

FOR THE RECORD

Begoña Martínez-Jarreta,¹ M.D., Ph.D.; Pilar Nievas,² M.D., Ph.D.; Emilio Abecia,³ M.D., Ph.D.; Rafael Hinojal,⁴ M.D., Ph.D.; and Bruce Budowle,⁵ Ph.D.

Haplotype Distribution of Nine Y-Chromosome STR-Loci in Two Northern Spanish Populations (Asturias and Aragon)

POPULATIONS: Caucasians from Aragon and Asturias (North of Spain)

KEYWORDS: forensic science, microsatellites, short tandem repeats, Y chromosome, haplotypes, population study, DYS19, DYS385I and II, DYS389I and II, DYS390, DYS391, DYS392, DYS393

Whole blood samples were collected from healthy unrelated donors born and living in Aragon ($n = 136$) and Asturias ($n = 120$). DNA was isolated using standard phenol-chloroform extraction method. Amplification was carried out according to Nievas (1) in a PE 2400 thermocycler (PE Biosystems). Each locus was amplified individually, except DYS389I/II and DYS385 (two loci each with the same set of primers). The recommendations of the International Society for Forensic Genetics were followed for typing and interpretation (2). In addition, we successfully took part in the quality control exercise for Y-STRs organized by Dr. Lutz Roewer, Institute of Legal Medicine, Humboldt University, Berlin, Germany (3). Y-STR haplotype variability was evaluated by means of Analysis of Molecular Variance (AMOVA) (4,5).

The complete data are available to any interested researcher upon request (mjarreta@posta.unizar.es).

¹ Professor of Forensic Medicine, Department of Forensic Medicine, Faculty of Medicine, University of Zaragoza, Zaragoza, Spain.

² Post Doctoral Fellow, Department of Forensic Medicine, University of Zaragoza, Zaragoza, Spain.

³ Research scientist, Department of Forensic Medicine, Faculty of Medicine, University of Zaragoza, Zaragoza, Spain.

⁴ Professor of Forensic Medicine, Department of Forensic Medicine, Faculty of Medicine, University of Oviedo, Asturias, Spain.

⁵ Unit Chief Forensic Science and Training Center, FBI Academy, Quantico, VA.

References

1. Nievas P. Caracterización genética de la población aragonesa y asturiana por medio del análisis de polimorfismos microsatélites. Aplicaciones médico-forenses [dissertation]. University of Zaragoza, 2001.
2. Gill P, Brenner C, Brinkman B, Budowle B, Carracedo A, Jobling MA, et al. DNA Commission of the International Society of Forensic Genetics: recommendations on forensic analysis using Y-chromosome STRs. *Int J Leg Med* 2000;114:305–9.
3. Roewer L, Kayser M, de Kniff P, Anslinger K, Betz A, Cagliá A, et al. A new method for the evaluation of matches in non-recombining genomes: application to Y-chromosomal short tandem repeat (STR) haplotypes in European males. *Forensic Sci Int* 2000;114:31–43.
4. Roewer L, Kayser M, Dieltjes P, Nagy M, Bakker E, Krawczak M, et al. Analysis of molecular variance (AMOVA) of Y chromosome specific microsatellites in two closely related human populations. *Hum Mol Genet* 1996;7:1029–33.
5. Schneider S, Roessli D, Excoffier L. Arlequin ver. 2.000: a software for population genetics data analysis. Genetics and Biometry Laboratory, University of Geneva, 2000.

Additional information and reprint request:

Begoña Martínez-Jarreta, MD., PhD
Department of Forensic Medicine
University of Zaragoza
C/Domingo Miral s/n
50.009-Zaragoza Spain
E-mail: mjarreta@posta.unizar.es

TABLE 1—Most frequently observed Y-STR haplotype among Asturian and Aragonese males (DYS19, *DYS389I*, *DYS389II*, *DYS390*, *DYS391*, *DYS392*, *DYS393*, *DYS385I*, *DYS385II*). Complete data can be obtained upon request.

	Asturias	Aragon		Asturias	Aragon
13-13-30-24-10-11-13-16,18	2		14-13-29-24-11-13-13-11,14	6	11
13-13-31-23-10-11-12-14,16		2	14-13-29-24-11-13-13-11,15	2	1
13-14-30-24-09-11-13-13,14	1	2	14-13-30-24-11-13-13-11,14		5
13-14-31-24-09-11-13-13,14	3		14-14-30-24-10-13-13-11,14	1	4
14-12-28-23-11-13-13-11,14	2		14-14-30-24-11-13-13-11,14	1	4
14-13-29-23-11-13-13-11,15	3	1	14-14-30-24-11-13-13-11,15		3
14-13-29-24-10-13-13-11,12		3	14-14-31-24-11-13-13-11,14		2
14-13-29-24-10-13-13-11,15	4	7	15-12-29-22-10-11-13-12,14	2	
14-13-29-24-10-13-13-12,14	2	1	15-13-29-23-09-11-12-13,16		2
14-13-29-24-10-13-14-11,14	2		15-14-29-23-10-11-13-12,12	2	

TABLE 2—Haplotype information parameters on nine Y-chromosome STR loci.

	Asturias	Aragon
Sample size	120	136
N° of haplotypes	101	104
Haplotype diversity	0.9952 ± 0.0023	0.9886 ± 0.0040
Mean number of pairwise differences	5.7558 ± 2.7746	5.1821 ± 2.5244
Average gene diversity	0.5755 ± 0.3072	0.5182 ± 0.2794

TABLE 3—Analysis of molecular variance (AMOVA) for seven Y-STR markers.

	Aragon	Asturias	Granada	Galicia	Argentina
Aragon		0.0220	0.4340	0.0120	0.0040
Asturias	0.01111		0.3000	0.9940	0.1240
Granada	-0.00016	0.00288			
Argentina	0.01463	0.00521			
Galicia	0.01093	-0.00666			

Lower left half: ϕ_{ST} values measuring genetic differences; upper right half: P values for ϕ_{ST} are obtained by simulation (4).