	Flinders University **Safe Work Method Statement** **Rat – Injection Techniques** **18/06/19**	
		**College of Medicine and Public Health Animal Facility**

SWMS Number	RA Number	RA Score	
SWMS- 2.1	RA- 2.1	MEDIUM	
Contact Person	**SWMS prepared by**	**AWC Approval Date**	**Review Date**
Roxanne Collingwood	Roxanne Collingwood	18/06/2019	June 2021

Contents

The SWMS **Rat – Injection Techniques** contains the following sections:

Legislation

- *Australian Code for the Care and Use of Animals for Scientific Purposes 8th Ed.*
- *Animal Welfare Act 1985*
- *Animal Welfare Regulations 2012*
- *Gene Technology Act 2000* (the Act)
- *Gene Technology Regulations 2001*
- *Work Health and Safety Regulations 2012*

University Policy

- Work Health and Safety Policy 2013
- Responsible Conduct of Research Policy 2016
- NHMRC Guidelines

Local Policy

Use of the College of Medicine and Public Health Animal Facilities by all staff and researchers of the College of Medicine and Public Health, Flinders University, is subject to awareness of, and adherence to the following:

Research Involving Animals:

- The University holds a licence for the use of animals for teaching and research purposes. To satisfy the requirements of the licence, anyone wishing to undertake teaching and research using animals must submit a proposal to the Animal Welfare Committee. No work with animals may commence until written approval has been received from the Animal Welfare Committee. Standardised application forms for Research and Teaching can be found on the Flinders University website listed below. It is your responsibility to regularly check this site for updates to guidelines, forms etc
  http://www.flinders.edu.au/research/researcher-support/ebi/animal-ethics/animal-ethics_home.cfm

  - **All staff and students involved in animal research must complete Animal Ethics Online Training (AEOT) and must also regularly attend Animal Researcher Information Sessions (ARIS).**

Safe Work Method Statement

Refer to Risk assessments, Safe Work Method Statement for chemicals, processes and plant equipment where appropriate. All projects must have an accompanying Risk Assessment signed by the Animal Facility Manager

SWMS 2.0 Rat- Sexing, Handling, Restraint and Ear Notching
RA 2.0 Rat- Sexing, Handling, Restraint and Ear Notching
SWMS 7.0 Compliance - Emergency Contingency
RA 7.0 Compliance - Emergency Contingency
SWMS 7.1Compliance -Transportation
RA 7.1 Compliance -Transportation
SWMS 7.2 - Rodent Importation
RA 7.2- Rodent Importation

Personal Protective Equipment Required

- **Gloves**
- **Gown**
- **Mask**
- **Hair Net**
- **Shoe Covers**

Hazards and Controls

- **Animal bites- training, demonstrate competency, adhere to SWMS**
- **Animal Scratches- training, demonstrate competency, adhere to SWMS**
- **Animal Allergies- wear PPE when handling animals or handling dirty cages to stop the potential development**
- **Needle Stick- DO NOT recap needles, dispose immediately into sharps containers, adhere to SWMS**

- **Chemical exposure- wear PPE and goggles**

Before Work Commences

Ensure that you are aware of the locations of the following:

- **Spill Kit**
- **Fire Extinguisher**
- **Eye Wash**
- **Exits**

Risk Assessment and SDS (Safety Data Sheet) - Ensure that you have read and understood for all the substances being used.

Equipment

- **Check for safety and electrical compliance**
- **Ensure that you have read and understood the Risk Assessment and Safe Work Method Statements**
- **Obtain training before using any equipment**

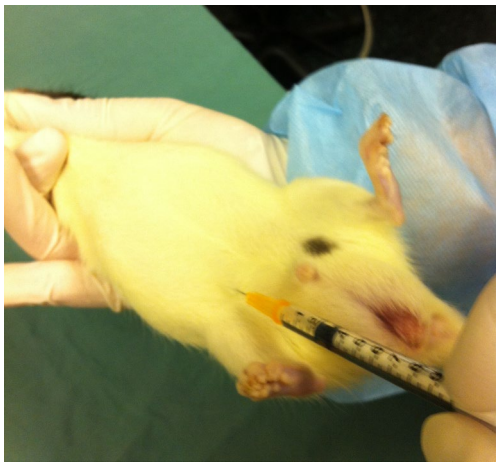
General Information

- **All procedures are to be performed by trained competent staff.**
- **Training is available from senior animal house staff or Animal Welfare Officer.**
- **Evidence of training is available in the "Training Needs Analysis"**

Intra-Peritoneal Injection

- Needle size 23 – 26G x 13-25mm, maximum bolus volume 1% of animal's body weight.
- One technician is required to restrain the rat using the method in SWMS 2.0

1. Using an appropriate size syringe and a 23 - 26 gauge needle, draw up the required dose, expel any air bubbles.
2. Gently rat tip backwards with its nose pointing towards the floor, this allows the internal organs to fall forward.
3. Insert the needle in to lower left quadrant as shown (*See Photo- intra-peritoneal*).
4. Gently draw back on the plunger, no fluid should be drawn up into the hub of the needle, then inject the required dose.



Intra-peritoneal injection

subcutaneous injection

Subcutaneous Injection

- Needle size 23 – 26G x 13 - 25mm, maximum bolus volume 1% of animal's body weight.
- Anesthesia is not required. This technique requires only one technician.

1. Using a 1 ml syringe and an appropriate gauge needle, draw up the required dose, and expel any air bubbles.
2. The injections are usually made under the skin of the back and sides, or under the skin overlying the neck.
3. Place the animal on a table and restrain.
4. Tent the skin over the shoulders between your thumb and forefinger.
5. Insert the needle through the skin in an anterior (*as shown above*) or posterior direction at a shallow angle to the skin surface.
6. Gently draw back on the plunger. If blood is not observed in the hub of the needle, inject the desired dose.
7. Withdraw the needle. Briefly apply pressure to the needle entry site.

Intradermal Injection

- Needle size 27 – 30G x 13mm, maximum number of sites is 6, depends on the thickness of the skin maximum volume is 0.05ml/site.
- This technique requires two technicians, one to restrain the animal the other to carry out the injection. Light anesthesia is required if one technician is administering the injection.
- Sites commonly used include the skin over the back and abdomen, or over the ventral surface of one hind foot.

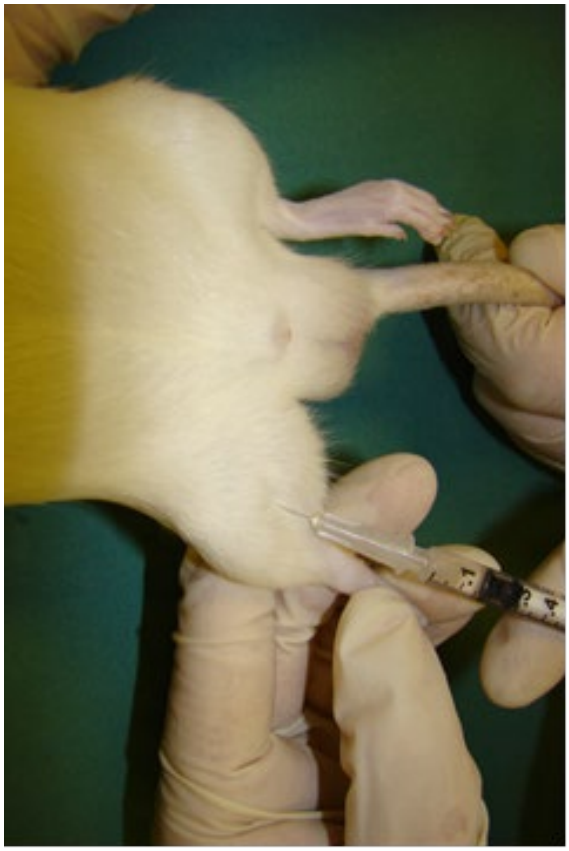
1. Shave the area to be injected.
2. With the bevel of the needle up, insert the needle almost parallel with the surface of the skin.
3. Insert the needle into the skin approximately 2-3mm, inject desired dose. Note: There is considerable resistance to the passage of the needle when it is being inserted into the dermis compared to a subcutaneous injection.
4. A bleb in the skin (*as seen in the photo below*) will indicate a successful intradermal injection.

Intradermal Injection

Intramuscular Injection

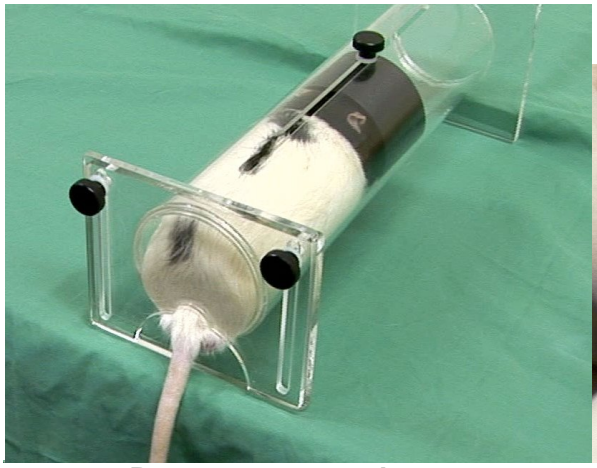
- Needle size 25 – 30G x 13mm, maximum volume 0.1ml per site.
- This technique requires two technicians if anesthesia is not used. Anesthesia is not required but can be used.
- Intramuscular injections are injected into the muscles of the hind limb, either the biceps femoris, or the quadriceps.

1. Restrain the rat and extend the hind limb. Palpate the muscle and femur with the fingertips.
2. Insert the needle anterior to the femur halfway between the hip and the knee, and parallel to the femur.
3. The needle is first directed slightly downward to enter the group of muscles, then parallel to the femur to maintain the depth while avoiding complete penetration of the muscle or touching the femur itself with the needle.
4. Care must be taken not to inject too deeply as it is possible to inject the sciatic nerve which runs down behind the femur.
5. Gently draw back on the plunger, to ensure that no blood is drawn up into the syringe, and then inject the desired dose.

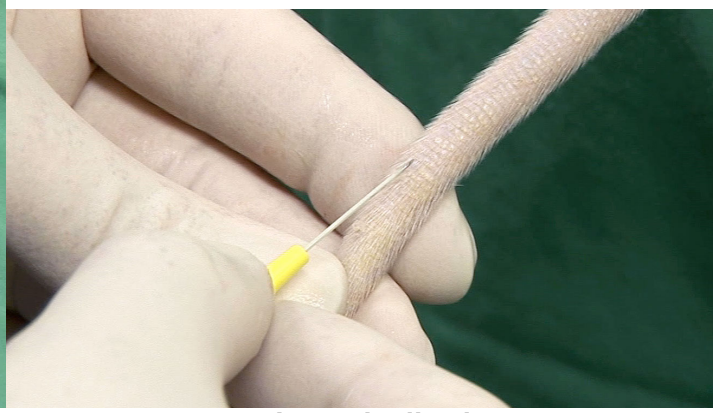


Intravenous Tail Vein Injection

- Needle size 23 – 26G x 13 - 25mm, maximum bolus volume 1% of animal's body weight.
- Anesthesia is not required and requires only one technician if the rat is restrained in a restrainer (*see photo below*).
- The tail vein can be dilated by one of several ways:
  - (i) Occluding the vessel with the thumb and forefinger.
  - (ii) Heating the tail by either immersing in warm water (37°C) for 1-2 minutes.
  - (iii) Placing the rat under a heat lamp for 3-5 minutes.
  - (iv) Placing the rat in an incubator for 3-5 minutes.
- The lateral (side) veins are immediately below the skin and must be entered at a very shallow angle, almost parallel to the vein. The tail should be bent down while the vein is being entered at the point of the bend. There are four blood vessels in the rat tail; the lateral (side) ones veins are used.



Perspex rat restrainer



Lateral tail vein

SWMS Review

This SWMS currently applies to the animals housed in the College of Medicine and Public Health Animal Facility. This SWMS will be reviewed 3 yearly, but also updated more frequently as policies, techniques and animal care requirements change.

Position	Name	Contact Details
Manager Animal Facility	Roxanne Collingwood	8204 4380 roxanne.collingwood@flinders.edu.au
Animal Welfare Officer	Lewis Vaughan	0450 424 143 awo@flinders.edu.au

Useful References

http://www.nhmrc.gov.au

http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/home-1

http://www.adelaide.edu.au/ANZCCART/

http://www.flinders.edu.au/research/researcher-support/ebi/animal-ethics/animal-ethics_home.cfm

Any questions regarding the above guidelines and any technical advice/ assistance required can be directed to Animal Facility Manager.