

DNA Technology in Identification of War Victims in Croatia

The establishment of the identity of war victims in Croatia has been made difficult by the spread of the war, increasingly large number of victims and their incineration in mass graves.

Last year, the Department of Pathology and Forensic Medicine, Clinical Hospital Split, had to identify 59 persons who had been killed on the Kupres battlefield, Bosnia and Herzegovina, April 1992. Their bodies in advanced state of decomposition were exchanged after one and a half year. Medico-legal expertise was performed by means of classical techniques of identification and, despite a series of problems characteristic of war circumstances, 35 persons were successfully identified but 24 persons remained unidentified.

As a last resort for us and a hope for the victims's relatives, DNA analysis was used (1). This technique, described for the first time in 1985, has been improved and used in some fields of forensic pathology, such as sexual crime and paternity testing. DNA present in sperm, nucleated blood, soft tissue, hair root and bone cells can be extracted, chemically divided into fragments and formed into a pattern that will serve as an identification profile (1). The details of the technique are complex and require highly specialized reagents and devices.

In the autumn of 1993, we had the opportunity to bring up our problems and needs during a 'radio-bridge' established between Split and New York, connecting the Croats from home and abroad in a joint action for the first time. As a result, a large humanitarian aid came from AmeriCares organization and Perkin Elmer firm. In addition, a number of individuals from Herzeg-Bosnia and Croatian emigrants in the USA also sent their contributions.

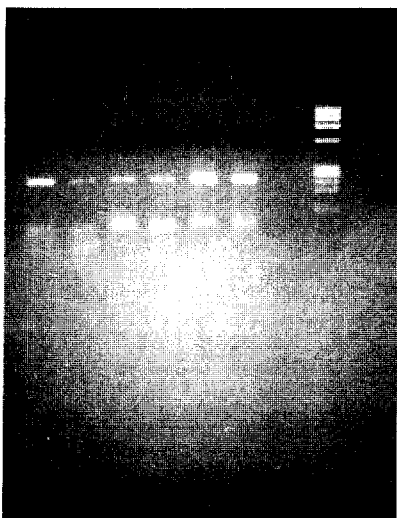


Figure 1. PCR amplified DNA (HLA-DQ) run on a 2% agarose gel; A, child tibia I; B, child tibia I; C, child tibia II; D, child tooth II; E, child tooth double amplified; M, marker ϕ x174 RF DNA/Hae III fragments.

Thanks to all of them, a modern laboratory equipment arrived in Split in March 1994.

A DNA laboratory was set up immediately in collaboration with American colleagues and, before long, the first results were soon obtained. The polymerase chain reaction (PCR) technique of specific gene amplification was used in casework to synthesize millions of copies of the polymorphic second exon of the human leukocyte antigen (HLA-DQ locus) from the bones of victims, where DNA was extensively degraded. The HLA-DQ allelic variants in the amplified DNA were determined in a rapid non-reactive test by hybridization to sequence-specific oligonucleotide probes in both the dot-blot and reverse dot-blot formats (2).

Our first results were made in the case of a missing child. A seven-year-old boy was reported missing in the area of Komin, Metković, in 1985. His body was never found but last year, some bones and a skull, presumably belonging to the boy, were discovered within some kilometers of the mouth of the Neretva river. DQ typing was carried out on teeth and long bone (tibia) samples (Fig. 1) and on DNA from the two parental bloodstain samples (3,4). The identification proved successful.

At present, the laboratory will concentrate on establishing the identity of dead soldiers but later it will be used for identification of criminals and their victims as well as for detection of genetic malformations. One soldier of the 59 killed on the Kupres battlefield has been recently identified.

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