



Curtin University Standard Operating Procedure

RODENT DOSING

Number: TEC 06

Version: 1.2

Date: 01/10/2008

Aim/Purpose: To describe the procedures for dosing animals for experimental or therapeutic purposes.

The routes listed below are commonly used dose routes. Other routes are described in the literature. When using a novel route the technique should be practiced on cadavers or training by an experienced operator sought. Refinement techniques for dosing involve reducing volume of injectate and using the smallest needle size possible. Volumes given are recommended maximums- it is appreciated that there will be times when larger amounts may be needed to achieve a scientific purpose or to achieve therapeutic levels. With adequate justification doses above these maximum values can be given. Disposable sterile needles and syringes should be used and changed between each animal (syringes may be reused for batches of animals but needles should be changed).

Table A2 Recommended maximum injectable volumes for laboratory rabbits and rodents

Route	Volume	Comments
Subcutaneous	2–5 ml (aqueous solutions)	Volume depends on the looseness of skin. Distension of the skin is painful, so minimise this by using multiple sites (up to 4 per session).
Intramuscular	0.05 ml/site (mouse) 0.2 ml/site (rat, guinea pig) 1 ml/site (rabbit)	Volumes refer to aqueous solutions that are rapidly absorbed. Halve volume/site for oily solutions.
Intraperitoneal	maximum bolus volume is 1% of animal's bodyweight	Volumes refer to aqueous solutions that are rapidly absorbed. Reduce volume for oily solutions. Distension of the abdomen is painful.
Intravenous	maximum bolus volume is 1% of animal's bodyweight	Volume refers to aqueous solutions. Bolus injection should be given slowly, over 1 minute. Greater volumes can be administered if much slower infusion rates are used.
Intradermal	0.05–0.1 ml/site	The volume depends on the thickness of the skin. Maximum number of sites is 6.
Oral (gavage)	10 ml/kg	See comments above under 'oral'.

Source: Based on BVAWF/FRAME/RSPCA/UFAW

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Taken from the Guidelines to Promote the Wellbeing of Animals Used for Scientific Purposes 2008

DOSING SITES

1. Oral

- Drug can be dosed in either the food or water. Difficulties with this method being palatability, accurate dosing when animals are socially housed and uneven concentration due to mixing difficulties.
- Oral gavage allows more precise dosing. A flexible gavage cannula is passed into the conscious animal's oesophagus and the substance administered through this. Anaesthesia is contraindicated for this dosing method as this removes the protective mechanisms which stop fluid going into the trachea. Please refer to SOP TEC 23 "Gastric Gavage Technique in Rats".
- To dose, hold the animal upright with the head and neck aligned in a straight line. The tube is inserted towards the back of the throat and will naturally (in most cases) follow the pathway of the oesophagus. If the animal coughs on dosing the tube may have been mistakenly inserted into the trachea and should be withdrawn immediately.
- Complications with oral gavage include puncturing of the stomach or oesophagus, or aspiration pneumonia from tracheal dosing. If an animal shows distress following this dosing method a veterinary surgeon should be consulted.

2. Intraperitoneal

- Intraperitoneal injections should be administered into the lower abdominal cavity in the lower left or right quadrant.
- Angling the animal's head downwards can help in pushing the internal viscera away and thus avoids injection into an organ.
- Injections should NOT be made in the midline as this can lead to puncture of the bladder.
- For mice a 23G needle should be used, 21G for rats.

3. Subcutaneous

- Locate loose skin between shoulder blades.
- Tent the skin and direct the needle into the centre of the tent and inject the drug. If in the correct spot no resistance will be felt.



- For mice a 25-26G needle should be used, 23-26G for rats.

4. Intramuscular

- The quadriceps muscle of the hind leg should be isolated.
- The injection site can be on the outside or inside of the limb but should be as far cranial (to the head end) of the animal as possible to avoid damage to the sciatic nerve.
- Due to the small amount of muscle mass in rodents take care not to penetrate too deep or bone may be hit.
- Draw back on the syringe to check whether a blood vessel has been hit, if no blood is withdrawn then it is safe to inject the substance.
- For mice use a 26-30G needle, for rats a 25-30G. Since the volumes that can be held in the muscle are so small it is often necessary to use a Hamilton Syringe to achieve such small volumes.

5. Intravenous

- This can be technically hard in rodents due to the small size of the veins.
- For intravenous dosing the most convenient route is the lateral tail vein. Dilation of the vein is usually necessary- this can be achieved by BRIEF (1-2 second) dipping of the tail into hot water at 40 degrees C or putting the animal into a warming box. The warming box should be kept at **no more than 37 degrees C** and **mice should not be kept in there for longer than 5 minutes, rats for no longer than 15 minutes** (pregnant animals should not be put into a warming box). When using warming chambers animals should be monitored continuously and removed if any signs of distress are shown.
- Shining a light near the tail can help illuminate the path of the vein more clearly.
- Use an alcohol based skin disinfectant to clean the skin prior to needle introduction.
- Administration can be by use of butterfly cannulas, small gauge intravenous cannulas or needle (25-30G) and syringe.
- On withdrawal of the cannula digital pressure should be used to stop bleeding and prevent haematoma development.



6. Intradermal

This is a difficult route to administer substances by and normally general anaesthesia is required to achieve accurate dosing. Training should be sought before using this dose route.

If in any doubt about dosing methods then please consult a veterinary surgeon for advice.

Author: Dr Tara Pike

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REVIEWER	Reviewed Annually by Dr Beng Chua	Dr Tara Pike	Dr Tara Pike		