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# $(CAC)_5$, a very informative oligonucleotide probe for DNA fingerprinting

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Using probes recognizing ubiquitously interspersed simple repetitive sequences many independent loci can be detected simultaneously. In search of suitable informative probes eight different simple repetitive oligonucleotides have been investigated by screening a panel of human DNAs . The DNAs were digested with the restriction endonucleases AluI, HinfI and MboI, run on 0.7% agarose gels and hybridized in the gel with the respective $^{32}$P-labelled oligonucleotides as described (1). The highest amount of bands was obtained after hybridization with $(CAC)_5$. Banding patterns were identical in monozygous twins. Also family studies proved that the bands are inherited according to the mendelian laws. Only one offspring fragment in 312 (of 42 investigated meioses) could not be found in either parent which would equal a mutation rate of 0.003 per locus per gamete. This initial result certainly tends to overestimate the mutation rate. All calculations were done according to Ali et al. (1). The probability $\hat{P}=2x10^{-8}$ (see Table) to find the same banding pattern in two unrelated individuals corresponds to data of Jeffreys et al. (2).Thus oligonucleotides are versatile tools for individual specific fingerprinting: Using $(CAC)_5$ very informative fingerprints are obtained with as little as 100 ng of DNA in the 4-25 kilobase range, while e.g. the less polymorphic $(GACA)_4$ probe is one order of magnitude more sensitive, recognizes shorter fragments and qualifies thus for forensic studies. Oligonucleotides have several advantages over cloned minisatellite probes: The former are synthesized chemically; no Southern blotting is required; hybridization and exposure time are reduced.

Table : Variation of DNA fragments hybridizing to $(CAC)_5$ in 16 humans.

| Restriction enzymes | No.of polymorphic bands | Average No.of polymorphic bands per individual | P | $\hat{P}$ | Max. mean allele frequency ($\hat{q}$) |
|---|---|---|---|---|---|
| AluI | 67 | 15.9 | 0.38 | $2x10^{-7}$ | 0.212 |
| HinfI | 70 | 15.8 | 0.33 | $2x10^{-8}$ | 0.182 |
| MboI | 61 | 9.4 | 0.29 | $9x10^{-6}$ | 0.156 |

References.(1) Ali, S., Müller, C.R. and Epplen, J.T. (1987) Hum. Genet. 74, 239-243; (2) Jeffreys, A.J., Wilson, V. and Thein, L.S. (1985) Nature 316, 76-79.