

Subject: Principles of Rodent Anesthesia and Surgery

BACKGROUND

This Standard Operating Procedure (SOP) provides detailed descriptions of procedures to be followed unless alternate procedures have been outlined in an *IACUC Protocol Application*. If an investigator wishes to deviate from the approved SOP, all changes must be outlined and justified in the protocol application (approval of the protocol indicates approval of the deviation from the SOP for that project only).

It is the researcher’s responsibility to ensure that adequate post-operative/post-anesthetic care is provided. The individual(s) providing post-operative care must be familiar with the approved IACUC protocol, have the ability to perform the assessments as indicated below, and must be able to provide support in case of complications.

IACUC Procedure

Anesthesia and Analgesia	Regimen outlined in the approved IACUC protocol will be followed. If inhalant anesthetics are used, there is an efficient system for evacuating waste anesthetic gases. Waste anesthetic gases are a safety concern and must be approved by the Office of Environmental Health and Safety for use prior to protocol approval. Provide the IACUC and PI a list of approved gas scavenging systems or techniques (link)
Preparation of Surgical Area	Performed in an isolated area of the laboratory away from other activities. The area is clean and orderly. All surfaces are cleaned and disinfected prior to use.
Supplemental heat source	A water circulating heating blanket or other appropriate source of heat is used to prevent hypothermia. Electric heating pads are not recommended. Animals are monitored carefully to insure overheating does not occur.
Preparation of Instruments and Drapes	Instruments are sterilized prior to surgery via steam autoclave. Instruments are wiped clean of debris then tips are re-sterilized preferably with a glass bead sterilizer between animals. Instruments are re-sterilized by autoclave after each group of five (5) rodents. Gas sterilization with ethylene oxide will be used for items which cannot withstand steam sterilization. All implanted materials (e.g., mini-pumps, catheters, suture material) MUST be sterile. Sterile drapes should be utilized to cover unclipped areas. An aseptic surface on which to place instruments during surgery will be provided.
Incision Site Preparation	Eye lubricant is applied to the animal’s eyes. All hair is removed from the surgical site with clippers. A pre-surgical prep of the skin is accomplished with three rounds of alternating disinfectants, i.e., iodine-based scrub and 70% alcohol.
Preparation of Surgeon	The surgeon wears cap, mask, and a clean scrub shirt, gown or lab coat. The surgeon washes hands, and puts on sterile gloves

Wound Closure	<p>Regimen outlined in the approved IACUC protocol will be followed.</p> <p>Internal sutures are of an absorbable material.</p> <p>Closure of body cavities is made by an interrupted suture pattern in separate layers.</p> <p>Skin is closed using sterile suture (non-absorbable in a simple, interrupted pattern), wound clips, or tissue glue.</p>
Post-operative care	<p>Caging The animal is placed in a clean cage empty of bedding; paper toweling or a drape may be placed under the animal. The cage is placed on top of a heat source. The animal may be singly housed during recovery. Group-housing during recovery will require more frequent monitoring to prevent more-awake animals from injuring sleeping animals.</p> <p>Treatments Eye lubricant is applied to the animal's eyes.</p> <p>Analgesia is provided as specified in the approved IACUC protocol. All animals will receive at least 24 hours of analgesia following surgery (minor or major).</p> <p>Warmed subcutaneous fluids (LRS or 0.9% NaCl) are given for surgical procedures lasting longer than 30 minutes or if fluids are lost via hemorrhage. Recommended volume is 0.5-1.0 ml for a mouse, 5-15 ml for a rat..</p> <p>Monitoring Anesthetized animals are carefully observed every 5 minutes and are never left unattended. Parameters to be monitored include rate and depth of respiration, temperature, color of eyes and extremities, reflexes to stimulation and spontaneous movement. If no complications arise, animal is monitored and care provided every 30-60 minutes.</p> <p>Recovery Once the animal is able to walk, groom, eat, and drink, the animal is moved to a clean cage with bedding. Food pellets are placed on the cage floor, and additional supportive care is provided as needed. The cage is returned to the DLAR animal housing facility. Exceptions for animal housing in a laboratory must be in the approved IACUC protocol.</p> <p>Thereafter, research staff will check the animal at least once daily for the first 10-14 days post-operative, or until the sutures or wound clips are removed. The incision site is checked for integrity, discharge, inflammation, or self-trauma. These or other signs of complications will prompt a consultation with the DLAR veterinarian.</p>
Recordkeeping	<p>Records of surgical procedures must be kept for each animal/cage. At a minimum, the procedure, anesthetics/analgesics, date and initials must be provided on the cage card; more detailed records will be maintained on a chart and kept near the cage.</p>
Non-survival surgery	<p>Supplemental heat is recommended as it will affect the depth of anesthesia, but it is not necessarily required for non-survival surgeries.</p> <p>The instruments and implants must be clean but not necessarily sterilized.</p> <p>The hair must be clipped from the surgical site but a surgical scrub of tissues with disinfectant is not required.</p> <p>The surgeon must wear gloves but not necessarily sterile surgical gloves.</p> <p>Wound closure and post-operative care are not applicable in a non-survival surgery scenario.</p>