



GOOD PRACTICE GUIDELINES

Collection of Blood Samples (Rat, Mouse, Guinea Pig, Rabbit)

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COLLECTION OF BLOOD SAMPLES
(RAT, MOUSE, GUINEA PIG, RABBIT)

Introduction

Many research programmes require the collection of blood samples from animals. The effect of this on the animals concerned may be minimal or profound, depending on the amount collected, the technique used, the frequency of sampling and the skill of the operator. Practical expertise in a particular method should be gained by first observing an experienced operator, then conducting the technique under supervision until competence is attained. A good skill level then needs to be maintained by regular use of the method.

Sampling technique

Recommended sites and methods in rats, mice, guinea pigs and rabbits are outlined in the table below.

	Mouse	Rat	Guinea-pig	Rabbit
Conscious	Tail vein	Tail vein or jugular vein or saphenous vein	Ear vein or saphenous vein	Ear vein or artery
Anaesthetised (recovery)	Cardiac puncture*		Cardiac puncture*	
Anaesthetised (non recovery)	Cardiac puncture or deep blood vessels	Cardiac puncture or deep blood vessels	Cardiac puncture or deep blood vessels	Cardiac puncture or deep blood vessels

*This method is not generally recommended because of the possibility of death from uncontrollable bleeding. However under some circumstances it may be the only option. It should only be carried out by an experienced person.

Indwelling catheters can also be used to collect blood samples, and should be seriously considered for multiple sampling to reduce the number of needle penetrations required and thus the severity of the procedure.

Collection from the retro-orbital venous plexus can cause several complications, and should be regarded as a technique requiring special justification and a high level of skill and competence. It is not recommended for routine use, but where it is used it must first have been shown that all other methods are inappropriate.

A) Collection from superficial sites

The following general recommendations can be made for sampling from superficial sites:

1. Check the anatomy of the vessel to be used to ensure venepuncture is in the correct location.
2. Handle the animals calmly using appropriate restraint, or sedation.
3. Use aseptic technique.
4. Use a suitable method to dilate the vein or artery to aid visualisation and needle entry. Avoid the use of xylene for this purpose.
5. Penetrate the vessel with a hypodermic needle and either collect the blood from the point of puncture, or leave the needle in place (if this technique is used, it is best to use a "butterfly" needle.)
6. Apply haemostasis after collection and ensure bleeding has stopped before returning the animal to its housing.
7. Observe the animals carefully for any adverse effects.

B) Collecting by cardiac puncture

Key points include:

1. The animal must be anaesthetised. This technique is best carried out under non-recovery anaesthesia, as haemorrhage into the pericardial cavity can cause serious complications.
2. A needle of sufficient length to penetrate the heart must be used.
3. Some knowledge of the thoracic anatomy is necessary in order to aim the needle in the correct direction.

C) Collecting from deep blood vessels

Key points include:

1. The animal must be anaesthetised (deep non-recovery anaesthesia)
2. Large vessels in the abdomen or thorax may be selected. Cutting the vessels in the axilla is an alternative method.
3. Collection from the caudal vena cava is often most reliable, especially if a large sample is required.

Frequency and volume of collection

Collection of excess blood volume may cause two problems:

- acutely, shock with possible mortality
- chronically, anaemia and depleted iron reserves

It is recommended that unless specifically justified, the following limits are adhered to in order to avoid these problems:

For single blood samples, not more than 15% of blood volume.

For multiple blood samples not more than 7.5% in any one week period, 10% in any two week period and 15% in any one month period (See References-Home Office 1991).

Blood volume averages

Mouse	78 ml/kg
Rat	65 ml/kg
Guinea-pig	75 ml/kg
Rabbit	56 ml/kg

However, for simplicity, the Home Office suggest that for calculating the 15% per month rule (above), an average of 65ml per kg should be taken as representative for most species (See References-Home Office 1991).

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