



## **Guidance on Surgery in Research and Instruction Animals**

Surgery is categorized into distinct types; survival vs. non-survival (terminal) and major vs. minor. These categories impact the requirements and methods for the surgical procedure. Survival procedures will require a greater degree of patient preparation/monitoring than non-survival surgery. The level of analgesia administered to animals will depend on the species and whether the procedure is major or minor (breaching of a body cavity or inducing substantial physical or physiological impairment vs. subcutaneous incision alone). UGA URAR veterinarians are available for consultation at any stage of a surgical procedure (from planning to execution to troubleshooting), and the IACUC encourages the enlistment of the URAR veterinary personnel to provide this support.

### **Preparation**

- Surgical procedures on experimental animals should be planned in consultation with a URAR veterinarian. Prior to submission or during IACUC review of the AUP detailing said procedure, the AV (or her/his designee) should discuss all phases (anesthesia, analgesia, surgical manipulation, recovery) of the proposed procedure with the researcher to ensure consideration of animal welfare and adherence to veterinary standard of care.
- Personnel training is a key aspect of surgical preparation. Laboratory surgeons should be equipped with written/practical material to assist in their mastery of the proposed technique. Research personnel should review anatomic diagrams and equipment (e.g., implant) specifications and complete a sufficient quantity of practice procedures on cadaver animals prior to the initial live procedure. Practice may include performing the procedure as terminal before recovering animals. In some cases, URAR staff can assist in the procurement of animal cadavers for training purposes. Experienced personnel (laboratory and/or veterinary) should be available throughout the training phase to assist new surgeons with their learning.
- The location in which the surgery will be performed should be identified during planning. The AWA requires surgical suites for operative procedures on USDA-covered species. Rodent and non-mammal survival surgeries may be completed on a laboratory benchtop, but an area larger than the surgical field must be set aside specifically for these purposes. Surgical areas must be sanitized with an approved disinfectant prior to each procedure, and kept clean and clutter-free between procedures.

### **Aseptic Technique**

- Aseptic (sterile) technique is the key factor enlisted to prevent post-operative infection. Generally, aseptic technique is a mindset fixated on prevention of bacterial contamination of the surgeon, surgical equipment, and operative site.
  - Surgeon: At minimum, for survival surgery, surgeons must wear sterile surgical gloves (exception for "Tips only" method-described below), clean lab coat/surgical gown, and a face mask. Surgeons should wash (surgical scrub) and dry hands thoroughly prior to

- donning sterile gloves. Gloves should be changed immediately if they become non-sterile (i.e., accidental contact with a non-sterile surface), damaged, and following heavy soiling.
- The “Tips only” method may be performed with clean exam gloves that are not sterile. “Tips only” refers to touching the sterile field with only the sterile tips of the surgical instruments, so the gloves never contact the sterile field. The “Tips only” method may be appropriate for rodents and other small animals such as fish, amphibians, and reptiles.
  - For non-survival surgery, at minimum, the surgeon must wear gloves.
  - Equipment: Sterilize surgical instruments, drapes, and implantable devices prior to use.
    - Sterilization can be achieved via several methods (steam autoclave, exposure to ethylene oxide/hydrogen peroxide, chemical submersion), the most appropriate of which (according to component materials) should be discussed in the planning phase of the project.
    - Each sterilization procedure has a concordant expiration date. Materials should be labeled so that the date of expiration can be readily determined.
    - Back-up equipment should be sterilized prior to the procedure, in case the primary set of equipment becomes contaminated.
  - Operative Site: Animal skin harbors a diverse bacterial flora. As such, fur/hair must be clipped (shaved) and removed, or feathers removed, and skin decontaminated prior to incision, with rare exceptions for aquatic animals.
    - For non-aquatic animals, skin decontamination is achieved via repeated, alternating application of surgical scrub (povidone-iodine or chlorhexidine gluconate) and isopropyl alcohol.
    - Three cycles are generally considered sufficient to achieve the objective. The site should be scrubbed from “clean to dirty,” beginning at the site of the incision, and radiating in a spiral pattern outward until a generous margin is established.
    - The incision site should then be draped (with a sterile disposable or sterile washable drape, depending upon application) and isolated.
    - At a minimum, for non-survival surgery, the fur should be clipped, or feathers removed, and the skin cleaned. For rodents and other animals that may easily become hypothermic, one must not leave the animal wet from excessive use of these liquid scrubs.

### **Wound Closure**

- The materials and methods used to close incisions will depend on the situation. The material (size, composition) should be appropriate for the species and procedure performed. Generally, wounds begin the first phase of healing, and skin closure is normally observed, by 10-14 days following an operation. At this time, the surgical site should be examined to ensure skin healing (with veterinary consultation, if necessary), and the closure materials removed. Wound closure materials left in place for an extended duration can lead to an uncomfortable inflammatory reaction.

### **Identification Post-Surgery**

- Animals which have had surgery should be identified to alert other personnel of the animal's special needs and in the event of a post-operative complication.
- For animals in URAR animal facilities, a URAR provided Post-Procedure card must be placed on the housing enclosure.

### **Post-Operative Monitoring**

- Animals which have had surgery should be monitored at least once daily throughout the recovery period (and more frequently, if the procedure dictates). The overall health status of the animal should be assessed, and the integrity of the closure confirmed at the time of each check. Any adverse effects observed (change in animal behavior, increased body temperature, seepage from the incision site, etc.) must be reported to the URAR veterinary personnel for animals under URAR purview, or the AV, for other animals.

### **Documentation**

- Surgical procedures must be documented, either in the animal's individual Clinical Health Record, or, for rodents and non-mammals, on a group record.
  - The IACUC website provides general templates for Anesthesia/Surgery and Post-Procedural Monitoring, which may be used.
- The hard copies of these records must be kept with the animal in its housing room until suture/wound clips are removed (typically 10-14 days post-operative), or, for animals that do not have sutures/wound clips, until healed (also typically 10-14 days).

### **Appropriate Anesthesia and Analgesia**

- Use of appropriate anesthesia and analgesia is required for a successful surgical outcome. These topics are covered in "Guidance on Anesthesia in Research and Instruction Animals" and "Guidance on Analgesia in Research and Instruction Animals." The URAR veterinarians are also available for consultation.