FOR THE RECORD

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Forensic Assessment of ACTBP2 (SE33) Microsatellite

POPULATION: State of Kerala, India

KEYWORDS: forensic science, India, microsatellite, ACTBP2, population data

The study evaluates the usefulness of human beta-actin related pseudogene (ACTBP2; SE33) microsatellite in forensics. Population samples of three ethnic groups from the state of Kerala, located on the southwestern coast of India, were analyzed. DNA was extracted using a rapid non-enzymatic salt precipitation method (1) and PCR amplified using locus specific primer (2). The forward primer was fluorescently labeled with Cy5 dye amidite. Amplimers were typed on ALF Express DNA Sequencer (Amersham Pharmacia Biotech). Allelic ladder developed in the laboratory was used for typing. Additionally, internal standards were used in each lane. Data were analyzed using Arlequin ver 1.1 (3). Polymorphic information content, power of discrimination and power of paternity exclusion were calculated as (4,5) and (6), respectively.

ACTBP2 is one of the most heterozygous loci known among the microsatellites. A total of 27 alleles were observed with repeats varying from 12.2 to 35.2, including numerous interalleles. High values were observed for polymorphism information content (PIC), power of discrimination (PD), and power of paternity exclusion (PE), indicating forensic efficiency of the locus. All the three populations conformed to Hardy Weinberg expectations when tested using exact test. The complete dataset can be accessed via electronic mail from the communicating author at msesh@apsara.barc.ernet.in or anugh@magnum.bavc.ernet.in

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TABLE 1—*Allele frequency distribution at ACTBP2 locus among three study populations.*

Allele	Ezhavas (n = 82) Frequency ± s.d.	Nairs (n = 74) Frequency ± s.d.	Muslims (n = 78) Frequency ± s.d.
12.2	…	0.03 ± 0.019 (2)	…
13	0.01 ± 0.012 (1)	0.01 ± 0.014 (1)	0.01 ± 0.013 (1)
14	0.04 ± 0.021 (3)	…	0.02 ± 0.018 (2)
15	0.04 ± 0.021 (3)	0.05 ± 0.026 (4)	…
16	0.01 ± 0.012 (1)	0.05 ± 0.026 (4)	0.09 ± 0.033 (7)
17	0.07 ± 0.029 (6)	0.05 ± 0.026 (4)	0.02 ± 0.018 (2)
18	0.12 ± 0.036 (10)	0.23 ± 0.049 (17)	0.15 ± 0.041 (12)
19	0.17 ± 0.042 (14)	0.11 ± 0.036 (8)	0.09 ± 0.033 (7)
19.2	0.01 ± 0.012 (1)	…	…
20	0.01 ± 0.012 (1)	0.01 ± 0.013 (1)	0.04 ± 0.022 (3)
20.2	0.02 ± 0.017 (2)	…	…
21	0.04 ± 0.021 (3)	0.01 ± 0.013 (1)	0.05 ± 0.025 (4)
21.2	0.01 ± 0.012 (1)	0.03 ± 0.019 (2)	0.04 ± 0.022 (3)
22	0.01 ± 0.012 (1)	…	0.01 ± 0.013 (1)
22.2	0.02 ± 0.017 (2)	0.04 ± 0.023 (3)	0.02 ± 0.018 (2)
23.2	0.04 ± 0.021 (3)	0.03 ± 0.019 (2)	0.04 ± 0.022 (3)
24.2	0.02 ± 0.017 (2)	…	…
25.2	…	0.01 ± 0.013 (1)	0.02 ± 0.018 (2)
26.2	0.02 ± 0.017 (2)	0.04 ± 0.023 (3)	0.04 ± 0.022 (3)
27.2	0.01 ± 0.012 (1)	0.07 ± 0.029 (5)	0.10 ± 0.034 (8)
28.2	0.01 ± 0.012 (1)	0.01 ± 0.013 (1)	0.06 ± 0.028 (5)
29.2	0.11 ± 0.035 (9)	0.12 ± 0.038 (9)	0.04 ± 0.022 (3)
30.2	0.04 ± 0.021 (3)	0.05 ± 0.026 (4)	0.04 ± 0.022 (3)
32	0.10 ± 0.033 (8)	0.03 ± 0.019 (2)	0.02 ± 0.018 (2)
32.2	…	…	0.05 ± 0.025 (4)
34	0.01 ± 0.012 (1)	…	…
35.2	0.04 ± 0.021 (3)	…	0.01 ± 0.013 (1)

n = No. of chromosomes; the number in the parenthesis denotes the observed number for each allele.

TABLE 2—*Forensic analysis of ACTBP2 microsatellite locus.*

	Ezhavas	Nairs	Muslims
Observed number of alleles	24	19	21
Observed heterozygosity	0.88	0.89	0.95
Expected heterozygosity	0.93 ± 0.013	0.77 ± 0.030	0.94 ± 0.011
Polymorphic information content	0.91	0.89	0.92
Power of discrimination	0.99	0.98	0.99
Power of paternity exclusion	0.83	0.79	0.86
Hardy Weinberg equilibrium (p > 0.05)			
Exact test (P value)	0.596 ± 0.0005	0.990 ± 0.0001	0.720 ± 0.0005