

STONEHILL
COLLEGE
General Rodent Procedures SOP

The intent of this Standard Operating Procedure (SOP) is to describe the various rodent handling, injection, tail snipping, and drug administration techniques necessary for basic research with rodents. This procedure is approved by the Institutional Animal Care and Use Committee (IACUC) of Stonehill College. Any exemption must be approved by the IACUC prior to its application.

1. **Introduction:** Various procedures must be performed when working with rodents (rats & mice) and the responsible personnel must learn the proper techniques before undertaking these procedures.

2. **Purpose:** To ensure that proper technique is used in order to avoid and/or limit pain and distress to the rodent.

3. **Procedures:**
 1. **Mouse Handling:** Grasp the base of the tail with the thumb and forefinger of one hand. **Note: Do not grasp toward the end of the tail as this can result in injury to the animal.** Place the mouse on surface to which the animal will cling, such as a wire cage top. As the mouse attempts to move forward, quickly scruff the loose skin at the back of the neck between the thumb and forefinger of the opposing hand. The mouse's head should be immobilized if the skin is held properly. **Note: Take care not to hold the skin too tightly; this can potentially suffocate the animal.** Lift the mouse with the hand that is immobilizing the head. Secure the tail between the small finger and the palm of the same hand. Use the other hand to perform the desired procedure.
 2. **Rat Handling:** Rats may be picked up by the tail. The rat must be picked up by the base of the tail. If the rat is picked up by the tip of the tail, the tail skin may be pulled off, causing serious injury. A safer method for both rat and handler is to grasp the whole body of the rat. One hand is placed over the animal's back, with the thumb and forefinger gently but firmly pressing the forelegs toward the head. Rats can also be wrapped in a towel. Commercial plastic restraint devices can also be used. Rats respond positively to frequent and gentle handling.
 3. **Injection Procedures:** Injection site must be cleaned by swabbing the area with a suitable disinfectant such as alcohol. Sterile syringe & needles are necessary for all injections.

Intraperitoneal Injections (IP): Hair must be clipped and sterile technique

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used. Up to 3mls of fluid can be injected in a mouse at one time. Up to 10mls of fluid can be injected in a rat at one time. Normally a 21 gauge needle can be used for both mice and rats. The injection is administered with the animal's hindquarters elevated in order to allow the intestines to fall away from the injection site. The injection can be given on either side of the midline.

Intramuscular Injections (IM): Up to 0.05ml of liquid can be injected in a mouse at one time. Up to 0.3 ml can be injected into a rat at one time. Unless the substance is viscous, a needle that is smaller than or equal to 23 gauge can be used in a mouse and a 21 gauge can be used in a rat. The quadriceps muscle or the posterior thigh is acceptable sites for this type of injection. Once the animal is securely restrained, the injection site must be shaved and disinfected. Insert the needle through the skin into the middle of the muscle and inject the desired substance. **Note: injections given near the ischiatic nerve in the hind leg may lead to discomfort, temporary lameness or permanent paralysis of the leg.**

Subcutaneous Injections (SC): Up to 3mls can be injected in a mouse at a time. Unless a substance is viscous, a needle that is smaller than or equal to 20 gauge can be used in a mouse and in a rat. This type of injection is given in the scruff (loose skin on the back of the neck) of the mouse. Pull the skin away from the underlying muscles, forming a tent. Insert the needle at a shallow angle through the skin into the subcutaneous tissue. **Note: Take care not to pass the needle through the other side of the tent of skin and not to enter the muscle tissue.** To ensure proper needle placement, aspirate before injecting the solution. Proper placement should not yield any aspirate.

Intradermal Injections (ID): 0.1 ml to 0.2 ml per site can be injected in both mice and rats. A 25 gauge or smaller needle should be used. Shave and disinfect the injection site. Stretch the skin between your fingers to isolate the site and insert the needle just under the surface of the skin. This should put the needle between the layers of the skin. Inject the solution and small bleb or pocket of fluid will form if the injection was done properly.

Intravenous Injections (IV): IV Injections should be done through the lateral tail vein in both mice and rats. A 25 or smaller gauge needle can be used in mice and a 23 or smaller gauge needle can be used in a rat. Up to 0.2 mls can be injected in mice and up to 0.5mls can be injected in rats. This injection must be done slowly. The animal should be anesthetized or otherwise secured in a restrainer. Extend the tail with one hand to produce a flat & more visible work surface. With the other hand, insert the needle at a slight angle. Make sure that the beveled surface of the needle faces out.

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4. **Blood Collection Procedures:** Approximate blood volume for an adult mouse is 1.6-3.2 ml. A single sample is usually 0.2-0.3 ml in volume.

5. **Tail Snipping:** In rodents over 21 days of age, anesthesia is required. Rodents that are under 21 days, where a sample of less than 1 cm is being taken, do not require anesthesia. After placing the animal under anesthesia (if necessary) and proper restraint, use sterile instruments to snip approximately 1 cm of the tail. Place gentle compression or cauterize the end of the tail to stop bleeding. Observe the animal for any additional bleeding or unusual behavior.

6. **Gastric Intubation (Gavage):** Gavage is a procedure used in rodents to administer a substance orally. This technique is a direct placement of a liquid preparation of a substance into the stomach by using a standard gavage tube attached to a hypodermic syringe. The animal is in a vertical position, either by the scruff of the neck (mouse) or with the hand encircling its body (rat). The gavage tube has a ball-like enlargement at the tip to prevent injury. The tube may be straight or bent slightly. The length of the tube depends on the size of the animal. Before inserting the tube, line it up with the ball at the level of the last rib to determine how far the tube should be inserted. Start the tube into the animal's mouth at a 45 degree angle with the horizontal plane. As the tube is advanced, raise to a vertical position. Do not use force, as the weight of the tube and attached syringe is sufficient to advance the tube. When the ball is in the stomach, slowly deliver the contents of the syringe, and then withdraw the tube. This procedure causes very little distress in the animal.