

STANDARD OPERATING PROCEDURE #202

RODENT STEREOTAXIC SURGERY

1. PURPOSE

The intent of this Standard Operating Procedure (SOP) is to describe procedures for rodent stereotaxic surgery.

2. RESPONSIBILITY

Principal investigators (PI) and their staff, veterinary care staff or any individual performing stereotaxic surgery on rodents, or assisting in those procedures.

3. MATERIALS

- 3.1. Anesthetics
- 3.2. Non-steroidal analgesic (such as carprofen or meloxicam; see Rodent Analgesia SOP)
- 3.3. Lidocaine-bupivacaine, 1:1 mixture (local analgesic)
- 3.4. Sterile 0.9% saline
- 3.5. Sterile ophthalmic ointment
- 3.6. Electric clipper
- 3.7. Gauze
- 3.8. Antiseptic solution for skin (e.g., chlorhexidine 2% solution or povidone-iodine solution, 70% alcohol, or 2% chlorhexidine in 70% alcohol solution)
- 3.9. 3% Hydrogen peroxide
- 3.10. Heating disc, warming pad or warm-water circulating pad (do not use electric heating pads unless specifically designed for use with laboratory rodents), insulating material (thermal drapes, bubble wrap)
- 3.11. Sterile surgical instruments
- 3.12. Sterile gauze and swabs
- 3.13. Sterile drapes
- 3.14. Drill, sterile stainless steel screws, sterile cannulae, sterile Hamilton syringe
- 3.15. Suture material or wound clips (Autoclips)
- 3.16. Dry bead sterilizer or cold sterilization agents (e.g. glutaraldehyde) and 70% alcohol (as a rinsing agent)

4. PROCEDURES

- 4.1. Document the details of the surgical procedure in the Rodent Procedure Log.
- 4.2. Pre-operative Care:
 - 4.2.1. Perform pre-operative procedures at a safe distance from the surgical environment in order to prevent contamination with hair(r)-6.3 ((r)-6.3dr0.1 ()J2.3 (irgt)-1)tha7594.2.1.

4.2.9.

4.4. Surgical Monitoring and Supportive Care:

- 4.4.1. Provide a contact heat source to prevent hypothermia.
- 4.4.2. Frequently monitor the presence of reflexes, the respiratory rate and breathing pattern, and when available, the heart rate.
- 4.4.3. Adjust the depth of anesthesia according to monitored parameters (presence of reflexes, respiratory rate and breathing pattern, heart rate).
- 4.4.4. In the case of respiratory arrest, stop anesthesia, administer oxygen and compress the thorax rapidly between the thumb and index at a frequency of 80-120/min.

Post-operative Care:

- 4.5.1. Post-operative care begins immediately following surgery, lasts a minimum of 3 days, and extends for up to 10 days.
- 4.5.2. Post-operative animals should be identified with a Post-Procedure cage card.
- 4.5.3. Do not return animals that have not completely recovered to an animal housing room.
- 4.5.4. Observe the animal until it regains righting reflexes; do not leave recovering animal unattended. Observe respiration and coloration of the eyes (for albinos), mucous membranes, and skin.
- 4.5.5. Prevent heat loss and maintain the animal in contact with a heat source or inside a heated cabinet until it regains righting reflexes.
- 4.5.6. Administer oxygen if necessary.
- 4.5.7. For surgeries exceeding 60 minutes, or if there has been significant blood loss, administer an additional 0.2 to 0.5mL/10 g body weight of isotonic fluids, subcutaneously.
- 4.5.8. Monitor animals daily for at least the first 3 days following the surgery. Continue daily monitoring and contact veterinary care staff if recovery is prolonged beyond 3 days. Record supportive care provided on the Post-Procedure cage card.
 - 4.5.8.1. Repeat analgesics post-surgically according to Rodent Analgesia SOP 101.
 - 4.5.8.2. Provide moistened food at the bottom of the cage.
 - 4.5.8.3. Administer from 0.2 to 0.5mL/10g body weight of isotonic fluids, subcutaneously.
 - 4.5.8.4. Examine the wound daily for signs of inflammation or infection such as redness, swelling or purulent discharge.
 - 4.5.8.5. Ensure adequate wound closure, presence of sutures or wound clips.
 - 4.5.8.6. Measure body weight.
- 4.5.9. Remove skin sutures or wound clips after 7 to 10 days.

5. REFERENCES

- 5.1. Gardiner TW, Toth LA. Stereotactic Surgery and Long-Term Maintenance of Cranial Implants in Research Animals. *Contemp Top Lab Anim Sci.* 1999 Jan;38(1):56-63.
- 5.2. Bradfield JF, Schachtman TR, McLaughlin RM, Steffen EK. Behavioral and physiologic effects of inapparent wound infection in rats. *Lab Anim Sci.* (1992). Dec;42(6):572-8.
- 5.3. Noell WK, Walker VS, Kang BS, Berman S. (1966). Retinal damage by light in rats. *Invest Ophthalmol Vis Sci* 5:450-473
- 5.4. J. Lanum, The damaging effects of light on the retina. Empirical findings, theoretical and practical implications. *Surv Ophthalmol.* (1978). Jan-Feb; 22(4): 221–249.

SOP REVISION HISTORY

DATE	NEW VERSION
2018.03.21	3.13 Sterile drapes
2018.03.21	4.1. Document the details of the surgical procedure in the Rodent Procedure Log.
2018.03.21	4.2.1. Apply 70% alcohol with gauze or swabs to the surgical site. Be careful not to wet a large area on the animal as the evaporation of alcohol will lead to heat loss. 4.2.2. Wash the surgical site with 2% chlorhexidine solution or povidone-iodine solution.
2018.03.21	4.3.6. Use the drape to shield the animal's eyes from surgical lights as prolonged exposure to intense light may cause damage to the retina.
2018.03.21	4.3.8 Reflect02 (e)-1hi ()asne s4.3.4.3.03. WaleciWasnid(i)13.8 (t)16.4 (e)7 (s)3.5uti a tc(r)-9.1 -2t 15 Tc 0.003(a)5.2 (led()2(lc)-1(o)-12 4.58 bup Tw 26.90 Tc 0(s)3.5c5 (t)2.5)3.5

Investigator:	Protocol:
Procedure: Stereotaxic Surgery	Performed by:

Instructions: complete this log for rodent procedures requiring anesthesia, analgesia or post-procedure care (ex. surgeries, experimental infection). Keep the log in the housing room while active and in your files for 3 years for future review by the Quality Assistant and/or the FACC.

ANALGESIA

..carprofen: mouse: 20mg/kg, rat: 5-10 mg/kg, SC, every 24 hrs
 ..buprenorphine: mouse: 0.1mg/kg SC or IP every 4-8 hrs;
 rat: 0.05mg/kg, SC or IP, every 8-12 hrs
 ..lidocaine/bupivacaine (local analgesic)
 ..other: _____

ANESTHESIA

..isoflurane 2-2.5%
 ..ketamine/xylazine/acepromazine*:
 mouse: 100 mg/kg (K)- 10 mg/kg (X)- 3 mg/kg (A) IP
 rat: 50 mg/kg (K)- 5 mg/kg (X)- 1 mg/kg (A); IP or IM
 ..other: _____

OTHER AGENTS ADMINISTERED

Animal ID	Date	Anesthesia		Analgesia		Other		Heat Source Provided		Recovery time	Comments/observations	Initials
		dose	time	dose	time	dose	time	procedure	recovery			

ANALGESIA

...carprofen: mouse: 20mg/kg, rat: 5-10 mg/kg, SC, every 24 hrs

...buprenorphine: mouse: 0.1mg/kg SC or IP every 4-8 hrs; rat: 0.05mg/kg, SC or IP, every 8-12 hrs

... OTHER _____

Initial the appropriate boxes when completed

Animal ID	Date	Analgesia			SC fluids			Wet food			Time			Remove Sutures (Day 7-10)
		Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	
1														