Allele Frequency in the Population of Spain Using Several Single Locus Probes

E. Valverde, C. Cabrero[1], A. Diez[1], A. Carracedo and T. Borrás[1]

Institute of Legal Medicine
University of Santiago de Compostela
Galicia, Spain

INTRODUCTION

Studies to determine allele frequency of single locus probes have been carried out for some of the world´s populations. We have delayed the construction of our database of spanish populations until solid electrophoretic and statistical criteria were accepted. Once the EDNAP group approved a laboratory protocol which has been widely accepted by European laboratories, we have carried out this study, and therefore we present the results for the probes YNH24 (HinfI, HaeIII), MS43a (HinfI), MS31 (HinfI) and TBQ7 (HaeIII).

METHODS

DNA was extracted from whole blood by a high salt method (Cabrero et al) and digested with HinfI or HaeIII. The resultant fragments were electrophoresed on agarose gels (0.7%) at 55V, according to the EDNAP group protocol. After electrophoresis, DNA was transferred via capillary to nylon membranes, hybridized with ^{32}P labeled probes, and exposed in autor adiography cassettes for 2-3 days.
Bands were measured independently by two operators using a densitometer (Elscript400, Hirschmann), and the data generated were translated to bp values using a computer program based on the Elder and Southern method (1987).

RESULTS

Figures 1, 2 and 3 show frequency data for YNH24, MS43a and MS31, respectively, using HinfI as restriction enzyme, and Figures 4 and 5 show frequency data for YNH24 and TBQ7, using HaeIII as restriction enzyme.

Accumulated frequency data was analyzed using the "sliding window fit method" proposed by Gill et al.(1990). For all probes the sliding window was 2x the match guideline of 2.8 Kb%, i.e. 5.6 Kb%. Frequencies are calculated by summing the positions of the raw data in 5.6 Kb% block with the mean value moving 5 bp per interval.

Frequency tables have been generated based on these criteria (details of these tables can be seen in Table 1 and 2). The statistical analysis of single locus probes and band matching in our practical caseworks is carried out with the ´conservative´ approach of Gill et al.(1991) using these frequency tables.

---

1 Dept. of Molecular Biology of Pharmagen Corp
Calera 3, 28760 Madrid, Spain

Advances in Forensic Haemogenetics 4
Edited by Ch. Rittner and P. M. Schneider
© Springer-Verlag Berlin Heidelberg 1992
Advances in Forensic Haemogenetics 4 (c) Springer-Verlag Berlin Heidelberg

Table 1. Detail of a frequency table corresponding to probe MS43a (HinfI as restriction enzyme)

WINDOW CENTRE (bp)	FREQUENCY	WINDOW CENTRE (bp)	FREQUENCY
8247.5	0.14184	9922.5	0.17021
8252.5	0.14184	9927.5	0.17021
8257.5	0.14539	9932.5	0.17376
8262.5	0.14539	9937.5	0.17376
8267.5	0.14539	9942.5	0.17021
8272.5	0.14184	9947.5	0.18085
8277.5	0.14184	9952.5	0.17730
8282.5	0.13830	9957.5	0.17730
8287.5	0.13475	9962.5	0.18085
8292.5	0.13475	9967.5	0.18085
8297.5	0.13475	9972.5	0.18440
8302.5	0.13121	9977.5	0.17730

Table 2. Detail of a frequency table corresponding to probe YNH24 (HinfI as restriction enzyme)

WINDOW CENTRE (bp)	FREQUENCY	WINDOW CENTRE (bp)	FREQUENCY
2542.5	0.04950	2882.5	0.09406
2547.5	0.04950	2887.5	0.09901
2552.5	0.04950	2892.5	0.11386
2557.5	0.04950	2897.5	0.11386
2562.5	0.04950	2902.5	0.11386
2567.5	0.05941	2907.5	0.10891
2572.5	0.06931	2912.5	0.11881
2577.5	0.07426	2917.5	0.12376
2582.5	0.07426	2922.5	0.12376
2587.5	0.08416	2927.5	0.11881
2592.5	0.07921	2932.5	0.11881
2597.5	0.08416	2937.5	0.12871

Population data from different spanish populations seem to have similar profiles and so, these frequency tables can be used for practical casework. Nevertheless, since the sample for some populations is too small, a data file was created in our program for further examination of accumulated data.

REFERENCES

Cabrero C, Diez A, Borras T (to be published) Short and inexpensive non enzimatic procedure to isolate genomic DNA from human blood

Elder JK, Southern E (1987) In: Bishop MJ, Rawlings CJ (eds) Nucleic acid and protein sequence analysis. IRL Press, Oxford, pp 165-1 Oxford, pp 165-172

Gill P, Evett IW, Woodroffe S, Lygo JE, Millican E, Webster M (1991) Databases, quality control and interpretation of DNA profiling in the Home Office Forensic Science Service. Electrophoresis 12: 204-209

Archive of SID Heidelberg 2004 (c) Springer-Verlag Berlin Heidelberg

Gill P, Werrett DJ (1990) Interpretation of DNA profiles using a computerised database. Electrophoresis 11: 444-448

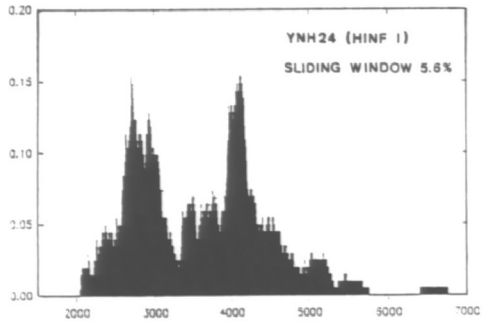

Fig. 1

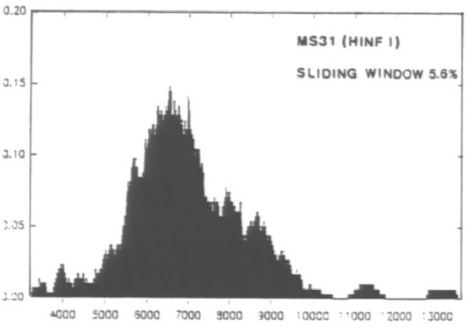

Fig. 2

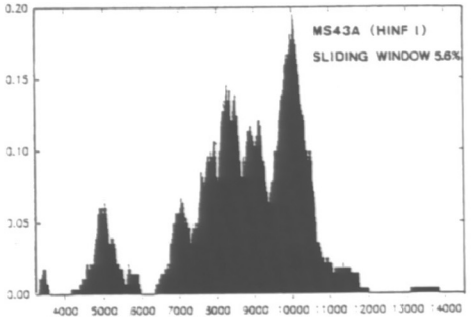

Fig. 3

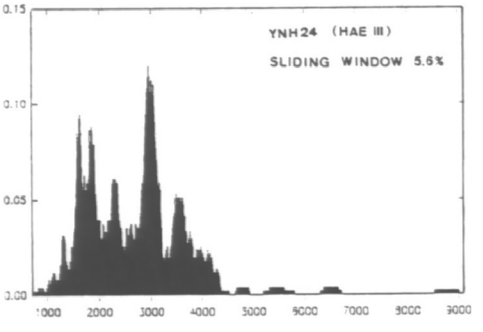

Fig. 4

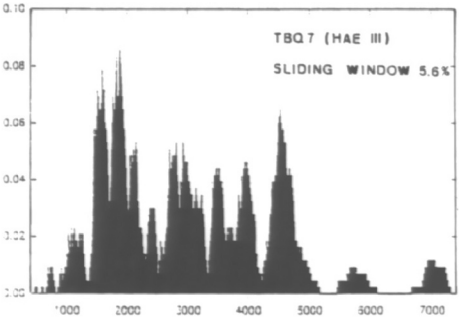

Fig. 5

Figs. 1-5. Frequency distribution of probes YNH24, MS43a and MS31

Advances in Forensic Haemogenetics 4 (c) Springer-Verlag Berlin Heidelberg