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FOR THE RECORD

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Distribution of Allele Frequencies for Two Tetranucleotide Repeats (FES and D2S1328) Among Five Indian Population Groups

POPULATION: The distribution of allele frequencies have been analyzed at two short tandem repeat (STR) loci FES and D2S1328 among five anthropologically distinct ethnic groups of India namely Ezhavas, Nairs, Arayas, Vishwakarma and Muslims. Muslims are religio-ethnic group while other populations mentioned above belong to distinct section of Hindu religion. All these populations are from Kollam district of Kerala in South India and speak Malayalam, an Indo-Dravidian language. A total of 264 random, healthy individuals of FES and 197 individuals for D2S1328 were analyzed.

KEYWORDS: forensic science, DNA typing, Indian population, short tandem repeat, FES and D2S1328

DNA Extraction: DNA was extracted using rapid, non-enzymatic salt precipitation method (1).

Amplification and Genotyping: PCR amplification was carried out using locus specific primers (2), in Eppendorf ™ Gradient Master Cycler. The forward primer was fluorescently labeled using Cy5 dye amidite. The amplified product were analyzed on 6 % denaturing polyacrylamide gel containing 7M urea using Alf Express DNA Sequencer (Amersham Pharmacia Biotech). In addition to external standard (107, 228, and 395 bps), internal standards were also used in each lane of the gel.

Access to complete data set: Via electronic mail from communicating author at msesh@apsara.barc.ernet.in.

Allele frequencies and hetrozygosity was calculated using software Popgene ver 1.31 (3). The polymorphism information content (PIC) was calculated as per Bolstein et al. (4) and Power of Discrimination (PD) as mentioned by Fisher (5).

Allele frequencies for FES and D2S1328 are presented In table 1 and 2 respectively. FES locus showed 10 repeat allele as the predominant allele at all five population except for Arayas where 11 repeat allele was predominant. At D2S1328 locus 8 repeat allele was the predominant allele among all the four populations except for Muslims where 12 repeat allele was the predominant allele. The expected and observed hetrozygosity did not show any significant difference at all the three loci. Alleles at both the loci for all five populations were in Hardy Weinberg Equilibrium. High PIC and PD value of these STR showed these markers are informative and can be used for forensic DNA typing and paternity testing.

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References

1. Lahiri K, Nurnberger JL. A rapid nonenzymatic method for the preparation of HMW DNA from blood for RFLP studies. Nucleic Acid Res 1991:19:5444.
2. Perez-lezaun A, Catafell F, Mateau E, Comas D, Bosch E, Bertranpetit J. Allele frequencies for 20 microsatellite in a worldwide population survey. Hum Hered 1997;47:189–96.
3. Yeh FC, Yang R, Boyle T. Popgene ver 1.31. Microsoft Window-based Freeware for Population Genetic Analysis. University of Ulberta and Centre for International Forestry Research, August 1999.
4. Bostein D, White RL, Skolnick M, Davis RW. Construction of genetic linkage map in man using restriction fragment length polymorphism. Am J Hum Genet 1980:32:314–31.
5. Fisher R. Standard calculations for evaluating a blood group System. Heridity 1951:5:95–102.

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TABLE 1—*Allele frequency distribution at FES in five Indian population groups.*

Allele (Repeats)	Ezhavas ($N = 92$)	Nairs ($N = 44$)	Arayas ($N = 39$)	Vishwakarma ($N = 20$)	Muslims ($N = 69$)
7	0.005	0.011	0.000	0.000	0.007
8	0.038	0.046	0.077	0.025	0.022
9	0.245	0.216	0.218	0.100	0.217
10	0.359	0.261	0.244	0.325	0.341
11	0.196	0.227	0.282	0.250	0.289
12	0.141	0.216	0.153	0.275	0.102
13	0.016	0.023	0.026	0.000	0.022
14	0.000	0.000	0.000	0.025	0.000
H	0.783	0.796	0.744	0.500	0.681
h	0.756 ± 0.045	0.793 ± 0.061	0.794 ± 0.065	0.764 ± 0.095	0.747 ± 0.052
Exact test	0.699	0.733	0.287	0.145	0.687
PIC	0.791	0.819	0.818	0.789	0.785
PD	0.895	0.917	0.920	0.888	0.896

N: No of individuals; H: observed hetrozygosity; h: expected hetrozygosity; PIC: polymorphism information content; PD: power of discrimination.

TABLE 2—*Allele frequency distribution at D2S1328 in five Indian population groups.*

Allele (Repeats)	Ezhavas ($N = 77$)	Nairs ($N = 30$)	Arayas ($N = 28$)	Vishwakarma ($N = 14$)	Muslims ($N = 48$)
7	0.013	0.017	0.000	0.000	0.000
8	0.331	0.283	0.339	0.393	0.292
9	0.156	0.117	0.036	0.070	0.115
10	0.058	0.100	0.036	0.036	0.052
11	0.207	0.150	0.268	0.179	0.143
12	0.149	0.182	0.268	0.179	0.323
13	0.086	0.117	0.036	0.143	0.053
14	0.000	0.017	0.017	0.000	0.012
15	0.000	0.017	0.000	0.000	0.012
H	0.818	0.867	0.821	0.643	0.729
h	0.795 ± 0.044	0.839 ± 0.067	0.751 ± 0.082	0.783 ± 0.110	0.779 ± 0.059
Exact test	0.092	0.971	0.987	0.096	0.866
PIC	0.819	0.847	0.783	0.789	0.805
PD	0.925	0.946	0.875	0.908	0.913

N: No of individuals; H: observed hetrozygosity; h: expected hetrozygosity; PIC: polymorphism information content; PD: power of discrimination.