Genetic identification of animal samples (Canis familiaris and Felis catus) in forensic context


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GENETIC IDENTIFICATION OF ANIMAL SAMPLES
(CANIS FAMILIARIS AND FELIS CATUS) IN FORENSIC CONTEXT

Abstract: Pets live with people and place biological samples everywhere, which may be useful in a forensic context linking suspects and victims, to an occurrence. There were analyzed samples of 63 unrelated dogs to the STR’s markers PEZ1, FHc2054, FHc2010, PEZ5, PEZ20, PEZ12, PEZ3, PEZ6, PEZ8 and FHc2079, and 63 feline samples of unrelated animals for the FcA733, FcA723 and FcA731 markers. Preliminary results show that it is possible to make genetic identification of individual animals of species under study, thus contributing to increase the potential of forensic samples of animal origin.

Keywords: Animal samples; STR’s; Canis familiaris; Felis catus.

Introduction

In a criminal investigation, the biological collected samples are mostly human, but they are not the only forensic evidence.

Pets such as cats (Felis catus) and dogs (Canis familiaris), live with people and place biological samples such as hair, saliva and blood everywhere, which may be useful in a forensic context linking suspects and victims, to an occurrence.

There are three different types of animal DNA evidence:

- the animal as a witness (e.g. struggles of animals);
- the animal as an aggressor (e.g. animals involved in attacks on people);
- the animal as a victim (e.g. the remains of an animal lost or stolen).

The aim of this study is to implement techniques for individual animal identification through the analysis of short tandem repeats (STRs) for each specie under study, with different samples, namely hair and blood.

Materials and Methods

Blood samples of 63 unrelated dogs were extracted by the Chelex100® method (Walsh et al., 1991) and hair samples were extracted by the DNA IQTM (Promega)
commercial kit. Amplification of PEZ1, FHC2054, FHC2010, PEZ5, PEZ20, PEZ12, PEZ3, PEZ6, PEZ8 and FHC2079 STRs was performed with the multiplex Canine StockMarks (Applied Biosystems) with the markers, according to manufacturer’s instructions. The amplified product was applied in an automatic capillary electrophoresis sequencer ABI PRISM™ 310 Genetic Analyzer using the ROX 350 internal standard and analyzed with the GeneScan Analysis 3.1 software. The fragments sizes were compared with the described by Eichmann (2004).

For the feline samples blood of 63 unrelated animals was extracted by the Chelex100® method (Walsh et al., 1991) and amplified for the FcA733, FcA723 and FcA731 markers in a multiplex reaction according Menotti-Raymond (2005). Detection of amplified product was performed as well as in dog samples using the Rox 500 internal standard.

Results

The results presented in electropherograms (Figures 1 and 2) show that it can be possible to make genetic identification of Canis familiaris and Felis catus with the chosen markers.

Discussion

In a forensic context the limiting step can be the poor genetic material normally found in a crime scene.

The methods used in this study showed that it was possible to extract DNA from blood and hair leading to a good yield of DNA concentration (>3 ng/ul and <13ng/ul). All markers analysed appeared to be polymorphic, which is extremely important because it allows greater discrimination and thus a better individual identification.

Conclusion

The STRs markers used in this work showed that it is possible to make genetic identification of individual animals of both species under study, thus contributing to increase the potential of forensic samples of animal origin.

The studied markers proved to be highly informative and an important tool to assist in solving crime scene and casework related problems involving animal samples.

References

Walsh P.S., Metzger D.A., Higuchi R.; “Chelex 100 as a medium for a simple extraction of DNA for PCR-based typing from a forensic material”; Biotechniques; Vol 10, pp. 506-513; 1991.


StockMarks® Horse, Cattle and Dog Genotyping Kits – Protocol, Applied Biosystems.

Figure 1 (a,b) – Felid electropherogram for the STR’s FCA733, FCA723 and FCA731.
Figure 2 (a,b) – Canid electropherogram for the STR’s PEZ1, FHC2054, FHC2010, PEZ5, PEZ20, PEZ12, PEZ3, PEZ6, PEZ8 and FHC2079.