

ANSI/ASB Standard 138, First Edition
2022

**Standard for Collection of Known DNA Samples
from Domestic Mammals**



ASB
ACADEMY
STANDARDS BOARD



Standard for Collection of Known DNA Samples from Domestic Mammals

ASB Approved December 2021

ANSI Approved May 2022



410 North 21st Street
Colorado Springs, CO 80904

This document may be downloaded from: www.aafs.org/academy-standards-board

This document is provided by the AAFS Academy Standards Board. Users are permitted to print and download the document and extracts from the document for personal use, however the following actions are prohibited under copyright:

- *modifying this document or its related graphics in any way;*
- *using any illustrations or any graphics separately from any accompanying text; and,*
- *failing to include an acknowledgment alongside the copied material noting the AAFS Academy Standards Board as the copyright holder and publisher.*

Users may not reproduce, duplicate, copy, sell, resell, or exploit for any commercial purposes this document or any portion of it. Users may create a hyperlink to www.aafs.org/academy-standards-board to allow persons to download their individual free copy of this document. The hyperlink must not portray AAFS, the AAFS Standards Board, this document, our agents, associates and affiliates in an offensive manner, or be misleading or false. ASB trademarks may not be used as part of a link without written permission from ASB.

The AAFS Standards Board retains the sole right to submit this document to any other forum for any purpose.

Certain commercial entities, equipment or materials may be identified in this document to describe a procedure or concept adequately. Such identification is not intended to imply recommendations or endorsement by the AAFS or the AAFS Standards Board, nor is it intended to imply that the entities, materials, or equipment are necessarily the best available for the purpose.

Foreword

This standard presents protocols for collecting DNA samples for use in genetic analysis of domestic mammals.

The American Academy of Forensic Sciences established the Academy Standards Board (ASB) in 2015 with a vision of safeguarding Justice, Integrity and Fairness through Consensus Based American National Standards. To that end, the ASB develops consensus based forensic standards within a framework accredited by the American National Standards Institute (ANSI), and provides training to support those standards. ASB values integrity, scientific rigor, openness, due process, collaboration, excellence, diversity and inclusion. ASB is dedicated to developing and making freely accessible the highest quality documentary forensic science consensus Standards, Guidelines, Best Practices, and Technical Reports in a wide range of forensic science disciplines as a service to forensic practitioners and the legal system.

This document was revised, prepared, and finalized as a standard by the Wildlife Forensics Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Wildlife Forensic Biology of the Organization of Scientific Area Committees (OSAC) for Forensic Science.

Questions, comments, and suggestions for the improvement of this document can be sent to AAFS-ASB Secretariat, asb@aafs.org or 401 N 21st Street, Colorado Springs, CO 80904.

All hyperlinks and web addresses shown in this document are current as of the publication date of this standard.

ASB procedures are publicly available, free of cost, at www.aafs.org/academy-standards-board.

Keywords: *DNA sample collection, domestic mammal, dog, cat, horse, cattle, pig, sheep.*

Table of Contents

1 Scope.....1

2 Normative References1

3 Terms and Definitions1

4 Requirements1

4.1 General.....1

4.2 Buccal Swabs2

4.3 Pulled Hair2

Annex A (informative) Bibliography4

Standard for Collection of Known DNA Samples from Domestic Mammals

1 Scope

This standard provides the protocol for obtaining genetic known evidence samples (i.e., buccal swabs and pulled hair) for the purpose of genetic analysis from domestic animals such as dogs, cats, or livestock. This standard does not address sampling of non-domestic animals.

2 Normative References

There are no normative references. Annex A (Bibliography) contains informative references.

3 Terms and Definitions

For purposes of this document, the following definitions apply.

3.1

buccal swab

A cotton swab or similar collection substrate; used in a relatively non-invasive sample collection technique for scraping the inside of a mouth to collect cells from the inner cheek lining; this is a common method for collecting and preserving samples for DNA testing from known individuals.

3.2

chain of custody

Chronological record of the handling and storage of an item from its point of collection to its final return or disposal.

3.3

known sample

Biological material for which the identity of the donor is established and used for comparison purposes.

3.4

nuclear DNA

The DNA inside a cell's nucleus, existing in the form of chromosomes.

4 Requirements

4.1 General

4.1.1 All known evidence samples shall be assigned a unique name or number.

4.1.2 All required paperwork (e.g., submission forms, chain of custody forms) shall be completed.

4.1.3 Pertinent information, such as sample collector, collection date and site, sample type (e.g., buccal swab, hairs), swab type, sample storage conditions, etc., shall be recorded.

4.2 Buccal Swabs

4.2.1 Buccal swabbing using cotton, nylon, or other swab types is the preferred method for collecting DNA from domestic cats and dogs. Buccal swabs should be sterile.

NOTE While many swab types are acceptable for buccal swabbing, cotton swabs can sometimes be problematic for buccal collection from dogs.

4.2.2 The collector shall complete the following.

- a) Isolate any animal(s) to be tested from other individuals (including nursing animals) and remove food and water at least 30 minutes prior to sample collection.
- b) If buccal swabs from more than one animal will be collected, complete the process for one animal and change gloves or clean hands before collecting from the next.
- c) Use at least two buccal swabs per animal to obtain replicate samples.
- d) Prepare a paper envelope or other container for each animal. Label it so as to uniquely identify the animal from which the sample is collected.

NOTE Other packaging options may be appropriate as long as buccal swabs are stored in a way that minimizes mold, bacterial growth, and sample degradation.

- e) Open the swab packaging and remove the swab by its handle.
- f) Place the head of the swab against the inside of the cheek and gums, and swirl/wipe vigorously eight to ten times.
- g) Allow the swab to dry in a clean environment, unless cells/swabs are directly transferred to a different storage medium (e.g., preservative liquid, preservative paper).
- h) Place the dry swabs in the labeled envelope (or equivalent). Seal the envelope and sign and date the seal.

NOTE Dry swabs may be stable at room temperature, however refrigeration is recommended for short term storage (days to weeks) while freezing is recommended for longer term storage.

4.3 Pulled Hair

4.3.1 Pulled hairs with roots are the preferred DNA source for domestic mammals other than cats and dogs. Because nuclear DNA is only present in high quantities in the root of the hair, cut hairs are not acceptable.

4.3.2 The collector shall complete the following.

- a) If hairs from more than one animal will be collected, complete the process for one animal and change gloves or clean hands (and pliers or similar if used) before collecting hairs from the next.
- b) Prepare a paper envelope or other container for each animal. Label it so as to uniquely identify the animal from which the sample is collected.

- Package loose hairs in a paper fold or adhere to a sticky note fold, and then place in the labeled envelope (or equivalent). Seal the envelope, sign, and date the seal.
- Alternately, place hair in the labeled envelope (or equivalent). Seal all corners of the envelope to prevent loss and sign and date the seals.

NOTE Other packaging options may be appropriate as long as hairs are stored in a way that minimizes mold, bacterial growth, and sample degradation.

- c) Collect thick hairs such as those from the mane, tail, or fetlock (base of leg just above the hoof). The area on the animal from which hairs are collected should be dry. If dirt or debris is present, brush the area to remove it.
- d) Use fingers or pliers (or similar) to grasp hair close to the skin and pull approximately ten hairs at once (do not cut hairs). Repeat this until 20 to 30 hairs with roots have been obtained.

NOTE For pigs, which have very thick hairs, five to ten hairs with roots are sufficient.

- e) Place the hairs in the labeled envelope (or equivalent). Seal the envelope and sign and date the seal.

NOTE Hairs may be stable at room temperature if kept dry and free from pests (e.g., Dermestidae beetles), however refrigerated or frozen are also acceptable storage conditions.

Annex A **(informative)**

Bibliography

The following bibliography is not intended to be an all-inclusive list, review, or endorsement of literature on this topic. The goal of the bibliography is to provide examples of publications addressed in the standard.

- 1] Ellegren, H., Johansson, M., Sandberg, K., Andersson, L. "Cloning of Highly Polymorphic Microsatellites in the Horse." *Animal Genetics*. 1991, vol. 23, pp. 133–142.
- 2] Irion, D.N., Schaffer, A.L., Famula, T.R., Eggleston, M.L., Hughes, S.S., Pedersen, N.C., "Analysis of Genetic Variation in 28 Dog Breed Populations With 100 Microsatellite Markers." *Journal of Heredity*, 2003, vol. 94, pp. 81–87.¹
- 3] Metallinos, D.L. "Canine Molecular Genetic Testing." *Veterinary Clinics of North America: Small Animal Practice*, 2001, vol. 31, pp. 421–431.
- 4] Oberbauer, A.M., Grossman, D.I., Eggleston, M.L., Irion, D.N., Schaffer, A.L., Pedersen, N.C., Belanger, J. M. "Alternatives to Blood as a Source of DNA for Large-scale Scanning Studies of Canine Genome Linkages." *Veterinary Research Communications*, 2003, vol. 27, pp. 27–38.

¹ <https://doi.org/10.1093/jhered/esg004>



ASB
ACADEMY
STANDARDS BOARD

Academy Standards Board
410 North 21st Street
Colorado Springs, CO 80904

www.aafs.org/academy-standards-board