

Collecting Mouse Tissue for Genetic Analysis Guidelines

I. Overview

The generation of genetically engineered mice commonly requires collection of tissue samples for genetic analysis. Tail tip excision, toeing, ear punch, peripheral blood collection or analysis of saliva are acceptable methods of tissue collection provided the guidelines below are followed. The IACUC requires that anesthesia must be administered to mice when the sampling method is associated with more than momentary pain or distress.

II. Guidelines:

- a. **Tail Tip Excision** – entails surgical removal of the distal tip of the tail. This procedure is considered painful when performed on adult mice and it is associated with only momentary pain or distress when performed on neonatal mice.
 - i. **Pre-weanling Mice:** Anesthesia is not required for mice 21 days of age or younger and if less than 1 cm of the tail is excised. Innervation of the tip of the tail is minimal at this age. If excision of larger sections or repeated excisions of tail are required, thus involving the coccygeal vertebrae, anesthesia is required.
 - ii. **Adult Mice:** Anesthesia is required for mice that undergo tail tip excision at ages over 21 days. Anesthesia can be provided by use of inhalant agents (for example, isoflurane), or injectable agents (pentobarbital, etc.).
 - iii. **Hemostasis:** It is important that complete hemostasis be achieved when performing tail tip excisions. Hemostasis can be achieved by use of cautery agents such as silver nitrate or a heated scalpel blade.
- b. **Ear Punching** - is commonly used as an identification method in rodents. It is performed using an instrument that removes a small (0.5-1 mm) circular section of tissue from the ear pinna. Multiple samples can be collected from one or both ears. Collection of the small tissue samples produced during ear punching may generate enough tissue (DNA) to allow analysis by PCR. Anesthesia is not required when performing ear punches on mice.
- c. **Peripheral Blood Collection** – Peripheral blood can provide tissue for genetic analysis. For more information or training in blood collection methods from mice, please contact the Attending Veterinarian and DARS.
- d. **Saliva Analysis** - Genetic analysis of oral epithelial cells collected in saliva from mice has been described and offers an alternative and noninvasive method of genetic analysis in the mouse. This method involves collecting a saliva sample from weanling mice by oral wash using a plastic pipette tip followed by nested PCR analysis. For more information refer to Nature Biotechnology 14:1146-1148, 1996
- e. **Toeing** - material may be collected for genotyping by the amputation of rodent toes. This is performed on rodents between 7 and 10 days of age, does not require the use of anesthetics, and also serves to provide a unique identification number to the individual pup. See “Guidelines for Toe Clipping” for additional information.