

UNIVERSITY ANIMAL CARE COMMITTEE

Policy on Genotyping in Mice and Rats

To determine the genotype of a transgenic mouse or rat, it is common practice to perform molecular biological testing such as polymerase chain reaction (PCR) or Southern blot analysis on isolated DNA. This usually requires the collection of tissue via a biopsy. Ear notching (punch) or tail snipping are the methods most often used. The purpose of this policy is to establish standards for obtaining biopsy material for genotyping purposes while minimizing pain and distress to the mouse or rat.

Note that other biomaterials (e.g.: buccal swab, hair follicle, fecal pellet) can be used for genotyping. The University Veterinarian may be contacted to review these methods.

Ear Punch

This method involves collecting a sample of tissue from the ear using a biopsy punch. Because ear holes are often used for identification purposes, this technique is ideal to fulfill both needs at the same time. Instruments used for ear notching dullen after repeated use and should be replaced often to minimize tissue trauma. Instruments should be disinfected between animals to avoid cross-contamination. The ear punch biopsy may be performed on mice and rats at any age.

Tail Snip

Tail snips can cause hypersensitivity up to six months after the tail has been snipped. The last 5mm of the tail has tendons, nerves and coccygeal vertebrae that partly ossify by 17 days of age. In a pre-weanling rodent, the distal 2mm tail does not contain mature vertebrae (bone), thus, the tail biopsy should be performed at as young of an age as is feasible. With increasing age, tail maturation includes mineralization of bone and increased vascularity. Tail tip amputation on older animals can result in prolonged discomfort. Instruments should be disinfected between animals to avoid cross-contamination.

The maximum amount of tissue to be removed is one 3mm tail snip for PCR, or one 5mm tail snip for Southern blot analysis. The maximum number of tail snips that can be performed is one. If additional genotyping is required, an ear punch, fecal pellet, hair follicle, or buccal swab must be used.

Mice:

- Tail tip amputation for genotyping is permitted on mice from d14 to d17 without the use of anesthetic.
- Tail tip amputation on mice after d17 requires justification and approval within the animal use protocol (AUP). General anesthesia and analgesia are mandatory on mice snipped after d17. If general anesthesia has been administered, fluid therapy must also be provided.
- Ear punch and tail snip are permitted on the same mouse at the same time, up to d17.

Rats:

- Tail tip amputation for genotyping is permitted on rats from d14 to d17 without the use of anesthetic.
- Tail tip amputation on rats after d17 requires justification and approval within the animal use protocol (AUP). General anesthesia and analgesia are mandatory on rats snipped after d17. If general anesthesia has been administered, fluid therapy must also be provided.
- Ear punch and tail snip are permitted on the same rat at the same time, up to d17.

For further information refer to UACC SOPs 7.14 Genotyping Mice and 10.14 Genotyping Rats.

Revision History:

Date	New Version
Oct/01/2007	Policy Created
Dec/01/2011	Triennial Review, title change, clarified ear punch or tail snip as acceptable, clarification that ossification may occur at d17 however up to d21 without anesthetic accepted, inclusion of other genotyping strategies (buccal swab, fecal pellet), all reference to toe clip for identification or genotyping removed
Nov/01/2014	Triennial Review
May/01/2018	Triennial Review, revised to ensure alignment with SOPs on genotyping (acceptable ages; max sampled tissue etc.)
June/01/2020	Revised to shift tail snip age cutoff (d17 without anesthesia/analgesia) and amount of tissue (3mm PCR/5mm Southern blot)
June/21/2023	Triennial Review, new format