Georgia State University
Institutional Animal Care and Use Committee
(IACUC)
It is the responsibility of the Georgia State University (GSU) Institutional Animal Care and Use Committee (IACUC) to ensure judicious and humane use of animals used in its teaching and research programs that is consistent with federal requirements.*

Aseptic Technique for Animal Surgery
BACKGROUND / PURPOSE: The Animal Welfare Act (AWA), Public Health Service (PHS) Policy, and the “Guide for the Care and Use of Laboratory Animals” (Guide) require the Institutional Animal Care and Use Committee (IACUC) and the attending veterinarian to provide oversight of all surgical procedures. The Guide states that, “Aseptic technique is used to reduce microbial contamination to the lowest possible practical level. Regardless of species, aseptic technique includes preparation of the patient, such as hair or feather removal and disinfection of the operative site; preparation of the surgeon, such as the provision of appropriate surgical attire, face masks, and sterile surgical gloves; sterilization of instruments, supplies, and implanted materials; and the use of operative techniques to reduce the likelihood of infection.”

POLICY OUTLINE:
1. Minimum aseptic technique for rodent and avian survival surgery:
   a. Surgical area:
      i. Any dedicated space in an investigator’s laboratory appropriately managed to minimize contamination from other activities in the room. A procedure room in the animal facility can also be utilized. The area must be uncluttered and disinfected prior to the surgical procedure.
      ii. No other activities can be performed in this same area while surgery is being performed.
      iii. Patient preparation (e.g. hair clipping and the disinfection of clipped area) must be conducted in a location separate from the surgical site (the separation can either be a separate room or a different location in the same room).
   b. Surgical instruments and supplies:
      i. Sterile instruments and supplies are required.
      ii. Instruments are initially autoclaved or gas sterilized. Alternatively, chemical sterilizing agents may be used for instruments and implantable devices consistent with manufacturer’s recommendations regarding exposure times necessary to achieve sterilization and subsequent washing procedures (e.g with sterile water or saline) to remove the chemical sterilant prior to use of the item.
      iii. If performing batch surgeries on rodents (e.g. using the same instruments on a series of animals during one surgical session) one must wipe the instruments clean (e.g. with sterile saline and sterile gauze) to remove gross contamination and re-sterilize the instrument tips (e.g. in a hot bead sterilizer between animals) before re-use.
iv. Again, if performing batch surgeries, one must ensure that the gloves remain sterile between surgeries. If sterility was broken between animals new gloves must be donned. If sterility was not broken or if the tips-only technique is being utilized (see below) the same gloves can be used on the subsequent animal provided that the gloves are wiped clean of any blood between animals with a sterile physiological fluid (e.g. sterile physiological saline).

c. Surgeon preparation:
   i. Hand scrubbing and rinsing of all hand surfaces
   ii. Gloves (either sterile surgical gloves OR clean exam gloves, see below)
      • Sterile surgical gloves. Using sterile surgical gloves allows you to touch all areas of the sterile surgical field and surgical instruments with your gloved hand.
      • Clean exam gloves. Using clean exam gloves and a “tips-only” technique restricts you to using only the sterile working ends of the surgical instruments to manipulate the surgical field. The gloved, but not sterile, hand must never touch the working end of the instruments, the suture, suture needle, the interior tissues of the animal, or any part of the surgical field. This technique is useful when working alone and manipulation of non-sterile objects (e.g., anesthesia machines, microscopes, stereotactic apparatus, lighting) is required.
   iii. A surgeon’s mask
   iv. A lab coat, surgical gown, and/or dedicated surgical scrub top.

d. Patient preparation:
   i. Clipping of fur (or use of a depilatory cream) or removal of feathers over the patient’s surgical site; this is to occur in a location that is removed from the surgery area (another room may be utilized or a different location on a lab bench also meets this objective). Loose hair may be removed by touching the prepared area with the sticky side of tape or by careful vacuuming.
   ii. Preparation of surgical site by scrubbing the skin with a disinfectant (e.g., chlorhexidine, betadine) followed by 70% alcohol or sterile water. The area is scrubbed with a new clean gauze pad or sterile cotton swab in a gradually enlarging circular pattern from the center of the proposed incision to the periphery. The gauze pad or swab should not be brought back from the contaminated periphery to the clean central area. This process is completed 3 times.
   iii. Lubricating ophthalmic ointment (such as Lacrilube or Tearfair) must be placed in the anesthetized animal’s eyes to prevent drying of the cornea if the anesthesia and recovery will last more than five minutes.
   iv. To prevent hypothermia, an attempt should be made not to wet the animal any more than necessary and the animals should be placed on a heating pad (using a circulating water blanket, warm water bottle, bubble wrap, or equivalent external heat source, taking care to not cause thermal burns to the animal’s skin). Care should be taken to prevent contamination of the sterile surgical field during subsequent handling and positioning of the animal.

e. Surgical draping of the disinfected area is required when sterile tissues or instrument may come in contact with non-sterile portions of the animal’s body or other non-sterile surfaces.
i. Sterile surgical drapes are available for purchase commercially or one can autoclave a cloth drape or utilize autoclaved gauze for this purpose. Alternatively, the GSU IACUC accepts the use of an adhesive plastic food wrap (e.g. Press-n-Seal is the only currently available product), pulled from a clean roll and applied across the surgical field and surrounding area as an appropriate surgical drape for rodent surgeries. Please see the DAR veterinary staff for details; the incision can be made directly through the plastic wrap and into the skin.

2. Minimum aseptic technique for all other mammalian species (e.g. rabbit, ferret, and others) survival surgery:
   a. Surgical area: According to The Guide, Major surgeries must be performed, "...in facilities intended for that purpose..." Practically, this means:
      i. Interior surfaces are monolithic and impervious to moisture.
      ii. Ventilation supply is filtered air at positive pressure.
      iii. There is minimal traffic.
      iv. A surgeon preparation area is located outside of the operating room.
      v. A patient preparation area is separate from the surgeon preparation area.
      vi. A patient recovery area is provided.
   b. Surgical instruments and supplies:
      i. Sterile instruments and supplies are required.
      ii. Instruments are initially autoclaved or gas sterilized. Alternatively, chemical sterilizing agents may be used for instruments and implantable devices consistent with manufacturer’s recommendations regarding exposure times necessary to achieve sterilization and subsequent washing procedures (e.g. with sterile water or saline) to remove the chemical sterilant prior to use of the item.
         1. NOTE: The preference is for autoclave and gas sterilization.
         2. NOTE: Alcohol is neither a sterilant nor a high-level disinfectant and is not appropriate for instrument preparation.
      iii. Appropriate indicators and verification must be located with instruments that have been sterilized.
      iv. Instruments which contact non-sterile materials or surfaces during the procedure must be discarded from the surgical field and not used until resterilized.
   c. Surgeon preparation:
      i. Hand scrubbing and rinsing of all hand surfaces
      ii. Sterile surgeon’s gloves (not exam gloves)
      iii. A surgeon’s mask
      iv. A surgical gown or dedicated surgical scrubs
      v. Hair bonnet
   d. Surgical site prep:
      i. Clipping of fur over the patient’s surgical site; this is to occur in a location that is removed from the surgery area (another room). Loose hair may be removed by touching the prepared area with the sticky side of tape or by careful vacuuming.
ii. Preparation of surgical site by scrubbing the skin with a disinfectant (e.g., chlorhexidine, betadine) followed by 70% alcohol or sterile water. The area is scrubbed with a new sterile surgical gauze pad in a gradually enlarging circular pattern from the center of the proposed incision to the periphery. The gauze pad should not be brought back from the contaminated periphery to the clean central area. This process is completed 3 times.

iii. Lubricating ophthalmic ointment (such as Lacrilube or Tearfair) must be placed in the anesthetized animal’s eyes to prevent drying of the cornea if the anesthesia and recovery will last more than five minutes.

iv. To prevent hypothermia, an attempt should be made not to wet the animal any more than necessary and the animals should be placed on a heating pad (e.g. using a circulating water blanket, taking care to not cause thermal burns to the animal's skin). Care should be taken to prevent contamination of the sterile surgical field during subsequent handling and positioning of the animal.

e. Surgical draping of the disinfected area is required when sterile tissues or instrument may come in contact with non-sterile portions of the animal’s body or other non-sterile surfaces.

3. Minimum aseptic technique for fish and amphibian survival surgery:

a. Surgical area:
   i. Any dedicated space in an investigator’s laboratory appropriately managed to minimize contamination from other activities in the room. A procedure room in the animal facility can also be utilized. The area must be uncluttered and disinfected prior to the surgical procedure.
   ii. No other activities can be performed in this same area while surgery is being performed

b. Surgical instruments and supplies:
   i. Sterile instruments and supplies are required.
   ii. Instruments are initially autoclaved or gas sterilized. Alternatively, chemical sterilizing agents may be used for instruments and implantable devices consistent with manufacturer’s recommendations regarding exposure times necessary to achieve sterilization and subsequent washing procedures (e.g with sterile water or saline) to remove the chemical sterilant prior to use of the item.
   iii. If performing batch surgeries (e.g. using the same instruments on a series of animals during one surgical session) one must wipe the instruments clean (e.g. with sterile saline and sterile gauze) to remove gross contamination and re-sterilize the instrument tips (e.g. in a hot bead sterilizer between animals) before re-use.
   iv. Again, if performing batch surgeries, one must ensure that the gloves remain sterile between surgeries. If sterility was broken between animals new gloves must be donned. If sterility was not broken or if the tips-only technique is being utilized (see below) the same gloves can be used on the subsequent animal provided that the gloves are wiped clean of any blood between animals with a sterile physiological fluid (e.g. sterile physiological saline).

c. Surgeon preparation:
   i. Hand scrubbing and rinsing of all hand surfaces
   ii. Gloves (either sterile surgical gloves OR clean exam gloves, see below)
• Sterile surgical gloves. Using sterile surgical gloves allows you to touch all areas of the sterile surgical field and surgical instruments with your gloved hand.

• Clean exam gloves. Using clean exam gloves and a "tips-only" technique restricts you to using only the sterile working ends of the surgical instruments to manipulate the surgical field. The gloved, but not sterile, hand must never touch the working end of the instruments, the suture, suture needle, the interior tissues of the animal, or any part of the surgical field. This technique is useful when working alone and manipulation of non-sterile objects (e.g., anesthesia machines, microscopes, stereotactic apparatus, lighting) is required.

iii. A surgeon’s mask
iv. A lab coat, surgical gown, and/or dedicated surgical scrub top.

d. Patient preparation:
i. Patient preparation in fish and amphibians should minimize disruption of the skin and natural mucus, because these are major barriers to infection. Thus, preparation of the patient consists of wiping the surgical site with a cotton swab soaked in sterile saline to reduce gross contamination in the area of surgery.

iii. Lubricating ophthalmic ointment (such as Lacrilube or Tearfair) must be placed in the anesthetized animal’s eyes to prevent drying of the cornea if the anesthesia and recovery will last more than five minutes.

e. Surgical draping of the disinfected area is required when sterile tissues or instrument may come in contact with non-sterile portions of the animal’s body or other non-sterile surfaces.

3. Postoperative Care:
a. Recovering animals should not be placed onto loose bedding material until they are fully awake, as suffocation can result. A paper towel or like material may be placed between the bedding and the animal until it awakens from anesthesia. Hypothermia may be prevented or treated by placing the recovering animals in a warm cage (e.g., as occurs when one places the cage on a supplemental heat source such as a circulating water pad). Be cautious with supplement heat sources; hyperthermia can be as detrimental as hypothermia.

b. Dehydration can be ameliorated by the administration of appropriate fluid therapy. Initially this may be done by giving 1 to 2 ml of warm fluids (0.9% sterile NaCl or equivalent) per 100 g of body weight by subcutaneous or intraperitoneal injection. If blood loss occurred during the surgical procedure, or if the animal is slow to recover from anesthesia, provide additional fluids. Veterinary staff may be consulted for assistance with appropriate fluid therapy.

c. Analgesia must be administered to control post-surgical pain as described in the IACUC approved protocol, unless there is approval by the IACUC not to provide analgesics. Analgesia should be administered before or during surgery for optimal effect. Veterinary staff may be consulted for appropriate analgesia regimens.

d. Animals should not be returned to the animal housing room until they are sternal and clearly awake. To prevent cannibalism or suffocation, rodents should be housed individually until they are ambulatory.
4. **Materials that have expiration dates:**
   a. Survival Surgery: Drugs and supplies intended to be used in animals must be in-date.
   b. Non-survival Surgery: Expired products other than anesthetics or analgesics, may be used for non-survival procedures. Expired anesthetics or analgesics may not be used at any time.

5. **Procedural techniques which encourage proper surgical outcomes include:**
   a. Gentle tissue handling
   b. Minimal dissection of tissue
   c. Appropriate use of instruments
   d. Effective hemostasis
   e. Correct use of suture materials and patterns
   f. Reducing surgical time

6. **Minimum aseptic technique for all non-survival surgery:**
   a. The Guide states the following “… at a 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 in order to ensure stability of the model and a successful outcome.”

**Pertinent Regulations**
- U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training
- Public Health Service Policy
- Guide for the Care and Use of Laboratory Animals
- Animal Welfare Act (AWA) and AWA Regulations

**IACUC Approval Date:**

**Signature IACUC Chair:**

**Revision Dates:**