Handling and Restraint of Small Laboratory Animals

These guidelines have been developed to introduce investigative staff to procedures recommended for handling and restraint of small laboratory animals. Techniques for performing parenteral injections and blood collection are addressed by separate Animal Care Services (ACS) guidelines. This document is intended to supplement hands-on instruction by an experienced member of your laboratory. There are a variety of other techniques in addition to those described in this document that are suitable alternatives.

Handling and Restraint

Although there are significant species differences when handling and restraining a laboratory animal, there are several important concepts that apply equally to all species. These include:

1. Handle animals gently but firmly.
2. Approach an animal slowly but purposefully.
3. Wear disposable gloves.
4. Always wash your hands prior to and after handling animals, as odors of other species or blood is frequently distressing. Additionally, your hands can act as a means of spreading infectious agents from one group of animals to another.
5. Wear a clean laboratory coat or disposable gown.
6. Use an appropriate method.

Animals used in experimental protocols that involve extensive manipulation should be handled frequently before the onset of the study to allow the animal to acclimate to your scent and the procedure(s). Frequent handling makes them more docile while restrained. Within specie, particular stocks or strains of animals may have distinctive behavioral responses.

Mice

Adult mice are picked up by the tail base by compressing the base of the tail between the thumb and forefinger and gently placing the animal onto a solid surface. Rest the animal on one’s forearm to transport it short distances. Alternatively, the animal can be placed in a small container with a cover that has holes to admit air. Adult mice can also be picked up by grasping the loose skin over the shoulders and gently lifting the animal from its cage. Alternatively, a pair of forceps (toothless) can be used to gently grasp the mouse by either the tail or the skin over the shoulders.

For restraint the mouse is picked up by the tail as described above and is placed over the wire bar lid of the cage and lowered until the mouse grasps the wire with its forefeet. The excess skin over the animal's neck is grasped between thumb and forefinger. The hand is rotated so that the mouse is lying on its back within the palm of the hand. The animal's head is closest to the thumb while the tail is grasped with one’s smallest finger. The result is a mouse that is immobilized for examination or manipulation. Be sure that the mouse is still breathing as this means of restraint can occlude the airway.

Devices are available to restrain mice for a variety of procedures. Commercially available plexiglass restraining cylinders provide access to the animal’s tail for intravenous injection or blood collection. Homemade devices can be made out of plastic syringe casings.
Conical plastic sleeves, referred to as Decapicones®, can also be used. The plastic is approximately the same thickness as that of plastic bags. The flexible transparent clear-plastic sleeve is conical, open at its base, and has a small breathing hole at the apex. The mouse is slid into the cone through the base with its nose resting adjacent to the breathing hole. The excess plastic is gathered and a rubber band is placed around the animal's tail and the plastic of the cone. The cone permits access to the tail and also, if the animal is positioned properly, will permit parenteral injections (e.g. IP, SQ) through the thin-walled plastic.

**Rats**

Rats can be picked up by the base of the tail, as described for mice. However, extreme care must be exercised, as an adult rat's body weight is approximately 20 fold greater than an adult mouse, whereas the tail is not 20 times greater in diameter. Therefore it is much easier to injure the rat's tail. Common injuries include fracturing coccygeal vertebrae (the small vertebrae within the tail) or causing the skin to slip off the tail exposing underlying tissue. It is essential that the rat be picked up by the base of the tail as close to the body as possible. The rat should then be placed on your forearm or a solid surface. A rat should not be carried by its tail for more than a few seconds!

Alternatively, rats (< 300 grams) may be picked up by grasping the animal's body from above so that the rat's back is held firmly around the thorax; commonly with your forefinger and third digit placed on either side of the animals' neck under the mandible. There are various techniques to this grip that provide equally effective restraint. When held firmly, the rat is restrained and is unable to move its head to bite. Large rats may be picked up similarly, however the hindquarters must be supported with the other hand.

As for mice, there are larger commercial plexiglass rat restrainers, which provide access to the rat's tail while protecting the handler from the animal's head. Also, larger Decapicones® are extremely useful for handling rats. They are utilized the same way as described for mice.

**Hamsters**

Males are generally more docile than females. If simple precautions are taken, hamsters can be routinely handled with minimal stress to the animal and handler. Awakening the hamster from sleep will frequently be met with an aggressive response. Hamsters can be removed from their cage with the use of a small can or cup, which they will usually enter; they can be scooped out with cupped hands; or they can be grasped by the abundant loose skin over the dorsal cervical region.

To manually restrain a hamster begin by placing the animal down on a solid surface. The palm of the hand is placed down over the hamster with the thumb near the head. The excess skin is grasped and gathered into your hand until the body wall is snug against your fingers. The animal will be immobile and will not be able to turn its head and bite.

**Guinea Pigs**

Guinea pigs should be restrained using two hands. Your dominant hand should be used to grasp the animal's thorax from below opposing your thumb and fingers on either side of the animal's chest. The second hand is used to support the hindquarters. For restraint with greater control, the animal can be held
using the same grip, however the animal should be grasped around the thorax from the back, and then the hind limbs should be grasped and extended.

**Rabbits**

Proper technique when handling rabbits is essential to prevent the animal from accidentally breaking its back, a common outcome associated with inappropriate rabbit handling. Rabbits should be removed from their cage by grasping the excess skin over the dorsal cervical region. Rabbits should never be picked up by their ears. The rabbit’s hind end must be supported as it is removed from its cage. If not supported properly, the rabbit may kick with its powerful hind limbs, inducing lumbar vertebral dislocation or fracture (broken back). Rabbits can be moved for short distances by permitting the animal to bury its head at the junction of your body and your bent elbow, supporting the animal's body with your forearm while putting gentle downward pressure over the animal's back with your other hand.

ACS has rabbit restrainers available that are extremely useful for transporting or restraining rabbits. Restrainers may be borrowed from ACS. Rabbits are relatively easy to restrain when using an appropriate restraining device. These devices provide excellent access to the rabbit's ears, making it very useful for blood collection or IV injections. Some restrainers also provide access to the animal's back for subcutaneous or intramuscular injections. Investigators should thoroughly clean the restrainer with an appropriate disinfectant before returning it to ACS. Because of the likelihood of spreading disease, restrainers used with conventional rabbits must be cleaned in a mechanical cage washer before use with specific pathogen-free rabbits.

Rabbits can also be restrained by using a towel. The towel is wrapped around the animal's body such that its head is covered, being sure that the nose is left exposed so that the animal can breathe, and it is swathed around the animal’s hindquarters. Either the ears or the rabbit’s dorsum is left exposed, dependent on the site that requires access. Clean towels should always be used between different groups of rabbits.