

Y-chromosomal STR haplotypes in an Arab population from Yemen

U.-D. Immel*, M. Kleiber, M. Klintschar

*Institut für Rechtsmedizin, Martin-Luther University Halle-Wittenberg,
Franzosenweg 1, 06112 Halle/Saale, Germany*

Abstract. We analysed eight Y-chromosomal STRs (DYS385, DYS19, DYS 389I and II, DYS390, DYS391, DYS392, DYS393) in an Arabic population sample of 128 males from the Sana'a region (Yemen) and found 117 different haplotypes. One hundred five of these haplotypes were never observed in any population study so far. © 2003 Elsevier B.V. All rights reserved.

Keywords: Population data; Microsatellite; Short tandem repeat; Y-chromosome

1. Introduction

Y-chromosomal STRs are increasingly used to study male-specific linkage evolution and for forensic applications [1]. For the last years, worldwide population data have been collected and protocols have been reported. However, forensic application of these linked markers requires knowledge of haplotype frequencies from different populations.

2. Material and methods

In the present study, a set of eight y-chromosomal STR loci (DYS19, DYS389-I, DYS389-II, DYS390, DYS391, DYS392, DYS393, DYS385) were analyzed in an Arabic population sample of 128 males from the Sana'a region. DNA was extracted from 128 unrelated male blood samples according to standard Qiagen procedures QiAmp Blood Kit. Amplifications were performed using fluorescent dye-labelled primers according to Elmoznino and Prinz [2]. The PCR products were analyzed by capillary electrophoresis using the ABI 310® Genetic Analyzer (Applied Biosystems) and genotyper software.

3. Results and discussion

Among the 128 Yemenian males studied 117 different Y-STR haplotypes were observed (Table 1). The most frequent haplotype occurred 4 times.

One feature of Y-STR haplotypes is the region-specific distribution qualifying these loci for estimating the ethnic origin of individuals. To identify haplotypes shared with other populations, searches in the Asian and European Y-STR databanks were performed for each Yemenian haplotype [3,4].

* Corresponding author. Tel.: +49-345-557-1833; fax: +49-345-557-1587.

E-mail address: uta.immel@medizin.uni-halle.de (U.-D. Immel).

Table 1
Yemenian Y-STR haplotypes

Sample	DYS 19	DYS 389 I	DYS 389 II	DYS 390	DYS 391	DYS 392	DYS 393	DYS 385 a	DYS 385 b	Sample	DYS 19	DYS 389 I	DYS 389 II	DYS 390	DYS 391	DYS 392	DYS 393	DYS 385 a	DYS 385 b
Y 271	14	13	30	23	10	11	12	15	18	Y 97	13	12	28	23	10	11	13	13	18
Y 140	14	13	30	23	11	11	13	13	17	Y 196	13	12	31	24	11	11	12	13	18
Y 166	14	13	30	24	11	11	12	13	17	Y 369	13	13	29	22	11	11	12	13	13
Y 151	14	13	30	24	11	11	12	13	17	Y 411	13	13	29	23	9	11	13	15	17
Y 1	14	13	30	24	10	11	12	13	18	Y 404	13	13	30	23	9	11	12	13	17
Y 302	14	13	30	24	10	11	13	16	19	Y 63	13	13	30	24	10	11	11	13	17
Y 270	14	13	31	23	11	11	11	13	17	Y 266	13	13	30	24	10	11	13	15	15
Y 93	14	13	31	23	11	11	12	13	18	Y 283	13	13	30	24	10	11	13	17	18
Y 182	14	13	31	23	9	11	13	13	18	Y 301	13	13	30	25	10	11	13	15	16
Y 101	14	14	28	23	10	11	12	13	15	Y 389	13	13	30	25	11	11	13	15	16
Y 343	14	14	28	23	11	12	13	14	16	Y 398	13	13	30	25	10	11	13	16	16
Y 412	14	14	28	24	10	11	12	12	16	Y 405	13	13	31	23	9	11	13	16	16
Y 49	14	14	29	22	11	11	11	13	17	Y 402	13	13	31	23	9	11	13	16	16
Y 217	14	14	29	22	10	11	12	13	17	Y 211	13	13	31	24	10	11	13	15	18
Y 76	14	14	29	22	11	11	12	13	18	Y 84	13	13	31	24	15	11	13	13	15
Y 396	14	14	29	23	9	10	12	12	17	Y 408	13	13	31	24	10	11	14	16	16
Y 406	14	14	29	23	10	11	12	13	17	Y 409	13	13	32	24	10	11	14	16	16
Y 384	14	14	29	23	9	12	12	13	17	Y 407	13	13	32	24	10	11	14	16	17
Y 400	14	14	29	24	9	11	12	13	20	Y 277	13	13	32	25	10	11	13	16	16
Y 105	14	14	29	24	10	11	12	18	18	Y 300	13	13	33	24	10	11	13	15	16
Y 401	14	14	29	26	9	11	12	14	18	Y 79	13	14	30	24	11	11	11	13	17
Y 387	14	14	30	22	10	11	12	13	17	Y 275	13	14	31	25	11	11	12	13	18
Y 32	14	14	30	23	11	11	11	12	16	Y 258	13	14	31	25	9	11	12	15	18
Y 60	14	14	30	23	10	11	11	13	17	Y 290	13	14	31	25	10	11	13	13	17
Y 15	14	14	30	23	11	11	11	13	18	Y 280	13	14	31	25	9	11	13	15	16
Y 16	14	14	30	23	11	11	11	13	18	Y 225	13	14	31	25	10	11	13	15	16
Y 237	14	14	30	23	10	11	12	13	16	Y 250	13	14	31	25	9	11	13	15	17
Y 385	14	14	30	23	10	11	12	13	16	Y 247	13	14	32	25	10	11	13	16	17
Y 385	14	14	30	23	11	11	12	13	16	Y 226	14	12	28	22	11	12	13	14	14
Y 391	14	14	30	23	8	11	12	13	17	Y 101	14	12	28	23	11	11	12	13	16

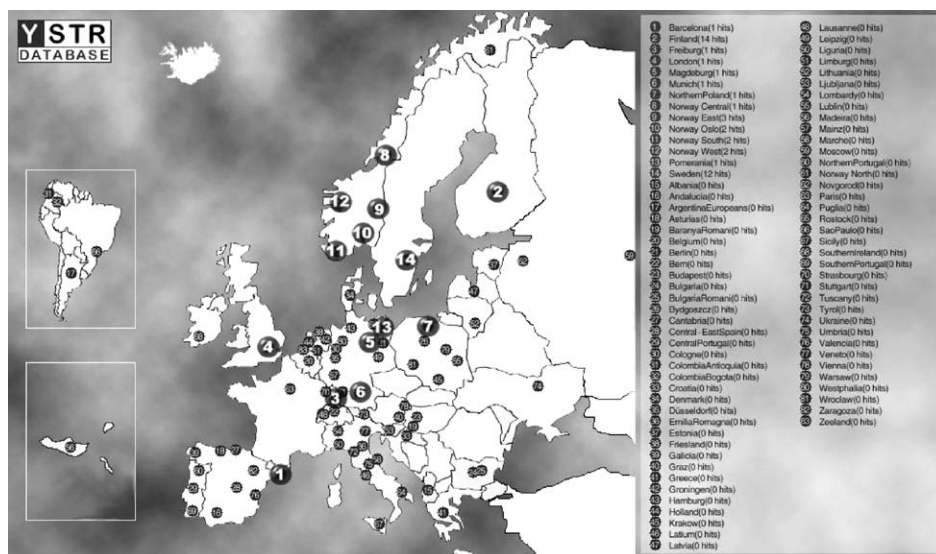


Fig. 1. Y285, 43 matches in the European database.

By doing so, eight matches were found in Asia. The haplotypes were found in 4 of 16 Asian population samples (Egypt, Syria, Turkey and Vietnam) with 2218 minimal haplotypes. Seven of the matching haplotypes were found in the Middle East, an area both geographically and culturally close to Yemen.

In Europe, we found 95 matches with 17 of the haplotypes from Yemen in 40 of 83 European population samples (12,802 individuals). Surprisingly, the geographical distribution of haplotype matches lacked the expected decline with growing geographical and cultural distance from Yemen. This finding is due to haplotype Y285, which was observed 43 times in Europe (Fig. 1), almost entirely in Scandinavia (in 36 of 1209 samples in the Y-STR database), whereas the remaining shared haplotypes show the expected south–north decline in frequency. The finding of a common Scandinavian haplotype in Yemen is surprising and might best be explained by a mere coincidence, i.e. two different lineages which have developed into matching haplotypes. This observation is a reminder not to overestimate the value of Y-STR haplotypes for estimating the ethnic origin of an individual.

Acknowledgements

The authors would like to thank A. Graul, A. Heide and S. Salostowitz for excellent technical assistance and G. Bothe for brilliant pictures.

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