

University Animal Care Committee Standard Operating Procedure		
Document No: 7.3	Subject: Aseptic Surgical Techniques (Mice)	
Date Issued: March 23, 2011	Revision: 4	Page No: 1

Location: Queen's University

Responsibility: Principal Investigators, Research Staff, Veterinary Staff

Purpose: The purpose of this Standard Operating Procedure (SOP) is to describe the methods used to practice aseptic surgical techniques in mice

1. Introduction and Definitions:

Abbreviations: Animal Care Services **ACS**, Principal Investigator **PI**, subcutaneous **SC**, intravenous **IV**, intraperitoneal **IP**, intramuscular **IM**, per os **PO**, per rectum **PR**

Asepsis refers to the state of being free from biological contaminants which could cause infection. To practice aseptic technique refers to the action of working within a sterile field to prevent infection.

To maintain good aseptic technique, the following (Halstead) principles should be adhered to:

- Strict asepsis during preparation and surgery.
- Good haemostasis during the procedure to limit infection rate.
- Minimize tissue trauma.
- Good surgical judgment to ensure the elimination of dead space and adequate removal of material.
- Minimize surgery time through knowledge of anatomy and technique.
- Correct use of instruments and materials.

2. Materials:

****All drugs, fluids, suture material and autoclaved items cannot be used if passed their expiry date****

- Disinfectant surface spray (Accelerated Hydrogen Peroxide – Peroxigard)
 - PPE - hair cap, face mask, sterile/clean gown, surgical gloves, booties or dedicated footwear
 - Clippers and/or depilatory cream
 - Antimicrobial soap (4% chlorhexidine)
 - 2% chlorhexidine solution
 - 70% isopropyl alcohol
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- Povidone-iodine solution
- Sterile towels
- Heat source
- Sufficient sterile surgical packs (steam, gas, cold) for the number of procedures to be performed
- Surgical towels or peel packs for autoclaving instruments
- Sterile gauze
- Autoclave indicators
- Scalpel blade(s)
- Surgical drape(s)
- Sterile bowl with alcohol or cold sterilant
- Sterile bowl with sterile (distilled) water rinse
- Bead sterilizer (optimal)
- Lactated Ringers or 0.9% sodium chloride
- Sterile syringes
- Sterile needles
- Anesthetics (as per described in the Animal Use Protocol)
- Emergency drugs
- Oxygen source (if required)
- Extra pre-weighed scavenge canisters (if using passive scavenging system when using gas anesthetic)
- Suture material

3. Procedures:

Surgical space and instrument care:

- Surgical area should be disinfected prior to starting surgery.
 - Surgery should be conducted in a separate area from where the animal was shaved and prepped.
 - Turn the bead sterilizer on.
 - All surgical instruments should be sterilized initially. This can be achieved by steam, chemical (ethylene oxide -EtO) or dry (bead sterilizer) sterilizing methods.
 - Lay out instrument pack and remove first wrap so it is ready for the surgeon to access the inside sterile wrap.
 - Have enough surgical packs for each surgical procedure.
 - If surgeries are conducted on multiple rodents and the lab does not have surgical packs available for each animal, the instruments may be cleaned with 70% isopropyl
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alcohol ensuring that all tissue, blood, and debris have been physically removed.

This procedure can be followed for a maximum of five surgeries before a new sterile pack is required.

- Rinse surgical instruments with sterile saline and then be placed in the bead sterilizer as per manufacturer's instructions.
- Instruments are then placed on a sterile surface to cool prior to using on another animal (maximum five).

Preparing the animal for surgery:

- Shave enough hair from the patient to minimize the chance that it can contaminate the incision site. Shaved area should have large enough margins around where incision will be but not too large to cause excessive heat loss.
- Remove any excess hair with a vacuum or tape.
- **First step of surgical scrub:** Prepare the area by scrubbing the area using either 4% chlorhexidine solution or iodine based scrub such as Betadine + detergent. This is intended to remove all oils and proteins. Manually scrub the surgical area for two minutes making sure to keep hair surrounding the shaved area to get wet. Allow the soap to stay on site for five minutes. Wipe off with alcohol or distilled water on a gauze
- **Second step of surgical scrub:** The intended incision site will be prepped with two consecutive applications alternating between both 2% chlorhexidine and 70% isopropyl alcohol **or** 10% povidone-iodine and 70% isopropyl alcohol. Allow the area to dry.
- Move animal to the surgical area placing the animal on a clean warm surface such as a sterile surgical drape. If necessary to stabilize the animal, secure to the surgical surface with tape or light weights.
- Administer analgesics as per described in the AUP.
- Conduct a final prep of the incision site, alternating between both 2% chlorhexidine and 70% isopropyl alcohol **or** 10% povidone-iodine and 70% isopropyl alcohol. Allow the area to dry.
- Open the surgical pack.

The Surgeon:

- Don a hair cap and face mask.
 - Wash hands with an antibacterial soap and dry hands with sterile towel (if surgical sink access).
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- Don clean lab coat/gown.
 - Don surgical gloves using sterile technique.
One pair of sterile gloves can be worn for a maximum of five surgical procedures before donning a new pair.
 - Sterile gloves must be saturated with 70% alcohol following each surgical procedure.
 - If there is a break in sterility a new pair of gloves must be worn.
 - Place sterile drape across the incision site. Ensure that the animal can be monitored at all times throughout procedure.
 - Administer bupivacaine (refer to SOP 7.1 "Pain Management in Mice").
 - Place and maintain surgical instruments on sterile surfaces only.
 - Skin incision is to be made using sterile scalpel blade/instruments. When making your initial incision, attempt a smooth single cut. Multiple incision attempts with a scalpel blade can create a surface area for bacteria to grow.
 - All suture material must be sterile and remain sterile throughout procedure.
 - Reuse of suture material for serial rodent surgeries (in one sitting) is permitted if the suture is soaked between animals in a 10% povidone iodine solution, then rinsed in sterile saline or water.
 - Sutures which can be re-sterilized include any monofilament (Prolene or Nylon/Ethilon) or 'coated' sutures, e.g. some Vicryl or Ethibond. On the outside of the packets it states whether the suture is coated or not. Multi-filament or twisted fibres, such as Chromic, Silk, Mersilene and non-coated Ethibond must be discarded after use.
 - Follow SOP 7.4 "Rodent Post-operative Care (Mice)" for recovery surgical procedures.
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References:

Gibson Karen, Donald Alan W, Hariharan Harihar, McCarville Carole. *Comparison of two pre-surgical skin preparation techniques.* Can J vet Res 1997; 61: 154-156.

SOP Revision History:

Date	New Version
01/28/16	
02/28/19	
06/20/19	
05/01/22	Updated SOP format