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Identification of a carbonized body by DNA profiling

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Abstract. In the South of Italy, there are many cases of kidnapped people that, after a longtime, are found completely burned in order to cancel every trace. The aim of the present work is to identify the body of a man found inside a car, without head, completely burned down. The DNA typing was performed on a bone taken from the backbone, as the internal organs were not useful for traditional analysis due to their high DNA degradation. For comparison, we obtained DNA specimen from saliva of hypothetical related and personal effect samples of the victim. © 2003 Elsevier B.V. All rights reserved.

Keywords: Human identification; Burnt tissue; Identifier; DNA profiling

1. Introduction

In south of Sicily (Italy), a man was found in a car, completely burnt down and without head. It was very difficult for the medical examiner to identify the body as no marks were found for recognition.

The police had a list of few missed people, with particular interest focused on a man that was supposed dead 4 months before.

Due to the bad condition of the body, it was quite hard to choose the samples to be analyzed. We finally decided to use a lombar vertebra, heavily contaminated by burnt material from the car, for the DNA extraction [1].

2. Materials and methods

DNA extraction from the unidentified body was carried out on a vertebra; the bone was washed for 3 h in ultrasonic bath and the burnt material was totally removed. Later the bone was cut and a small part of tissue taken from the inner part of the bone was used for the nuclear DNA analysis. This analysis was performed with I.Q. procedure “Tissue and Hair extraction Kit Protocol (Promega)” [2]; the protocol includes simple steps for DNA extraction by an Incubation buffer, DNA capture by using a special resin, DNA washing

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by a washing Buffer and then DNA elution by an Elution Buffer. The samples (less to 0.5 mg of tissue) were then put into a 1.5-ml tube with the Incubation buffer, at 56 °C for 3 h, with 50 µl twice of PK (20 mg/ml) and 100 µl of 1 M DTT. For the following steps, we used the IQ protocol.

DNA from saliva samples belonging to the parents and the brothers and from toothbrush recovered into the house of the man of the missing man were extracted with chelex treatment (Biorad) [3].

The amplification of DNA extracted was performed by use of “AmpFLSTR Identifier” kit (Applied Biosystem), in 23 µl final reaction in a Perkin Elmer Gene Amp PCR System cyler 2400 and 9700. The product of reaction after 28 cycles was then analyzed and further repurification with Microcon 100 Amicon as performed to follow [4].

According to the kit protocol, positive and negative controls were enclosed during the amplification step. Automatic allele designation was achieved by the use of Genotyper v.3.7 software. (Applied Biosystems).

3. Results and discussion

The results of the DNA fingerprinting are reported below (Table 1). It was possible to uniquely identify the burnt body. The analysis was found to be faster than other methods used for similar applications.

The sample, a lombar vertebra, taken by the medical examiner was found to be a good source for DNA extraction. Moreover, the cells into the bone and their DNA content were well protected by both the burnt material dropped from the car and some other tissues (fats) from the body.

The personal identification was performed by comparing the DNA profile with those from the victim’s tooth brush and from paternity tests.

Table 1
The results of the DNA fingerprinting

Locus	Father	X	Mother
Amelogenina	X–Y	X–Y	X–X
D8S1179	13–14	13–13	11–13
D21S11	25.2–32.2	29–32.2	29–31.2
D18S51	14–21	14–17	15–17
D3S1358	16–18	15–18	15–16
VWA	16–17	17–19	18–19
FGA	25–25	22–25	22–22
D5S818	11–11	11–12	12–12
D13S317	11–12	11–11	11–11
D7S820	8–10	10–10	9–10
TH01	8–9.3	6–9.3	6–9
TPOX	8–8	8–11	11–11
CSF1PO	11–11	11–11	10–11
D16S539	10–10	9–10	9–10
D2S1338	18–20	18–19	19–20
D19S433	14–14	13–14	13–16

The paternity test on the DNA samples from missing man's family showed that the genetic profile from the carbonized body was compatible with the DNA profiles from the parents. The probability of paternity calculated by using Sicily allele frequencies was 0.9999998 (99.9998%) [5].

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References

- [1] M. Holland, Extraction of DNA from Dried Skeletal Remains, Workshop June 9, 1998, Innsbruck.
- [2] DNA IQ™ Tissue and Hair Extraction Kit. User's Manual, Technical Bulletin, vol. 307, Promega, 2002.
- [3] P.S. Walsh, D.A. Metzger, R. Higuchi, Chelex 100 as a medium for simple extraction of DNA for PCR-based Typing from forensic material, *BioTechniques* 10 (1991) 506.
- [4] Amp^F/STR Identifiler PCR amplification kit, User's manual, PE Biosystems, 2001.
- [5] J. Butler, *Forensic DNA Typing*, Academic Press, San Diego, CA, 2001.