Jul 23, 2020

Minipump Subcutaneous Implantation for Rats

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1 Works for me This protocol is published without a DOI.

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ABSTRACT

This protocol outlines the step-by-step procedure for performing subcutaneous implantation of osmotic minipumps on rats.

PROTOCOL CITATION

Lani Tieu, Lauren Smith, Olivier George 2020. Minipump Subcutaneous Implantation for Rats. **protocols.io** https://protocols.io/view/minipump-subcutaneous-implantation-for-rats-bh7gj9jw

KEYWORDS

osmotic minipump, rats, surgery

CREATED

Jul 02, 2020

LAST MODIFIED

Jul 23, 2020

PROTOCOL INTEGER ID

38856

GUIDELINES

Keep surgery station/field as clean and sterile as possible:

- Wear sterilized gloves when operating on a rat
- Replace pads after operating on 3-4 rats
- Sterilize tools in hot bead sterilizer or keep them soaking in betadine-alcohol solution in between animals

Always make sure the rat is completely anesthetized before beginning the surgery

- Pinch between the toes to check for a response
- Do not begin surgery if you see the rat resisting/pulling back its leg

Monitor the oxygen and fluid level of the anesthesia machine to ensure that isoflurane is being delivered to nose cone during surgery.

MATERIALS

NAME	CATALOG #	VENDOR
Anesthetic (Isoflurane)	NC9259743	Fisher Scientific
Isoflurane vaporizer	Mobile Laboratory Animal Anesthe	VetEquip
Vetbond		3M corporation

MATERIALS TEXT

- Osmotic minipumps, prepared and filled with drug
- Scale
- Surgery log book and sheets
- Anesthesia machine
- Isoflurane
- Green/blue pee pads
- Lamp
- Gauze
- Alcohol prep pads
- Betadine swabsticks
- Sharp scissors or scalpel
- Blunt scissors
- Tooth/tissue forceps
- Dish with betadine-alcohol solution
- Dish with sterile water
- Suture thread and needle
- Vetbond
- Cefazolin (160 mg/kg)
- Flunixin (2.5 mg/kg)
- Saline (Bacteriostatic)
- (2) 1 ml syringes
- 25-gauge needles (blue)
- Recovery cage
- Water-circulating heating pad
- Post-op stickers (orange)

SAFETY WARNINGS

There is potential exposure to isoflurane which may cause dizziness and headaches.

BEFORE STARTING

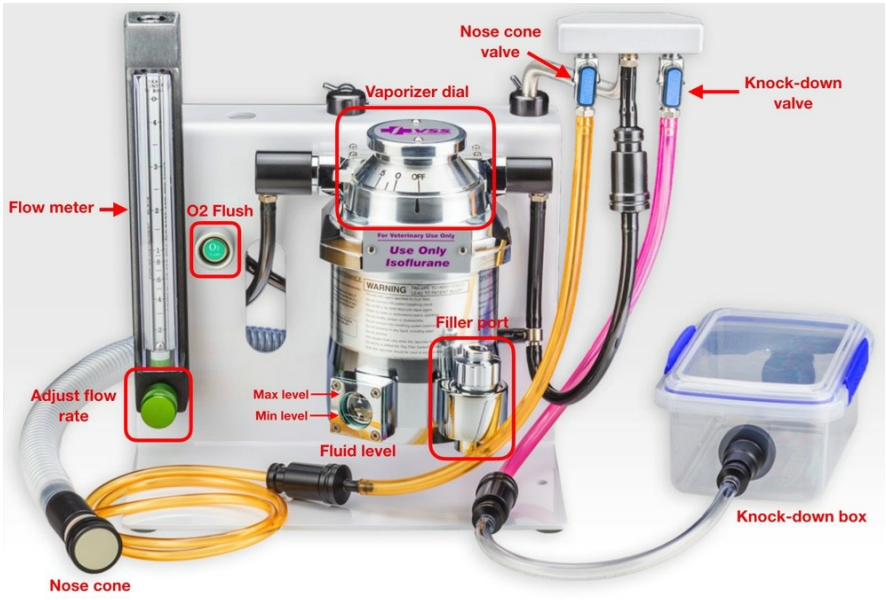
Set up prepping/recovery station:

1. Line the prepping/recovery station with green pads.
2. Set up prepping field with shaver, scale, and surgery log.
3. Set up recovery field with vetbond, cefazolin (160 mg/kg, antibiotic), flunixin (2.5 mg/kg, analgesic), 25 gauge needles (blue), 1 ml syringes (1 for cefazolin and 1 for flunixin), 10 ml syringe, and a recovery cage (lined with blue pad) placed on top of a water-circulating heating pad.

- Prepare 160 mg/kg cefazolin: add 6.25 ml saline in 1 vial of cefazolin (each vial contains 1 g cefazolin)
- Prepare 2.5 mg/kg flunixin: add 1.5 ml flunixin to 30 ml bottle of saline (diluted from 50 mg/kg flunixin meglumine solution)

Set up anesthesia machine:

1. Place the mobile rodent anesthesia machine next to surgery station. Place nose cone on surgery table and secure it with tape.
2. Open oxygen tank with tank wrench. Place the knock-down valve (pink) in the downward position to release air-flow to the induction chamber.
3. Adjust oxygen flow rate to 1 LPM.
4. While isoflurane vaporizer is OFF, unscrew the filler port and pour isoflurane into the resevoir until the fluid level is just below the max level.



Anesthesia machine diagram.

Set up surgery station:

1. Line the surgery station with green pads.
2. Set up surgery field with lamp, alcohol prep wipes, surgery tools, gauze, suture thread, suture needle, 1 dish with betadine-alcohol solution, and 1 dish with sterile water.

Procedure

1 Anesthetize rat in induction chamber with isoflurane vaporizer dial on 5.

2 Shave the rat's back starting from above the hind legs to the shoulders.

3 Weigh the rat and record weight on the surgery sheet.

4 Place the rat on surgery table and put its nose in the nose cone. Put vaporizer dial on 3.

5 Clean the rat's back with alcohol prep pad and betadine swabstick.

6 With sharp scissors or scalpel, make an incision on the lower back just above the hind legs. Make the cut wide enough for the minipump to be inserted.

7 Use tooth/tissue forceps to hold the skin up and blunt-dissect with blunt scissors.

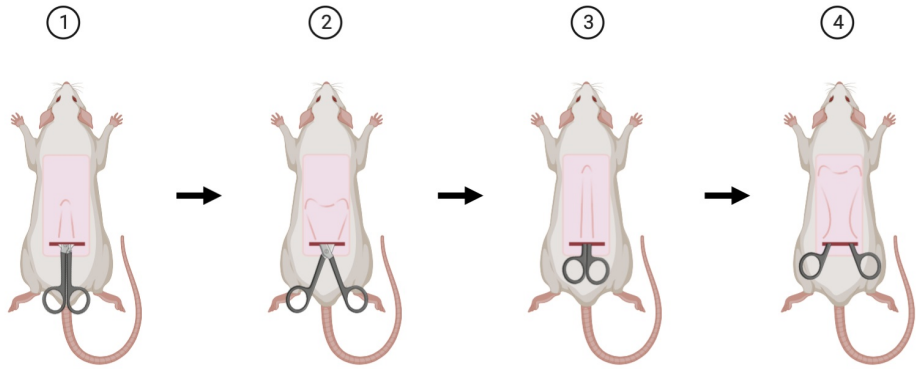
7.1 Insert closed blunt scissors into the incision, keeping them parallel to the rat's back.

7.2 Open the scissors while they are inside to separate the skin from the muscle, and create a subcutaneous pocket.

7.3 Pull scissors out while they are open and repeat steps 7.1 and 7.2 moving towards the shoulders. Make the pocket big enough for the minipump to sit inside.

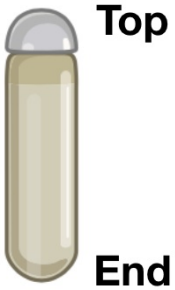
The minipump should not rest against the incision when it is closed up.

Never close the scissors while they are inside the animal.

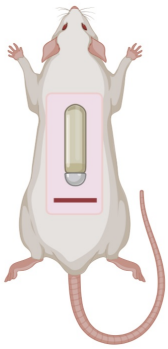


Steps for blunt-dissecting the subcutaneous tissue.

8 Pick up the filled minipump by the top and insert it with the end going in first.



Minipump.



Placement of minipump in rat.

9 Close the incision site with sutures and vetbond. Write down how surgery went in surgery sheet.

10 Give point-body weight intramuscular cefazolin injection.

11 Give point-body weight subcutaneous flunixin injection.

12 Place the rat in recovery box. Wait for the rat to wake up and show some active behavior before returning to home cage. Write down recovery notes in surgery sheet.

13 Put POST-OP sticker on cage card with date and type of surgery.

14 Sterilize surgery tools before operating on the next rat.