

Detection of DNA polymorphisms by using α satellite probes:
Application to the forensic identification

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INTRODUCTION

The α satellite is a complex family of tandemly repeated DNA located at the centromeric regions of human chromosomes. Each chromosome contains some tandem copies of a higher - order repeat unit, comprised of tandem monomer units of 171 bp. It is also reported that the α satellite DNA shows RFLPs based on site variations within and between monomer units (Waye 1987; Willard 1986, 1987).

Here we describe that RFLPs involving α satellite can be a tool of the forensic identification.

MATERIALS AND METHODS

DNAs were prepared from peripheral lymphocytes from healthy Japanese individuals.

The probes, D11Z1, D17Z1 and DXZ1 (α satellite DNAs on 11, 17 and X chromosomes, respectively), were obtained from Oncor and labeled with digoxigenin - dUTP by random primed (DNA Labeling & Detection Kit, Boehringer).

DNAs were digested with BglI, EcoRI, HindIII, MspI, PvuII or XbaI and the fragments were separated by agarose gel electrophoresis. After Southern blotting - hybridization procedures, the filters were washed in 0.1 x SSC - 0.1 % SDS at 65 °C and the hybrids were detected by enzyme immunoassay.

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RESULTS AND DISCUSSION

Fig. 1.
EcoRI - D17Z1
polymorphism

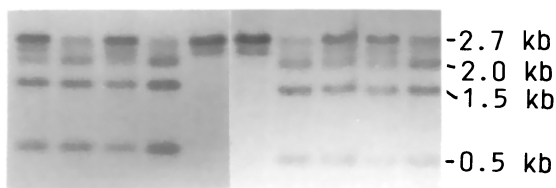
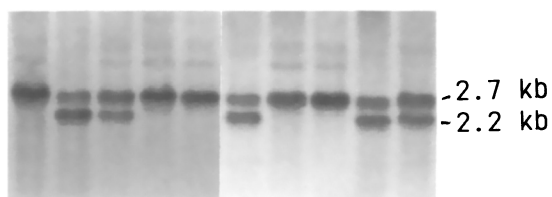


Fig. 2.
PvuII - D17Z1
polymorphism



For detecting the RFLPs involving α satellite, genomic DNA from unrelated Japanese individuals was digested with restriction endonuclease and hybridized to the α satellite DNA probe. EcoRI - and PvuII - cleaved genomic DNA gave the

Table 1. Frequencies in a Japanese population

	Fragment	n	Present	Absent
EcoRI - D17Z1	2.0 kb	184	0.45	0.55
	1.5		0.72	0.38
	0.5		0.72	0.38
PvuII - D17Z1	2.2 kb	110	0.47	0.53

n ; number of chromosomes examined.

clear polymorphic variations of chromosome 17 (Fig. 1 and 2). Both the pattern of bands and the relative intensity of each band were reproducible. Table 1 gives the frequencies

in a Japanese population of the polymorphic fragment lengths. Mendelian inheritance was also investigated (Fig. 3).

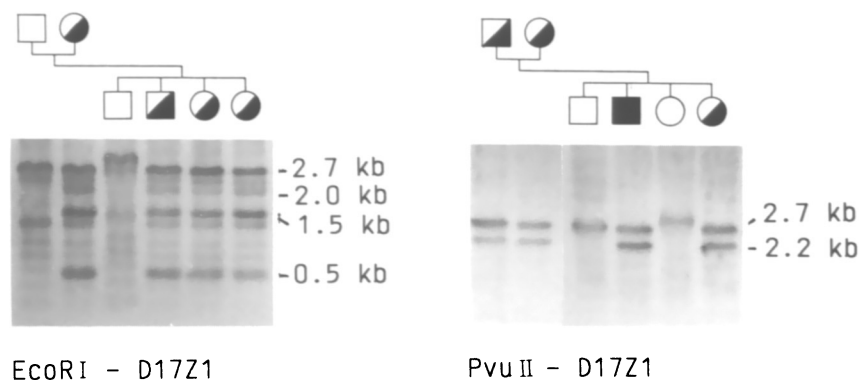


Fig. 3. Mendelian inheritance of the polymorphisms

The detection method used was practically enough sensitive and the polymorphisms described here are likely to be available for the individual identification or parentage testing.

REFERENCES

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