LAB_097 Subcutaneous Implant Surgery in Mice and Rats (Expiry: April 2029)

I. OBJECTIVE

To surgically implant material/device in rodents subcutaneously to meet the objectives of a specific study. This may include osmotic or mini pumps where continual controlled dosing of a drug is required.

NB: The use of (*) indicates this statement is dependent on the facility procedures
NB: The use of (**) indicates this statement is dependent on AEC Approvals

II. COMMENTS / RECOMMENDATIONS

- Users must keep monitoring records, which include surgical records and anaesthesia records (example templates can be obtained by contacting the UQBR Veterinarians or Animal Ethics Unit Veterinary Officer).
- Any associated experimental compounds or medications (including your anaesthetic protocol) must be detailed within the Animal Ethics Committee (AEC) application.
- PPE as per UQBR-REF-012 PPE Requirements Summary.
- Aseptic technique - LAB_001 Aseptic Technique for Laboratory Animal Surgery - is preferred, but Clean surgical technique must be practiced as a minimum - LAB_002 Clean Technique for Laboratory Animal Surgery.
- In the event of equipment failure, or anaesthetic recovery mid-surgery, “alleviating unanticipated pain and distress must take precedence over an individual animal reaching the planned endpoint of the project, or the continuation or completion of the project. If necessary, animals must be humanely killed without delay” (Clause 2.4.18, Australian code for the care and use of animals for scientific purposes 8th Edition., 2013 (updated 2021)), and the UQ Unexpected Adverse Event processes followed.

III. EQUIPMENT

- Disinfectants*: surface disinfectant (e.g. 70% ethanol) and skin disinfectants (e.g. chlorhexidine based). Refer to LAB_001 Aseptic Technique for Laboratory Animal Surgery and LAB_002 Clean Technique for Laboratory Animal Surgery for options.
- Clean recovery box (multiple boxes if working with multiple cohorts of animals) containing bedding material only.
- Active heating equipment* as per LAB_058 Heating Procedures in Mice and Rats
- Anaesthetic agents**
- Analgesic agents**
- Implant material**
- Hair removal items*– as per LAB_089 Rodent Hair Removal Prior to Procedures
- Ophthalmic lubricant (non-medicated, viscous and pH neutral: e.g. Refresh “Lacri-lube”©, Visco-tears© gel)
- Sterile surgical instruments
    - Including: scalpel e.g. #15, fine Iris straight surgical scissors
- Sterile surgical consumables
    - Including: gauze, sterile cotton tips, absorbable monofilament suture (size: 4-0, 5-0 or 6-0), warmed normal (0.9%) saline (sterile), 7mm or 9mm wound clips and wound clip applicator or surgical glue.

IV. SAFETY AND COMPLIANCE

- Possible risks include mouse bite injury, needle stick injury, spills, exposure to infectious agents, repetitive task musculoskeletal injury and psychosocial harm.
- The person undertaking this task must ensure all relevant approvals are in place, training has been undertaken, and risk assessments have been performed. If unsure, consult your supervisor.

V. PROCEDURE

1. Turn on heat mats, ensure recovery boxes are sitting on heat mats and are warming – ref. LAB_058 Heating Procedures in Mice and Rats
2. Prepare yourself and the workstation as per LAB_001 Aseptic Technique for Laboratory Animal Surgery / LAB_002 Clean Technique for Laboratory Animal Surgery
3. Perform a clinical assessment of the animal (e.g. as per the Standard Score Sheet) and if suitable, proceed with anaesthesia and analgesia of the animal as per AEC approved protocol.**
4. Apply ophthalmic lubricant to both eyes, using a sterile cotton tip.
5. Assess the animal's anaesthetic depth (refer to the relevant UQBR anaesthesia SOP. When an adequate depth of anaesthesia is confirmed, proceed with surgery preparation, including removal of fur as per LAB_089 Rodent Hair Removal Prior to Procedures.
6. *If movement of skeletal muscle, or withdrawal reflexes are present at any point throughout the procedure, activity must stop and only resume once sufficient anaesthetic depth is regained. If you are having difficulty maintaining appropriate anaesthetic depth consult a UQBR veterinarian immediately.*
7. Clean and disinfect skin as per LAB_001 *Aseptic Technique for Laboratory Animal Surgery* / LAB_002 *Clean Technique for Laboratory Animal Surgery***
8. Make a skin incision using fine surgical scissors or a scalpel blade. The location of the implant is project-specific and subject to AEC approval. The incision should be as small as possible to accommodate the implant.
9. Use blunt dissection to make a subcutaneous pocket of sufficient size to comfortably hold the implant. Where possible, make the pocket cranial to the incision site so that the implant does not sit immediately under the incision line.
10. Insert the implant material following the manufacturer's advice.

Figure 1. 100uL capacity Alzet Mini Pump. This company produces 3 pump sizes: 100uL (appropriate SC for mice and rats >10g), 200uL (appropriate SC for mice and rats >20g), and 2mL (appropriate SC for rats only >150g), limitations exist relative to subcutaneous placement of minipumps, always check manufacturers details (Alzet, 2019).

11. Close the incision using either suture material, or wound clips. Note that surgical glue is not usually sufficient for closure after this type of surgery.

    Ensure there is minimal tension over the surgical site, either over the implant or at the incision. Also ensure the implant does not sit directly under the incision site. Note if inserting a mini pump, the moderator head should be inserted away from the incision.

12. Place the animal into a recovery box, maintained on a heat mat until recovered from anaesthesia. The recovery box may then be placed into a climate controlled, Ventilated Cabinets® (if available) for ~12 hours recovery.
13. You must clean and disinfect all equipment between each animal.
14. Continuously monitor all rodents during surgery and throughout the recovery phase by keeping them within line of sight. Return to the home cage once ambulatory. Ongoing monitoring is as described by the approved AEC activity.**
15. Update Cage Card and records
16. Monitor for post-operative complications such as pain or wound breakdown. Ensure post-operative analgesia is provided. Remove skin sutures or surgical clips between 10-14 days post-operatively.

VI. BIBLIOGRAPHY

1. Alzet Osmotic Pumps 2019, viewed 18 January 2019, http://www.alzet.com/company/.

Version #	Reviewing AEC	AEC Review Date	Approved Until
2	Laboratory Biomedicine AEC	16/02/2022	16/02/2025
3.1	Laboratory Biomedicine AEC	02/04/2026	02/04/2029