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Table of Contents:

Introduction.....	1
Genetic Links in the Iberian Peninsula (STR and SNP).....	2
Historical Background	2
STR Analysis of the Iberian Peninsula	4
SNP Analysis of Iberian Populations.....	6
Conclusion	8
Getting the Most from Your STR Testing	9

Introduction

Hello, and welcome to the July 2012 issue of DNA Tribes® Digest. This month's article explores deeper genetic links in the Iberian Peninsula, including long-distance (and possibly more ancient) links with populations outside of the West Mediterranean. The analysis includes data from both STR markers (for a more detailed comparison to European sub-regions) and SNP markers (for a closer look at individual parts of Spain and Portugal).

Best regards,
Lucas Martin
DNA Tribes

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Genetic Links in the Iberian Peninsula (STR and SNP)

Historical Background

The Iberian Peninsula includes present day Spain and Portugal, located between the Mediterranean Sea and the Atlantic Ocean. In the ancient world, Iberian populations participated in patterns of trade and migration that transmitted new technologies, languages, and cultural ideas in the Mediterranean Basin and Europe (illustrated in **Figure 1**).

Many of these innovations began in the centrally located Fertile Crescent that included Mesopotamia, the Nile Valley, and East Mediterranean and spread outward to secondary centers (such as the Central Europe and North Africa) and eventually diffused to more distant peripheral locations (such as the British Isles). Within this geographical network, the Iberian Peninsula has been an important node or contact point linking Western Europe with the East Mediterranean since the Neolithic period.



Figure 1: The Iberian Peninsula and related locations of the ancient world, including possible “center” and “periphery” relationships linking populations of the Mediterranean Sea and Europe.

Archaeologists have documented several periods of innovation that affected early West Mediterranean cultures: Neolithic (farming and pastoralism); Copper Age (early metallurgy); Bronze Age (long distance trade in metals); and the more recent Iron Age. In each period, these waves of culture each linked Iberia to other population centers in Europe, North Africa, and the East Mediterranean.

One Neolithic wave of culture involved the “maritime pioneers” that spread **Cardium Ware** pottery along the Adriatic and Mediterranean coasts. Archaeologists have also compared Iberian cultures during the Neolithic period (such as the Hispano-Mauritanian and Ibero-Saharan cultures) to

contemporary North African cultures.¹ Recent evidence for herds of North African dairy cattle around 7,000 BCE (during the more fertile “Green Sahara” period) suggest North Africa could have played a role as a population center in the Neolithic Mediterranean. Similarly, Megalithic sites (similar to Stonehenge) were erected in Iberia and other sites throughout Atlantic Europe and North Africa (such as Nabta Playa in the Nubian Desert), suggesting these cultures were in contact (either direct or indirect) in this period.

In the subsequent Copper Age (Chalcolithic period), copper metallurgy appeared in several parts of the world. Within Europe, the precocious **Carpatho-Balkan Metallurgical Province** (CBMP) emerged in the Balkan Peninsula between 5,500 and 3,500 BCE before finally disintegrating around 3,200 BCE.² Copper using cultures emerged later in the Iberian Peninsula, including the **Los Millares** settlement in eastern Andalusia (3,200-2,300 BCE).

Archaeologists currently tend to downplay “diffusionist” models of prehistory that might seek a connection between the decline of the Balkan metallurgical province and the emergence of copper technology in the West Mediterranean. However, it is acknowledged that the “**Bell Beaker phenomenon**” (2,800-1,800 BCE) later linked the Iberian Peninsula with Central Europe during the Copper Age. It has been suggested that Beaker sub-cultures traveled using the seacoasts and rivers, acting as migratory specialists linking settlements throughout Western Europe.

In the following Bronze Age, new technology based on bronze alloys stimulated new cosmopolitan patterns of culture: long-distance trade networks linked local elites through kinship and gift exchange. Parts of Europe emerged as “secondary centers” linked with primary civilization centers of the East Mediterranean (see **Figure 1**).³ At this time, the Central European and East Mediterranean influenced **El Argar culture** (1800-1300 BCE) emerged in the southeastern Iberian Peninsula. The Argarian culture transmitted this period’s eclectic culture (dubbed the “Amarna Age synthesis” by Cyrus Gordon) to the West Mediterranean. However, older Iberian Copper Age cultures still persisted in central and northern Iberia during this period.⁴

The “Amarna Age” flourishing of East Mediterranean cultures ended around 1200 BCE. However, new patterns of **Atlantic Bronze Age** trade (1300-700 BCE) soon emerged that connected cultures of the Iberian Peninsula with Western Europe and the British Isles. Around this time, the Central European **Urnfield culture** also influenced parts of eastern Spain, possibly associated with an early wave of Proto-Celtic languages.⁵ (A less uncertain wave of Celtic influences later came to Spain with the **Halstatt culture**, centered near the Upper Danube River.)

These West Mediterranean cultures continued to develop locally during the Iron Age, when written records began in Europe. As of the 1st century BCE, the Roman writer Varro described four

¹ These comparisons with North Africa were less emphasized after the 1950’s, when archaeological literature shifted to focus on local sequences of development rather than patterns of cultural transmission between populations. For a current view, see Emerging Complexity: The later prehistory of south-east Spain, Iberia and the west Mediterranean by Robert Chapman, p. 25. For older models mentioning similarities with North Africa, see Spain and Portugal: The Prehistory of the Iberian Peninsula by H. N. Savory.

² For more information, see <http://dnatribes.com/dnatribes-digest-2012-05-01.pdf> and Evgeny Chernykh’s analysis of metallurgical provinces at <http://tp.revistas.csic.es/index.php/tp/article/view/149/150>.

³ For more detailed discussion, see The Rise of Bronze Age Society: Travels, Transmissions and Transformations by K. Kristiansen and T. B. Larsson, pp. 161-185.

⁴ See Emerging Complexity by Robert Chapman, p. 28-29.

⁵ Graham Isaac has criticized proposed Atlantic origins for Celtic languages in favor a setting closer to Central Europe, based on linguistic features shared between Celtic and IE languages of Eastern Europe and Central Asia. See Celtic From the West ed. by B. Cunliffe and J. T. Koch, pp. 153-168.

preceding waves of ancient colonists to the Iberian Peninsula: (1) the Iberians; (2) the Persians; (3) the Phoenicians; and (4) the Celts and Carthaginians.⁶

Three of these cultures still persisted in the West Mediterranean during the Roman period. The Iberians mentioned by Varro possibly included speakers of the Paleohispanic Iberian language of eastern Spain and/or Aquitanian (Proto-Basque) cultures of northern Spain and southwestern France. The Celts of Iberia lived primarily in northwestern areas (including present day Galicia).

The Carthaginians were descended from Phoenician (Canaanite) cultures of the East Mediterranean and lived primarily in North Africa, coming in contact with Iberian Peninsula cultures in trading posts such as Tartessos and Gader (Cadiz). The other (Persian) migration mentioned by Varro might dimly recall pre-Phoenician contacts (possibly related to long-distance trade in precious metals) with early Indo-European related cultures of West Asia during the Bronze Age.

In summary, archaeological evidence is consistent with at least three sources of migration to the Iberian Peninsula: (1) the East Mediterranean, including Neolithic Cardium Ware “maritime pioneers,” metal seeking “prospector” cultures during the Copper Age, and cosmopolitan Argarian links during the Bronze Age; (2) Central Europe, including “Celtic” Urnfield and Halstatt expansions and perhaps more ancient links with Copper Age populations of the Balkan Peninsula; and (3) North Africa, including possible “Green Sahara” Neolithic links, as well as later Carthaginian and Moorish contacts.

STR Analysis of the Iberian Peninsula

Genetic contributions to the Iberian Peninsula (including the Spanish, Basque, and Portuguese sub-regions) were identified based on autosomal STR data.⁷ To identify deeper relationships with more distant parts of Europe, this analysis excluded comparison to local Spanish, Basque, and Portuguese sub-regions and also excluded contributions from the neighboring Belgic and Italian sub-regions.⁸ Results are summarized in **Table 1** and illustrated in **Figure 2**.

Region or European Sub-Region	Estimated Contribution
Celtic	38.7%
Thracian	18.8%
North African	18.2%
Balkan	12.4%
Polish	9.2%
Other	2.7%

Table 1: STR based genetic contributions to the Iberian Peninsula (including the Spanish, Basque, and Portuguese sub-regions). This analysis excluded local Spanish, Basque, and Portuguese contributions and from the neighboring Belgic and Italian sub-regions.

⁶ See Emerging Complexity by Robert Chapman, pp. 28-29.

⁷ For more about the world regions in DNA Tribes® STR tests, see <http://dnatribes.com/populations.html> and <http://dnatribes.com/dnatribes-europa.html>.

⁸ For analysis not excluding the more local links with Western Europe and the Italian Peninsula, see <http://dnatribes.com/dnatribes-digest-2010-12-31.pdf> and <http://dnatribes.com/dnatribes-digest-2009-03-28.pdf>.

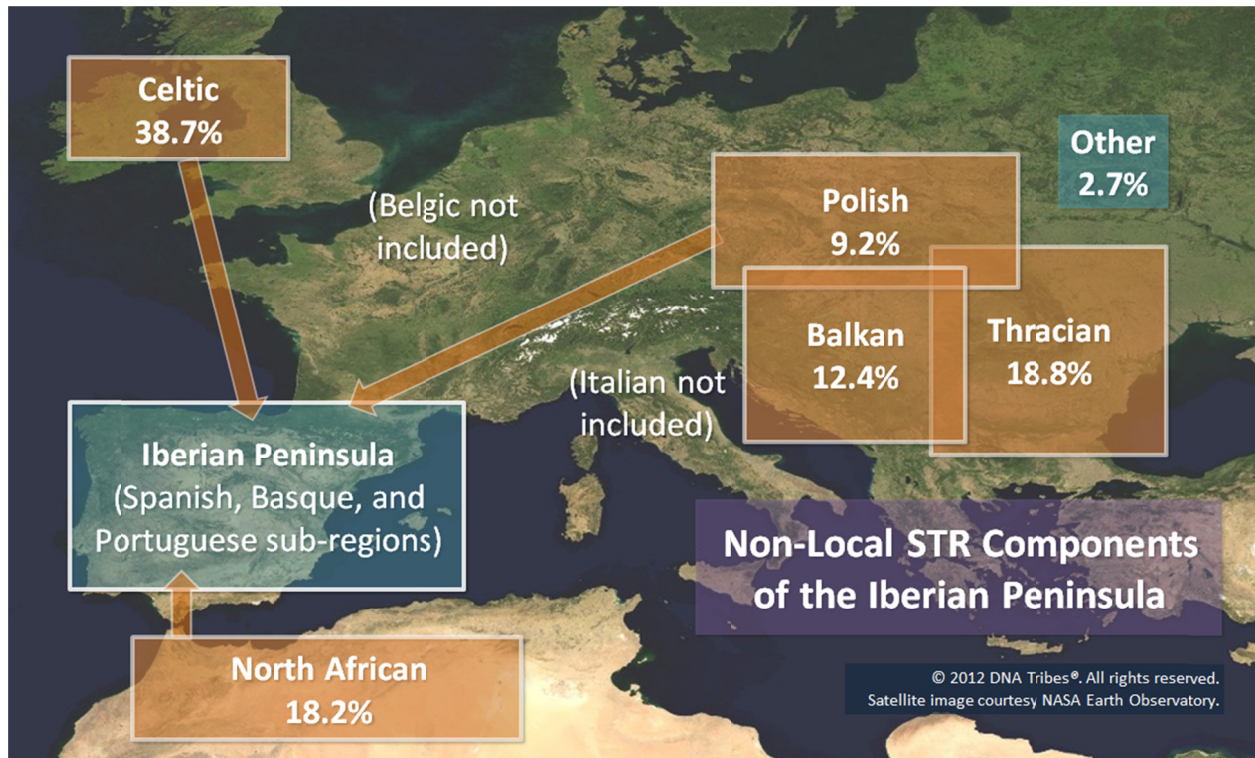


Figure 2: STR based genetic contributions to the Iberian Peninsula (including the Spanish, Basque, and Portuguese sub-regions). This analysis excluded self-reference to the local Spanish, Basque, and Portuguese contributions and to the neighboring Belgic and Italian sub-regions.

Discussion: Results in **Table 1** indicate that, after excluding local relationships with the neighboring Belgic and Italian sub-regions,⁹ Iberian Peninsula populations share three groups of genetic links: (1) Southeast/Central European; (2) British Isles; and (3) North African.

Southeast and Central European genetic links included Thracian (18.8%), Balkan (12.4%), and Polish (9.2%), for a total of 40.4%. These genetic links may reflect archaeologically attested contacts with Central Europe, including Celtic speaking expansions rooted in the Urnfield and Halstatt cultures, as well as more ancient connections with Copper Age cultures of the Balkan Peninsula.

Some of these links (Thracian and Balkan in particular) also suggest connections with earlier food-producing populations expanding from the Balkan Neolithic. These might have included the LBK or Danubian “frontier farmers” that expanded into Central and Western Europe, possibly marrying wives from indigenous hunting-fishing populations and developing new patricentric forms of culture in the process.¹⁰ Balkan and Thracian genetic links may also relate to even earlier Neolithic Cardium Ware cultures active in the Adriatic and Italy.

⁹ For analysis not excluding these local relationships, see <http://dnatribes.com/dnatribes-digest-2010-12-31.pdf> and <http://dnatribes.com/dnatribes-digest-2009-03-28.pdf>.

¹⁰ For more detailed discussion of possible population dynamics related to Neolithic cultures of Central and Western Europe, see <http://dnatribes.com/dnatribes-digest-2012-06-01.pdf>, pp. 7-8.

The Celtic contribution of 38.7% suggests contacts with populations of the British Isles. These might include contacts with the spread of Celtic languages, but might also express older genetic links related to the Atlantic Bronze Age and more ancient Megalithic and Bell Beaker cultures (whose languages are uncertain).

Finally, the North African genetic contribution of 18.2% suggests contacts between the Iberian Peninsula and neighboring populations of present day Morocco and nearby parts of Northwest Africa. These might reflect Paleolithic and Neolithic links related to the “Green Sahara.” However, this might also include ongoing contacts between the Iberian Peninsula and Phoenician, Carthaginian, and Moorish cultures that helped transmit innovations from the East Mediterranean.

SNP Analysis of Iberian Populations

Genetic contributions (excluding local Iberian admixture) for several individual populations within the Iberian Peninsula and nearby were identified based on autosomal SNP data.¹¹ Results are summarized in **Table 2** and illustrated in **Figure 3**.

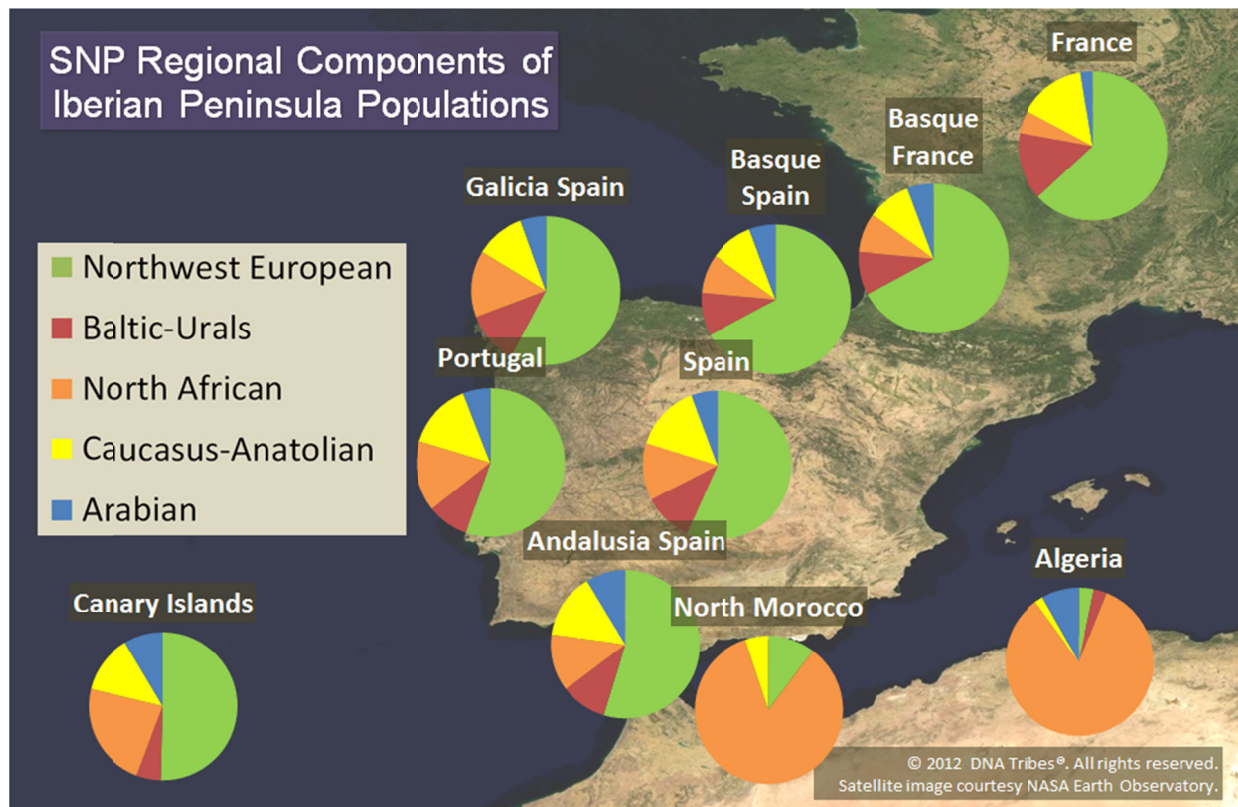


Figure 3: Genetic contributions to populations of the Iberian Peninsula and nearby (excluding local Iberian genetic components).

¹¹ For more information about DNA Tribes® SNP analysis, see <http://dnatribes.com/snp.html>.

Discussion: Results in **Table 2** indicate that the non-local genetic components vary somewhat within the Iberian Peninsula. Several nearby populations of Western Europe and the Mediterranean were also included to provide a broader context for this intra-Iberian variation.

Population	N.W. European	Baltic-Urals	North African	Caucasus-Anatolian	Arabian
<i>Algeria</i>	3.2%	2.9%	83.9%	1.9%	8.2%
Andalusia Spain	54.7%	10.0%	12.5%	14.2%	8.6%
Basque France	65.4%	12.6%	8.8%	7.3%	5.9%
Basque Spain	67.2%	9.3%	8.5%	9.4%	5.7%
<i>Canary Islands</i>	50.4%	5.3%	23.0%	12.8%	8.5%
<i>France</i>	63.1%	14.8%	4.9%	14.6%	2.6%
Galicia Spain	57.8%	11.5%	14.5%	10.7%	5.6%
<i>North Morocco</i>	10.2%	0.0%	84.7%	5.1%	0.0%
Portugal	55.3%	9.0%	15.4%	14.4%	5.9%
Spain	56.7%	10.7%	12.4%	14.4%	5.7%

Table 2: Regional genetic contributions to populations of the Iberian Peninsula (bold) and nearby (italics) (excluding local Iberian admixture). The highest level of each non-local genetic component found in the Iberian Peninsula is highlighted.

For all Iberian populations, the largest non-local component is Northwest European. The Northwest European component is largest in Spanish Basque (67.2%) and French Basque (65.4%) populations and smallest in Andalusia (54.7%) and Portugal (55.3%). Notably, the Basque populations were more similar to France (63.1% Northwest European), suggesting the possibility that Basque related cultures were involved in Atlantic Ocean contacts between Iberia and Northwest Europe in early periods.

The second largest non-local component is Baltic-Urals, which has a relatively uniform distribution throughout the Iberian Peninsula. These Baltic-Urals genetic links suggest that Iberia's northern contacts were not limited to Atlantic Europe, but might also have included links with Central or Eastern Europe (also indicated by STR analysis). Notably, the Baltic-Urals component is not exclusive to Indo-European speaking Spanish and Portuguese samples, but also is found in Basque populations.

North African components are also identified throughout Iberia. These are largest in Portugal (15.4%) and Galicia (14.5%) and smallest in French Basque (8.8%) and Spanish Basque (8.5%). This suggests that North African links were associated with the western Iberian Peninsula more than the northern Iberian Peninsula.

Caucasus-Anatolian and Arabian links were identified throughout the Iberian Peninsula. These might reflect expansions of food producing cultures originating in the Fertile Crescent and spreading westwards from the East Mediterranean. However, direct links from the Levantine, Mesopotamian, or Aegean regions were not identified by STR analysis (see previous section of this article).

Instead, STR results indicated substantial genetic links with the Balkan and Thracian sub-regions of Southeastern Europe and the North African region. For this reason, the Caucasus-Anatolian SNP components in Iberia might in part reflect contacts with populations expanding from the Balkan Peninsula (where Caucasus-Anatolian components are found today) since the Neolithic period.

Conclusion

In summary, both STR and SNP results indicate that Iberian Peninsula populations share genetic characteristics with Atlantic Europe (including Western Europe and the British Isles) and to some extent North Africa.

In addition, results suggest possible genetic connections between the Iberian Peninsula and Central and Southeastern Europe. More specifically, STR analysis indicate genetic connections with the Balkan Peninsula, including the Balkan (West Balkan), Thracian (East Balkan), and Polish (Central Europe north of the Carpathian Mountains) sub-regions. Similarly, SNP analysis identifies Baltic-Urals components throughout the Iberian Peninsula.

However, STR results did not indicate direct genetic links with regions of the East Mediterranean (such as the Aegean, Levantine, or Mesopotamian regions). This suggests that the cultural contacts between the Iberian Peninsula and the East Mediterranean attested in the archaeological record (such as the introduction of Neolithic and Copper Age technologies) may have been transmitted by populations of North Africa and the Balkan Peninsula.

More broadly, genetic similarities between Iberian and Balkan populations suggest that early food producing cultures of the Balkan Peninsula and nearby parts of Central Europe (including the Carpatho-Balkan metallurgical province that coalesced during the Copper Age) might have played a role in shaping the genetic and cultural landscape of Atlantic Europe.



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