

Policies and Procedures

SECTION: IACUC	NUMBER: 7.09			
CHAPTER: Miscellaneous Experimental Animal Use Policies	ISSUED: 11/2005	REV. A: 4/7/2009	REV. B: 11/2012	REV. C: 08/2016
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Purpose

The purpose of this policy is to provide guidelines for aseptic surgical procedures in rodents. This procedure is approved by the Creighton University Institutional Animal Care and Use Committee (IACUC). All investigators will follow this policy unless scientific justification is provided and approved by the IACUC.

Responsibility

The major responsibility for animal protection and monitoring during and after a procedure lies with the Principal Investigator (PI). Any instances in which a PI or staff member fails to provide veterinary care in accordance with this Policy is considered an infraction by the Creighton University IACUC and may result in suspension of a protocol and/or the privilege of an individual to perform animal research. Serious infractions may result in a loss of the ability to utilize data generated as a result of the study. This policy applies to any Creighton University principal investigators, co-investigators, post-doc/fellow, technicians, graduate students, undergraduate students and visiting scientist who are involved in rodent survival surgical procedures. It is the responsibility of the PI to ensure that all individuals involved in a procedure on an animal are aware of their duties and responsibilities, the appropriate contact individuals should problems arise during or after a procedure, and that all individuals read and understand this Policy,

Application

This policy applies to all surgical procedures performed on rodents in which the animal is expected to recover from anesthesia. Prior to performing any survival surgery techniques on rodents, an approved IACUC Protocol must be in place with descriptions of the surgical procedures to be performed and personnel must be appropriately trained. The following principles described in the *Guide for the Care and Use of Laboratory Animals (the Guide)* apply to rodent surgery.

- Appropriate pre-operative and post-operative care of animals in accordance with established veterinary medical and nursing practices are required
- A dedicated surgical facility is not required. However, a designated animal procedure space is required and at the time of use the aseptic surgery should be

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conducted in an area which is dedicated to surgery and related activities, and at all times during the surgery managed to minimize contamination

- All survival surgery will be performed by using aseptic procedures, including masks, sterile gloves, sterile instruments, and aseptic techniques.

The Guide states that it is important for research personnel to be appropriately qualified and trained in all procedures to ensure that good surgical technique is practiced. Good technique includes:

- Asepsis
- Gentle tissue handling
- Minimal dissection of tissue
- Appropriate use of instruments
- Effective hemostasis
- Selection of suture materials and patterns or other wound closure techniques that minimize trauma, remain intact, and is appropriate to decrease the chance of dehiscence. Analgesia, preservation of corneal integrity, nutritional support and maintenance of body temperature and hydration should be considered in the surgical plan. The surgical plan should also give consideration to the availability of personnel to provide anesthetic induction and post-operative care appropriate to the surgical procedure.

Investigators should work closely with the veterinarian to assure that the challenges of consecutive surgeries within one work session are adequately addressed.

Personal Protective Equipment

- Clean gown or lab coat,
- Mask,
- Gloves
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.
- Hair cover.

Pre-Operative

- Surgery should be conducted in a disinfected, uncluttered area that promotes asepsis during surgery (see Agents, Table 1)
- Prepare the animal by removing hair from the surgical site. Perform this

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- procedure in an area separate from where the surgery is to be conducted;
- Administer analgesics (preemptive analgesia) as appropriate and approved in your IACUC protocol
- Protect the corneas from drying out by applying an ophthalmic ointment
- Prepare the surgical site(s) with an appropriate skin disinfectant (see Agents, Table 2); and
- Surgeons should wash and dry their hands before aseptically donning sterile surgical gloves.

Operative

- The animal must be maintained in a surgical plane of anesthesia throughout the procedure;
- Begin surgery with sterile instruments and handle instruments aseptically (see Agents, Table 3);
- Instruments and gloves may be used for a series of similar surgeries provided they are maintained clean and disinfected between animals (see Agents, Table 4);
- Monitor and/or maintain the animal's vital signs, especially heart and respiratory rates; and
- Close surgical wounds using appropriate techniques and materials.

Post-Operative

- Move the animal to a warm, dry area and monitor it during recovery. Return the animal to its routine housing only after it has fully recovered from anesthesia;
- Provide analgesics as appropriate and as detailed in your approved IACUC protocol;
- Generally, remove skin closures (staples or sutures) 10 to 14 days post-operatively as stated in your approved protocol; and
- Maintain a record of surgery and post-operative care utilizing the Rodent Post-Procedure Monitoring Card. On surgical day, also mark on this card the date skin closures are to be removed and a check box to be marked when this occurs.
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Definitions

Aseptic Surgical Procedures

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Surgery performed using procedures that limit microbial contamination so that significant infection or suppuration does not occur.

Major Surgery

Any surgical intervention that penetrates and exposes a body cavity; any procedure that has the potential for producing permanent physical or physiological impairment; and/or any procedure associated with orthopedics or extensive tissue dissection or transection.

Minor Surgery

Any surgical intervention that neither penetrates and exposes a body cavity nor produces permanent impairment of physical or physiologic function. Examples are superficial vascular cut down, and percutaneous biopsy.

Sterilization

The process whereby all viable microorganisms are eliminated or destroyed. The criterion of sterilization is the failure of organisms to grow if a growth supporting medium is supplied.

Disinfection

The chemical or physical process that involves the destruction of pathogenic organisms. All disinfectants are effective against vegetative forms of organisms, but not necessarily spores

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Table 1. Recommended Hard Surface Disinfectants (for example, table tops or equipment)

Always follow manufacturer's instructions for dilution and expiration periods

AGENT	EXAMPLES	COMMENTS
Alcohols	70% ethyl alcohol 85% isopropyl alcohol	Contact time required is 15 minutes. Contaminated surfaces take longer to disinfect. Remove gross contamination before using. Inexpensive.
Quaternary Ammonium	Roccal®, Quatricide®	Rapidly inactivated by organic matter. Compounds may support growth of gram negative bacteria.
Chlorine	Sodium hypochlorite (Clorox® 10% solution) Chlorine dioxide (Clidox®, Alcide®, MB-10®)	Corrosive. Presence of organic matter reduces activity. Chlorine dioxide must be fresh; kills vegetative organisms within 3 minutes of contact.
Glutaraldehydes	Glutaraldehydes (Cidex®, Cetylcide®, Cide Wipes®)	Rapidly disinfects surfaces.
Phenolics	Lysol®, TBQ®	Less affected by organic material than other disinfectants.
Chlorhexidine	Nolvasan®, Hibiclens®	Presence of blood does not interfere with activity. Rapidly bactericidal and persistent. Effective against many viruses.

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Table 2. Skin Disinfectants

Alternating disinfectants is more effective than using a single agent. For example, an iodophor scrub can be alternated three times with 70% alcohol, followed by a final soaking with a disinfectant solution. Alcohol, by itself, is not an adequate skin disinfectant. The evaporation of alcohol can induce hypothermia in small animals.

AGENT	EXAMPLES	COMMENTS
Iodophors	Betadine®, Prepodyne®, Wescodyne®	Reduced activity in presence of organic matter. Wide range of microbicidal action. Works best in pH 6-7.
Cholorhexidine	Nolvasan®, Hibiclens®	Presence of blood does not interfere with activity. Rapidly bactericidal and persistent. Effective against many viruses. Excellent for use on skin.

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Table 3. Recommended Instrument Sterilants

Always follow manufacturer's instructions for dilution, exposure times and expiration periods.

AGENT	EXAMPLES	COMMENTS
Steam sterilization (moist heat)	Autoclave	Effectiveness dependent upon temperature, pressure and time (e.g., 121oC for 15 min. vs 131oC for 3 min).
Dry Heat	Hot Bead Sterilizer Dry Chamber	Fast. Instruments must be cooled before contacting tissue. <i>Only tips of instruments are sterilized with hot beads.</i>
Gas sterilization	Ethylene Oxide	Requires 30% or greater relative humidity for effectiveness against spores. Gas is irritating to tissue; all materials require safe airing time.
Chlorine	Chlorine Dioxide	Corrosive to instruments. Instruments must be rinsed with sterile saline or sterile water before use.
Glutaraldehydes	Glutaraldehyde (Cidex®, Cetylcide®, Metricide®)	Several hours required for sterilization. Corrosive and irritating. Instruments must be rinsed with sterile saline or sterile water before use.
Hydrogen peroxide-acetic acid	Actril®, Spor-Klenz®	Several hours required for sterilization. Corrosive and irritating. Instruments must be rinsed with sterile saline or sterile water before use.

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Table 4. Recommended Instrument Disinfectants

Always follow manufacturer's instructions for dilution, exposure times and expiration periods

AGENT	EXAMPLES	COMMENTS
Alcohols	70% ethyl alcohol 85% isopropyl alcohol	Contact time required is 15 minutes. Contaminated surfaces take longer to disinfect. Remove gross contamination before using. Inexpensive.
Chlorine	Sodium hypochlorite (Clorox® 10% solution) Chlorine dioxide (Clidox®, Alcide®)	Corrosive. Presence of organic matter reduces activity. Chlorine dioxide must be fresh. Kills vegetative organisms within 3 min. Corrosive to instruments. Instruments must be rinsed with sterile saline or sterile water before use.
Chlorhexidine	Nolvasan®, Hibiclens®	Presence of blood does not interfere with activity. Rapidly bactericidal and persistent. Effective against many viruses. Instruments must be rinsed with sterile saline or sterile water before use.

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Table 5. Wound Closure Selection

MATERIAL	CHARACTERISTICS AND FREQUENT USES
Polyglactin 910 (Vicryl®), Polyglycolic acid (Dexon®)	Absorbable; 60-90 days. Ligate or suture tissues where an absorbable suture is desirable.
Polydioxanone (PDS®) or, Polyglyconate (Maxon®)	Absorbable; 6 months. Ligate or suture tissues especially where an absorbable suture and extended wound support is desirable
Polypropylene (Prolene®)	Nonabsorbable. Inert.
Nylon (Ethilon®)	Nonabsorbable. Inert. General closure.
Silk	Nonabsorbable. (Caution: Tissue reactive and may wick microorganisms into the wound). Excellent handling. Preferred for cardiovascular procedures.
Chromic Gut	Absorbable. Versatile material.
Stainless Steel Wound Clips, Staples	Nonabsorbable. Requires instrument for removal.
Cyanoacrylate (Vetbond®, Nexaband®)	Skin glue. For non-tension bearing wounds.

Suture gauge selection: Use the smallest gauge suture material that will perform adequately. **Cutting and reverse cutting needles:** Provide edges that will cut through dense, difficult to penetrate tissue, such as skin. **Non-cutting, taper point or round needles:** Have no edges to cut through tissue; used primarily for suturing easily torn tissues such as peritoneum or intestine.