1. **Purpose**

The purpose for the tail biopsy is to collect tissue to characterize the genotype of mice or rats used in research, teaching, or testing. The collected tail tissue is for DNA extraction and analysis. DNA prepared from tail biopsies is suitable for analysis using Southern Blot or PCR.

2. **General Principles**

DNA can also be obtained from ear punches, hair samples or oral swabs. The tail biopsy procedure is the most typically used procedure to obtain tissue for DNA analysis using PCR. The tail of a mouse is composed of bone, cartilage, blood vessels, and nerves. In a young mouse < 21 days of age the tissue near the tip of the tail is soft and the bones have not completely mineralized. As the mouse reaches 21-28 days of age, tail tissue maturation includes mineralization of the bone and increased vascular supply. It has been reported that rat pups do not develop pain perception of tail clamping until 12 to 14 days of age.

3. **Protocol**

3.1 Tail biopsy for genetic analysis of mice and rats must be performed only when scientifically justified. It is best to perform tail biopsy in mice at ≤20 days and rats ≤11 days of age. These mice and rats would be classified using Category C.

3.2 Tail biopsy in mice and rats older than 20 days and 11 days of age, respectively, is categorized as a potentially painful procedure (Category D), thus anesthesia must be provided. Based on this pain classification, proposing to perform tail biopsy in mice over 20 days and rats over 11 days of age must be accompanied by a search for alternatives to this potentially painful procedure.
3.3 The length of tail tip to be removed shall not be greater than 5 mm (about 3/16 inch). Digital carbon fiber calipers in the ARC can be used to accurately measure the tail length.

3.4 Hemostasis must be assured before returning the tail-snipped mouse or rat to its cage. This is accomplished by applying manual pressure to the end of the tail. The use of heat to cauterize the amputated end of the tail may not be used unless bleeding problems are severe. A medical grade, non-toxic styptic powder may be used if necessary.

3.5 Repeated tail amputations on a single mouse or rat are not allowed. If an additional sample from a mouse or rat may be needed at a later date, cut the original tissue biopsy in half and preserve the extra piece at 20°-80° F.

4. Recommended Procedures

4.1 Mice and Rat Identification: Identify animals using tattooing, ear tagging, or ear notching.

4.2 Incision: Make clean incisions using scalpels with sterile blades or thoroughly disinfected scissors. Use a fresh blade or disinfect scissors for each mouse.

4.3 Anesthesia: For mice older than 20 days and rats older than 11 days isoflurane is the recommended anesthesia. This is most appropriate since the procedure is very brief.

4.4 Analgesia: In mice or rats older than 21 days or 11 days, respectively, buprenorphine 0.05-0.1 mg/kg IP may be administered BEFORE the procedure.

4.5 Hemostasis: Apply manual pressure or use Styptic powder (Kwik?Stop®) applied to the tail to stop bleeding after snipping.