



Division of Research

SUBJECT: Anesthesia, Surgeries and Analgesia	Effective Date: 4/3/2020	Policy Number: 10.4.6	
	Supersedes: 8/31/2018 11/17/2017 9/29/2017 8/25/2017 9/1/2014 7/30/2004	Page 1	Of 6
	Responsible Authorities: Vice President, Research Institutional Animal Care and Use Committee Assistant Vice President for Research, Research Integrity Assistant Vice President for Research, Comparative Medicine		

- I. Background
Public Health Policy (PHS), the Guide for the Care and Use of Laboratory Animals (the *Guide*) and the Animal Welfare Regulations (AWR) require IACUC's to provide appropriate oversight for any anesthetic and surgical procedure performed in laboratory animals. This includes but is not limited to review of protocols describing anesthesia, surgical procedures, inspection of areas where surgical procedures are performed including pre- and post-operative care areas, appropriate training of personnel who perform anesthetic and surgical procedures and are responsible for peri-operative care as well as regular evaluation of anticipated and non-anticipated outcomes of surgical procedures in all vertebrate research animals included in the animal care and use program at FAU.

- II. Purpose
To establish a policy that will provide guidance to Animal Care and Research Staff in regards to the performance of aseptic surgery and anesthesia (alone and in conjunction with surgical procedures) on laboratory animals compliant with laws and regulations governing animals in research and teaching as well as state of the art veterinary medical techniques. To minimize risks associated with anesthesia and surgical procedures; and reduce post-operative pain.

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III. General Statement

When required for scientific data collection or clinical or operational requirements, animals will undergo anesthetic and/or surgical procedure(s), as detailed in the approved protocol. All individuals who perform, or are expected to perform, anesthesia and/or surgeries must be trained in the relevant technique(s) and need to be familiar with the details of the particular animal care and use protocol as well as the provisions of this policy. To minimize risks during anesthesia and surgery and to minimize post-operative pain, animals need to be appropriately assessed and monitored during pre-, intra-, and post-procedural periods and appropriate anesthetic and analgesic regimen provided.

IV. Policy

1. Appropriate **anesthesia** must be provided to all animals undergoing procedures that require either immobilization or surgical procedures or both.
2. **Survival surgical procedures** involving any vertebrate species must be conducted using aseptic technique.
3. **Survival surgical procedures involving USDA regulated species** must be conducted in IACUC approved surgical facilities. Instruments used for surgery must be sterile. Appropriate Personal Protective Equipment (PPE) must be donned including head cover, surgical mask, sterile gown and gloves. Note: Exam gloves in boxes are not considered sterile and must not be used for performing aseptic surgery.
4. **Survival surgical procedures in non-USDA regulated species** require a designated, uncluttered, clean area. The surgical suites available within or in conjunction to a vivarium have to be used unless individual research laboratory areas have been specifically requested and approved by the IACUC. Instruments used for surgery must be sterile. The surgeon must wear appropriate PPE such as clean scrubs or lab coat, sterile gloves, head cover and surgical mask. Note: Exam gloves in boxes are not considered sterile and must not be used for performing aseptic surgery.
5. **Non-survival surgical procedures involving any vertebrate species** must be conducted in an uncluttered, clean area. Surgical preparation of the animal and sterile technique is generally not required. Short non-survival surgical procedures such as transcatheter perfusion and harvesting of tissues during surgery do not require shaving of the surgical site unless otherwise dictated by the specific research aim.
6. All anesthetic, surgical procedures and analgesic provisions must be described in the approved **IACUC protocol or amendment** in sufficient detail including peri-operative monitoring, pre-operative and post-operative care and assessment of analgesic effectiveness. It is expected that post-surgical analgesia will be provided. All anesthetic, sedative, and analgesic drugs administered to animals have to be within the expiration date stated by the manufacturer.
7. Any deviation from this policy must be specifically outlined and the scientific justification for the exception approved by the IACUC.
8. **Monitoring** of animals must occur continuously from induction of anesthesia

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and for the duration of the anesthetic/surgical procedure until full recovery is indicated by regaining the righting reflex and purposeful movement of the animal. Post-surgical animals have to be monitored at least once a day until the surgical incision has healed. The period may be extended depending on the procedure performed and/or if physical impairment has been induced. Animals must be observed for pain during and after the pain management regimen described in the IACUC protocol and additional analgesic administered if necessary unless otherwise approved by the IACUC. In non-survival surgeries, monitoring ends with euthanasia and confirmation of death.

9. **Post-operative Monitoring** must be appropriate for the specific survival surgery performed. Length and intensity of monitoring, parameters observed and documented, administration of analgesics as well as observation for pain beyond the duration of analgesia is dependent on the particular surgery. The post-operative monitoring plan will be discussed with veterinary staff during the design of the study, approved by the IACUC, and must be followed as described in the IACUC protocol.
10. **Recordkeeping** is necessary for all experimental anesthetic and surgical procedures. For confirmation of quality care, proper documentation of administered anesthetics/analgesics has to occur and adequate animal monitoring of animals including pain has to be recorded during the procedure and for a minimum of once daily for three (3) days for minor surgical procedures and at least once daily for five (5) days for major surgical procedures post-operative. The IACUC may request additional monitoring depending on the invasiveness of the procedure (for example, extra monitoring may be required every 4-6 hours for the first 24 hours following the procedure). These documents need to be available for review by the IACUC at any time.
11. **Surgeons** have to have adequate experience with animal models, specifically the species involved in surgical procedures, and training in anesthesia, aseptic technique, and the specific surgery performed. Undergraduate students and volunteers can assist an experienced surgeon but cannot perform surgery by themselves without direct and continuous oversight by the PI or his/her designee experienced in the particular surgical procedure.
12. **Training** of animal care and research staff is overseen by the IACUC. Requirements for training are addressed in IACUC Policy 10.4.22 Personnel Training in the Care and Use of Animals. All personnel are expected to adhere to training requirements outlined in that policy in addition to specific training mandates listed here. All personnel using anesthetic regimens and performing surgeries have to be trained and/or their proficiency evaluated by the Attending Veterinarian or her designee in regards to:
 - a. Anesthesia administration and monitoring adequate depth of anesthesia
 - b. Asepsis, gentle surgical technique, and minimal dissection of tissue
 - c. Appropriate use of instruments
 - d. Effective Hemostasis

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- e. Correct use of suture and materials
- f. Analgesic drug delivery, species-specific assessment of pain/distress and healing of surgical incisions.

13. **Animals enrolled in a surgical group** need to be examined before the surgery for overall appearance and health. Animals should have an appropriate body score since many animals will lose some weight in the immediate post-operative period. Proper hydration during and immediately after surgery, a clean and quiet environment, and palatable feed/feed supplement should be provided to support swift recovery.

V. Definitions

1. **Anesthesia** is the condition of having sensation, including the feeling of pain, blocked or temporarily taken away. It is induced by either a single or a combination of injectable or inhalant drugs. It can be local, only including a certain part of the body, or general, affecting the entire body. General anesthesia comprises a reversible state of amnesia, analgesia, loss of responsiveness, loss of skeletal muscle reflexes, decreased stress response, or all of these simultaneously.
2. An **analgesic** or painkiller is any member of the group of drugs administered to achieve relief from pain, which act in various ways on the peripheral and central nervous system.
3. **Survival Surgery** is a surgical procedure from which an animal is expected to regain consciousness. The length of consciousness is not a determining factor, rather the ability of an animal to experience pain or distress.
4. **Non-survival surgery** is a surgical procedure from which an animal does not regain consciousness, rather is euthanized at the end of the procedure. Animals must be maintained at a proper anesthetic plane without recovery before euthanasia to avoid pain or distress.
5. **Major survival surgery** penetrates and exposes a body cavity (e.g. laparotomy, thoracotomy, craniotomy), causes substantial impairment of physical or physiologic functions (e.g. stroke surgeries, amputations) or involves extensive tissue dissection or transection.
6. **Minor survival surgery** does not expose a body cavity and produces little or no physical impairment such as wound suturing, peripheral vessel cannulation and subcutaneous implants.
7. **Aseptic technique** involves a set of specific practices and procedures performed under carefully controlled conditions with the goal of preventing or minimizing contamination by microbiological agents. Aseptic technique requires preparation of the animal, the surgeon as well as the use of sterile items including surgical instruments, drapes, gloves and implanted materials.
8. **Post-surgical period** is considered the time from recovery of the animal from anesthesia until the surgical incision has healed. Surgical staples or skin sutures have to be removed 7-14 days post-operatively if applicable.

VI. Accountability

The Principal Investigator (PI) will be responsible for:

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- Assuring that procedures are performed as described in the corresponding IACUC protocol and if necessary submitting an amendment to the protocol and await approval before new method(s) will be introduced
- Assuring that research personnel attend relevant training requested by the IACUC and/or collaborates with the AV to set an appointment for assessment of proficiency
- Training personnel in protocol specific experimental methods approved in the relevant IACUC protocol(s), regulations related to anesthesia, surgery and analgesia and relevant IACUC policies and SOPs
- Maintaining anesthetic and/or surgical equipment so that it is always in proper working order
- Assuring that any anesthetic, sedative or analgesic drug administered to animals is within the manufacturer provided expiration date.

The IACUC will be responsible for:

- Reviewing and approving, requiring modifications in (to secure approval) or withholding approval of IACUC protocols and/or amendments
- Providing oversight for all animal procedures conducted including anesthesia, analgesia and surgical procedures
- Developing and directing an appropriate training program
- Checking that analgesic, sedative, and analgesic drugs are administered to animals only within the manufacturer provided expiration date.
- Post approval review of anesthetic and surgical procedures/records

The Research Integrity office will be responsible for:

- Administrative support of the IACUC members to facilitate their regulatory function
- Maintaining policy and assure regular review and update as necessary by the IACUC
- Keeping relevant training records and provide to the IACUC for review

The Office of Comparative Medicine (CM) will be responsible for:

- Comparative Medicine personnel will abide to this policy when performing anesthesia and/or surgical procedures and providing analgesia
- Veterinary review of IACUC protocol and advise PI on appropriate method of anesthesia, analgesia and surgical technique
- Providing support and training for all personnel regarding anesthesia, analgesia and surgical techniques as required by the IACUC including hands on training, verification of proficiency of personnel in particular experimental technique(s) via observation and support regarding proper maintenance of equipment.

VII. Procedures

Please refer to the IACUC SOP Rodent Anesthesia, Surgery and Analgesia at <http://www.fau.edu/research/research-integrity/guidance-and-procedures.php>

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IX. References

1. PHS Policy on Humane Care and Use of Laboratory Animals
2. Animal Welfare Regulations, 9 CFR Ch. 1
3. Guide for the Care and Use of Laboratory Animals, 8th edition, 2011

POLICY APPROVAL

Initiating Authority

Signature: _____

Date: _____

Name: Daniel C. Flynn, Ph.D., Vice President for Research

Executed signature pages are available in the Initiating Authority Office(s)