Suitable Identification Method for Transgenic Hemophilia Type A mice (HA)

Forget J[1], Bernier L[1], Arlund E[2],
[1] Charles River Laboratories Preclinical Services Montreal, Quebec, Canada
[2] Somark Innovations

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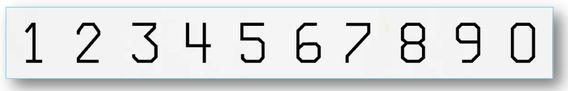
Introduction

Reliable identification of laboratory animals is critical to the conduct of safety assessment studies to generate quality data. Various identification methods are available, including ear tags, manual tattoos, and radio frequency identification devices (RFID); however, most of these are not suitable for transgenic HA mice as this model has less than 1% of normal factor VIII activity and exhibit prolonged clotting times. Minor lesions induced by ear tags, RFIDs or manual tattoos can result in excessive blood loss leading to distress or even death within few hours.

The LabStamp tail tattoo system developed by Somark Innovations was evaluated for its suitability for transgenic HA mice. The system allows a controlled depth of needle penetration and delivery of the microencapsulated ink at the desired level; the mid dermal layer of the skin. Injury to blood vessels is avoided therefore alleviating risks of hemorrhage in these hemophilic mice.

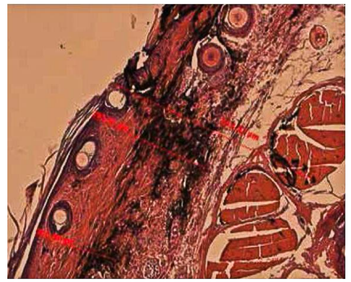
LabStamp font guide

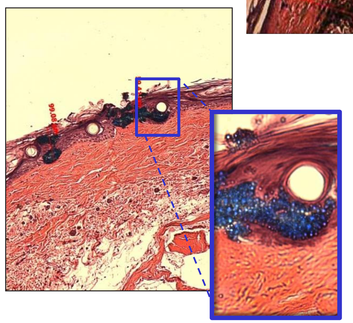


Experimental Procedures

This method was evaluated on 132 transgenic HA mice that were 6 to 7 weeks of age at time of identification. The identification system is based on a 3 digits system where numbers from 0 to 9 were used to identify the animals. Two different ink colors were available, black and UV green; UV green emits a reflected color under black light and was selected for better contrast due to the dark coloration of the tail. Black light was used to enhance the reading of the numbers. Animals were observed over a few days after the tattoo application for signs associated with damage to blood vessels at the set depth of penetration of the needle, and again after a 15-week period to assess the permanence of the tattoo.

Traditional Ink: Horizontal and vertical migration





Microencapsulated Ink: No migration

Integrity of legibility of the tattoo was evaluated within a week after the application and again after 15 weeks post application. The technician was blinded to the animal number prior to reading.

Quality of the tattoo was evaluated based on how legible the numbers were and classified as good, acceptable, or poor.

Good: clear numbers

No. 249

No. 321

No. 385

Acceptable: numbers slightly fading and/or thicker lines; numbers can still be clearly identified

No. 369

Poor: At least one number out of three cannot be identified due to number partially or completely missing

No. 314

Results

There were no clinical observations associated with the identification procedures over a few days after the application of the tattoo, confirming absence of substantial damage to blood vessels at the set depth of penetration.

Identification for each animal was clear and legible a few days post application (100%).

After at least 15 weeks, reevaluation of individual tattoo resulted in 92% of the numbers that were legible, from which 74% were noted as ''good'' and 18% as ''acceptable''. The remaining 8% (10 out of 132 animals) had one of the three numbers that could not be identified. Observations included part of a number missing or numbers that were fading.

Re-identification with the LabStamp may further complicate partial tattoos and clarification of the numbers using a traditional manual tattoo machine was not an option with this strain of mice. In these cases, the cage card was updated to reflect the observed tattoo. In the example below, mouse No. 314 was updated to 3_4, thus keeping unique identifiers for each mouse on study.

Conclusion

The LabStamp system eliminated the risks associated with damage to blood vessels and therefore was considered to provide a suitable identification for use with transgenic Hemophilia type A mice. This identification approach may also present an alternative for use with non-deficient pigmented laboratory mice.

The automated characters of the LabStamp system are unique and reduced the variability in reproducing the numbers manually.

Legibility of the tattoos was considered suitable for almost all animals for a period of at least 15 weeks using UV green ink. Alternatives were selected for animals with a poor identification in order to maintain a unique identification.

ACT, Orlando, Florida
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