ACCEPTABLE METHODS OF RODENT BLOOD WITHDRAWAL

Chronic Blood Withdrawal: In sequential blood sampling (over a period of time) the maximum blood withdrawal for survival for most mammals is 1.5% of lean body weight every 14 days.

Acute or Single Blood Withdrawal: The maximum amount of survival blood in an acute withdrawal is 1% of the body lean body weight. For a 20 gram adult mouse this amounts to 4 micro capillary tubes (50 µl each), which equals 200 µl.

To facilitate blood collection, warm the rodent first. When using the tail veins or artery, you may dip the tail in warm (45°C) water. The entire animal can be warmed with a carefully placed heat lamp for 5-10 minutes or circulating water pads.

Submandibular bleeding (mice)

A relatively simple way to obtain blood from a mouse is to puncture the area behind the hinges of the jawbones. Veins that drain blood from other parts of the face meet in this area and form the jugular vein.

Scruff the mouse and pierce a small hole. Various items may be used to pierce the skin including 19, 22, or 23 gauge needles, number 11 scalpel blades, or specially made mouse bleeding lancets. Information on the lancets and a video of this procedure may be seen by going to the following URL: http://www.medipoint.com

Saphenous vein

This method of obtaining blood is often used when a series of small samples is needed. Place the mouse in a conical tube and shave the caudal surface of the thigh. The saphenous vein can be seen in this area. It is advantageous to apply a lubricant to prevent wicking. Place a tourniquet above the knee and poke the vein with a 22 gauge needle. Microhematocrit and microvette tubes work well to collect the blood. This method of blood withdrawal does not require anesthesia, however we find the method of restraint is cumbersome. For detailed instructions and pictures of this procedure please visit http://www.uib.no/vivariet/mou_blood/Blood_coll_mice_.html

Tail artery and veins (mice)

Tail veins and artery can be used for serial bleedings. Use the central tail artery or lateral tail veins. Anesthesia is not required for tail nick. Start midway up the tail and nick the artery or vein. You
may collect blood with micro capillary tubes, a micropipette or various microtainer collection tubes. Move cranially 0.5 cm at a time applying pressure after the bleed.

**Tail artery and veins (rats)**

Blood may be withdrawn from the ventral tail artery using a syringe without the plunger (**remove the plunger before inserting in the tail**) and a 22-gauge (**or smaller**) needle. When bleeding from either of the lateral tail veins, a 22-gauge needle is inserted into the vein. Let the blood drip into the collection vessel. A tourniquet placed at the base of the tail will facilitate bleeding.

**Tail cut bleeding (rats, mice)**

This method must be described in the animal use application and approved by the IACUC. See policy below.

**Volumes less than 1% of total body weight:**

1. Perform on unanesthetized or anesthetized animals.

2. Place animal in approved animal restrainer. (Experienced handlers may be able to perform technique in habituated rats with light or no restraint). In order to vasodilate the tail blood vessels warm the entire animal with a carefully placed heat lamp for 5-10 minutes or circulating water pads. You may also dip the tail in warm (45°C) water.

3. Remove any bedding material or feces from the tail, wash with a surgical skin disinfectant and rinse with water.

4. Place the animal on a clean work surface.

5. Using a fresh scalpel blade or sharp scissors, cut 1-2 mm of the distal tail at an angle perpendicular to the work surface.

6. Apply gentle pressure proximal to the collection site to occlude venous return and ease collection. Collect the blood in a capillary tube or other suitable collection device.

7. Apply gentle digital pressure to the wound for 30-45 seconds with a clean gauze pad to stop any hemorrhaging. For persistent bleeding, apply a silver nitrate stick to the wound. Styptic powder and cautery pens are also acceptable ways to stop the bleeding.

8. Return the animal to its cage.

9. Serial samples can be obtained over a short period of time by gently removing the scab.

10. Only the fleshy portion of the tail tip should be cut. No cutting into vertebrae is permitted. As only a small portion of the tail does not contain vertebrae, the use of the tail
cut procedure should be limited. The scab may be removed from the end of the tail to facilitate bleeding at a later point in time.

11. To be performed only by individuals trained in the technique and comfortable with rodent handling.

Orbital sinus bleeding

Orbital sinus/plexus bleeding (permitted in rats, mice, gerbils, guinea pigs, hamsters) should be proposed to the IACUC, along with a scientific justification, only after other methods have been considered. The IACUC permits orbital sinus bleeding when it is performed with appropriate technique and anesthesia and when it is justified. However, it is the experience of the veterinary staff that this method of bleeding may lead to orbital damage, blindness, and potentially the death of the animal if it is not performed correctly. The IACUC encourages you to first consider using the submandibular vein, the tail artery, or tail veins as a source of blood. These methods are less likely to harm the animal and may be used repeatedly for bleeding. The lateral saphenous vein is also a recommended site for blood collection in rodents.

Maximum use is two (2) times per eye, alternating eyes with each bleeding and each bleeding separated by a week. Maximum withdrawal within a two week period is 1.5% body weight. Orbital sinus bleeding requires training and must be performed only on anesthetized animals.

“Following blood collection, the eyelids should be held closed for a few seconds to allow the punctured blood vessel to clot. It is also common practice to place a small amount of ophthalmic ointment into the eye following this procedure.” excerpt from Laboratory Animal Technician Training Manual

Cardiac puncture

Cardiac puncture as a method of blood withdrawal is permitted in all species as long as the two following conditions are met:

1. Animal is under a surgical plane of anesthesia when procedure is conducted

2. The cardiac puncture is a terminal procedure and the animal is not allowed to recover from anesthesia following the puncture