Research and Innovation Division

Research Animal Standard Operating Procedure

SOP# 39

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	Blood collection – tail vein	
Species	Mouse	
ACEC	**Reference**	SOP#39-Jan-23- Blood collection – tail vein - Mouse
	Author	Phil Hansbro
	Version	1.2
	Date approved	27 January 2023
	Date for review	27 January 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

Site of Blood Collection

Tail vein

Description of procedure

1. MATERIALS

1.1 Needle- 25-26G
1.2 Blood collection device (e.g. Capillary tube)
1.3 Gauze
1.4 Antiseptic soap and water.
1.5 Restraint device
1.6 Heat lamp (optional)
1.7 Weighing machine

2. PROCEDURES

2.1 Set up work surface with the above outlined materials.
2.2 Weigh mouse and calculate approximate blood volume and maximum blood collection volumes as follows:
(i) 10% of the blood volume is the maximum that may be collected every 2-3 weeks (Table 1 below).

Body Weight (g)	20
Estimated whole blood volume (ml/kg)	70
Blood volume (ml)	1.4
10% of blood volume	0.14

2.3 Place the mouse in a restraint device such as a plexiglass or 50 ml tube that is commercially available so that the tail of the rodent extends downward to the floor.
2.4 Gently wash the side of the tail over the vein with gauze soaked with antiseptic soap and water
2.5 The veins are located on the lateral surface (either side) of the tail. If the vein is easily visible, next step is omitted.
2.6 If the vein is not readily visible, place the mouse under a heat lamp for a few minutes to cause the vein to dilate. Care must be taken not to burn the mouse's ears. Place the lamp at least 45-60 cm away from the animal. Place your hand at the animal's level for at least 1 minute to determine if the lamp is too close to the animal.

2.7 **Collection**:
(i) Occlude the vein by placing the tail between your thumb and index finger or between your index finger and middle finger. This will cause the vein to dilate.
(ii) Insert a needle into the vein until a flash of blood is seen. Start as distal (far away) from the base of the body as possible as it is easier to

successfully hit the vein lower in the tail. If you are initially unsuccessful, insert the needle directly above the last venipuncture site. The vein is very shallow so do not insert the needle at any angle to the tail.

(iii) Once the needle hub fills with blood, do not remove the needle from the tail. Insert the capillary tube(s) into the needle hub and allow gravity to fill the tubes.

(iv) Once the blood sample is collected, remove the needle from the tail and apply pressure to the venipuncture site until bleeding has stopped.

(v) Gently wash away any traces of blood before returning the mouse to its cage.

NOTE: Discard all garbage into appropriate containers and clean the work area.

Maximum volume of blood will be collected?

No more than 10% of the animal's blood volume i.e. for a 20 g mouse this is 0.14 ml.

How will the animal be monitored for the effects of acute blood loss?

Signs to be monitored as indicative of acute blood loss (hypovolaemic shock) in the mouse include pale ears and feet, cold skin and extremities, restlessness, hyperventilation, and a subnormal body temperature.

How will the animal be monitored for the effects of chronic blood loss?

Signs to be monitored as indicative of anaemia from chronic blood loss include:

- pale mucous membranes (conjunctiva or inside the mouth)
- pale tongue, gums, ears or footpads (if non-pigmented)
- increased respiratory rate when at rest (at the extreme level).

Peripheral blood smears can be examined in order to detect early changes associated with anaemia, for example, polychromasia of the red cells.

References

Diehl KH, et al (2001). A good practice guide to the administration of substances and removal of blood, including routes and volumes. *Journal of applied Toxicology* 21.1: 15-23

National Centre for the Replacement, refinement and reduction of Animals in Research. Blood sampling. Available: https://www.nc3rs.org.uk/our-resources/blood-sampling

ACEC Chair