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SHORT COMMUNICATION

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Population genetic study of the AmpFLP system APO B in an Austrian population sample

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Abstract Allele frequencies of the AmpFLP system APO B were determined in an Austrian population sample consisting of 210 unrelated Caucasian individuals living in the Salzburg region. A total of 25 different alleles could be observed. The allele distributions were in accordance with Hardy-Weinberg equilibrium. No new mutations were found in 184 meioses and seven "interalleles" and four alleles < 29 could be detected.

Key words AmpFLP · APO B · Allele frequencies · Austria · Population studies

Introduction

The AmpFLP system APO B (Boerwinkle et al. 1989) is widely used for forensic stain analysis and paternity testing. In this paper we present allele frequency data in an Austrian population sample.

Materials and methods

DNA was isolated as described previously (Neuhuber et al. 1996) and 1–3 ng was amplified using published primer sequences (Boerwinkle et al. 1989). Amplification was performed in a GeneAmp PCR System 9600 (Perkin Elmer) with the following conditions (BioTherm DNA polymerase, GeneCraft, Münster): 2 min 94° C, 29 cycles of 15 s 95° C/40 s 61° C/60 s 72° C, 5 min 72° C. PCR reaction buffer was adjusted to 2.5 m*M* $MgCl_2$. After electrophoresis in a 5.5% polyacrylamide gel, fragments were visualized as described by Allen and Budowle (1989).

The mean exclusion chance (MEC), mean exclusion probability (MEP), polymorphism information content (PIC), probability of match (pM) and the discrimination power (D) were determined using the computer programme HWE-Analysis, Version 3.1 (Christoph Puers, Institute for Legal Medicine, University of Münster) (Table 1).

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Table 1 Allele frequencies for APO B (n = 210 individuals)

Allele	Frequency	Allele	Frequency
< 29.IV	0.002	39 A	0.002
< 29.III	0.002	39	0.050
< 29.II	0.005	41 A	0.002
< 29.I	0.017	41	0.007
29	0.057	43	0.002
29 C	0.010	45	0.017
31	0.024	47	0.062
31 C	0.002	49	0.076
33	0.043	51 A	0.002
35	0.220	51	0.012
35 C	0.002	53	0.010
37	0.370	55	0.002
37 C	0.002		

MEC = 0.631, MEP = 0.597, PIC = 0.777, pM = 0.070, D = 0.930. Observed and expected heterozygosities are 0.8333 and 0.7989 ± 0.0542 respectively. A = anodal variant, C = cathodal variant

Results and discussion

A total of 25 different alleles was observed in an Austrian Caucasian population sample (population size n = 210 individuals) including seven "interalleles" (designated with C for cathodal or A for anodal) and four alleles < 29 (designated < 29.I for the longest to < 29.IV for the smallest allele. No new mutations were found in 184 meioses. Examples for alleles 29.I–29.IV are shown in Fig. 1. Alleles < 29.III and < 29.IV would suggest approximately 25 and 23 repeats, respectively.

Expected and observed heterozygosities (H.exp, H.obs) are listed in Table 1. No significant deviation from Hardy-Weinberg equilibrium (exact test; Guo and Thompson 1992) was found ($P > 0.05$). The discrimination power (Jones 1972) was 0.93.

A comparison of allele frequencies with data from Hungary (Woller et al. 1995) and from Germany (Schnee-Griese and Teifel-Greding 1991) revealed no significant differences, except for alleles < 33 which may be due to

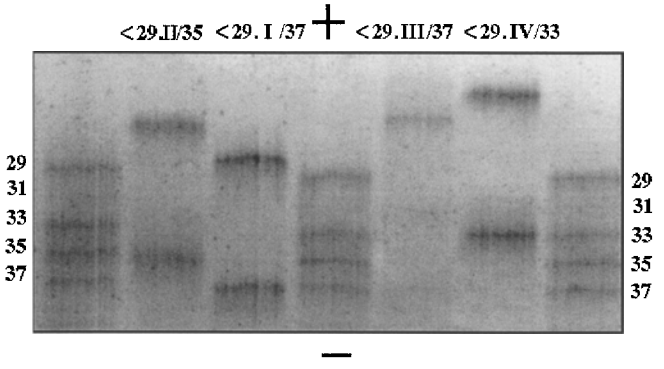

Fig. 1 Examples for the four different alleles < 29 found in an Austrian population (29.I for the longest to 29.IV for the smallest allele)

different nomenclatures. The Hungarian data also do not contain "interalleles".

These data make APO B useful for forensic DNA testing. The fact that the PCR fragments are relatively long is a disadvantage when using APO B for stain analysis, however it is very suitable for paternity testing.

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