

	UCSD INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE POLICY MANUAL	POLICY 35.03
	Surgery in Rodents, Birds, Reptiles, Amphibians and Fish	Approved: 8.17.11 Revised: 2.20.2019 Revised: 2.17.2021

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.
USDA-covered rodent species	Rodents other than species of the genus <i>Rattus</i> or <i>Mus</i> (e.g. hamsters, gerbils, peromyscus, guinea pigs, etc.)
Contemporaneous	existing or occurring in the same period of time; data is recorded at the time of observation

IV. Policy

The following rules apply to the conduct of surgical procedures in rodents, birds, amphibians, reptiles and fish 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 and approved by the IACUC in the Animal Use Protocol and must at minimum:
 - a. include an area that may be aseptically prepared and maintained throughout the surgery
 - b. minimize unnecessary traffic and assure security
 - c. provide necessary space and resources for monitoring the animals until they are fully recovered.
- 3. PERSONNEL.** Only people listed on an approved animal use protocol with training appropriate to the species and procedures performed may conduct the surgical procedures. Training must be documented through the personnel qualifications form associated with each applicable protocol.
- 4. STABILIZATION PERIOD.** A minimum 48 hour stabilization period following animal acquisition is required prior to surgery.
- 5. 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. 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.
- 6. MONITORING DURING ANESTHESIA.** Animals must be monitored for basic physiologic function, which may include temperature, heart rate, respiratory rate, movement, mucous membrane color, etc. 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 or until euthanized.

For survival surgeries, the following additional rules apply:

- 7. 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 must be performed by trained individuals.

8. SURGICAL AND POST-SURGICAL MONITORING AND DOCUMENTATION.

A surgical monitoring record must be maintained. Post-surgical health observations must be made and documented for a minimum of five consecutive days following the surgery, including weekends and holidays. If problems arise post-operatively, the animal must be observed daily until the problems are resolved. If instrumentation is internalized, observations and documentation must continue weekly beyond the first 5 days until removal of the instrument or final disposition of the animal. If the instrumentation is exteriorized (e.g., catheters), observations and documentation must be done daily until removal of the instrument or final disposition of the animal. Records must be kept in the animal holding area, and must be readily and independently accessible to an inspector.

Observations must be recorded contemporaneously; any exceptions to this must be clearly documented and justified. If any records are recreated or reproduced in any form, the original records must be maintained.

9. CAGE LABELING. For the duration of post-surgical monitoring, cages must be labeled with the date of surgery and the procedure performed.

10. 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 the wound is not healed within that time.

11. TECHNIQUE. Survival surgeries must be performed with aseptic techniques appropriate to the procedure and in a manner to reduce microbial contamination to the lowest practical level. At a minimum, this includes the following:

a. The area designated for surgery must be used for no other purpose during the surgical session and must be cleaned and disinfected before and after use.

b. The surgical field must be cleared of hair, feathers and debris. The surgical site must be prepared with an antiseptic solution such as povidone iodine applied using a surgical preparation technique.

c. Surgeons must wear clean surgical attire (e.g. clean scrub shirt, lab coat or gown). They should wash and dry their hands before aseptically donning sterile surgical gloves or clean powder-free exam gloves. Anything entering the surgical field (including instruments, gloved-hands, solutions, suture, etc.) must be sterile. Instruments must be sterilized prior to surgery and handled to maintain sterility.

e. Devices (catheters, pumps, telemeters, etc.) must be sterile at the time of implantation.

f. For USDA-covered rodent species, the use of sterile gloves is required for each animal.

12. 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 Veterinary staff.

V. Related Documents

UCSD Documents	Use of Non-Pharmaceutical Grade Compounds in Animals Expired Medical Materials Anesthetic and Analgesic Dosages in Laboratory Animals Safe use of Anesthetic Gases Euthanasia Policy Anesthesia Policy "ALCOA": Elements Of Good Documentation
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 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 ASEPTIC SURGERY IN RODENTS

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.
- [Aseptic Technique Video](#)

Surgery Facility

- Rodent surgeries do not have to be done in a dedicated surgical suite, however, the immediate surgical area must not be used for other purposes during surgery and should be uncluttered.
- Choose a rodent surgical area with hard impervious surfaces which can be easily sanitized and disinfected before and after use.

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 all hair from the surgical site allowing for a generous border of at least 1 cm to avoid contamination of the incision with hair or to allow for extension of the incision if necessary. Hair removal and initial skin disinfection should be performed in a location separate from where the surgery will be performed to avoid the potential for contamination of the surgical site with aerosols generated during preparation of the animal.
- Clean and aseptically prepare the surgical site using an appropriate antiseptic such as chlorhexidine or povidone iodine. Alcohol use by itself is not an effective antiseptic.
 - Carefully scrub the area with a gauze sponge or q-tip starting at the center of the proposed incision and working in a circular pattern to the periphery. Do not bring the gauze or q-tip from the contaminated periphery back to the clean central area.
 - You can alternate scrubs of chlorhexidine/povidone iodine soap 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 chlorhexidine/povidone iodine solution prior to the start of surgery.
- A sterile surgical drape 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

- Surgeons should wear a clean scrub shirt, lab coat or gown and wash and dry their hands before putting on sterile surgical gloves or clean gloves.
- **Note on gloves:** *Sterile gloves are only required if you are touching the surgical site or the tip of sterile instruments with your gloved hands, otherwise you may wear new, clean, powder-free non-sterile gloves. Put on a new pair of gloves after you have prepared the surgery area and the patient, before you start your surgery. If you need to touch animal tissue with your hands, or there is any possibility of this, you MUST wear sterile gloves.*
- A surgical mask is recommended for both major and minor procedures.

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.

- *Wet Heat (Steam Autoclaving)*
 - It is recommended to use a new set of steam autoclaved instruments for every 4-5 major surgical procedures.
 - In between each of these 4-5 procedures autoclaved instruments can be sterilized with a glass bead sterilizer.
- *Dry Heat (Glass Bead Sterilizer)*
 - Optimal method for re-sterilization of the tips of instruments on the day of surgery.
 - Remove all organic material and blood from the instrument.
 - Immerse the tips into a glass bead sterilizer for at least 15 seconds.
 - Thoroughly cool the instruments prior to use in the animal. This can be accomplished by dipping them in sterile water or placing them on a clean work surface with the tips elevated to avoid contamination.
 - Only the sterile tips should touch the prepped skin of the animal or come into contact with internal tissues.

Some instruments and implants may require other methods of sterilization such as the use of a gaseous chemical (ethylene oxide) or liquid chemicals (glutaraldehyde and cetylclide)

- *Gaseous Chemical - Ethylene Oxide (ETO)*
 - ACP has an ETO sterilizer that UCSD investigators can use on a recharge basis. To schedule use of this equipment please contact ACP Veterinary Services (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 – (Glutaraldehyde/Cetylclide)*
 - Chemicals used must be classified as sterilants and NOT disinfectants.
 - Chemical sterilants typically require contact times of 6-12 hours, depending on the chemical use. Glutaraldehyde and cetylclide require soaking of the 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 the animal tissues.