

FOR THE RECORD

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Allele Frequency Distribution of Two Minisatellite Loci (D19S20 and ApoB 3' VNTR) Among Five Distinct Population Groups of India

KEYWORDS: forensic science, DNA typing, D19S20, ApoB 3' VNTR, Indian population

We have analyzed DNA polymorphism at two minisatellite loci (D19S20 and ApoB 3' VNTR) among five anthropologically distinct population groups of India. Two of these belong to the state of Maharashtra in Western India (Konkanasthas and Marathas) and three from the state of Kerala in Southern India (Nairs, Ezhavas, and Muslims). A total of 235 individuals at D19S20 and 246 individuals at ApoB locus were studied.

Genomic DNA was extracted using a rapid nonenzymatic method (1). PCR amplification of both the loci was achieved by using locus specific primers flanking the repeat region (2,3) and carried out in a Hybaid™ thermal cycler using Taq polymerase (Roche Molecular diagnostics). Amplimers were electrophoresed in 6% denaturing urea gel (7M) and analyzed by fragment manager using ALF DNA Sequencer (Amersham Pharmacia Biotech). Allelic ladders for both the loci were developed in our laboratory and used for the correct assignment of the allele sizes.

Access to Data: Via electronic mail from communicating author, e-mail address: msesh@apsara.barc.ernet.in.

Analysis of Data: The expected genotype frequencies for both the loci were calculated under the assumption of Hardy-Weinberg equilibrium expectation. The expected heterozygosity or gene diversity was calculated as by Nei et al. (4). The Polymorphic Information Content was determined according to Botstein et al.

(5) and the Power of Discrimination was calculated as by Fisher (6).

At D19S20 locus, allele 6 was found to be the predominant allele across the five population groups (Table 1). At ApoB locus, allele 37 was the most common allele among all the four population groups except Konkanasthas where it was allele 36 (Table 2). The expected and observed heterozygosity showed no significant differences at both the loci.

References

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TABLE 1—Distribution of allele frequencies at D19S20 minisatellite among five Indian population groups.

Allele (repeats)	Konkanasthas (N = 43)	Marathas (N = 75)	Nairs (N = 34)	Ezhavas (N = 45)	Muslims (N = 38)
	Freq ± S.D	Freq ± S.D	Freq ± S.D	Freq ± S.D	Freq ± S.D
4	...	...	0.029 ± 0.021 (2)	0.033 ± 0.019 (3)	0.066 ± 0.029 (5)
5	...	0.033 ± 0.015 (5)	0.015 ± 0.015 (1)	0.033 ± 0.011 (1)	0.013 ± 0.013 (1)
6	0.405 ± 0.054 (34)	0.313 ± 0.038 (47)	0.456 ± 0.061 (31)	0.400 ± 0.052 (36)	0.447 ± 0.057 (34)
7	0.179 ± 0.042 (15)	0.153 ± 0.030 (23)	0.235 ± 0.052 (16)	0.200 ± 0.042 (18)	0.224 ± 0.048 (17)
8	0.012 ± 0.012 (1)	0.073 ± 0.021 (11)	0.015 ± 0.015 (1)	0.011 ± 0.011 (1)	0.013 ± 0.013 (1)
9	0.036 ± 0.020 (3)	0.027 ± 0.013 (4)	0.088 ± 0.035 (6)	0.033 ± 0.019 (3)	...
10	0.036 ± 0.020 (3)	0.053 ± 0.018 (8)	...	0.011 ± 0.011 (1)	...
11	0.036 ± 0.020 (3)	0.013 ± 0.009 (2)	0.029 ± 0.021 (2)	0.011 ± 0.011 (1)	0.013 ± 0.013 (1)
12	...	0.013 ± 0.009 (2)	...	0.022 ± 0.016 (2)	...
13	0.012 ± 0.012 (1)	0.020 ± 0.012 (3)	0.015 ± 0.015 (1)	0.033 ± 0.019 (3)	0.026 ± 0.019 (2)
14	...	0.013 ± 0.009 (2)	...	0.011 ± 0.011 (1)	0.026 ± 0.019 (2)
15	0.036 ± 0.020 (3)	0.040 ± 0.016 (6)	0.015 ± 0.015 (1)	0.033 ± 0.019 (3)	0.013 ± 0.013 (1)
16	0.119 ± 0.036 (10)	0.060 ± 0.020 (9)	0.029 ± 0.021 (2)	0.056 ± 0.024 (5)	0.040 ± 0.023 (3)
17	0.071 ± 0.028 (6)	0.100 ± 0.025 (15)	0.029 ± 0.021 (2)	0.122 ± 0.035 (11)	0.066 ± 0.029 (5)
18	0.036 ± 0.020 (3)	0.053 ± 0.018 (8)	0.044 ± 0.025 (3)	0.011 ± 0.011 (1)	0.053 ± 0.026 (4)
19	0.024 ± 0.017 (2)	0.027 ± 0.013 (4)	...	...	...
20	...	0.007 ± 0.007 (1)	...	...	...
<i>H</i>	0.71	0.75	0.71	0.69	0.68
<i>h</i>	0.80 ± 0.06	0.86 ± 0.04	0.74 ± 0.07	0.78 ± 0.06	0.74 ± 0.07
PIC	0.80	0.86	0.75	0.80	0.76
PD	0.92	0.95	0.80	0.91	0.82

N = No. of individuals; The number in the parenthesis denotes the observed number for each allele. *H* = Observed heterozygosity; *h* = Expected heterozygosity; PIC = Polymorphic Information Content; PD = Power of Discrimination.

TABLE 2—Distribution of allele frequencies at ApoB minisatellite among five Indian population groups.

Allele (repeats)	Konkanasthas (N = 61)	Marathas (N = 64)	Nairs (N = 37)	Ezhavas (N = 40)	Muslims (N = 44)
	FREQ ± S.D	FREQ ± S.D	FREQ ± S.D	FREQ ± S.D	FREQ ± S.D
31	...	0.016±0.011 (2)	...	...	0.023±0.016 (2)
32	...	0.008±0.008 (1)	...	0.013±0.013 (1)	0.023±0.016 (2)
33	0.025±0.014 (3)	0.078±0.024 (10)	0.094±0.032 (7)	0.025±0.018 (2)	0.080±0.029 (7)
34	0.049±0.020 (6)	0.031±0.015 (4)	0.027±0.019 (2)	0.063±0.027 (5)	0.046±0.022 (4)
35	0.057±0.021 (7)	0.078±0.024 (10)	0.081±0.034 (6)	0.050±0.025 (4)	0.023±0.016 (2)
36	0.262±0.040 (32)	0.148±0.032 (19)	0.081±0.034 (6)	0.188±0.044 (15)	0.205±0.043 (18)
37	0.172±0.034 (21)	0.172±0.034 (22)	0.284±0.051 (21)	0.350±0.054 (28)	0.318±0.049 (28)
38	0.164±0.034 (20)	0.156±0.032 (20)	0.176±0.045 (13)	0.163±0.042 (13)	0.125±0.036 (11)
39	0.066±0.023 (8)	0.141±0.031 (18)	0.108±0.038 (8)	0.025±0.018 (2)	0.057±0.025 (5)
40	0.041±0.018 (5)	0.055±0.020 (7)	0.054±0.027 (4)	0.025±0.018 (2)	0.011±0.011 (1)
41	0.025±0.014 (3)	...	...	0.013±0.013 (1)	0.046±0.022 (4)
44	...	0.008±0.008 (1)	...	...	...
45	0.025±0.014 (3)	0.031±0.015 (4)	...	...	...
46	0.041±0.018 (5)	0.055±0.020 (7)	0.014±0.014 (1)	0.013±0.013 (1)	0.011±0.011 (1)
47	0.041±0.018 (5)	0.023±0.013 (3)	0.027±0.019 (2)	0.038±0.021 (3)	0.023±0.022 (2)
48	0.016±0.012 (2)	...	0.054±0.027 (4)	0.038±0.021 (3)	0.011±0.011 (1)
49	0.016±0.012 (2)	...	...	...	...
H	0.79	0.86	0.78	0.80	0.73
h	0.86 ± 0.04	0.90 ± 0.04	0.86 ± 0.06	0.81±0.06	0.82 ± 0.06
PIC	0.87	0.89	0.86	0.83	0.84
PD	0.97	0.97	0.95	0.94	0.94

N = No. of individuals; The number in the parenthesis denotes the observed number for each allele.

H = Observed heterozygosity; h = Expected heterozygosity; PIC = Polymorphic Information Content; PD = Power of Discrimination.