SAN DIEGO STATE UNIVERSITY

IACUC Guidelines

Rodent Non-survival Surgery

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Rodent Non-survival Surgery
Non-survival surgery is defined as any surgical intervention on an appropriately anesthetized animal from which the animal will not recover from anesthesia. This includes any procedures which involve making incisions and dissections prior to death of the animal such as transcardial perfusion or a non-recovery infarction (kidney, heart) model. This does not include tissue harvest which occurs after the animal has been euthanized (post-mortem tissue harvest). All animal non-survival surgeries, whether rodent or non-rodent require that certain procedures are followed.

Location of the Surgery
Non-survival procedures in rodents do not require the use of a dedicated operating room. These procedures may be performed on a clean, disinfected surface in an area free of clutter, traffic and air drafts; temporarily dedicated for the surgical procedure; e.g., animal procedure room or biological safety cabinet.

Training
It is important that persons have had appropriate training to ensure that the terminal procedures are performed appropriately, in particular, that the animal is maintained at an appropriate level of anesthesia. People performing and assisting in non-survival surgical procedures in a research setting often have a wide range of educational backgrounds and may require various levels and kinds of training before they participate in non-survival surgical procedures on animals. For example, persons might need training in interspecies variations in anatomy, physiology, and the effects of anesthetics and analgesic drugs.

Aseptic Technique
While aseptic technique is not required for a non-survival surgical procedure, adherence to the basic tenets of survival surgery are still important for human occupational health concerns, humane animal use, and for collection of accurate research data. Clean surgical procedures must always be used. The Eighth Edition of the Guide for the Care and Use of Laboratory Animals states: “At minimum, the surgical site should be clipped, the surgeon should wear gloves and the instruments and surrounding area should be clean. For non-

survival procedures of extended duration, attention to aseptic technique may be more important to ensure stability of the model and a successful outcome." In addition, more stringent aseptic practices may need to be employed in those instances where tissues must be manipulated or collected in a sterile manner.

Preparation of Instruments

Instruments and supplies used for non-survival surgeries should be clean. Instruments may need to be cleaned as needed between animals to remove any build-up of debris or dried blood that may compromise the instrument's function. In situations where the non-survival surgery requires aseptic methods, most instruments can be sterilized in a steam autoclave (please check the manufacturer's recommendations). Instruments or devices that cannot withstand the autoclaving process may be sterilized by ethylene oxide ("ETO") gas, hydrogen peroxide (Sterad), or bead sterilizer.

Related IACUC Guidelines

Surgical Instrument Cleaning, Packaging, and Storage

Anesthesia and Analgesia

There are several anesthetic regimens that may be used to anesthetize rodents for surgery. It is imperative that any personnel performing surgery on rodents be familiar with the anesthetic agents and administer them appropriately. Animals must be completely anesthetized prior to surgery beginning and remain anesthetized the entire time. Methods for ensuring anesthetic depth should be written into the protocol. The appropriate use of anesthesia includes: an understanding of the agents administered including mechanism of action, margin of safety and systemic effects; monitoring of the patient for anesthetic depth and vital signs; familiarity with equipment and techniques associated with the administration of the anesthetic; the implementation of the necessary supportive measures such as supplemental heat and fluid administration; and the appropriate use of analgesics as a part of balanced anesthesia and pain management. Any anesthetics, analgesics, emergency drugs and euthanasia agents used in conducting a non-survival surgery must be in-date (i.e. not expired).

> The USDA Policy #3 states: For acute terminal procedures, where an animal is put under anesthesia, the research is carried out (surgery or testing of a compound) and the animal is euthanized without ever waking up, medical materials may be used beyond their "to be used by" date if such materials use does not adversely affect the animal's wellbeing or compromise the validity of the scientific study. **Anesthesia, analgesia, emergency drugs and euthanasia drugs that are within their expiration dates are required for all such procedures**. Facilities allowing the use of expired medical materials in acute terminal procedures should have a policy covering the use of such materials and/or require investigators to describe in their animal activity proposals the intended use of expired materials. The attending veterinarian and the Institutional Animal Care and Use Committee (IACUC) are responsible for ensuring that proposed animal activities avoid or minimize discomfort, distress, and pain to the animal.

APHIS has determined that these responsibilities cannot be met unless the veterinarian and the IACUC maintain control over the use of expired medical materials.

Related Reference Document

Anesthesia and analgesia for laboratory animals

Euthanasia

Animals undergoing non-survival surgery must be euthanized prior to and without waking up from a surgical plane of anesthesia. The methods of euthanasia employed must be consistent with those outlined in the most current AVMA Guidelines (see references). In some cases the non-survival procedures may result in the euthanasia of the animal as with transcardial perfusion with preservative or fixative agents. In those instances where euthanasia of the animal must be conducted as a separate procedure, such as administration of a commercial euthanasia solution, overdose with pentobarbital sodium, or carbon dioxide, it is highly recommended to perform a secondary method from which the animal cannot recover such as cervical dislocation in rodents, thoracic chest incision, or severing of the great vessels).

Questions concerning these Guidelines, specific non-survival surgical procedures, aseptic technique, anesthesia or analgesia should be directed to the IACUC or veterinarians.

References

AVMA Guidelines for the Euthanasia of Animals: 2020 Edition. American Veterinary Medical Association. https://www.avma.org/KB/Policies/Documents/euthanasia.pdf

National Research Council. **Guide for the Care and Use of Laboratory Animals.** Institute of Laboratory Animal Resources, National Research Council. 2011.

USDA Animal Care Policy Manual. Policy #3 Veterinary Care. March 2014. https://www.nal.usda.gov/sites/default/files/Policy3.pdf