

Policies and Procedures

SECTION: Research and Compliance	NUMBER: R&C-ARF-14.0			
CHAPTER: Animal Resource Facility	ISSUED: 11/2005	REV. A: 4/7/2009	REV. B:	REV. C:
POLICY: Survival Surgery in Rodents	REV. D:	REV. E:	PAGE 1 OF 8	

1. PURPOSE

This policy provides 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.

2. 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 detailing the specific procedure proposed and identifying individuals appropriately trained to perform the scope of work proposed.

The following principles described in the *Guide for the Care and Use of Laboratory Animals (the Guide)* apply to rodent surgery.

- Appropriate preoperative and postoperative care of animals in accordance with established veterinary medical and nursing practices is required
- A dedicated surgical facility is not required
- 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
- Correct use of suture materials and patterns

3. RESPONSIBILITY

The major responsibility for animal protection and monitoring during and after a procedure lies with the Principal Investigator. Any instances in which a Principal Investigator 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

Policies and Procedures

SECTION: Research and Compliance	NUMBER: R&C-ARF-14.0			
CHAPTER: Animal Resource Facility	ISSUED: 11/2005	REV. A: 4/7/2009	REV. B:	REV. C:
POLICY: Survival Surgery in Rodents	REV. D:	REV. E:	PAGE 2 OF 8	

an individual to perform animal research. Serious infractions may result in a loss of the ability to use data generated as a result of the study. This Policy applies to any Creighton University faculty, resident, staff, student, or fellow who is involved in rodent survival surgical procedures. It is the responsibility of the Principal Investigator 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.

4. PERSONAL PROTECTIVE EQUIPMENT

- Clean gown or lab coat
- Mask
- Sterile gloves
- Head cover

5. PREOPERATIVE

- 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 procedure in an area separate from where the surgery is to be conducted.
- Prepare the surgical site(s) with an appropriate skin disinfectant (see Agents, Table 2).
- Surgeons should wash and dry their hands before aseptically donning sterile surgical gloves.

6. PERIOPERATIVE

- Small animal surgical procedures performed outside of the ARF should be performed in a biosafety cabinet.
- The animal must be maintained in a surgical plane of anesthesia throughout the procedure.
- Begin surgery with sterile instruments and handle instruments aseptically (see Sterilants, 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.
- Close surgical wounds using appropriate techniques and materials.

Policies and Procedures

SECTION: Research and Compliance	NUMBER: R&C-ARF-14.0			
CHAPTER: Animal Resource Facility	ISSUED: 11/2005	REV. A: 4/7/2009	REV. B:	REV. C:
POLICY: Survival Surgery in Rodents	REV. D:	REV. E:	PAGE 3 OF 8	

POSTOPERATIVE

- 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 the approved IACUC protocol.
- In general, remove skin closures 10 to 14 days postoperatively.
- Maintain a record of surgery and postoperative care using the Rodent Post-Procedure Monitoring Card.

7. DEFINITIONS

- 7.1. **Aseptic Surgical Procedures:** Surgery performed using procedures that limit microbial contamination so that significant infection or suppuration does not occur. See Animal Resource Facility Policy R&C-ARF-13.0, "Aseptic Surgery."
- 7.2. **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.
- 7.3. **Minor Surgery:** Any surgical intervention that neither penetrates and exposes a body cavity nor produces permanent impairment of physical or physiologic function. Examples include superficial vascular cut down and percutaneous biopsy.
- 7.4. **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.

8. 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.

Policies and Procedures

SECTION: Research and Compliance	NUMBER: R&C-ARF-14.0			
CHAPTER: Animal Resource Facility	ISSUED: 11/2005	REV. A: 4/7/2009	REV. B:	REV. C:
POLICY: Survival Surgery in Rodents	REV. D:	REV. E:	PAGE 4 OF 8	

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	<ul style="list-style-type: none"> 70% ethyl alcohol 85% isopropyl alcohol 	<ul style="list-style-type: none"> Contact time required is 15 minutes. Contaminated surfaces take longer to disinfect Remove gross contamination before using Inexpensive
Quaternary Ammonium	<ul style="list-style-type: none"> Roccal® Quatricide® 	<ul style="list-style-type: none"> Rapidly inactivated by organic matter Compounds may support growth of gram negative bacteria
Chlorine	<ul style="list-style-type: none"> Sodium hypochlorite (Clorox® 10% solution) Chlorine dioxide (Clidox®, Alcide®, MB-10®) 	<ul style="list-style-type: none"> Corrosive Presence of organic matter reduces activity Chlorine dioxide must be fresh; kills vegetative organisms within 3 minutes of contact
Glutaraldehydes	<ul style="list-style-type: none"> Glutaraldehyde (Cidex®, Cetylcide®, Cide Wipes®) 	<ul style="list-style-type: none"> Rapidly disinfects surfaces
Phenolics	<ul style="list-style-type: none"> Lysol® TBQ® 	<ul style="list-style-type: none"> Less affected by organic material than other disinfectants
Chlorhexidine	<ul style="list-style-type: none"> Nolvasan® Hibiclens® 	<ul style="list-style-type: none"> Presence of blood does not interfere with activity Rapidly bactericidal and persistent Effective against many viruses

Policies and Procedures

SECTION: Research and Compliance	NUMBER: R&C-ARF-14.0			
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POLICY: Survival Surgery in Rodents	REV. D:	REV. E:	PAGE 5 OF 8	

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	<ul style="list-style-type: none"> • Betadine® • Prepodyne® • Wescodyne® 	<ul style="list-style-type: none"> • Reduced activity in presence of organic matter • Wide range of microbicidal action • Works best in pH 6-7
Cholorhexidine	<ul style="list-style-type: none"> • Nolvasan® • Hibiclens® 	<ul style="list-style-type: none"> • Presence of blood does not interfere with activity • Rapidly bactericidal and persistent • Effective against many viruses • Excellent for use on skin

Policies and Procedures

SECTION: Research and Compliance	NUMBER: R&C-ARF-14.0			
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POLICY: Survival Surgery in Rodents	REV. D:	REV. E:	PAGE 6 OF 8	

Table 3. Recommended Instrument Sterilants

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

AGENT	EXAMPLES	COMMENTS
Steam sterilization (moist heat)	<ul style="list-style-type: none"> Autoclave 	<ul style="list-style-type: none"> Effectiveness dependent upon temperature, pressure, and time (e.g., 121°C for 15 min. vs. 131°C for 3 min)
Dry Heat	<ul style="list-style-type: none"> Hot bead sterilizer dry chamber 	<ul style="list-style-type: none"> Fast Instruments must be cooled before contacting tissue <i>Only tips of instruments are sterilized with hot beads</i>
Gas sterilization	<ul style="list-style-type: none"> Ethylene oxide 	<ul style="list-style-type: none"> Requires 30% or greater relative humidity for effectiveness against spores Gas is irritating to tissue; all materials require safe airing time
Chlorine	<ul style="list-style-type: none"> Chlorine dioxide 	<ul style="list-style-type: none"> Corrosive to instruments Instruments must be rinsed with sterile saline or sterile water before use
Glutaraldehydes	<ul style="list-style-type: none"> Glutaraldehyde (Cidex®, Cetylcode®, Metricide®) 	<ul style="list-style-type: none"> Several hours required for sterilization Corrosive and irritating Instruments must be rinsed with sterile saline or sterile water before use
Hydrogen peroxide-acetic acid	<ul style="list-style-type: none"> Actril® Spor-Klenz® 	<ul style="list-style-type: none"> Several hours required for sterilization Corrosive and irritating Instruments must be rinsed with sterile saline or sterile water before use

Policies and Procedures

SECTION: Research and Compliance	NUMBER: R&C-ARF-14.0			
CHAPTER: Animal Resource Facility	ISSUED: 11/2005	REV. A: 4/7/2009	REV. B:	REV. C:
POLICY: Survival Surgery in Rodents	REV. D:	REV. E:	PAGE 7 OF 8	

Table 4. Recommended Instrument Disinfectants

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

AGENT	EXAMPLES	COMMENTS
Alcohols	<ul style="list-style-type: none"> 70% ethyl alcohol 85% isopropyl alcohol 	<ul style="list-style-type: none"> Contact time required is 15 minutes Contaminated surfaces take longer to disinfect Remove gross contamination before using Inexpensive
Chlorine	<ul style="list-style-type: none"> Sodium hypochlorite (Clorox® 10% solution) Chlorine dioxide (Clidox®, Alcide®) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Nolvasan® Hibiclens® 	<ul style="list-style-type: none"> 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

Policies and Procedures

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POLICY: Survival Surgery in Rodents	REV. D:	REV. E:	PAGE 8 OF 8	

Table 5. Wound Closure Selection

MATERIAL	CHARACTERISTICS AND FREQUENT USES
<ul style="list-style-type: none"> • Polyglactin 910 (Vicryl®) • Polyglycolic acid (Dexon®) 	<ul style="list-style-type: none"> • Absorbable; 60-90 days • Ligate or suture tissues where an absorbable suture is desirable
<ul style="list-style-type: none"> • Polydiaxanone (PDS®) • Polyglyconate (Maxon®) 	<ul style="list-style-type: none"> • Absorbable; 6 months • Ligate or suture tissues especially where an absorbable suture and extended wound support is desirable
<ul style="list-style-type: none"> • Polypropylene (Prolene®) 	<ul style="list-style-type: none"> • Non-absorbable • Inert
<ul style="list-style-type: none"> • Nylon (Ethilon®) 	<ul style="list-style-type: none"> • Non-absorbable • Inert • General closure
<ul style="list-style-type: none"> • Silk 	<ul style="list-style-type: none"> • Non-absorbable (caution: tissue reactive and may wick microorganisms into the wound) • Excellent handling • Preferred for cardiovascular procedures
<ul style="list-style-type: none"> • Chromic Gut 	<ul style="list-style-type: none"> • Absorbable • Versatile material
<ul style="list-style-type: none"> • Stainless Steel Wound Clips • Staples 	<ul style="list-style-type: none"> • Non-absorbable • Requires instrument for removal
<ul style="list-style-type: none"> • Cyanoacrylate (Vetbond®, Nexaband®) 	<ul style="list-style-type: none"> • 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.