

Tail Vein Injections in the Mouse and Rat SOP

Purpose

This Standard Operating Procedure (SOP) describes the methods for injection of substances in rats and mice using the lateral tail veins. This SOP follows the CCAC guidelines for the injection into the tail vein in laboratory rodents.

Responsibility

Those trained persons listed on an approved Animal Care Committee protocol performing the procedure

All animal users injecting rodents must have successfully completed the UBC Animal Care Services (or equivalent) Rodent Biology and Husbandry course

References

Canadian Council on Animal Care (CCAC) guidelines (www.ccac.ca)

Calculations

Species	Recommended Needle Gauge	Recommended Maximum Volume (5-10ml/kg)
Mouse (25gm)	25-27G	0.125ml – 0.25ml
Rat (200gm)	25G	1ml – 2ml

Materials

- Appropriate animal restrainer
- Appropriate needle size for the species
- Appropriate sized syringe
- Solution to be injected
- Heat source (heating pad or bowl of warm water)
- 70% isopropyl alcohol
- 2 x 2" gauze

Procedure

1. Place the mouse or rat in a cage on the heating pad, turned on 'low', for 5-10 minutes or soak the tail in warm water to cause vasodilation (enlargement) of the vein. Ensure the animal does not overheat.

Note: Heat lamps are not recommended as they pose a higher risk of causing hyperthermia and burn related injuries to the animals.

2. Place the animal in the restraining device.



Mouse



Rat

3. Swab the tail with a gauze dampened with alcohol to increase the visibility of the vein.
4. Locate one of the two lateral tail veins in the middle third of the tail.

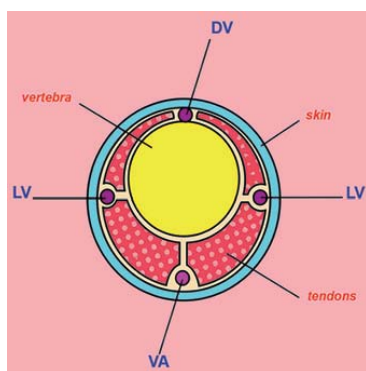


Diagram of a transverse sectional view of a rat tail showing the dorsal vein (DV), lateral veins (LV), and the ventral artery (AV). Image reprinted from *The Laboratory Rat*, G.J. Krinke (Ed.), pp 491, Copyright 2000

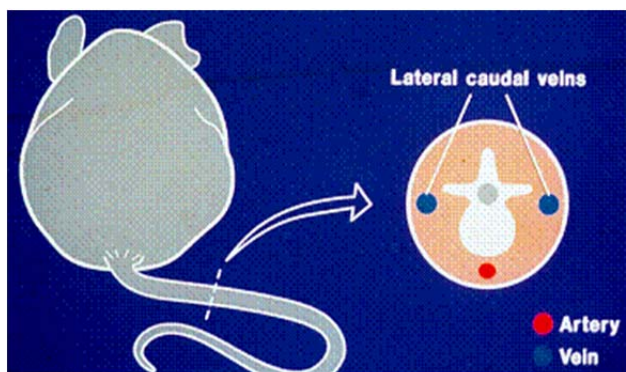


Diagram of a transverse sectional view of mouse tail lateral veins and ventral artery.
Kathryn Flynn, NIH – DVR - SoBran

5. Restrain the tail while occluding the vein with your non-dominant hand. With the bevel of the needle facing upward and the needle almost parallel to the vein, slide the needle into the tail vein. Confirm the location by gently applying negative pressure to the plunger; if the needle is in the vein you should see a flash of blood in the hub of the needle. If you do not see a flash of blood in the hub of the needle pull your needle back slightly without removing it from the tail, while keeping negative pressure in the syringe and redirect the needle until you see a flash of blood.

*Mouse**Rat*

6. Release the vein occlusion proximal (closer to the animal) to your injection site. Slowly press the plunger to inject your substance into the vein. If the needle is in the vein, there will be no resistance while injecting and the vein itself will blanch. If the needle is not in the vein, the fluid will cause blanching around the vein or a subcutaneous bleb.
7. Remove the needle from the vein and apply slight pressure to the puncture site with a dry piece of gauze until the bleeding has stopped.
8. Remove the animal from its restrainer and place it in the cage. Monitor the animal for 5-10 minutes to ensure hemostasis (bleeding has stopped).

Complications

1. Tail necrosis: Perivascular (outside of the vein) injection of fluids can potentially lead to necrosis of the tissues surrounding the injection site.
2. Hyperthermic signs include:
 - a. Red extremities
 - b. Rapid respiration or panting
 - c. Decreased activity