Research and Innovation Division

Research Animal Standard Operating Procedure

SOP#79

Research Animal Standard Operating Procedures (SOP) must meet the following criteria:

1. Describe procedures or activities involving research animal(s) common to more than one research project.

2. Support the handling and or performance or undertaking of a procedure(s), involving an animal, in the same way on each occasion it is performed.

3. Describe a procedure or activity involving a research animal(s) undertaken by more than one person; and

4. Describe a procedure or activity involving a research animal(s) that will be undertaken in more than one location.

Name of Procedure	Intravenous injection in small rodents	
Species	Rat, mouse	
ACEC	**Reference**	SOP#79 – Aug 23 - Injection, intravenous-rodents
	Author	Jenny Smart
	Version	1.4
	Date approved	25 August 2023
	Date for review	31 August 2026
	Procedure classification 1. Observation involving minor interference 2. Animal unconscious without recovery 3. Minor conscious intervention 4. Minor surgery with recovery 5. Major surgery with recovery 6. Minor physiological challenge 7. Major physiological challenge	3
Ethical considerations	1. Respect for animals must underpin all decisions and actions involving the care and use of animals for scientific purposes. 2. The procedure must be performed according to current best practice to support the wellbeing of the animal. 3. Persons performing this procedure must be competent in the procedure or be under the direct supervision of someone who is competent.	

Details

Purpose

To describe the procedure for safely performing an intravenous injection in rats and mice with a minimum of stress to the injected animal.

Description of procedure

EQUIPMENT

1. Sterile syringe of sufficient size to contain the volume of injectate.
2. Sterile hypodermic needle. The needle should be of the smallest gauge possible through which the injectate can pass. Viscous solutions will require a larger gauge needle. In general, use a 25G needle for rats and a 29G needle for mice.
3. Antiseptic such as chlorhexidine in 70% ethanol in water
4. Cotton gauze swabs
5. Sharps container
6. Injection solution

NOTE:

1. Injections should be carried out in a quiet area away from other animals.
2. Animals should be acclimatised to handling before attempting injections. Use the acclimatisation period between delivery of the animal to the research holding facility and the first injection to condition the animal to the catching and restraint techniques used for the injection.
3. The maximum volume injected via the intravenous route should be no more than:

Species	Mouse	Rat
Maximum Volume for adult animal	0.2ml	2.0ml

PROCEDURE

1. Attach the needle to the syringe, apply antiseptic to the rubber diaphragm of the bottle of injectate, carefully uncap the needle and insert it through the rubber diaphragm.
2. Invert the bottle of injectate and draw up the calculated volume of injectate into the syringe.
3. Put the needle and syringe to one side. DO NOT recap needle (to avoid needle stick injuries). Avoid contaminating the sterile needle by resting the needle hub or top of syringe against the needle cap so that the needle is elevated.
4. Suitable veins for intravenous injection:
    a. Mice- lateral tail vein
    b. Rats- lateral tail vein
5. Catch and restrain animal to be injected as follows:
    a. **Mice**- use tunnel or cup handling to remove the mouse from the home cage and place into a restrainer or mouse bag, leaving the tail free.
    b. **Rats**- grasp the rat gently around the upper body and place the rat into a restrainer or rat bag leaving the tail free.
6. Prepare the site of injection as follows:
    Tail vein (Rats and Mice)- Using a cotton gauze swab soaked with antiseptic, apply the antiseptic to the injection site
7. It is common practice to stimulate dilation of the tail veins in mice either by placing them in a warmer environment (e.g. at 28-30 ºC) for up to 30 minutes, or by placing the tail in

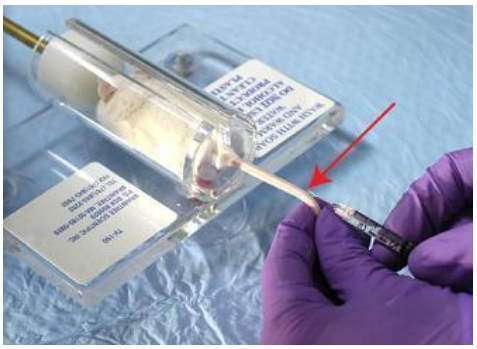
warm (30-35 ºC) water. If a warming box or incubator is used, its temperature should be monitored carefully. It is good practice to place an electronic thermometer adjacent to the animal's cage in the incubator, as the temperature registered by the device thermostat may not be accurate.

8. Ensure that the bevel of the needle is facing upwards. Insert the needle through the skin and into the vein. The needle should be inserted almost parallel to the skin.
9. Draw back on the hub of the needle to ensure that the needle has penetrated the blood vessel. Blood should be seen in the hub of the needle.
10. If the needle is correctly sited, inject and remove the needle smoothly.
11. The speed of the administration of the injection will depend on the substance to be injected.
12. Hold a dry cotton gauze swab over the site of injection for at least 60 seconds to ensure that bleeding has stopped.
13. Place needle and syringe into sharps container.
14. Release the animal back into its cage and observe for any signs of abnormal behaviour.

Images of Intravenous Injections

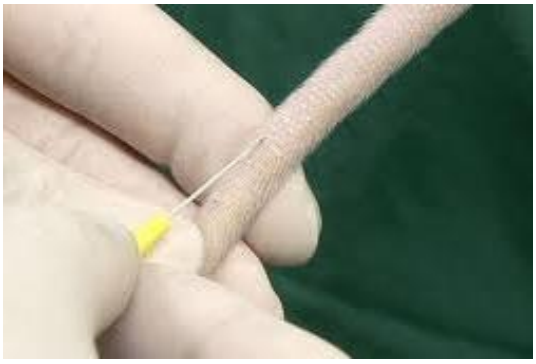
Mouse

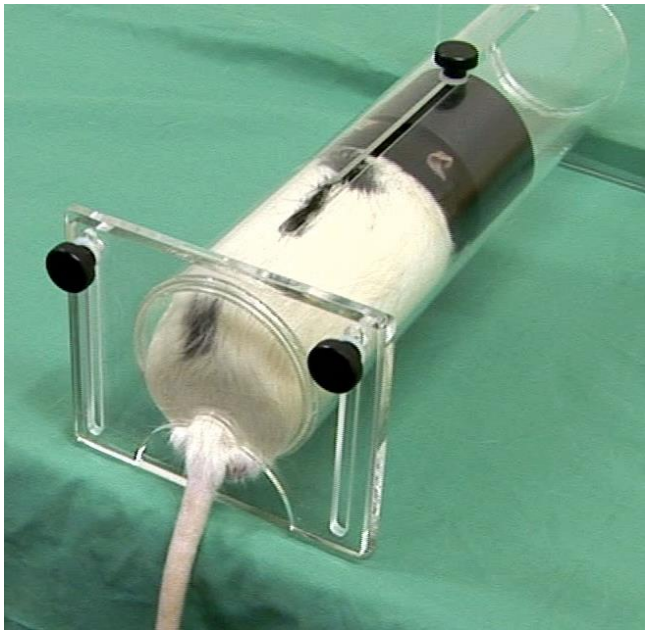
Lateral Tail Vein



Rat

Lateral Tail Vein





References

1. Refining procedures for the administration of substances" Report of the BVAAWF/FRAME/RSPCA/UFAW Joint Working Group on Refinement. *Laboratory Animals* (2001) 35, 1 41 https://journals.sagepub.com/doi/pdf/10.1258/0023677011911345

2. Basic Biomethodology for laboratory mice http://www.theodora.com/rodent_laboratory/injections.html

3. https://researchanimaltraining.com/articles/intravenous-injection-in-the-mouse/ This site was previously known as Procedures with Care. It links out from the NC3Rs site and also includes a short video of the procedure.

   Note: Photos also courtesy of these sites

ACEC Chair