LAB_093 Urinary Catheter Insertion in Female Mice

I. OBJECTIVE

To perform urinary catheter insertion in female rodents to deliver substances into the bladder.

II. COMMENTS / RECOMMENDATIONS

- Users must keep monitoring records, which includes surgical 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 is facility dependent, however, this should at least include disposable gloves, long sleeved lab gown, face mask, safety glasses, hair bonnet, closed in shoes.
- Wherever possible, active heating (e.g. a heat mat) must be used at all times.
- Clean surgical technique must be practiced, as per LAB_002 Clean Technique for Laboratory Animal Surgery
- Wherever practicable, aseptic surgical technique must be practiced, as per LAB_001 Aseptic 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 Edn., 2013)

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 boxes – standard housing boxes including sterile feed, water, appropriate nesting materials (to aid thermal support) and environmental enrichment.
- Active heating equipment (e.g. fit for purpose heat mats, Aria Ventilated Cabinets®)
- Anaesthetic agents – as per AEC approved protocol
- Ophthalmic lubricant (non-medicated, viscous and pH neutral: e.g. Refresh “Lacri-lube”©, Visco-tears© gel)
- Sterile surgical consumable
    - Including: gauze, cotton tips, IV catheter (22G 0.60 x 25mm)

IV. PROCEDURE

1. Prepare yourself and the work station as per LAB_001 Aseptic Technique for Laboratory Animal Surgery / LAB_002 Clean Technique for Laboratory Animal Surgery
2. Prepare clean, warm recovery boxes (e.g. resting on a heat mat).
3. Anaesthetise the animal as per AEC approved protocol.
4. Check for the absence of a withdrawal reflex. If a withdrawal reflex is present, the animal is not sufficiently anaesthetised and anaesthetic depth needs to be increased prior to proceeding.

   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 regained. If you are having difficulty maintaining appropriate anaesthetic depth consult a UQBR veterinarian (once the animal has recovered, and before proceeding to anesthetise any more animals).

5. Apply ophthalmic lubricant to both eyes, using a sterile cotton tip.
6. Lie the rodent in dorsal recumbancy and express the bladder by manual palpation and gentle pressure
7. Prepare the animal by disinfecting the peri-urethral area as per LAB_001 Aseptic Technique for Laboratory Animal Surgery / LAB_002 Clean Technique for Laboratory Animal Surgery.
8. Gently insert the catheter into the urethra until it reaches the bladder using one of the below methods

   The urethra has a 'U' bend from the external opening to the bladder. Understanding the anatomy will make catheter insertion much easier. Some rodents may be difficult to catheterise, if this occurs identify the animal on the cage card to avoid future use. Ensure a new sterile catheter us used for each animal. As a guide the correct length of insertion for a 7 week old female is 10mm, a warning mark on the catheter is useful.

   For training purposes, the use of fresh white mice cadavers and pigmented water-soluble solution is helpful as the catheter and correct placement in the bladder can be visualized. A volume of 25ul is sufficient to measure successful delivery.

   Method One

   a. Restrain the hips firmly and push skin/peri-urethral area caudally (towards the tail) to straighten the urethra.
   b. Insert tip of catheter, then slightly reduce hold on the peri-urethral area
   c. Gently advance the catheter to the bladder, reducing hold on peri-urethral to improve movement of catheter under the pubic bone

   Method Two

   a) Insert tip of catheter in a cranial to caudal (head to tail) direction about 3mm.
   b) With the tip in place swing the free end of the catheter caudally to the direction of the tail tip until it is parallel with the tail
   c) Gently advance catheter to the bladder

   Method Three

   a. Place the animal in ventral recumbency (on its front). Lift the animal by the tail and bend the tail backwards until perpendicular to spine and flexing the spine over your hand.
   b. Insert the catheter tip and then maintain a slight curve in the catheter as it is advanced to the bladder.

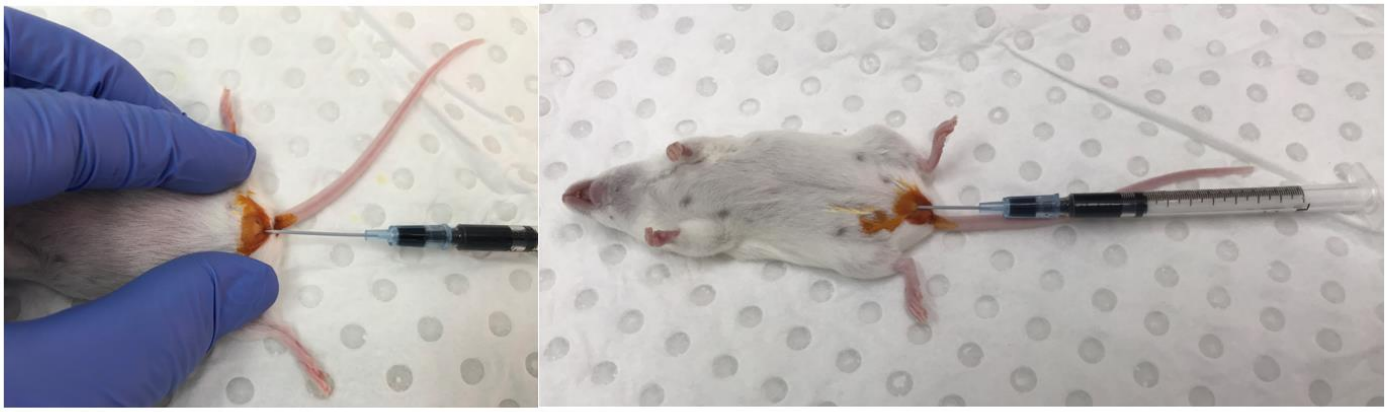

Figure 1 Placement and insertion of the catheter in a female mouse (UQBR 2021).

9. Once the catheter is in the correct location push slowly on the plunger to deliver the solution. *If resistance is felt withdraw slightly to re-position as the catheter tip may be pushing against the wall of the bladder.*
10. Slowly remove the catheter on a 30-45 degree angle to reduce leakage
11. Place the animal into a recovery box, maintained on a heat mat until fully ambulatory. If available, recovery boxes may then be placed into a climate controlled, Ventilated Cabinets® for ~12 hours recovery.
12. Clean and disinfect all equipment between each animal.
13. Continuously monitor all mice during surgery and throughout the recovery phase until fully ambulatory. *It is common to observe grooming of the per-urethral area up to 30 minutes following recovery.*

V. REFERENCES

1. National Health and Medical Research Council (NHMRC) 2008, *Guidelines to promote the wellbeing of animals used for scientific purpose,* viewed 13 October 2021, https://www.nhmrc.gov.au/about-us/publications/guidelines-promote-wellbeing-animals-used-scientific-purposes
2. Office of the Gene Technology Regulator (OGTR) n.d., viewed 13 October 2021, http://www.ogtr.gov.au/
3. St Clair, M, Sowers, A, Davis, J, & Rhodes, L 1999, 'Urinary Bladder Catheterization of Female Mice and Rats', *Contemporary Topics in Laboratory Animal Science,* vol. 38, no. 8, pp. 98-79.
4. University of Queensland n.d., *Health, safety and wellbeing,* viewed 13 October 2021, https://staff.uq.edu.au/information-and-services/health-safety-wellbeing
5. University of Queensland n.d., *Health and safety risk assessments,* viewed 13 October 2021, https://staff.uq.edu.au/information-and-services/health-safety-wellbeing/health-safety-workplace/risk/assessments
6. UQ Biological Resources, 2021 Urinary Catheter Insertion in Female Mice.

Version #	**Reviewing AEC** (note: all other relevant AECs ratify the approval)	**AEC Review Date**	**Approved Until**
2	LBM	16/02/2022	16/02/2025