Spanish population data for the 15 STRs loci included in Powerflex-16

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Short tandem repeat (STR) loci are the most informative PCR-based genetic markers available to date for attempting to individualize biological material. The 16 STR loci: D3S1358, TH01, D21S11, D18S51, PentaE, D5S818, D13S317, D7S820, D16S539, CSF1PO, PentaD, vWA, D8S1179, TPOX, FGA, and the locus amelogenin can be amplified simultaneously using the the PowerPlex16 kit (Promega, Madison, WI, USA).

This paper presents allele distribution data in the Spanish population. The data demonstrate that these loci can be useful for providing estimates of the frequency of a DNA profile in forensic identity testing and that a multiple locus profile is extremely rare in all the population.

Whole blood was obtained in EDTA vacutainer tubes by venipuncture from unrelated individuals ($N=323$) residing in Andalucia (Spain). Extracted DNA samples were amplified at the 16 loci using the PowerPlex 16 kit (Promega). Samples were analyzed using the ABI Prism™ 310 Genetic Analyzer (PE Biosystems, Foster City, CA) according to the manufacturer's recommended protocol.

All 15 loci are highly polymorphic in the Spanish sample population with the locus TPOX (66.8%) having the lowest observed heterozygosity, and the locus D18S51 (87.5%) displaying the highest heterozygosity. The most discriminating loci were D18S51 (PD=0.969) and PentaE (PD=0.968). The combined probability of exclusion for the 15 STR loci is 0.99999953. There was little evidence for departures from Hardy-Weinberg expectations (HWE) in this sample population. Based on the exact test, the locus that departed significantly from HWE was vWA ($p=0.0488$). After employing the Bonferroni correction for the number of loci analyzed, these observations are not likely to be significant. An interclass correlation test analysis was performed to detect any correlations

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Table 1

Locus	PD (Obs)	PD (Exp)	PE
1. D3S1358	0.92269737	0.92278200	0.58299702
2. THO1	0.91326177	0.92153232	0.57932276
3. D21S11	0.96156510	0.96393249	0.71562119
4. D18S51	0.96918283	0.97244149	0.75197184
5. PentaE	0.96892313	0.97153083	0.74728688
6. D5S818	0.87629848	0.87782049	0.48530485
7. D13S317	0.91784972	0.92716219	0.59710511
8. D7S820	0.92269737	0.93174389	0.60817361
9. D16S539	0.90226801	0.91172840	0.55780904
10. CSF1PO	0.83907548	0.86025565	0.45017867
11. PentaD	0.94650277	0.95237783	0.67224651
12. vWA	0.92944945	0.93221428	0.60962035
13. D8S1179	0.92529432	0.93586954	0.62118533
14. TPOX	0.81864612	0.82216391	0.40301804
15. FGA	0.96641274	0.96961134	0.73910229
Total	> 0.99999999	>0.99999999	0.99999953

between alleles at any of the pairwise comparisons of the 15 loci. A resumé of the PD and PE is shown in Table 1.

In conclusion, a Spanish database has been established for the loci D3S1358, TH011, D21S11, D18S51, PentaE, D5S818, D13S317, D7S820, D16S539, CSF1PO, PentaD, vWA, D8S1179, TPOX, FGA. All loci are highly polymorphic. The application of the product rule is valid for estimating the rarity of a multiple loci profile for these 15 loci.