

Research article

Results of Gefi's (the Italian ISFG working group) collaborative exercise on three miniSTR loci (“NC01”)

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Abstract

A sample of 1070 individuals was collected by 12 collaborating forensic laboratories from Central and Northern Italy, and typed by the so-called “NC01” triplex, including the three loci D10S1248, D14S1434, and D22S1045. Heterozygosities were 0.771, 0.717, and 0.720, respectively. © 2008 Elsevier Ireland Ltd. All rights reserved.

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1. Introduction

Degraded DNA samples are commonly observed in forensic casework studies. Recovery of information from these degraded samples can be enhanced by use of PCR products smaller than those of conventional loci. Reduced-size STR amplicons can be created by moving the primers closer to the STR repeat region; these markers are called “miniSTRs”. Several miniSTR markers have been proposed to increase the number of core European STR loci [1]. In this study we analyzed the multiplex “NC01” introduced by Coble and Butler [2] within an Italian collaborative study with proficiency testing.

2. Materials and methods

Twelve laboratories located in Northern and Central Italy (Fig. 1) typed 50–157 unrelated subjects born in their region, totaling 1070 individuals. The data from Tuscany were published previously [3]. For quality control, the organizing committee delivered two blind stains. The reference control sample 9947A was kindly provided by Mike Coble. Allele nomenclature followed the recently updated scheme [4]. Statistical analyses were conducted by ARLEQUIN 3 [5].

3. Results

Table 1 shows the distribution of allele frequency in Northern-Central Italy for the three loci D10S1248, D14S1434, and D22S1045. A total of 36 tests for Hardy-Weinberg equilibrium were performed, and none resulted significant after applying the

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Fig. 1. Location within Italy and sample size of the collected samples.

Bonferroni correction. The global test of population differentiation (testing for heterogeneity of allele frequency among subsamples) showed an exact P -value of non-differentiation = 0.353 ± 0.112 . Use of these markers in the forensic practice in Italy is now supported by a validated population database.

Conflict of interest

None.

Table 1
Allele frequencies of three miniSTR in Italy

Allele	D10S1248	D14S1434	D22S1045
9	0.0014	0.0005	
10	0.0014	0.1888	0.0005
11	0.0023	0.0551	0.1257
12	0.0304	0.0355	0.0093
13	0.2640	0.3332	0.0047
14	0.3103	0.3626	0.0565
15	0.1991	0.0187	0.3650
16	0.1458	0.0033	0.3472
17	0.0393	0.0023	0.0850
18	0.0061		0.0061
H_{exp}	0.771	0.717	0.720
PE_{trios}	0.555	0.474	0.485
PE_{duos}	0.377	0.303	0.312

H_{exp} : expected heterozygosity; PE_{trios} : paternity exclusion in standard trios; PE_{duos} : paternity exclusion in motherless cases.

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