TAIL BIOPSY OF MICE POLICY

Background:

The University of Missouri – Kansas City (UMKC) Institutional Animal Care and Use Committee (IACUC) is obligated to provide policies that notify and train personnel concerning the appropriate techniques, equipment, and agents for performing appropriate procedures to ensure humane care and use of laboratory animals.

Policy:

To verify the correct genetically altered rodents are produced, it is often necessary to sample tissue for DNA analysis. Commonly, the tip of the tail is sampled for this purpose. The section of the tail removed should be the smallest section that permits the necessary testing. It is recommended that tail samples be limited to no more than 5 mm total of tissue.

In the mouse the terminal tail vertebrae ossify and enervation becomes fully functional between 2 and 4 weeks of age. At this point, the tail biopsy becomes more painful. Thus, tail sampling is recommended in mice less than three weeks of age. In mice of this age, a biopsy of the distal tail of no more than 5 mm total may be performed without anesthesia. Animals over 3 weeks of age should be anesthetized using inhalant, injectable, and local agents such as topical formulations of lidocaine and prilocaine (EMLA cream®) as described in the approved IACUC protocol. A maximum of 3 tail biopsies not exceeding 10mm cumulatively in length.

Sampling should be performed using a sterile, sharp instrument, such as a scalpel blade or scissors. Adequate hemostasis should be achieved by direct pressure by holding the tail between the thumb and finger, or by silver nitrate, cautery, or tissue adhesive.

If possible, alternatives to tail biopsies should be strongly considered. These alternatives must be approved in the IACUC protocol:

- Tissue can be obtained by ear punching, which can also serve as identification. Ear punching is performed using an instrument that removes a small (2-4 mm in diameter) circular section of tissue from the ear pinna. Multiple samples can be collected from one or both ears. Collecting small tissue samples produced during ear punching may generate enough tissue (DNA) for PCR analysis.
- Small quantities of blood from the saphenous vein, orbital sinus, lateral tail vein, submandibular vein, or other acceptable blood collection route may be used for analysis,
- PCR analyses using saliva[1] and hair[2] have also been described among others.

Age Range (Days)	Recommended Tail Length Removed	Anesthesia Required?	Analgesia Required?
<21 days	≤ 5 mm	No	Recommended
21-35 days	≤ 2 mm	Yes	Yes

Revisions to the Policy:

This policy is intended to be flexible and readily adaptable to changes in regulatory requirements. The UMKC IACUC has the authority to amend this policy as needed. The UMKC IACUC has reviewed and approved this policy.

Created: April 2010
Revised: May 2013; February 2016; February 2019; February 2022; February 2025

References:

- [1]Irwin, M.H.; Mofatt, R.J.; Pinkert, C.A. Identification of Transgenic Mice by PCR Analysis of Saliva. Nature Biotechnology (1996) 14, 1146-1148.
- [2]Schmitteckert, E.M.; Prokop, C.; Hedrich, H.J. DNA Detection in Hair of Transgenic Mice—A Simple Technique Minimizing the Distress on the Animals. Laboratory Animals (1999) 33(4), 385-389.
- Zimmermann, K; Schwarz, H.P.; Turecek, P.L. Deoxyribonucleic Acid Preparation in Polymerase Chain Reaction Genotyping of Transgenic Mice. Comparative Medicine (2000) 50(3), 314-316.