

# Y-STR polymorphisms from Basque-speaking region of Cinco Villas (Navarra) in the context of the Pyrenean genetic landscape

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**Abstract.** Haplotype frequencies for 15 Y-STRs (minimum haplotype plus DYS460, DYS461, DYS437, DYS438, DYS439, GATA H4, DYS635) were determined in a set of 42 samples from the Basque-speaking region of Cinco Villas (Navarra, Western Pyrenees). Thirty-five different haplotypes were detected (haplotype diversity=0.9919) and only seven were found in duplicate. These results are compared with available data on the populations of the Pyrenees region. © 2005 Published by Elsevier B.V.

*Keywords:* Y-STR; Basque-speaking region; Pyrenees; Iberian Peninsula

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## 1. Introduction

The Iberian Peninsula presents a complex geographical landscape with mountain ranges as in Northern Spain. That enhances the genetic isolation of small populations and consequently significant differentiation. This study was carried out in order to create a database representing this region of the Pyrenees.

## 2. Material and methods

Blood specimens were collected from 42 unrelated males with the four grandparents belonging to the Basque-speaking region of Cinco Villas (Navarra, Western Pyrenees;

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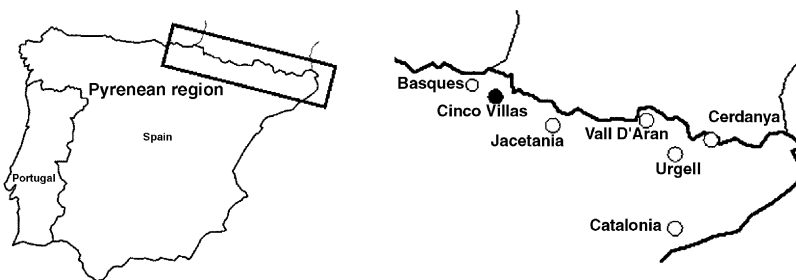


Fig. 1. Geographical locations in the Pyrenees.

Fig. 1). Amplification of minimum haplotype plus DYS460, DYS461, DYS437, DYS438, DYS439, GATA H4, DYS635 was performed as described [1] and ran on ABI 310 sequencer. Haplotype frequencies and genetic diversity were calculated. Data were compared with those from other Pyrenean regions and with 3 neighbour

Table 1

Haplotypes for DYS19, DYS389I, DYS389II, DYS390, DYS391, DYS392, DYS393, DYS385, DYS437, DYS438, DYS439, DYS460, DYS461, GATA H4, DYS635 from Cinco Villas' sample

|     |   |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |
|-----|---|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|
| L1  | 2 | 14 | 12 | 28 | 24 | 11 | 13 | 13 | 11,14 | 15 | 12 | 12 | 11 | 12 | 28 | 23 |
| L2  | 1 | 14 | 12 | 28 | 24 | 11 | 13 | 13 | 11,14 | 15 | 12 | 12 | 10 | 12 | 28 | 23 |
| L3  | 1 | 14 | 13 | 28 | 24 | 10 | 13 | 13 | 11,14 | 15 | 12 | 11 | 11 | 12 | 28 | 23 |
| L4  | 1 | 14 | 13 | 29 | 24 | 11 | 13 | 13 | 12,14 | 15 | 12 | 11 | 11 | 13 | 28 | 23 |
| L5  | 2 | 14 | 13 | 29 | 24 | 10 | 13 | 13 | 11,14 | 14 | 12 | 12 | 10 | 12 | 29 | 23 |
| L6  | 1 | 14 | 13 | 29 | 23 | 11 | 13 | 13 | 11,14 | 15 | 12 | 12 | 10 | 13 | 28 | 23 |
| L7  | 1 | 14 | 13 | 29 | 24 | 10 | 13 | 13 | 11,13 | 15 | 12 | 11 | 10 | 14 | 27 | 23 |
| L8  | 1 | 14 | 13 | 29 | 24 | 10 | 13 | 13 | 11,14 | 15 | 11 | 12 | 11 | 11 | 28 | 23 |
| L9  | 1 | 14 | 13 | 29 | 25 | 11 | 13 | 13 | 11,14 | 14 | 12 | 12 | 11 | 12 | 28 | 23 |
| L10 | 1 | 14 | 13 | 29 | 24 | 11 | 13 | 13 | 11,14 | 15 | 12 | 12 | 11 | 12 | 28 | 23 |
| L11 | 1 | 14 | 13 | 30 | 23 | 11 | 13 | 13 | 11,15 | 14 | 12 | 13 | 11 | 12 | 27 | 23 |
| L12 | 1 | 14 | 14 | 30 | 24 | 11 | 13 | 13 | 11,14 | 14 | 12 | 11 | 10 | 12 | 27 | 23 |
| L13 | 2 | 14 | 14 | 30 | 24 | 10 | 13 | 13 | 11,14 | 14 | 12 | 12 | 10 | 12 | 27 | 23 |
| L14 | 2 | 14 | 14 | 30 | 24 | 10 | 13 | 13 | 11,14 | 15 | 12 | 12 | 11 | 12 | 29 | 23 |
| L15 | 1 | 14 | 14 | 30 | 24 | 11 | 13 | 13 | 11,15 | 15 | 12 | 13 | 10 | 12 | 29 | 23 |
| L16 | 1 | 14 | 14 | 30 | 24 | 11 | 13 | 13 | 11,14 | 15 | 12 | 11 | 11 | 12 | 28 | 23 |
| L17 | 1 | 14 | 14 | 30 | 24 | 10 | 13 | 14 | 11,14 | 15 | 12 | 11 | 11 | 12 | 28 | 23 |
| L18 | 1 | 14 | 14 | 30 | 25 | 11 | 13 | 13 | 11,15 | 14 | 12 | 11 | 11 | 12 | 27 | 23 |
| L19 | 1 | 14 | 14 | 30 | 24 | 11 | 13 | 13 | 11,14 | 14 | 11 | 12 | 10 | 12 | 27 | 25 |
| L20 | 1 | 14 | 14 | 30 | 24 | 10 | 13 | 14 | 11,14 | 15 | 12 | 12 | 11 | 12 | 27 | 23 |
| L21 | 1 | 14 | 14 | 30 | 24 | 10 | 13 | 14 | 12,14 | 15 | 12 | 12 | 11 | 11 | 28 | 23 |
| L22 | 1 | 14 | 14 | 30 | 23 | 10 | 13 | 13 | 11,11 | 15 | 12 | 13 | 11 | 12 | 28 | 23 |
| L23 | 1 | 14 | 14 | 30 | 23 | 10 | 13 | 13 | 11,11 | 15 | 12 | 13 | 11 | 12 | 28 | 24 |
| L24 | 1 | 14 | 14 | 31 | 24 | 11 | 13 | 13 | 11,14 | 15 | 12 | 12 | 11 | 12 | 28 | 23 |
| L25 | 1 | 14 | 14 | 31 | 24 | 10 | 13 | 13 | 11,14 | 15 | 12 | 12 | 11 | 12 | 28 | 23 |
| L26 | 1 | 14 | 14 | 31 | 24 | 10 | 13 | 13 | 11,14 | 14 | 12 | 13 | 10 | 12 | 27 | 23 |
| L27 | 1 | 14 | 15 | 31 | 23 | 10 | 13 | 13 | 11,11 | 15 | 12 | 12 | 11 | 12 | 28 | 23 |
| L28 | 2 | 14 | 16 | 32 | 25 | 10 | 14 | 13 | 11,14 | 14 | 12 | 12 | 10 | 12 | 27 | 23 |
| L29 | 1 | 15 | 12 | 28 | 24 | 11 | 13 | 13 | 10,14 | 15 | 12 | 12 | 11 | 12 | 28 | 23 |
| L30 | 1 | 15 | 13 | 28 | 23 | 10 | 11 | 13 | 12,13 | 15 | 10 | 12 | 11 | 10 | 28 | 20 |
| L31 | 2 | 15 | 13 | 29 | 25 | 10 | 11 | 13 | 12,16 | 15 | 10 | 11 | 11 | 11 | 28 | 22 |
| L32 | 2 | 15 | 13 | 29 | 24 | 10 | 13 | 13 | 11,14 | 14 | 12 | 12 | 10 | 12 | 28 | 23 |
| L33 | 1 | 16 | 13 | 28 | 23 | 10 | 11 | 13 | 12,12 | 15 | 10 | 12 | 10 | 11 | 27 | 21 |
| L34 | 1 | 16 | 13 | 28 | 23 | 10 | 11 | 13 | 12,12 | 15 | 10 | 11 | 10 | 10 | 28 | 22 |
| L35 | 1 | 17 | 13 | 28 | 23 | 10 | 11 | 13 | 12,12 | 15 | 10 | 11 | 10 | 10 | 28 | 22 |

samples: Catalonia [2], Basque sample 1 [3] and Basque sample 2 [4] (Fig. 1). Comparisons were restricted to minimum haplotype minus DYS385. For statistical analysis DYS389I was subtracted from DYS389II. ARLEQUIN ver 2.000 software was used [5].

### 3. Results and discussion

Thirty-five different haplotypes were detected and haplotype diversity was  $0.9919 \pm 0.0069$  (Table 1). Most frequent haplotype in European and in over all Pyrenean samples – 14–13–29–24–11–13–13 for DYS19–DYS389I–DYS389II–DYS390–DYS391–DYS392–DYS393 – is present only in 2 cases in Cinco Villas (0.048). Frequencies of this modal haplotype plus others one-step away comprise 35.71% of Cinco Villas. The highest frequencies of this haplotypic class correspond to the Basque Country 1 (0.570) and Vall D’Aran (0.600). However, in this case the modal haplotype is much more represented (0.244, 0.138 and 0.333 for Basque 1, Basque 2 and Vall D’Aran, respectively). Subsequently Cinco Villas’ sample differs from those of Basque origin probably due to genetic drift and it is not justified to fuse these sample for forensic purposes. The smallest genetic distances between Cinco Villas and the other populations from Pyrenees were obtained against Vall D’Aran ( $R_{st} = -0.004$ ) and Alt Urgell ( $R_{st} = 0.010$ ).  $R_{st}$  values always above 2% were observed for all other comparisons (Jacetania,  $R_{st} = 0.041$ ; Cerdanya,  $R_{st} = 0.028$ ; Catalonia,  $R_{st} = 0.031$ ; Basques 1,  $R_{st} = 0.039$ ; and Basques 2,  $R_{st} = 0.044$ ).

### Acknowledgements

Work partially funded by Fundação para a Ciência e a Tecnologia (SFRH/BD/860/2000 and Programa Operacional Ciência, Tecnologia e Inovação) and Project PR48/01-9837 from Complutense University, Madrid.

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