including family members and especially children, are not allowed in Universidad Central del Caribe animal facilities without prior approval by the ARC Supervisor. Tours of Universidad Central del Caribe animal facilities are conducted by ARC personnel for interested groups.

3- Photographs or Videotapes of Animals

The use of animals in biomedical research is a very sensitive and emotional issue. Therefore, faculty members are urged to carefully consider all possible interpretations of pictures of research animals taken for documentation or publication. The ARC office is available to advise faculty in the development of photographic materials and to help review materials for subject matter that might be misinterpreted by the general public. Under no circumstances should photographic equipment be taken into the Universidad Central del Caribe animal facilities without the specific prior approval of the ARC Supervisor or/and Chairman of IACUC.

4-Inquiries Regarding Animal Use

Investigators and technicians should not attempt to answer questions from individuals outside the Universidad Central del Caribe regarding animal care and use at this Institution. All questions should be referred to the ARC Supervisor or/and the Chairman of the IACUC. The Office of the Associate Dean for Research will handle all inquiries from members of the media and will clear all interviews in advance with Universidad Central del Caribe faculty and staff. The ARC Supervisor should be informed of all such requests for information and, when possible, provided with the name, address, telephone number, and affiliation of the individual(s) making the inquiry.

5-Break-ins

Anyone discovering a break-in of animal housing or use areas should inform the ARC Supervisor immediately. The area should not be cleaned or otherwise disturbed until permission is received from individuals responsible for the investigation.

6-Radios, cellular, phones, mp3 players,

Many species can hear frequencies of sound that are inaudible to humans; hence equipment and materials that produce noise within the hearing range of nearby animals can have potential effects. For this reason, radios, cellular, phones, mp3 players, and any other generator of sound/frequencies should not be used unless they are part of an approved protocol or an enrichment program.

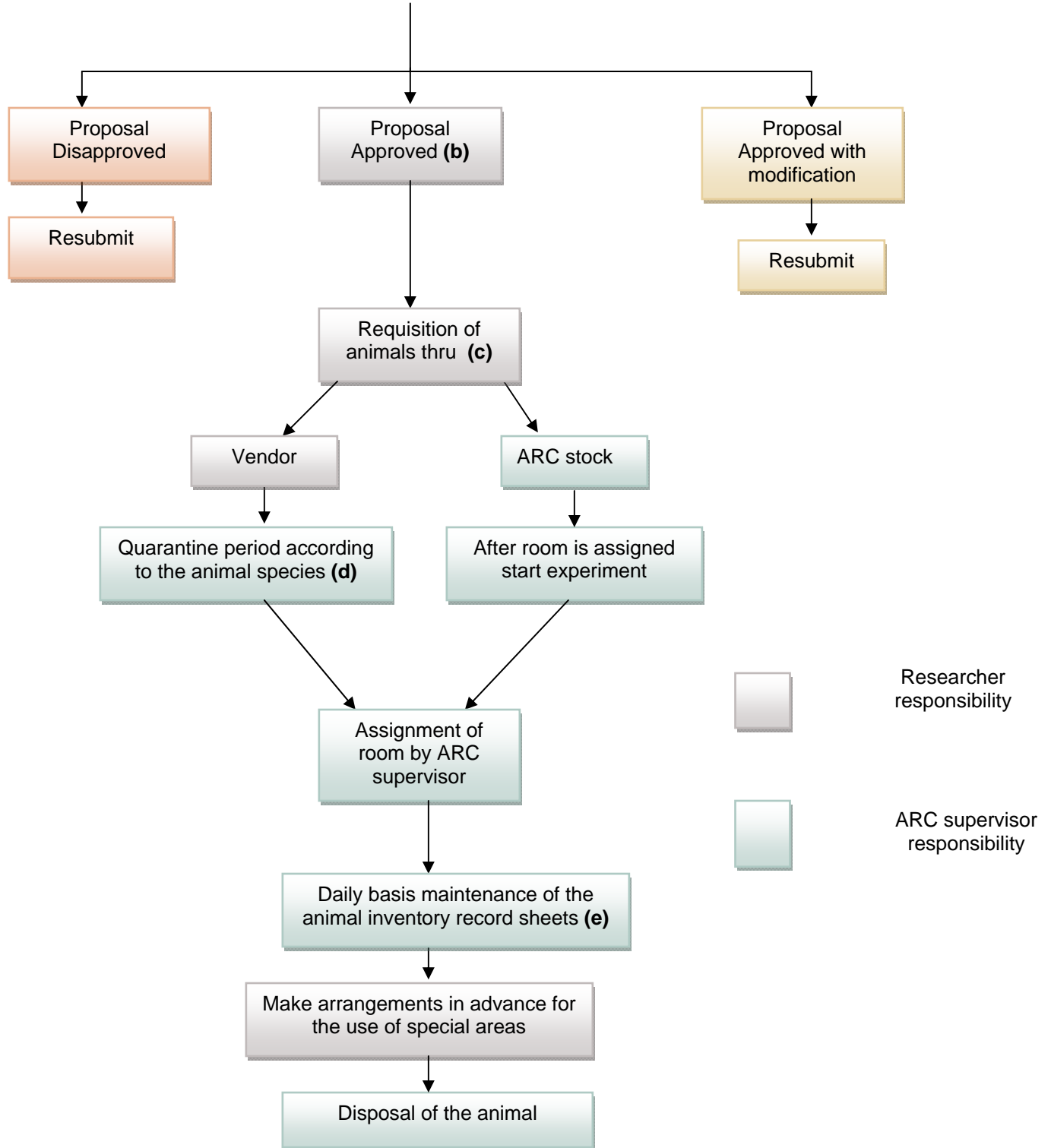
E- **Pets in Animal Facilities, Laboratories, or Offices**

Pets are not allowed in animal facilities, laboratories, or offices. Housing of animals covered by the Animal Welfare Act in offices and laboratories is closely scrutinized by the USDA.

F- Procedure for requesting service from the ARC

In order to receive services from the ARC it is necessary to complete the following procedure:

Submission of the Application for Protocol Approval involving Animal Laboratory Use to the Institutional Management Animal Laboratory Committee (IMALC) (a)



G- Removal of Animals from the Institution

Animals must not be removed from the institution without prior, specific permission from the ARC Supervisor.

H- Transportation of Animals within the Institution

In planning the route by which animals will be transported between laboratories and the animal housing areas or other laboratories, care should be taken to minimize time spent in public areas including hallways or lobbies. Passenger elevators are not to be used. The proper way to transport animals is in a plastic cage with metal lid. Animals should be concealed from the public during transportation in public corridors by placing a drape loosely over the cage. Call the ARC office or ask the area ARC supervisor for advice or assistance.

Only people authorized to handle animals may transport animals.

I- Animal Identification

The Animal Welfare Act (AWA) and the Guide require certain information on all animal cages for identification purposes. Cage cards or tags supplied by the ARC have been designed to satisfy these requirements. Research or other data may be placed on a second card in the holder behind the identification card. However, the completed ARC card must be visible on all animal cages at all times.

J- Record Keeping

Each investigator is responsible for maintaining records that document efforts to avoid animal pain and distress during the research procedure. These records must be maintained for three years after completion of the project and are subject to inspection by the USDA, NIH site visitors, and the IACUC. Records for individual experimental groups of rodents and other small animals should include the Animal Project Number and source of the animal; date of experimental procedure; procedure performed including Animal Project Number and person(s) performing procedure; pre-surgical drugs, anesthetics, and post-surgical care; illnesses or injuries; medical treatment during course of experiment; date of death or euthanasia; and disposition.

K- Experimental Procedures in Animal Housing Areas

Experimental procedures including euthanasia are not to be performed in occupied animal rooms unless justified for scientific or environmental control reasons and the investigator has obtained approval from ARC and/or the IACUC.

L- Animal Experimentation Involving Hazardous Agents

To protect the safety of animals and humans, the use of radioactive materials, hazardous biological, chemical, or physical agents must be approved by both the Radiation Safety, Biosafety, or Chemical Hazards Committee (as appropriate) and the IACUC. Animals exposed to hazardous agents must be clearly identified and housed in designated facilities; animal wastes and animal carcasses must be disposed of according to established protocols.

The selection of an animal biosafety level is influenced by several characteristics of the infectious agent, the most important of which are the severity of disease, the documented mode of transmission of the infectious agent, the availability of protective immunization or effective therapy, and the relative risk of exposure created by manipulation in handling the agent and caring for infected animals.

Animal experiments involving infectious agents of animal origin must be conducted with great care to avoid potential epizootic infection in the animal colonies. Caution also must be exercised when inoculating animals with biological material such as transplant tumors and tissue culture products that may contain infectious agents. Transplant tumors must be free of murine pathogens prior to inoculation in experimental rodents.

Facilities for housing animals exposed to biohazardous agents/organisms are available. However, arrangements for such special housing must be made with the ARC as far in advance of the study initiation as possible after consultation with the investigator, the ARC Supervisor, the IACUC, and the Biosafety Committee.

M- Waste Disposal

It will be disposed of in a safe and sanitary manner with a private company.

Hazardous wastes must be rendered safe by sterilization, decontamination, or other appropriate measures before disposal. The ARC will coordinate the disposal of animal wastes and carcasses. It is the investigator's responsibility, however, to ensure that the ARC is aware that biohazardous agents are being used. Animal carcasses generated in infectious disease research or recombinant DNA research are stored by placing a second red bag inside the first so that biohazardous material waste will be double bagged for disposal by a private company.

Radioactive animal waste must be packaged in opaque plastic bags with labels that include the activity of each radionuclide in the waste.

N- Blood Collection Techniques

Aseptic procedures should be used when collecting blood in all situations. Blood collection by cardiac puncture in any species or from the retro-orbital plexus in rats and mice should be performed only on anesthetized animals.

Consult the ARC veterinary staff for recommendations on the volume of blood and frequency of bleeding for each species.

<http://www.ahc.umn.edu/rar/BLOOD.HTML>

O- Animal Surgery

Guidelines for Selecting Species Appropriate Anesthetic, Analgesic, and Tranquilizing

<http://www.healthsystem.virginia.edu/internet/ccm/anesth/aneshome.cfm>

1. Pre- and Post-Surgical Care of Animals

The health status of all animals used for survival surgical procedures should be evaluated prior to surgery. The animal's cage should be tagged to withhold food and water overnight or longer as necessary depending upon the species and the procedure. The use of pre-surgical tranquilizers can reduce animal anxiety thus resulting in a much smoother, quieter induction and a reduced requirement for anesthetic agent.

The principal investigator is responsible for postoperative care of the animal with appropriate input from an ARC veterinarian. Immediate post-surgical care should include observing the animal to ensure uneventful recovery from anesthesia and surgery. The animal must be monitored and returned to the animal housing area until it regains sternal recumbency and is capable of holding its head up. Color and capillary refill time should be evaluated frequently.

Appropriate postoperative care for rodent species includes the administration of fluids, analgesics, and other drugs as indicated; clinical observations for signs of pain, abnormal behavior, appetite, and excretory functions; and providing care for surgical incisions.

2. Survival Surgery in Non-Rodent Mammals

Survival surgery is defined as any surgery from which the animal recovers consciousness for any period of time. Individuals performing survival surgical procedures must be knowledgeable about aseptic surgical techniques and have adequate training and skills to conduct the procedure without causing undue post-surgical distress to the animal. Aseptic techniques must be used for all survival surgical procedures.

The classification of "major" or "minor" for each proposed surgical procedure will be determined by the IACUC. The guidelines used by the committee to make this determination are described in the current edition of the Guide.

Minor survival surgery does not expose a body cavity and causes little or no physical impairments to the animal. Wound suturing, peripheral vessel

cannulation, pump implantation in subcutaneous tissue, etc. are examples of minor survival surgery.

Minor surgical procedures may be performed in a suitably located and equipped laboratory setting using appropriate aseptic technique. This includes a clean work area, preparation of the surgical site including clipping of the hair, disinfecting of the skin and draping of the surgical site with sterile drapes; the use of sterile supplies and instruments; and the use of sterile gloves and a surgical mask by the surgeon and any assistants working in the surgical field.

Major survival surgery penetrates and exposes a body cavity or produces substantial impairment of the animal's physical or physiologic functions. Laparotomy, thoracotomy, craniotomy, joint replacement, limb amputation, etc. are examples of major survival surgery.

3. Surgery in Rodents

All procedures on rodent species may be conducted in a laboratory. For major survival surgical procedures appropriate aseptic techniques including a clean work area; preparation of the surgical site including removal of the hair, disinfection of the skin and draping of the surgical site with sterile drapes; use of sterile supplies, instruments and suture materials; and use of sterile gloves and a surgical mask by the surgeon and any assistants working in the surgical field should be used.

4. Non-Survival Surgery

If the animal will not regain consciousness postoperatively, major surgical procedures on non-rodent species may be conducted in a suitably located and equipped laboratory.

5. Multiple Survival Surgeries

Multiple-survival surgical procedures on a single animal are discouraged. Under special circumstances, such as if the procedures are essential related components of the research projects, more than one major surgical procedure on a single animal may be permitted with the approval of the IACUC. Occasionally, unanticipated additional surgeries to correct complications that arise following the primary surgical procedures may be done so long as they are approved by an ARC veterinarian and do not cause an inordinate degree of pain or distress to the animal. Multiple-survival surgical procedures for teaching protocols are not to be done. Cost alone is not an adequate justification for performing multiple-survival surgical procedures on an animal.

P- Paralytic Agents

The use of paralytic agents is discouraged, particularly in surgical experimentation. It is recognized, however, that their use for certain applications has merit. If such agents must be used, written justification must be provided to the IACUC. Under no circumstances are paralytic agents to be used for surgery without appropriate anesthesia. The protocol must specifically note, in detail, how an appropriate level of anesthesia will be maintained throughout the time that the animal is under the influence of the paralytic agent.

Q- Prolonged Physical Restraint

Prolonged physical restraint may be stressful to the animal and should be avoided unless justified as essential to the research objectives. All physical restraint for periods longer than one hour must be specifically justified in the protocol for consideration and approval by the IACUC. Convenience alone is not adequate justification for the use of prolonged physical restraint.

When prolonged physical restraint is required, animals should be conditioned to the equipment by gradually increasing times of restraint until the required restraint time is reached. The period of restraint must be limited to the minimum required to accomplish the research objectives restraint. For each situation, the IACUC will make a determination regarding the intensity of the attention required. Attention must be given 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, prompt veterinary care must be provided. This may require temporary or permanent removal of the animal from the restraint device. If the health problem is considered serious by the ARC clinical veterinarian tending the animal, the well-being of the animal must take priority over the experimental objectives.

R- Immunization of Research Animals

Because there are diverse opinions and techniques associated with animal immunization, protocols that propose to use procedures contrary to the following policies will be considered by the IACUC upon receipt of written justification and documentation. If appropriate documentation is lacking, it may be necessary to conduct a study designed to provide appropriate documentation.

1. Complete Freund's adjuvant

Many of the classical adjuvants, especially Freund's Complete Adjuvant (FCA), cause local inflammation and often chronic pain. When draining skin granulomas form and tissue is sloughed, the antigen-adjuvant emulsion may be lost.

Laboratory personnel using FCA should be cautioned about inadvertent self-injection on needle tips. This results in painful and long-lasting inflammation in humans.

Use of alternate adjuvants which produce less detrimental side effects is strongly encouraged.

2. Post-Injection Care

Animals given aqueous solutions of antigens after sensitization should be observed for signs of anaphylactic shock. Appropriate treatment should be administered if an acute reaction occurs.

Inflammatory reactions at injection sites should be reported to an ARC veterinarian for examination and treatment if indicated.

S- Unavoidable Pain or Distress

Every effort must be made to avoid or minimize discomfort, distress, or pain to experimental animals, consistent with sound research design. Procedures that may cause more than momentary or slight pain or distress must be justified for scientific reasons in writing by the investigator. To minimize distress to the animals, the earliest possible end point to the study must be defined and used. Whenever possible, this should be prior to death of the animal. The protocol must justify and clearly state the end point to be used.

T- Euthanasia

The euthanasia guidelines provided by the ARC are based on recommendations of the American Veterinary Medical Association Guidelines on Euthanasia. Any deviations from these guidelines must be justified in writing and approved by the IACUC.

http://www.avma.org/issues/animal_welfare/euthanasia.pdf

U- Personnel Health Surveillance Program

All personnel working with animals must have evidence of a valid tetanus shot and any other specific requirements.

Any injuries should be promptly attended to and be reported to the Human Resources Office.

1- Animal Bites or Other Animal Related Injuries

In the event of an animal bite or other animal related injury, administer first aid and promptly report the injury to the ARC supervisor and your employer. Go to a clinic/hospital if additional treatment is necessary. Complete the "Workers Compensation Worksheet for First Report of Injury" form and submit it to the designated person. Also, contact the Human Resources Office of the Universidad Central del Caribe

V- Humane Methods of Animal Maintenance and Experimentation

Animal Resources Center at Universidad Central del Caribe is based on the US Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research and Training, the recommendations of the Guide for the Care and Use of Laboratory Animals, and the requirements of the Animal Welfare Act and its amendments.

A. Animal Care

Animals are housed in cages designed to provide a physical and social environment that contributes to the well-being of the animals while minimizing variables that can modify an animal's response during experimentation. Environmental factors such as temperature and humidity ranges, air exchange rates, lighting, and noise levels are considered in housing the various species. Palatable, uncontaminated, and nutritionally adequate food and fresh, potable, uncontaminated drinking water are provided to meet the particular requirements of each species. Bedding, if used, is absorbent and free of toxic chemicals. Cage and equipment-cleaning schedules and methods are designed to keep animals clean and dry and eliminate pathogenic organisms while providing minimal interference with normal physiological requirements of each species.

The veterinary care program consists of observing all animals to assess their health and welfare using appropriate methods to prevent, control, diagnose, and treat diseases and injuries; providing guidance to users regarding handling, immobilization, anesthesia, analgesia, and euthanasia; and monitoring surgery programs and post-surgical care.

Personnel caring for animals are trained by the ARC supervisor in laboratory animal husbandry through formal courses and closely supervised on-the-job experience. They are taught to detect and report variations in normal function or behavior of the animals. Personnel learn to handle the animals in a calm, confident manner that minimizes stress and ensures the safety of both the handler and the animal.

B. Animal Experimentation

It is the responsibility of any investigator using animals in research to ensure that he/she and their employees, both professional and technical, know how to handle and care properly for the species being used. They also should be knowledgeable about the animal model and the techniques used. The veterinary staff should be consulted if there are any questions. In addition, information regarding the basic needs of each species is readily available from reference sources in the Animal Resources Center library. Investigators should try whenever possible to reduce the number of animals used, refine techniques to minimize pain or distress suffered, and replace animals with alternative or adjunctive methods.

1. Reduction - The numbers of animals used in research can be reduced in a variety of ways.

- * Literature Review

No experiment using animals should be performed without a thorough review of the literature to eliminate the possibility of needless repetition and to determine the most appropriate model to answer a particular research question. Through the inter-library loan system, the Universidad Central del Caribe library has access to literature concerning all aspects of animal experimentation or electronic methods. Specific information may be sought using a variety of databases including AGRICOLA which is maintained by the National Agricultural Library.

- * Use Based on Requirements to Achieve Statistical Significance

All experiments should be planned to provide sufficient data points to determine statistical significance. Using insufficient numbers of animals may require a repetition of the experiment and, therefore, may be as undesirable as using too many animals.

- * Disease-Free Animals

While the cost of disease-free animals, sometimes called SPF (Specific Pathogen Free), is high initially, the long-term benefits of using such animals usually far outweigh the initial cost.

- * Sharing Animals or Tissues

In some cases, the organs, tissues, etc., may be commercially available. Several investigators sharing the organs of a single animal reduces the number of animals necessary and the cost of the investigation.

2. Refinement

Whenever possible, investigators should design experiments so that death is not the end point. Minor modifications of the approach to the experimental problem may allow euthanasia of an animal before it suffers significant discomfort or anxiety. Along the same lines, when passing tumors or growing tumors *in vivo*, efforts should be made to collect tissues or evaluate effects prior to the time that the animal is incapacitated.

Anesthetic, analgesic, or tranquilizing agents should be administered for any procedure potentially causing more than minimal pain or distress to the animal; exceptions must be justified and approved by the IACUC. The principal investigator should be alert to, and recognize signs of pain or

distress in the animal he/she is working. Changes in dietary or grooming habits or changes in body temperament may indicate that an animal is in pain or distress. If the investigator or research technician has any questions or needs assistance, an ARC Veterinarian should be consulted.

3. Replacement

* Teaching New Techniques

New techniques should be demonstrated or practiced on models or cadavers. Videotapes and slide-tape presentations should be developed and used as much as possible in training programs.

* Alternative or Adjunctive Methods

While an intact biological system may be required to answer some research questions, tissue culture, or other *in vitro* techniques, including computer or mathematical modeling may provide satisfactory alternative or adjunctive methods.

VI. ANIMAL RESOURCES CENTER (ARC)

The Animal Resources Center (ARC) is responsible for establishing and providing appropriate facilities for the care and use of animals; professional and technical expertise, consultation and service in all phases of laboratory animal care and use; health care programs for laboratory animals, including diagnostic services; and continuing education in the care and use of animals by ARC staff.

A. Veterinarians and Staff

The veterinarian provides expertise in the biology, diseases, and pathology of laboratory animals and techniques associated with the use of these animals in research.

B. Organization

The ARC is a research and academic service area responsible to the President of Universidad Central del Caribe through the Chairman of IACUC.

The Supervisor of the ARC coordinates and directs operations of animal health programs, animal care programs, business operations, and teaching programs. The Supervisor organizes and directs the daily operation of the animal facilities. The Supervisor also assists in planning facility renovations, training technicians and evaluating services coordinates the daily operation in the ARC, orders animals and supplies, provide reports about animal usage, animal care, supplies, as well as requested assistance. Moreover, other issues relating to the finances of the ARC and communications between the ARC and other departments within the Universidad Central del Caribe are directed from the administrative offices.

C. Description of Facilities

The animal resources facilities consist of approximately 7,700 square feet of animal housing and support areas located on the same floor. Specialized space includes: cage washing areas, autoclave areas, food storage, bedding storage, diet kitchens, stock and treatment, necropsy rooms, animal yard moat.

D. Animal Procurement

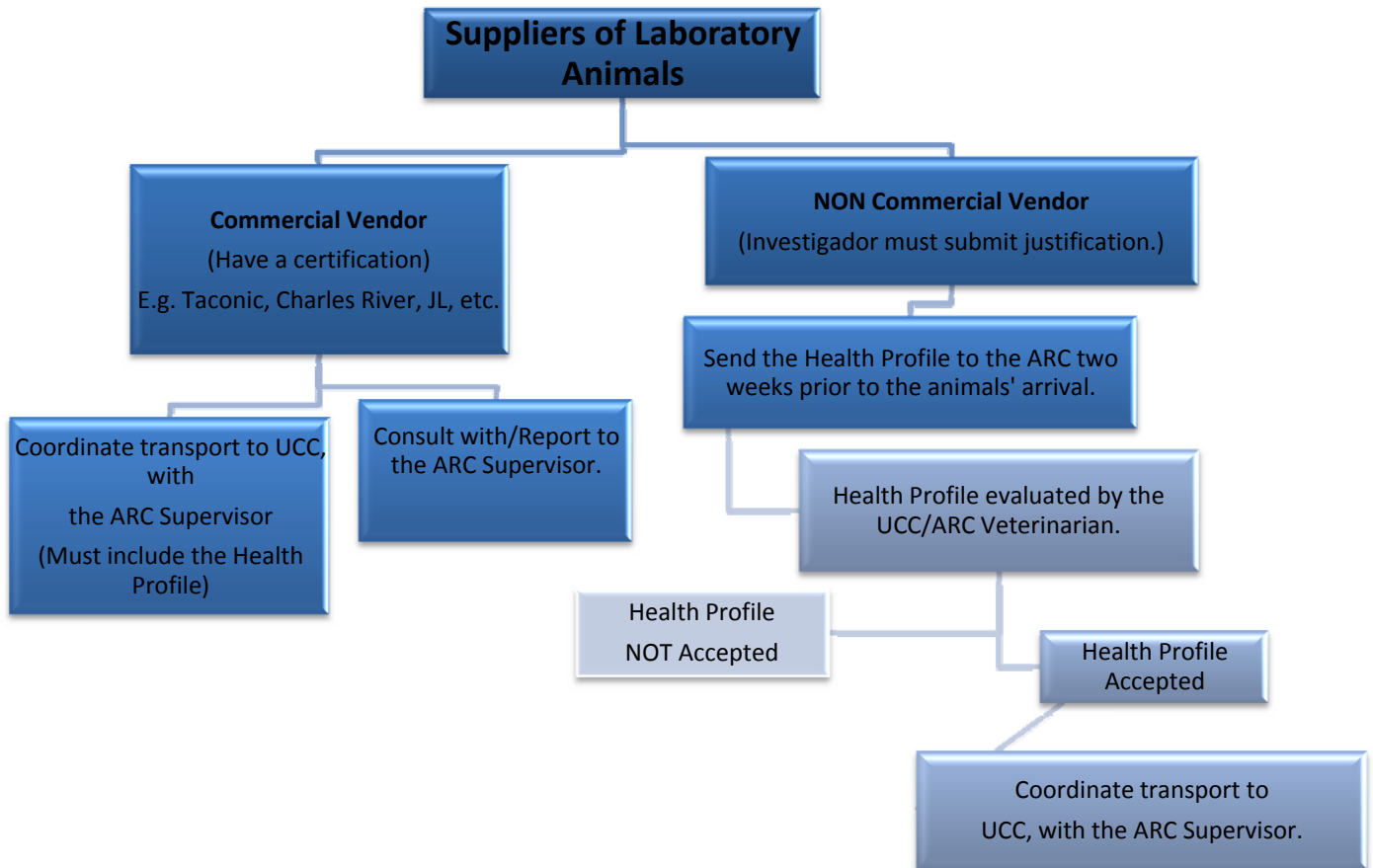
The researcher must process all animal orders through the purchasing department. Before ordering animals, the researcher must inform the ARC supervisor to ensure there is adequate space to house the animals and for the selection of the vendor. After ordering, the researcher must coordinate with the ARC supervisor for the arrival of the animals. Animals are generally not shipped after Wednesday of each week so they will not arrive on a weekend.

1. Ordering

All research and teaching protocols that use animals must be submitted to the Institutional Animal Care and Use Animals Committee for approval. After approval, the original should be given to the Animal Resources Center supervisor with a copy sent to the researcher requesting the permit.

Steps to follow when choosing a supplier for laboratory animals:

Note: The following are the main investigator's responsibilities when considering a supplier for laboratory animals.



2. Receiving

Animals are received at the ARC by the Supervisor or a delegate and checked for order specifications and any obvious signs of illness. The animals are then identified in an appropriate manner. The Supervisor ensures that the animals are housed in the appropriate animal room and notifies the investigator of the animal's arrival and location. If by mistake, animals are delivered directly to an investigator and bypass receiving procedures, ARC should be notified immediately. If an investigator requires animals to be delivered directly to a laboratory for immediate use, the requirement should be noted on the purchase requisition.

In order to reduce introduction of disease to research colonies the animal facilities maintains a quarantine system. All rodents (rats and mice) are isolated for a period of 48 hours minimum, if they are from a well known vendor. All animals are segregated by shipments and by origin (vendor). Daily observations are made for signs of disease and extension of the isolation period may be made necessary. If diseases are observed in these animals, the investigator is notified and appropriate arrangements made. Upon satisfactory completion of the quarantine period, the animals are moved to colony rooms for long term housing. Colony housing is accomplished by segregating animals by species and by origin (vendor).

3. Shipping

All shipments of animals to other institutions, regardless of whether or not they are to be returned, must be coordinated through the ARC to ensure that the necessary Health Certificates required are obtained. ARC personnel will assist in making the necessary shipping arrangements.

4. Sources of Animals

The ARC staff is knowledgeable regarding the sources and availability of animals for use in research and should be consulted especially if special strains are required.

The ARC receives periodic health assessment reports for laboratory animals available from various sources. Recommendations regarding use of these animals are made based on their health status. A request to obtain animals from an unapproved vendor must be approved by an ARC clinical veterinarian.

- Commercial Vendors

Commercial vendors, selected based on consistent good health of their animals and on dependable delivery and service, are used most frequently as a source of research animals. Animals generally not considered acceptable or with limited acceptability due to known disease problems may be purchased if required for a particular study,

however, the investigator must realize that these animals will have to be housed and handled in such a way that they do not jeopardize the health of any other animals or humans.

- Other Institutions

The ARC must be notified if animals are to be acquired from other institutions. The ARC veterinarian will need information about the health status of these animals so that they may be shipped and housed in a manner that protects them from infection and prevents infection of resident animals.

E. Animal Care

1. Routine Animal Care

ARC personnel check all animals daily, including weekends and holidays, to ensure that adequate food and water are available. Rooms are cleaned monthly. Cages are changed on a regular basis depending upon the animal species.

Each day, the Animal Care Technicians tag cages containing sick animals and removes any animals that died overnight. The reports of sick and dead animals are submitted daily to the ARC Supervisor for further action.

2. Special Care Requirements

Animals receiving special care (i.e., special diet, fasting, etc.) are identified through tags or labels attached to the animal's cage. A supply of these tags is available from the ARC Supervisor. Care should be taken to select the most appropriate tag and complete it properly prior to attaching it to the animal's cage.

Other special requirements such as altered lighting cycles or temperature, isolation, etc. or special care for large groups of animals may be arranged with the ARC supervisor.

3. Standard and Special Diets

Standard dry diets are fed ad libitum in self-feeders to all rodents unless otherwise specified. The ARC provides special diets, but ARC personnel can assist investigators in locating sources for them. Dietary supplements are provided when necessitated by disease problems or dietary requirements.

4. Environmental Control

Each animal room has fresh air (i.e., non-recirculated air). Relative humidity and temperature are periodically monitored as appropriate. All rooms are on individual time-controlled lighting systems set for 12 hours dark (6PM-6AM) and 12 hours light (6AM-6PM) unless deviations are required by the research protocol.

To assure USDA and Guide standards are met, animals should be housed only in facilities approved by ARC. Housing animals in laboratories for periods longer than 12 hours must be approved by the IACUC.

5. Vermin Control

A private company comes to the ARC monthly to perform vermin control. Animal rooms, bedding room, and food room are not treated.

6. Disposition of Carcasses or Animal Wastes

After ensuring that the animal is dead, the carcass should be placed in a plastic bag and stored in the freezer. Radioactive carcasses and animal wastes should be bagged in the same manner and placed in the Radiation Safety freezers. Final disposal is by a private company.

7. Other Support Services

ARC personnel are trained to provide a variety of specialized animal care support functions including establishment and maintenance of animal breeding colonies. Call the ARC office for information or assistance.

8. Per Diem Charges

The ARC must recover costs for the care of animals housed within its facilities through per diem rates charged to investigators for the care of their research animals. These rates are established through a cost analysis performed according to guidelines established by the NIH. Rates are implemented only after review and approval by the budget office, IACUC and the Universidad Central del Caribe administration. Faculty members applying for grants may contact the ARC Director to obtain information concerning any anticipated increases.

The researcher should consult with the ARC supervisor about estimated animal costs before submitting a grant application.

F. Animal Health

1. Routine Health Care

The veterinarians with assistance of the animal health technologists (AHT) perform preliminary physical examinations as needed. Animals are treated only after approval by the investigator, except in emergency situations.

2. Emergency Health Care

If the individual(s) designated by the principal investigator as emergency contact(s) can not be reached within a reasonable length of time, an ARC veterinarian will provide supportive care according to his/her professional judgment. In the event the animal must be euthanatized, every effort will be made to save tissues needed for the research protocol. The investigator or his designee will be notified as soon as possible of any action taken.

3. Reporting Sick Animals

An animal observed to be ill or exhibiting abnormal behavior should be reported to the ARC as soon as possible so that it may be examined by a veterinarian. Inconsistent laboratory results of experimental animals may suggest an underlying disease problem in the research animals used. If all other possibilities for the inconsistencies have been eliminated, please consult with the ARC veterinary staff for assistance.

4. Quarantine Procedures

As determined by a clinical veterinarian, animals will be quarantined upon arrival at Universidad Central del Caribe for a period dependent upon the species, source, and health status.

5. Zoonotic Disease

When people handle animals, the potential always exists for contracting zoonotic diseases such as leptospirosis, toxoplasmosis, or LCM (lymphocytic choriomeningitis); however, this potential can be almost eliminated by purchasing only disease-free animals from reliable vendors and by practicing good hygiene.

G. Diagnostic Laboratory and Necropsy

The ARC or veterinarians may recommend the diagnostic laboratory procedures and necropsy analysis.

H. Billing Procedure

The ARC must recover its operating costs from charges for services rendered. Charges for services, assistance, supplies, and/or animal care are itemized on a monthly bill submitted to each investigator.

VII. Grant and Manuscript Preparation

A. Preparing NIH Grant Applications

The Public Health Service Policy requires that the use of all vertebrate animals in research be governed by the Principles for Use of Animals and also, in the case of warm-blooded vertebrates, the Guide for the Care and Use of Laboratory Animals. No PHS award involving the use of animals is made unless an Assurance (see Section I.A.2.) has been approved by the Office for Protection from Research Risks (OLAW).

Several sections of the application require information about the proposed animal use. Failure to supply the requested information may delay consideration or jeopardize funding. These sections are:

1. Face Page - 5. Vertebrate Animals: Indicate the IACUC (IACUC) approval date. Enter "pending" if IACUC review is delayed beyond the submission date of the application. The UCC Animal Welfare Assurance Number is A3566-01.
2. Page 4 - Supplies: State the number of animals to be used, their unit purchase cost (actual cost of animal + shipping + box charges), and their unit care cost.
3. Page 5 - Supplies: Include the full initial cost of the animals and an inflationary increase of 4-10% per year for each succeeding year. Although 4% inflation is the maximum allowed on most grants, higher rates may be accepted if it can be documented.
5. Research Plan - F. Vertebrate Animals: Provide a detailed description of the proposed use of the animals in the work outlined in the experimental design and methods section. Identify the species, strain, ages, sex, and numbers of animals to be used.
6. Justify the use of vertebrate animals, the choice of species, and numbers used. If the animals are in short supply, costly, or to be used in large numbers, provide a specific rationale for their selection and their numbers.
7. Describe the procedures for adequate maintenance and veterinary care of the animals involved. Reviewers will wish to know if the living conditions of animals will be appropriate for the species and contribute to their health and comfort and if medical care for animals will be available and provided as necessary by a qualified veterinarian. The following general statement may be used if the proposed work will necessitate no special care. "Housing and day-to-day care for the animals are

consistent with the standards of the Guide for the Care and Use of Laboratory Animals and the Animal Welfare Act. All animals are observed daily and appropriate veterinary care provided by the veterinary medical staff of the Animal Resources Center. This staff consists of veterinarians with training and experience in laboratory animal medicine and science and technician.”

8. Describe the procedures to avoid unnecessary discomfort, pain, or injury to the animals. Reviewers will specifically try to determine that procedures will avoid or minimize discomfort, distress and pain to the animals, consistent with sound research design; procedures that may cause more than momentary or slight pain or distress to the animals will be performed with appropriate sedation, analgesia, or anesthesia, unless the procedure is justified for scientific reasons by the investigator; personnel conducting procedures are qualified and trained in those procedures; and that animals that would otherwise experience severe or chronic pain or distress that cannot be relieved will be painlessly sacrificed at the end of the procedure or, if appropriate, the procedure.

9. Describe methods of euthanasia to be used and reasons for selection. Justification based on scientific reasons must be provided if methods of euthanasia used are not consistent with the recommendations of the American Veterinary Medical Association Panel on Euthanasia

B. UCC Application for Use of Animal Subjects Form

Investigators are urged to submit the Application for Use of Animal Subjects forms 2 months prior to the grant deadline to ensure no delays in approval and subsequent notification of the granting agency. Lack of timely receipt by NIH of the verification of approval can delay consideration and jeopardize funding. It is the investigator's responsibility to submit a completed Application for Use of Animal Subjects Form to the Institutional Animal Care and Use Committee (IACUC), Prof. Zilka Ríos, Basic Science Building, Microbiology Department, second floor for each new proposal, competitive renewal, modification of ongoing grant, grant supplement, or noncompetitive continuation involving animals, regardless of funding source; any pilot project and modifications in approved animal use protocols; and any educational project in which vertebrate animals are used. Protocols using vertebrate animals must be approved prior to beginning the project.

Submit the original of the completed “Application for Protocol Approval Involving Laboratory Animal Use” (*Protocol*) (no handwriting) directly to the Chairman of IACUC. The investigator will be notified in writing of the decision of the IACUC. Upon approval, one copy of the Protocol will be filed in the Chairman of IACUC office and the other copy to ARC office. Appropriate notification will be provided to Office of Grants Management and the granting agency. The assigned Identification Number must be indicated on all orders for animals to be used on that protocol.

IACUC approval is valid for three year only. The protocol modifications will be notified using the “Approved Protocol Modification Application”. Approximately one month prior to a project's approval expiration, the IACUC office will mail out annual

renewal notifications. It is the investigator's responsibility, however, to assure all ongoing projects are submitted for annual review.

C. Manuscript Preparation

Publications of work based on animal studies should provide a complete and accurate description of the animals used including common name; genus and species; strain, stock, or breed; source; age and/or weight; sex; method of identification; and microbiologic status. The animals' environment - kind of caging; room temperature, humidity, ventilation, and lighting; diet and water; and husbandry routines - should be defined for duplication of experimental results. Other information that should be provided includes time of sampling; where and how the samples were obtained; all drugs and dosages used; and the euthanasia method employed.

VIII- GLOSSARY

1. Necropsy - an examination of a dead body; postmortem.
2. Quarantine- is the separation of newly received animals from those already in the facility until the health and possibly the microbial status of the newly received animals have been determined.
3. Euthanasia is the act of killing animals by methods that induce rapid unconsciousness and death without pain or distress.
4. Carcass-the dead body of an animal, often specific of a slaughtered animal dressed as meat.
5. Recumbency It may be preferable to keep these foals confined in sternal recumbency on a soft mat for as long as possible.
6. Laparotomy-a surgical incision into the abdomen.
7. Thoracotomy-surgical incision into the thorax.
8. Craniotomy-the surgical operation of opening the skull.
9. Contusion-a bruise; injury in which the skin is not broken.
10. Freund's adjuvant- a substance consisting of killed microorganisms, such as mycobacteria, in an oil and water emulsion that is administered to induce and enhance the formation of antibodies.
11. Animal Yard Moat- indoor yard

IX-

**Appendix
I
Security Access Code**

Universidad Central del Caribe
Animal Resources Center
And
Institutional Animal Care & Use Committee
(IACUC)

Animal Resources Center Users

Ref: Installation of an Electronic Lock

In a visit to the Animal Resources Center carried out by different agencies, they recommended that access control be established for the facilities for the purpose of increasing security for animals, personnel, equipment, and the Center's structure.

The Institutional Animal Care & Use Committee (IACUC), in a meeting on January 19, 2001, recommended the purchase of an electronic lock.

This electronic lock will be installed on door #241. This door provides access to the animal rooms, the laboratory, and the Center's warehouse. This particular model works through a code system.

Starting April 18, 2001, this system will be put into effect every day 24 hours a day.

The established regulations for the security system are detailed below:

- A different code will only be given to each authorized personnel member. This code will be considered confidential.

- Authorized personnel will be identified as those specified and approved in the current Application for Protocol Approval Involving Animal Laboratory Use, and any changes should be notified and approved in the Update Approved Protocol Application; IACUC members; Animal Resources Center employees; personnel authorized by their director to take samples from the existing freezers in the area.

- The Center Supervisor must be informed of any visits beforehand.

- Maintenance personnel for air conditioners, elevators, etc. must use door #035. Should they need to use door #241, the Center Supervisor must be contacted.

- The security code may be changed in accordance with the existing needs. Any changes will be notified beforehand.

- In case of a tropical storm or hurricane warning, as well as warnings for other adverse weather conditions, the system will become and remain inactive until conditions return to normal.

- If any personnel member transfers his/her code, admittance to the Center may be revoked at the discretion of IACUC members.

All recommendations should be submitted in writing and directed to Prof. Zilka Ríos (zrios@uccaribe.edu) or Betzaida Torres (btorres@uccaribe.edu).

**Appendix
II**

Security Cameras
(Pending approval)