

## FOR THE RECORD

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# Y-STR Haplotypes from Eight South Indian Groups Based on Five Loci

**POPULATION:** Five Y-chromosome short tandem repeat (STR) loci (DYS389I, DYS389II, DYS390, DYS391, and DYS393) were typed in 81 males from seven tribal populations of south India, including 30 Koragas, 23 Yeravas, 5 Mullukurunan, 2 Mullukurumba, 4 Paniya, 3 Kuruchian and 3 Bettakurumba; and 11 south Indian caste individuals of mixed origins.

**KEYWORDS:** forensic science, DNA typing, population genetics, Y-chromosome, short tandem repeats, haplotypes, South India, DYS389I, DYS389II, DYS390, DYS391, DYS393

DNA was extracted from blood or hair samples from 81 unrelated males. These samples are a subset of 155 males typed for 14 Y-chromosome single nucleotide polymorphisms (Y-SNP) and are characterized by the derived state at M52, RPS4Y, M17, or YAP (1). Additional information on the eight Indian groups can be found elsewhere (2,3). Genomic DNA from blood samples was extracted with the IsoQuick (Microprobe) kit (3,4). Hair samples, each consisting of at least one hair with an attached bulb, were rinsed with a 70% ethanol solution and DNA was extracted as described (5). All samples were genotyped for 5 loci: DYS389I, DYS389II, DYS390, DYS391, and DYS393. These loci were amplified in separate PCRs and detected on an ABI PRISM 377 DNA sequencer (Applied Biosystems), as described elsewhere (6). Laboratory internal control standards were used as quality controls.

Alleles were designated according to the number of repeats. The number of haplotypes was counted for each population. Haplotype

diversity was calculated as:

$$h = \frac{n}{n-1} \left( 1 - \sum_{i=1}^k x_i^2 \right)$$

where  $n$  is the sample size,  $k$  the number of different haplotypes and  $x_i$  the frequency of the  $i$ th haplotype, computed using ARLEQUIN 2.0 (7). The variance in allele size distribution was calculated in EXCEL (Microsoft) for each locus independently and then averaged across the five loci. The discrimination capacity was determined by dividing the number of haplotypes by the number of individuals in each population.

The Y-STR haplotypes observed in the different populations are listed in Table 1. Diversity parameters according to the Y-SNP background are shown in Table 2. A total of 16, 7, 9 and 2 different haplotypes were observed on the backgrounds of M52, RPS4Y, M17 and YAP, respectively. Overall, low diversity was observed on the background of M52 and RPS4Y and high diversity on the background of M17. These results indicate that different patterns of Y-STR diversity are associated to different Y-SNP backgrounds in south India. The complete dataset is also available to any interested researcher upon request.

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TABLE 1—Y-STR haplotypes from 81 south Indian males based on five loci and classified according to Y-SNP background.

Y-SNP Background	DYS389I	DYS389II	DYS390	DYS391	DYS393	Yeravas	Bettakurumba	Koragas	Mullukurumba	Mullukurunan	Kuruchian	Paniya	Caste group	TOTAL
M52	9	17	22	10	12	2	-	-	-	-	-	-	-	2
M52	9	17	23	10	12	1	-	-	-	-	-	-	-	1
M52	10	16	21	10	12	-	-	-	-	-	-	-	1	1
M52	10	16	22	10	12	-	1	6	1	-	-	-	-	8
M52	10	16	22	11	12	-	-	-	-	2	-	-	1	3
M52	10	16	23	10	12	-	1	-	-	1	1	-	-	3
M52	10	16	23	11	12	-	-	-	-	1	-	-	-	1
M52	10	17	22	10	12	5	-	2	1	-	-	1	-	9
M52	10	18	22	10	12	-	-	2	-	-	-	-	-	2
M52	11	16	21	10	12	-	-	-	-	-	-	-	1	1
M52	11	16	21	11	12	-	-	1	-	-	-	-	-	1
M52	11	16	22	10	12	-	-	10	-	-	-	-	1	11
M52	11	16	22	11	12	-	-	5	-	-	-	-	-	5
M52	11	16	23	10	12	-	-	1	-	-	-	-	-	1
M52	11	17	22	10	12	-	-	1	-	-	-	-	-	1
M52	11	17	23	10	12	-	-	-	-	-	1	-	-	1
RPS4Y	9	15	23	10	13	-	-	-	-	-	-	-	1	1
RPS4Y	9	17	23	10	14	2	-	-	-	-	-	1	-	3
RPS4Y	10	17	21	10	14	2	-	-	-	-	-	-	-	2
RPS4Y	10	17	22	10	14	7	-	-	-	-	-	-	-	7
RPS4Y	10	17	22	11	14	-	-	-	-	-	-	1	-	1
RPS4Y	10	17	23	10	14	-	-	-	-	-	-	-	1	1
RPS4Y	10	18	25	10	13	-	-	-	-	1	-	-	-	1
M17	10	17	24	10	13	-	-	-	-	-	-	1	-	1
M17	10	17	24	11	13	-	-	-	-	-	-	-	1	1
M17	10	18	23	10	13	-	-	-	-	-	-	-	1	1
M17	10	18	25	10	13	-	-	-	-	-	-	-	1	1
M17	10	18	25	11	13	1	-	-	-	-	1	-	-	2
M17	10	18	27	11	13	1	-	-	-	-	-	-	-	1
M17	10	19	25	10	13	-	-	-	-	-	-	-	1	1
M17	11	17	25	10	13	-	1	-	-	-	-	-	-	1
M17	11	18	25	10	13	2	-	-	-	-	-	-	1	3
YAP	10	17	22	10	15	-	-	1	-	-	-	-	-	1
YAP	10	20	22	10	15	-	-	1	-	-	-	-	-	1

TABLE 2—Diversity of Y-STR haplotypes in south India, according to Y-SNP background.

Y-SNP Background	Sample Size	Number of Haplotypes	Haplotype Diversity	Variance in Allele Size Distribution	Discrimination Capacity
M52	51	16	0.89 ± 0.02	0.20	0.31
RPS4Y	16	7	0.79 ± 0.09	0.32	0.44
M17	12	9	0.94 ± 0.06	0.34	0.75
YAP	2	2	1.00 ± 0.50	0.90	1.00

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