



DNA Tribes® Digest August 1, 2012
Copyright © 2012 DNA Tribes®. All rights reserved.

To request an email subscription to DNA Tribes® Digest, email digest@dnatribes.com with the subject heading "Subscribe." To unsubscribe from DNA Tribes® Digest, email digest@dnatribes.com with the subject heading "Unsubscribe." Previous issues of DNA Tribes® Digest are available online at <http://dnatribes.com/library.html>.

Table of Contents:

Introduction.....	1
Celtic Language Origins and Geographical Links in Northwest Europe (SNP and STR)	2
Historical Background	2
Map of Possible Archaeological Links for Proto-Celtic Migrations	4
SNP Analysis of Northwest European Populations	5
STR Analysis of Northwest Europe.....	7
Conclusion	9
<i>DNA Tribes SNP®</i> Update for August 2012	10

Introduction

Hello, and welcome to the August 2012 issue of DNA Tribes® Digest. This month's article includes a two part genetic analysis of Northwest Europe based on autosomal SNP and STR data. First, SNP analysis will focus on possible genetic traces of Proto-Celtic migrations to Western Europe. Second, STR analysis will explore inter-regional links related to contacts between Celtic speaking populations during the Iron Age.

Best regards,
Lucas Martin
DNA Tribes

**DNA Tribes® is on Facebook.
Find us at <http://facebook.com/DNATribes>**

Celtic Language Origins and Geographical Links in Northwest Europe (SNP and STR)

Historical Background

The Northwest European genetic region includes populations of present day Western Continental Europe, the British Isles, and Scandinavia (illustrated in **Figure 1**).

Today, the primary language families spoken here are Germanic (such as English, Dutch, and Danish) and Italic (such as French and Walloon). These languages have spread to their present day territories since the Roman period, when Latin speaking civilizations from the Mediterranean together with Germanic speaking cultures from the North Sea expanded outwards into Western Europe.



Figure 1: Map of Northwest Europe.

Prior to these Germanic and Italic expansions, another group of languages was spoken throughout Western Europe: the Celtic languages. Today, small pockets of Celtic languages survive in peripheral areas such as the Scottish Highlands, Wales, Cornwall, the Irish *Gaeltacht*, and Brittany in Western France. However, during the 1st millennium BCE, Celtic languages were spoken not only throughout Western Europe, but also in the Iberian Peninsula, Northern Italy, and the Balkan Peninsula.

Living near the outskirts of classical Roman civilization, the ancient Celts retained customs that have been described as “consciously archaic:” riding chariots that had gone out of fashion in Greece since the Homeric period; painting or tattooing their bodies; entering battle against Roman legions unclothed; and transmitting a large body of druidic history, religion, and folklore through the spoken word and rote memorization.

Archaeologists traditionally associate the appearance of “Fully Celtic” languages with the Halstatt C culture (800-650 BCE), located between the Alps and Danube River (see **Figure 2**). Possibly derived from the Basarabi Culture on the Lower Danube (in present day Romania), Halstatt C appeared during a period of “Thraco-Cimmerian” migrations from the Black Sea into Central Europe.¹

In this period, pastoralist steppe tribes expanded into Southeastern Europe (stopping at the Tisza River in Hungary), bringing new Iron Age technologies and cultural innovations from the Caucasus and Central Asia. In Western Europe, the Thraco-Cimmerian migrations stimulated cultural changes that spread easily into Atlantic Europe but met more resistance near the North Sea. The resulting Western Halstatt culture was relatively decentralized and egalitarian, based on a highland oriented cattle culture.

However, these Celtic (Halstatt) expansions cut off previous trade routes between Italy and Denmark. In South Scandinavia, an isolated “Dark Age” (Jastorf) period began based on family farming, continuing in part the Urnfield culture that Halstatt C had displaced from Central Europe.² Similarly in Britain, Halstatt C innovations (such as pinned garments) were most noticeable in Lowland England (trading with Belgium), and the previous Urnfield like cultures relocated to marginal locations in Western Britain (trading with Armorica).³

¹ For more detailed discussion, see *Europe Before History* by K. Kristiansen, pp. 195-207.

² *Ibid.*, p. 306; 343-4. Cultural boundaries persisted between Celtic and Germanic areas until the Roman conquest.

³ *Ibid.*, p. 300.

Around 450 BCE, a second wave of Celtic cultures emerged near La Tène (in Switzerland) and transmitted Greek and Etruscan innovations from the Mediterranean world. La Tène expansions possibly included population movements into Britain, reaching as far as Scotland (where iron was introduced). For instance, in Northern England, the Arras culture of Yorkshire (associated with the Parisii tribe) practiced chariot burials similar to La Tène cultures based in the Seine River in France.

However, archaeological evidence for Iron Age Celtic influence in nearby Ireland is minimal. Instead, Irish populations continued older folkways (rooted in the Atlantic Bronze Age) during this period. Therefore, it is thought that Celtic languages and crafts (such as weapons and horse gear) spread to Ireland through smaller numbers of specialists (such as metallurgists, artisans, warriors, priests, bards, etc.). Alternatively, this has led some scholars to question the traditional association between Halstatt C and La Tène material culture and the Celtic languages, proposing instead that Celtic languages developed locally in Western Europe during the Atlantic Bronze Age.

To address this puzzle, the linguist Graham Isaac has identified sound changes that isolate several stages of Proto-Celtic areal contacts (language similarity due to living near another language).⁴ The language links identified by Isaac suggest several geographical settings related to ancestral Proto-Celtic migrations. These include (not necessarily in chronological order):

1. A stage of Italic contacts [*Western Europe*].
2. A stage of Greek, Balto-Slavic, Thracian, and Phrygian contacts [*Eastern Europe*].
3. A stage of Tocharian contacts [*Eastern Europe or Central Asia*].
4. A stage of Balto-Slavic, Albanian, and Iranian contacts [*Eastern Europe*].

Some of these stages (#2, #3 and #4) require locations in Eastern Europe for early Proto-Celtic populations (illustrated in **Figure 2**), excluding an Atlantic origin for Celtic languages. Isaac further notes that Celtic languages were spoken in a large territory with little linguistic differentiation during the Iron Age. This suggests that Celtic languages had expanded in Western Europe only recently, probably differentiating into local Celtic dialects only after 1,500 BCE at the earliest.

In terms of geography and chronology, Isaac's analysis is broadly consistent with Celtic emergence in a Halstatt C context⁵ with roots in the "Thraco-Cimmerian" migrations from the Black Sea. Most notably, Isaac's model includes periods of contact with Tocharian (stage #3) and Indo-Iranian (stage #4) languages primarily attested in Central Asia; **Figure 2** suggests the Catacomb Culture (2,800-1,900 BCE) of the Pontic-Caspian Steppe as a possible setting for these eastern areal contacts.⁶

The migrating populations that transmitted the Celtic languages to Western Europe might have left only a small genetic signature (if any). However, based on this linguistic analysis, this signature might include otherwise unexpected genetic components from Eastern Europe or Central Asia.

The following genetic analysis (SNP and STR) will emphasize the Celtic Iron Age context for genetic links in Northwest Europe. This will include any genetic traces of early Proto-Celtic migrations from Eastern Europe, as well as later contacts between Celtic speaking settlements in Iron Age Europe.

⁴ See "The Origins of the Celtic Languages: Language Spread from East to West" by Graham R. Isaac in the volume *Celtic From the West* ed. by B. Cunliffe and J. T. Koch, pp. 153-168; and *Studies in Celtic Sound Changes and Their Chronology* by Graham R. Isaac.

⁵ Isaac's results exclude Atlantic Bronze Age origins for Celtic, but do not exclude Halstatt C or Urnfield contexts.

⁶ An early Proto-Celtic involvement in the Catacomb community could also explain the Northwest European like genetic links identified for modern Dargin and Lezgin populations of the North Caucasus. See <http://dnatribes.com/dnatribes-digest-2012-05-01.pdf>.

Map of Possible Archaeological Links for Proto-Celtic Migrations

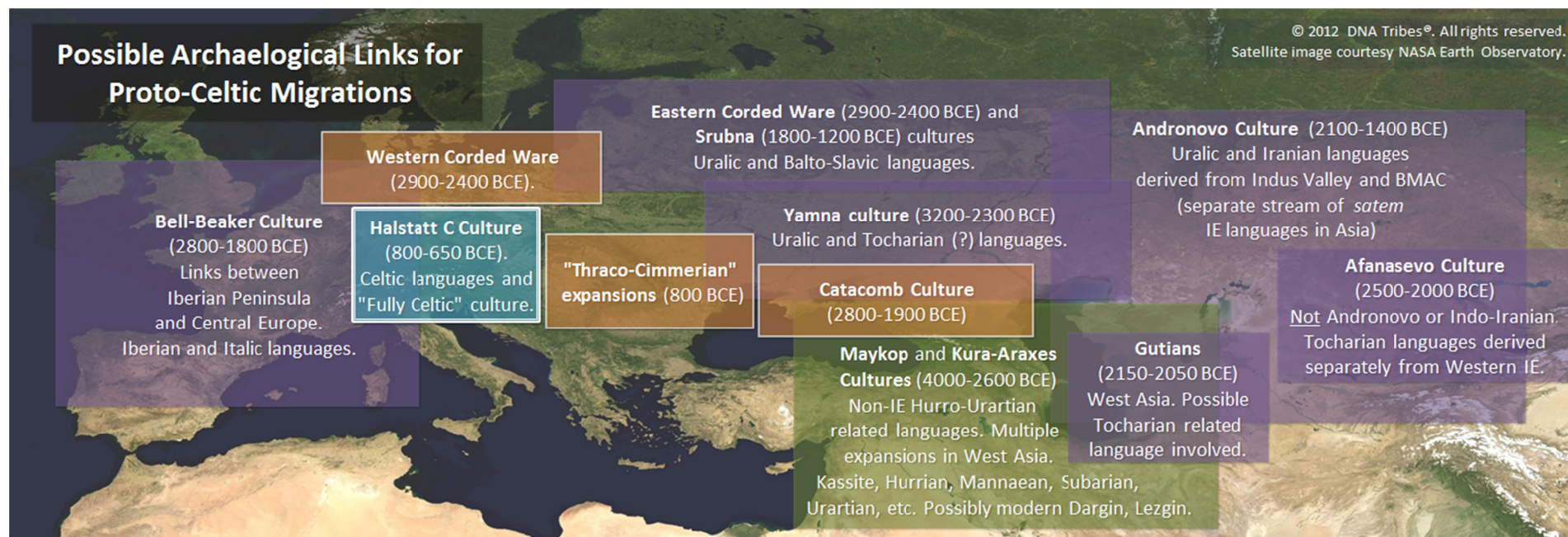


Figure 2: A model of possible archaeological links influencing the Celtic languages. The Halstatt C culture (**highlighted in blue**) is associated with "Fully Celtic" cultures of Iron Age Europe. **Orange boxes** highlight possible archaeological cultures related to Proto-Celtic migrations based on areal contacts identified by the linguist Graham Isaac.⁷ **Purple boxes** highlight the surrounding cultures and languages that might have influenced the early Proto-Celtic languages. The **green box** highlights the ancient Hurrian related languages, possibly related to the North Caucasus genetic links described later in this article.

⁷ For more information, see "The Origins of the Celtic Languages: Language Spread from East to West" by Graham R. Isaac in the volume Celtic From the West ed. by B. Cunliffe and J. T. Koch, pp. 153-168; and Studies in Celtic Sound Changes and Their Chronology by Graham R. Isaac.

SNP Analysis of Northwest Europe

Genetic contributions to Northwest European populations (**excluding local Northwest European admixture**) were identified based on autosomal SNP data.⁸ Results are summarized in **Table 1** and illustrated in **Figure 3**.

Population	Baltic-Urals	Iberian	North Caucasus	Other
Netherlands	49.9%	48.2%	1.9%	0.0%
Scandinavia	58.9%	38.7%	2.2%	0.2%
Argyll and Bute (Scottish Highlands)	46.6%	49.0%	3.4%	1.0%
England	45.2%	53.6%	1.2%	0.0%
Cornwall (Southwest Britain)	44.5%	53.1%	2.4%	0.0%
Orkney Islands (Northern Scotland)	48.6%	47.5%	3.9%	0.0%
Germany and Austria	50.3%	47.8%	1.8%	0.1%
Ireland	51.2%	45.3%	3.4%	0.0%

Table 1: Genetic components of Northwest European populations (**excluding local Northwest European admixture**).

Discussion: Results in **Table 1** indicate three regional components for all studied Northwest European populations: Baltic-Urals, Iberian, and North Caucasus.

The Baltic-Urals (Eastern European) component was largest for Scandinavia (58.9%) and smallest for Cornwall (44.5%). The Iberian (Southwest European) component was largest for England (53.6%) and smallest for Scandinavia (38.7%). Given Proto-Celtic migrations from Eastern Europe and later “Fully Celtic” links with Central Europe and the Mediterranean, both of these components could have been involved in Celtic expansions. However, Iberian and Baltic-Urals components are expected in Northwest Europe due to geographical proximity, so they are not identifiable as Proto-Celtic “signatures.”

However, results also identify a third component from a non-adjacent region: the North Caucasus.⁹ This was largest in Orkney (3.9%), Argyll (3.4%), and Ireland (3.4%). Although these populations were at the periphery of the Iron Age Celtic speaking world, they were later places where Celtic languages persisted during the period of Roman and Germanic expansions. More specifically, Argyll (in the Scottish Highlands) and Ireland were both associated with Goidelic (Q-Celtic) cultures, and Orkney (North Sea islands near Scotland) was associated with Pictish cultures that probably involved Brythonic (P-Celtic) languages.

This North Caucasus component, although small, could represent a signature of Proto-Celtic migrations from Eastern Europe. Given the language link discussed above, this component could reflect genetic traces of Proto-Celtic links with the Catacomb Cultures near the Pontic-Caspian Steppe.

⁸ For more information about DNA Tribes® SNP analysis, see <http://dnatribes.com/snp.html>.

⁹ As of the August 2012 SNP update, the “North Caucasus” component is now distinguished from the nearby “East Mediterranean” (related to some South Caucasus populations such as Armenians) and “Persian” (related to Kurdish and Turkmen populations) components.

Similarly, this geographically unexpected link in Northwest Europe appears to be reciprocated in some present day North Caucasus populations, such as Dargins and Lezgins.¹⁰

However, the difficulty of associating North Caucasus links with Proto-Celtic migrations is that a similar component is also identified for Scandinavia (2.2%), which was outside the Celtic speaking territories of Europe during the Iron Age. This objection could perhaps be overcome, if North Caucasus links in Scandinavia could be associated with gene flow from British Isles captives during the Viking period. Alternatively, genetic links between the North Caucasus and Northwest Europe could also relate to earlier pre-Celtic expansions (such as Maykop and Catacomb Culture links with Europe during the Chalcolithic and Bronze Age periods).

Nevertheless, reciprocal genetic links between Northwest Europe (in particular the British Isles) and North Caucasus (in particular Dargins and Lezgins) present a possible signature of the Proto-Celtic expansions that first transmitted Celtic languages to Western Europe.

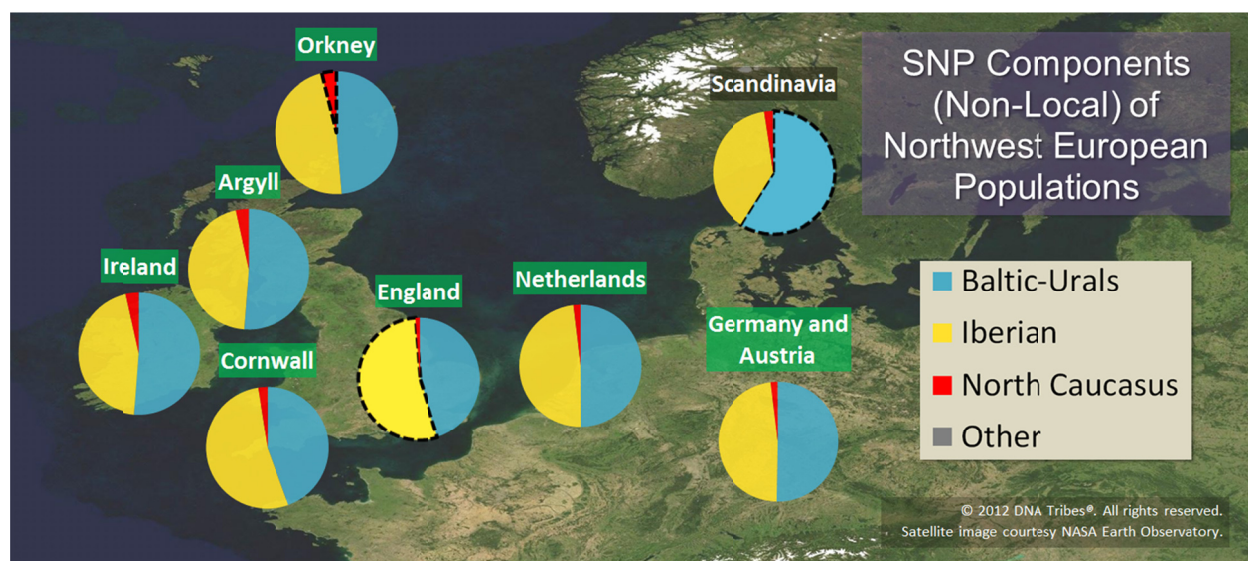


Figure 3: Genetic contributions to populations of Northwest Europe (excluding local Northwest European admixture). Populations where Celtic languages were spoken during the Iron Age are highlighted in green. For more information about DNA Tribes® SNP analysis, see <http://dnatribes.com/snp.html>.

¹⁰ For more detailed analysis, see <http://dnatribes.com/dnatribes-digest-2012-05-01.pdf>.

STR Analysis of Northwest Europe

Genetic contributions to Northwest Europe (including the Celtic, Belgic, Norse, and Germanic sub-regions) were identified based on autosomal STR data.¹¹ Results are summarized in **Table 2** and illustrated in **Figure 4**.

European Sub-Region	Estimated Contribution (%)
Italian	32.3%
Portuguese	26.3%
Balkan	24.6%
Polish	12.1%
Finnic	2.9%
Other	1.8%

Table 2: STR based genetic contributions to Northwest Europe (including the Celtic, Belgic, Norse, and Germanic sub-regions). This analysis excluded local Celtic, Belgic, Norse, and Germanic contributions.

Discussion: Results in **Table 1** indicate genetic links with several parts of Europe, including the Iberian Peninsula, Italy, and Eastern Europe.

Iberian links are from the Portuguese sub-region (26.3%), which includes Galicia as well as Portugal. During the Iron Age, these western parts of the Iberian Peninsula were Celtic speaking areas (the Castro culture). However, these genetic links might also predate the Celtic Iron Age, since maritime links between Northwest Europe and Iberia were active during the earlier Atlantic Bronze Age and other periods.

Results also indicate genetic links with the Italian sub-region (32.3%). During the Iron Age, the Po River Valley of northern Italy was known as Cisalpine Gaul due to early Celtic settlements (later absorbed by the Roman civilization). However, links between Italy and Northwest Europe also existed before the Celtic period: for instance, in Bronze Age trade links between Denmark and Italy (see Historical Background for more information).

Both Portuguese and Italic genetic links might relate to ongoing contacts between populations of Northwest Europe and the West Mediterranean. These ancient links are also reflected in similar *centum* Indo-European languages that include the Italic (Romance) and Germanic languages that expanded since the Roman period and are still spoken throughout Western Europe today. Based on Isaac's analysis, this linguistic continuity (possibly dating to the Bell-Beaker period¹²) was temporarily interrupted by Celtic expansions from Eastern Europe during the Iron Age.

Results further identified genetic links with several parts of Eastern Europe, including Balkan (24.6%), Polish (12.1%), and Finnic (2.9%). These links might primarily reflect the geographical proximity of Northwest Europe and Eastern Europe, which are connected both by land (Central Europe)

¹¹For more information about DNA Tribes® STR based 15, 21, and 27 Marker Kit tests, see <http://dnatribes.com/index.html>.

¹²For more detailed discussion of early population dynamics in Neolithic and Copper Age Europe, see <http://dnatribes.com/dnatribes-digest-2012-06-01.pdf> and <http://dnatribes.com/dnatribes-digest-2012-07-01.pdf>.

and by sea (the Baltic Sea). Inland connections might include the Danube River Valley, reflected in Balkan genetic links (24.6%). Maritime links via the Baltic Sea might include Finnic genetic links (2.9%). Polish genetic links (12.1%) might include both inland links via Central Europe, as well as maritime links via the Baltic Sea.

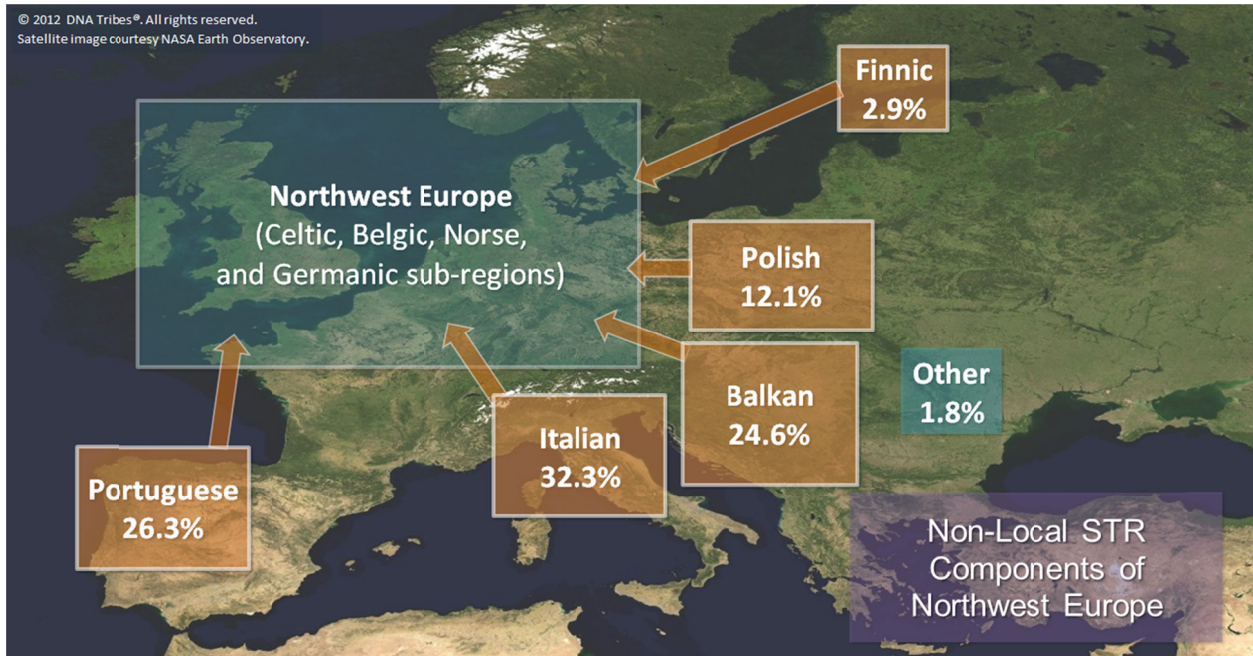


Figure 4: STR based genetic contributions to Northwest Europe (including the Celtic, Belgic, Norse, and Germanic sub-regions). This analysis excluded local Celtic, Belgic, Norse, and Germanic contributions.

These geographical links with Eastern Europe have existed in all periods of prehistory, so results do not isolate a specifically Celtic related signature in this case. However, the migration route suggested by Isaac's linguistic analysis might relate most to the Balkan (24.6%) and Polish (12.1%) genetic links. These sub-regions are located near the Danube River and Carpathian Mountains, associated with the Iron Age "Thraco-Cimmerian" expansions from the Black Sea (coinciding with the Halstatt C period and "Fully Celtic" cultures).

In summary, the genetic contributions identified based on STR data include inter-regional links that were active between Celtic speaking populations during the Iron Age. These include genetic links with the Balkan Peninsula, Central Europe, the Iberian Peninsula, and Italy. These results do not express exclusively Celtic related contacts, because all of these inter-regional links were active during other periods of prehistory. Instead, these genetic links express the underlying geographical relationships that facilitated the spread of Celtic languages, as just one example of early cultural transmissions in this part of the world.



Conclusion

In summary, SNP and STR analysis identified potential genetic traces of the initial Proto-Celtic expansions from Eastern Europe, as well as later contacts between Celtic speaking populations of Western Europe during the Iron Age.

SNP results identified a small but consistent genetic link between Northwest Europe and the North Caucasus. However, this geographically unexpected link might present evidence of migrations that transmitted the Proto-Celtic languages from Eastern Europe.

Results for STR analysis identified genetic links between Northwest Europe and neighboring sub-regions of Europe. These might to some extent express contacts between Celtic speaking populations during the Iron Age (although not necessarily limited to this period). More generally, these genetic links reflect the inter-regional relationships that have facilitated trade, migrations, and the spread of shared languages throughout prehistory and history.

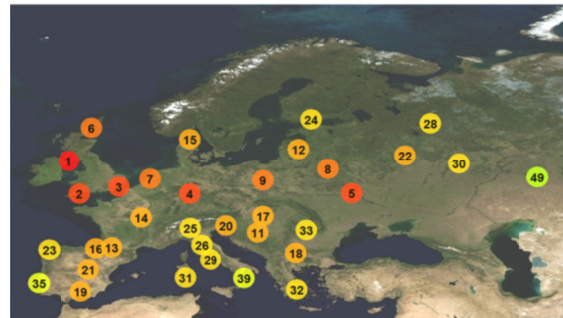
DNA Tribes SNP® Update for August 2012

We are pleased to announce a new update for *DNA Tribes*® SNP analysis. This includes several *New* and *Enhanced* features for a total 40+ page analysis for each person's genotype.

New Populations: Several new populations have been added to our SNP database:

New European populations:

- Andalusia Spain
- Germany and Austria
- Greek Mixed
- Italy General
- Netherlands
- Portugal
- Russia General
- Serbia and Croatia
- Southern Italy and Sicily



New Middle Eastern populations:

- Assyria

New East Asia populations:

- Tibet

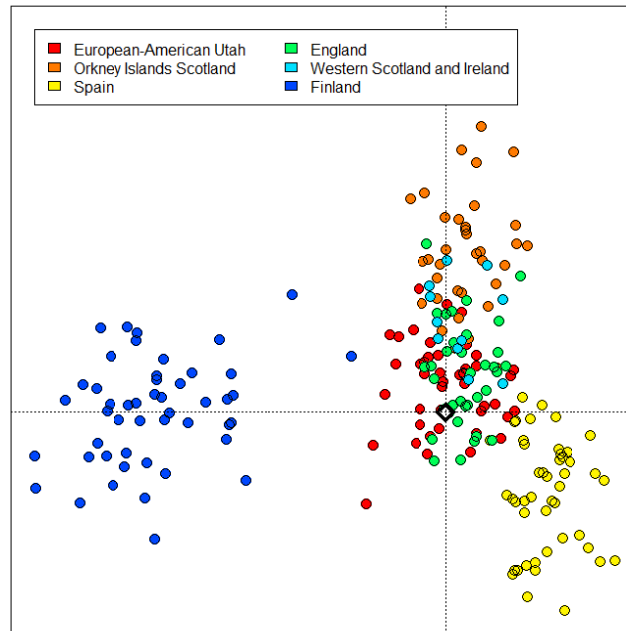
New Population Mixture Analysis (Native and Diasporic): Each person's report now includes admixture comparisons to our SNP database. This includes (1) Native Populations and (2) Global Population admixture analysis (including communities that have migrated or mixed in recent history).

Population admixture does not identify percentages of ethnicity or nationality, but instead identifies more specific geographical signals that can express more ancient links between populations. For instance:

Population	Percentage
European-American Utah	17.8%
England	12.3%
Finland	11.3%
Spain	10.0%
Orkney Islands Scotland	8.8%
Western Scotland and Ireland	8.6%
Cornwall West Britain	7.0%
Vologda Northern Russia	5.1%
Poland	3.4%
Sardinia	3.2%
France	2.7%
North Kannadi India	1.6%

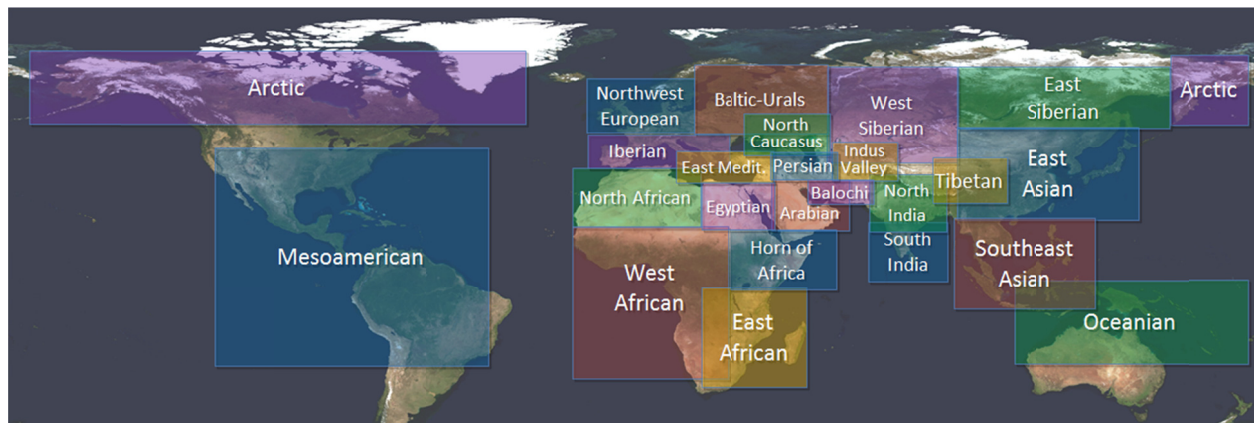
Cyprus	1.5%
Jewish Iraq	1.5%
Belarus	1.3%
Scandinavia	1.2%
Turkmen	0.9%
Basque France	0.6%
Andalusia Spain	0.5%
Chuvash Russian Federation	0.4%
Pima Mexico	0.1%
Ukraine	0.1%
Bulgaria	0.1%
Tuscany Italy	0.1%

New Personalized MDS (Multi-Dimensional Scaling): To expand on admixture results, each person's report now includes MDS analysis that visualizes your genotype's relationships to: (1) Continents; (2) World Regions; (3) Native Populations; and (4) Global Populations.



Enhanced World Region Analysis: Our updated regional admixture and MDS analysis now distinguishes a total of 24 world regions, including several new and more detailed regions:

- North Caucasus
- East Mediterranean
- Egyptian
- Persian
- North India
- Balochi
- West Siberian
- Tibetan





Enhanced “Calculator Effect” Removed: As of our August 2012 update, total similarity and admixture results will now be directly comparable for all samples, regardless of whether you have submitted your genotype to be included in our analysis.

Note: Customers with a family member included in a native population in our database will still be affected by the calculator effect. These customers can obtain higher total similarity scores and admixture percentages for that population and related world region.

Updated on Website World Admixture Tables: Comprehensive admixture tables listing the continental and regional components of world populations in our database are available at <http://www.dnatribes.com/dnatribes-snp-admixture-2012-08-01.pdf>.

Updated on Website Sample Reports: Updated DNA Tribes® SNP reports for several world populations are available at <http://dnatribes.com/snp.html>. New SNP analysis orders (**Sale Price \$59.99**) and updates to your personal DNA Tribes® SNP report can also be ordered at this link.