

	UCSD INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE POLICY MANUAL	POLICY 7.02 Approved: 8.17.2011 Revised 2.20.2019
	Surgery in non-rodent mammals	

I. Background & Purpose

The University of California is committed to the improvement of human and animal health and the advancement of science. When these pursuits involve surgical procedures in animals, UCSD is committed to their humane care and use as specified in the Guide for the Care and Use of Laboratory Animals, the PHS Policy and the Animal Welfare Act.

II. Who Should Read This Policy

All personnel on an approved IACUC protocol engaged in or responsible for surgical procedures in animals.

III. Definitions

Term	Definition
Surgery	a procedure involving a skin incision or penetration of a body cavity by means other than an injection.
Survival Surgery	a surgical procedure from which an animal is expected to regain consciousness.
Non-survival Surgery	a surgical procedure from which an animal is euthanized before regaining consciousness.
Minor Surgery	a surgical procedure that does not expose a body cavity and causes little or no physical impairment. Examples include wound suturing, peripheral vessel cannulation, and placement of subcutaneous implants.
Major Surgery	a surgical procedure that penetrates and exposes a body cavity or produces substantial impairment of physical or physiologic functions. Examples include laparotomy, thoracotomy, orthopedic procedures, limb amputation and enucleation.

IV. Policy

The following rules apply to the conduct of surgical procedures in non-rodent mammals at UCSD unless a scientifically justified exception has been submitted to and approved by the IACUC.

- 1. PROTOCOL APPROVAL.** All surgical procedures to be performed on animals at UCSD must be described in an animal use protocol approved by the IACUC.
- 2. FACILITIES.** Facilities where surgery is performed must be specified in the protocol and approved by the IACUC in the Animal Use Protocol and must comply with facility-specific standard operating procedures and regulations from the USDA and the Guide for the Care and Use of Laboratory Animals.
- 3. PERSONNEL.** Only people listed on an approved animal use protocol with training appropriate to the species and procedures performed may perform the surgical procedures. Training must be documented through the personnel qualifications form associated with each applicable protocol.
- 4. STABILIZATION PERIOD.** A minimum 72 hour stabilization period following animal acquisition is required before any surgery may be performed.
- 5. PRE-SURGICAL EVALUATION AND FASTING.** Surgical staff must perform and document a pre-surgical health assessment of each animal. Withholding of food and/or water prior to surgery must be described in the applicable Animal Use Protocol.
- 6. ANESTHESIA.** Animals must be properly anesthetized for all surgical procedures consistent with the Anesthesia Policy (Policy 34.01) and as described in the applicable Animal Use Protocol. Animals must not be left unattended from the time of anesthetic induction until the animal is fully conscious, physiologically stable and able to maintain awake posture or positioning as appropriate for the species. Animals must be monitored for basic physiologic function, which at minimum includes temperature, heart rate, respiratory rate, movement, and mucous membrane color, from the time of anesthetic induction until the animal is fully conscious, physiologically stable, able to maintain awake posture or positioning as appropriate for the species or until euthanized.
- 7. MONITORING DURING ANESTHESIA.** An anesthetic record is required and must include observations from the induction of anesthesia to extubation and return of the animal to its home cage or enclosure. For anesthesia periods over 30 minutes, use of an external heat source to maintain body temperature is required and must be described in the Animal Use Protocol.

8. NON-SURVIVAL SURGICAL TECHNIQUE. At a minimum, the surgical site must be clipped, the surgeon must wear gloves and the instruments and surrounding area must be clean.

For survival surgeries, the following additional rules apply.

9. ANALGESIA and POST-SURGICAL CARE. Animals must receive adequate analgesia and post-surgical care as described in the applicable Animal Use Protocol. The post-surgical care of animals includes weekends and holidays, and must be performed by trained individuals. Observation of pain or distress beyond that anticipated and approved of in the Animal Use Protocol requires a veterinary staff consultation or euthanasia of the animal.

10. POST-SURGICAL MONITORING AND DOCUMENTATION. Post-operative observations of animal health must be documented on an approved Post-Surgical Progress Notes form. Records must be kept in the animal holding area and must be readily and independently accessible to an inspector.

Health observations must be documented at least daily:

- until suture or staple removal and adequate healing of the surgical site or at least five days following the surgery, whichever occurs latest.
- for any procedure that involves exposed instruments, catheters, bandages, etc. until removal of these items and adequate healing of the associated sites has occurred.
- for animals that exhibit signs of pain, distress, discomfort or other health complications until resolved.

Health observations must be documented at least weekly:

- after adequate healing has occurred.

Pain and/or distress beyond that anticipated and approved in the Animal Use Protocol requires a veterinary staff consultation or euthanasia of the animal.

11. LABELING OF ANIMAL CAGE. During the time of required post-operative monitoring, the animal cage or enclosure must be clearly labeled (e.g., with a sticker) with the surgery performed and the date of the procedure.

12. WOUND CLOSURE. Unless otherwise specified in the applicable Animal Use Protocol, non-absorbable suture and or surgical staples must be removed upon wound healing, not to exceed 14 days, unless wound is not healed within that time.

13. TECHNIQUE. Survival surgeries must be performed using aseptic techniques as follows:

- a. Preparation of the surgeon must include surgical scrub/hand wash and use of mask, shoe covers, cap and sterile gloves and gown.
- b. The operative field must be cleared of hair, and the skin prepared with an antiseptic solution such as povidone iodine applied using a surgical preparation technique. Use of sterile surgical drapes is required.
- c. All instruments that come into direct contact with the surgical area must be sterile.
- d. Devices (catheters, pumps, telemeters, etc.) must be sterile at the time of implantation.
- e. Use of new personal protective apparel is required for each surgery.

14. MULTIPLE MAJOR SURVIVAL SURGERIES. Multiple major surgical procedures on a single animal are acceptable only if they are (1) included in a single research project or protocol, and (2) either scientifically justified by the investigator or necessary for clinical reasons as determined by the UCSD veterinary staff.

V. Related Documents

UCSD Documents	Use of Non-Pharmaceutical Grade Medications in Animals Expired Medical Materials Anesthetic and Analgesic Dosages in Laboratory Animals Safe use of Anesthetic Gases Policy and Guidelines for Euthanasia Anesthesia Policy
Other Documents and References	Animal Welfare Act & Regulations

VI. Additional information

- Procedures with the sole purpose of tissue collection (e.g., trans-cardial perfusion) are covered under the [Policy 13 on Euthanasia](#).
- Non-survival surgical procedures lasting longer than 8 hours should be done aseptically and follow survival procedure requirements.
- If samples are being collected for tissue or microbial culture, then aseptic techniques should be followed to prevent contamination.

BEST PRACTICES FOR PERFORMING STERILE SURGERY IN NON-RODENT MAMMALS

Training

- Each person involved with a study needs appropriate training to adequately perform the duties required.
- Adequate surgical training includes asepsis, gentle tissue handling, minimal dissection of tissue, appropriate use of instruments, effective hemostasis, and correct use of suture materials and patterns.
- Individuals trained in human surgery may need additional training in other species' variations in anatomy, physiology, the effects of analgesic and anesthetic drugs, or in postoperative procedures.

Surgery Facility

- ACP-approved operating room locations are as follows:
 - BSB B104
 - BSB B269
 - CTF A050
 - URC 183
 - EFS Surgery

Preparation of the Animal

- Place a bland ophthalmic ointment such as lacri-lube on the surface of the eye to keep the corneas moist during anesthesia.
- Remove adequate amounts of hair from around the surgical site in the event that the incision will need to be extended. Hair removal and initial skin disinfection should be performed in a location separate from the surgical suite to avoid the potential for contamination of the surgical field by aerosols generated during preparation of the animal.
- Clean and aseptically prepare the surgical site using an appropriate antiseptic such as Novalsan or Betadine. Alcohol use by itself is not an effective antiseptic.
 - Carefully scrub the area with a gauze sponge starting at the center of the proposed incision and working in a circular pattern to the periphery. Do not bring the gauze from the contaminated periphery back to the clean central area.
 - You can alternate scrubs of chlorhexidine/povidone iodine with alcohol or sterile saline rinses.

- Repeat the process 3 times (scrub followed by a rinse) to minimize the presence of micro-organisms.
- The skin can be “painted” with Nolvasan/Betadine solution prior to the start of surgery.
- A sterile surgical drape must be used. This will help prevent contaminants from entering the surgical field and also provide a sterile area upon which to lay sterile instruments and suture during surgery.

Preparation of the Surgeon

- Surgical attire- Clean scrubs, sterile gown and gloves, cap, mask and shoe covers or shoes that are dedicated for use in the OR.
- The surgeon should scrub their hands up to their elbows with an antiseptic solution such as povidone iodine (betadine).
- The hands should always be held higher than the elbows during the procedure.
- Scrubbing of the hands and forearms should be performed for a minimum of 5 minutes.
- Drying is done with a sterile towel and always from the hands down to the elbows.

Preparation of Instruments and Implants (Catheters, wires, cannulae, electrodes, etc.)

- Several techniques (wet heat, dry heat, gaseous or liquid chemical agents) can be used to sterilize instruments and implants or materials that will come into contact with animal tissues. The use of steam (wet heat) or glass bead sterilizers (dry heat) are the preferred methods for sterilizing.
- If multiple surgeries will be done on the same day then multiple sterile packs will need to be prepared.
 - *Wet Heat (Steam Autoclaving)*
 - The most common method for the routine sterilization of instruments and materials.
 - *Ethylene Oxide (ETO)*
 - ACP has an ETO sterilizer that UCSD investigators can use on a recharge basis. To schedule use of this equipment please email acp-vetservices@ucsd.edu.
 - Sterilization times can vary between 12 or 24 hours depending on what is being sterilized.
 - As the gas is irritating to tissue, the instruments/implants must be properly purged before use. This purging cycle takes an additional 2 hours of time.
 - *Liquid Chemicals Agents (Gluderaldehyde/Cetylcide)*
 - Not commonly used to sterilize instruments for surgery because of the prolonged contact time necessary to kill bacterial spores.

- Chemicals used must be classified as sterilants and NOT disinfectants.
- Chemical sterilants typically require contact times of 6-12 hours, depending on the chemical used. Glutaraldehyde and cetylchide require soaking of instruments for a minimum of 10 hours to kill bacterial spores.
- Chemical sterilants must be prepared and used according to the manufacturer's recommendations.
- All sterile instruments must be thoroughly rinsed with sterile water or saline before coming into contact with animal tissues.