



Genetic data for the locus SE33 in a south Portuguese population with Powerplex[®] ES System

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Abstract. Allele frequencies and forensic efficiency parameters for SE33 locus were calculated from a sample of 328 individuals residing in the south of Portugal. A significant deviation from Hardy–Weinberg equilibrium was observed. The results demonstrate the usefulness of SE33 for forensic identification, which should be added to the set of STRs loci routinely studied, namely in complex cases that involve relatives. © 2005 Elsevier B.V. All rights reserved.

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1. Introduction

The SE33 (ACTP2—the human actin beta-actin-related pseudogene H-beta-Ac-psi-2) locus is one of the most informative tetranucleotide short tandem repeat (STR) systems for biological identification [1].

The purpose of the present study was to establish the allele frequencies distribution for the SE33 locus in a south Portuguese population, which can be used for forensic purposes.

2. Materials and methods

Blood samples were obtained from 328 unrelated individuals (285 Caucasians and 43 Africans) involved in paternity testing cases, residents in the south of Portugal. DNA was extracted by the Chelex-100 method. SE33 locus was amplified using the Powerplex[®] ES System (Promega Corporation, Madison WI, USA). Capillary electrophoresis was performed in an ABI PRISM 3100 Automatic DNA Sequencer. Genescan[®] Analysis

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v3.7 and Genotyping® v3.7 software were used for STR analysis and allele designation. Quality control and proficiency testing for this system have been carried out for the GEP-ISFG working group.

Allele frequencies and forensic parameters (Power of Discrimination, Power of Exclusion, Heterozygosity and Minimum Frequency value) were calculated. Minimum allele frequency was also estimated using sample size and the heterozygosity value. Hardy–Weinberg equilibrium was evaluated by performing the exact test.

3. Results

A total of 170 genotypes and 38 alleles were observed, none of which exceeded 11% in frequency (Table 1). The most common alleles were 19 (10.21%), 18 (7.47%), 16 and 29.2 (7.32%). The minimum allele frequency was 0.0109. It was detected an out-off ladder allele—39.2. An irregular distribution of alleles frequencies is detected (Fig. 1).

The Power of Discrimination (PD) and the Power of Exclusion (PE) was of 0.995 and 0.903, respectively. The Heterozygosity value (h) was 0.947. SE33 locus showed a significant departure from Hardy–Weinberg equilibrium in the examined population sample.

4. Discussion

The high number of alleles observed at SE33 locus confirmed the high degree of polymorphism. Alleles 9.2 and 39.2 were found in Papuans and Japanese populations [2], respectively. In this study, the allele 9.2 was detected in a Caucasian women that was born

Table 1
The allele frequencies for the SE33 locus in the south Portuguese population ($n=328$)

Allele	Frequency	Allele	Frequency
9.2	0.0015	22	0.0137
11	0.0030	22.2	0.0152
11.2	0.0046	23.2	0.0320
12	0.0030	24.2	0.0320
13	0.0091	25.2	0.0396
13.2	0.0076	26.2	0.0427
14	0.0366	27.2	0.0518
14.2	0.0015	28	0.0015
15	0.0473	28.2	0.0625
16	0.0732	29.2	0.0732
16.2	0.0015	30.2	0.0503
17	0.0595	31.2	0.0320
18	0.0747	32.2	0.0091
19	0.1021	33	0.0030
19.2	0.0046	33.2	0.0015
20	0.0595	34	0.0046
20.2	0.0107	35	0.0046
21	0.0229	36	0.0015
21.2	0.0046	39.2	0.0015

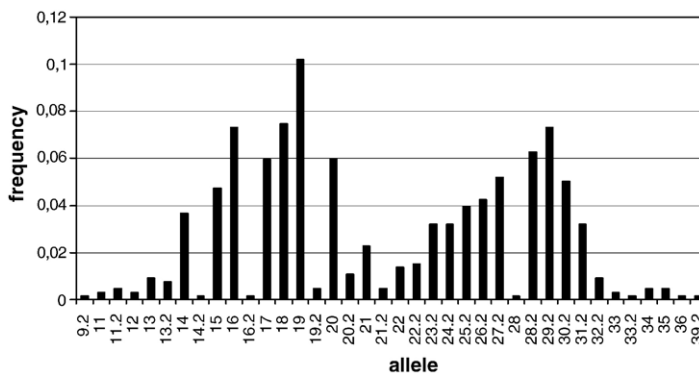


Fig. 1. The distribution of allele frequencies of SE33 in the south Portuguese population ($n=328$).

in a south region of Portugal (Alentejo) and the allele 39.2 was found in an African man that was born in Cape Verde. The observed Hardy–Weinberg deviation from equilibrium may be a probable result of the presence of rare alleles and the heterogeneity (concerning their origin) of population. The forensic efficiency values suggest that SE33 is a highly discriminative locus and demonstrate the usefulness of SE33 for forensic identification, that should be added to the set of STRs loci routinely studied in order to increase the discrimination potential, namely in complex cases which involve relatives.

References

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