Y-DNA clade J-L817

research summary document by Vitaly Goldberg, Bnei Yahya project administrator

Summary

This document aims to summarize the currently available information on the clade of Y-DNA haplogroup J-P58 (J1c3) defined by SNP markers L817 and L818, as well as its possible interpretations and hypotheses arising from it.

In terms of STR haplotypes, J-L817 persons can be distinguished from all the other members of parent J-P58 group by the values of two Y-STR markers: DYS392 at or above 13 and DYS390 at or above 24.

Based on the currently available Y-SNP and Y-STR test results, an overwhelming majority of J-L817 persons belong to a subclade defined by the SNP marker L816. Members of J-L816 subclade can be distinguished from L816- persons by the value of Y-STR marker DYS439 between 9 and 11. According to the calculations based on Rozhanskii-Klyosov methodology, the most recent common ancestor of J-L816 was born approximately 1050 years before present. A majority of his modern descendants are Ashkenazi Jews, but some of them are Spanish, Portuguese, Irish, German and Romanian persons with no known Jewish ancestry.

Persons confirmed or expected to be positive for L817 and L818 but negative for L816 have values of DYS439 at or above 12. Such cases are extremely rare; they include persons with known origin from Germany, Poland, Syria, Southeastern Turkey, Western Iran, and China.

SNP markers L816, L817, L818 were discovered in a Walk through the Y test by Family Tree DNA in October 2011.

Methods

The results and hypotheses presented here are based on the database of Y-STR haplotypes that includes cases found in public Family Tree DNA projects. Cases found in sources such as ySearch or SMGF Y-chromosome database were not included in calculations.

Genetic distance calculations, estimates of time to most recent common ancestor (TMRCA) and respective standard deviations are based on the general approach and mutation rate constants proposed in the 2011 paper by Igor Rozhanskii and Anatole Klyosov and an earlier 2009 paper by Anatole Klyosov. Calculations for 49-marker haplotypes use 67-marker haplotypes with the exclusion of 18 markers prone to RecLOH, null mutations and other complications (DYS385, DYS389 II, DYS459, DYS464, YCA II, CDY, DYF395S1, DYS425, DYS413). Cross-subclade TMRCA estimates are based on the method proposed in the 2010 article "Irish Haplotypes and Haplogroups" by Anatole Klyosov.

Genetic distance matrices are built in Microsoft Excel (manual corrections are made where necessary to ensure proper mutation counting in the case of RecLOH events affecting several Y-STR markers). Phylogenetic trees include unique haplotypes at each testing level and are constructed with Kitsch programme (part of Phylip package), using the Fitch-Margoliash method with evolutionary clock assumption. Randomized input option of Kitsch is enabled, with jumbling being performed 90 times to determine the optimal tree. The resulting optimal trees are visualised using FigTree software.
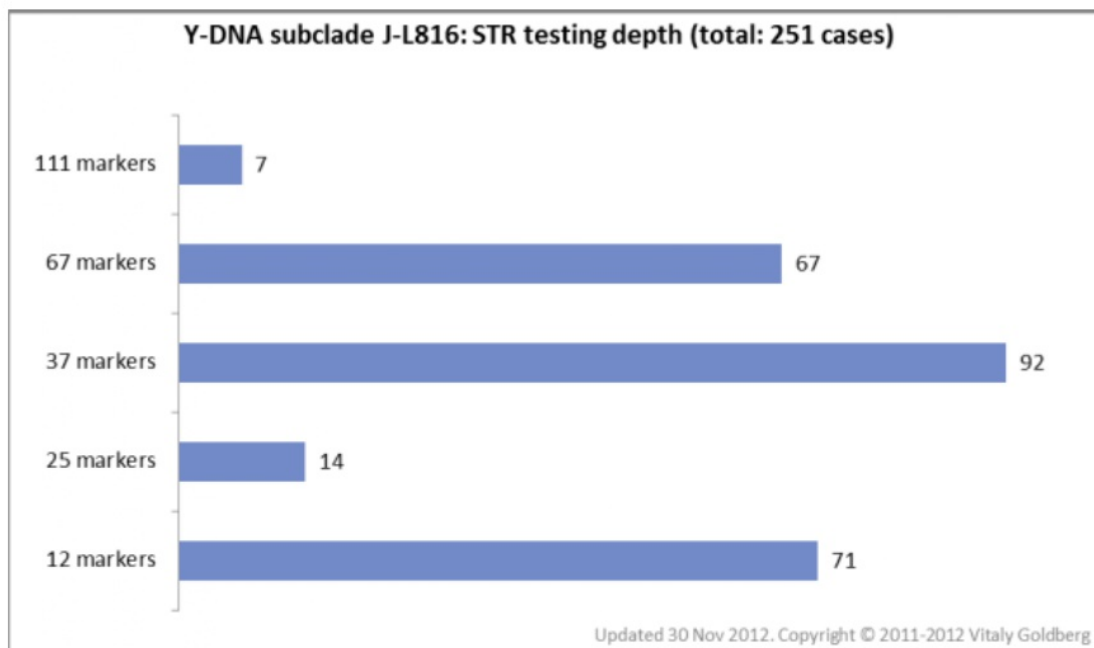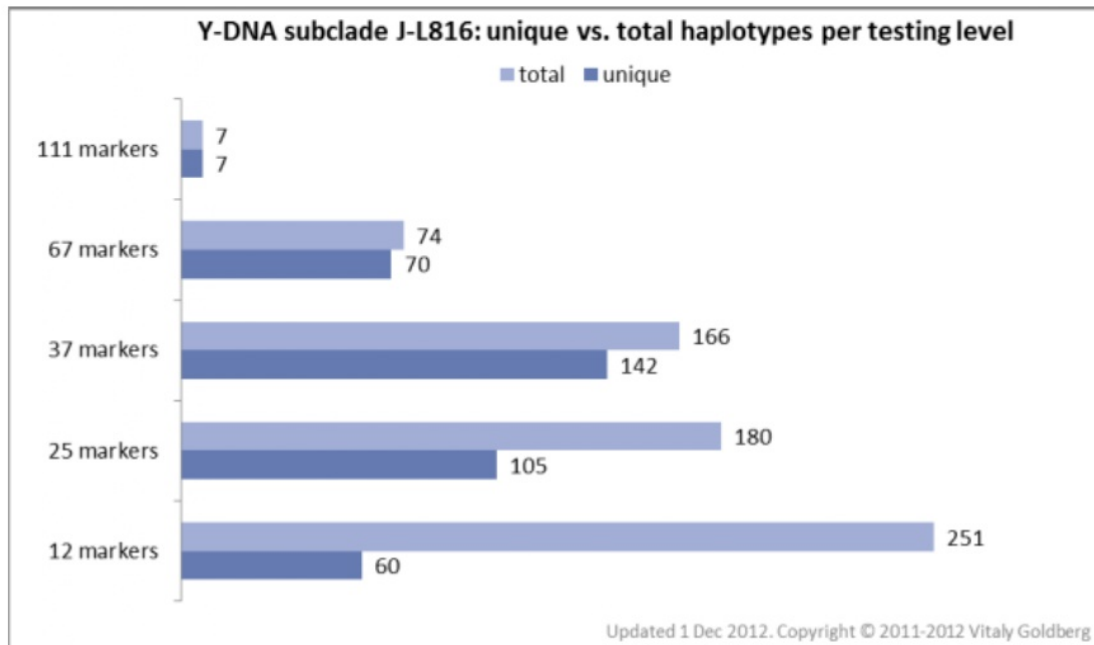
Phylogeny and TMRCA

The time to the most recent common ancestor (TMRCA) of the cluster encompassing the currently known J-P58 persons with the values of Y-STR marker DYS392 at or above 13 and DYS390 at or above 24 is estimated at approximately 5100 years before present (ybp). To put this into context, the end of 4th millenium BCE is the time when centralised state was formed in Egypt and cuneiform writing emerged in Mesopotamia.

According to phylogenetic trees based on genetic distances between known J-58 persons with the above characteristic Y-STR marker values, the cluster in question breaks down into two major branches. The first one includes 3 members that are distinguished by the following Y-STR values: DYS390=24, DYS385a=18 and DYS439>=12. The TMRCA of this group is estimated at 2500 ybp (standard deviation: 490 years). It is

not clear yet whether this branch belongs to the J-L817 subclade as none of its members have tested SNP markers L817 and L818 thus far.

Another branch (estimated TMRCA: 2925 ybp) encompasses all confirmed members of J-L817 subclade. In its own turn, it breaks down into two clearly distinct sub-branches. The first sub-branch is characterised by the following Y-STR values: DYS390=24, DYS385a=15 and DYS439>=12. It includes 3 persons of European origin (estimated TMRCA: 375 ybp; one person tested positively for SNP markers L817 and L818 but negatively for L816), and a Kurdish person. Our FTDNA project members, which belong to this sub-branch, are placed to **Subgroup A**.

Y-DNA subclade J-L816: unique vs. total haplotypes per testing level

total ■ unique

Testing level	total	unique
111 markers	7	7
67 markers	74	70
37 markers	166	142
25 markers	180	105
12 markers	251	60

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Y-DNA subclade J-L816: STR testing depth (total: 251 cases)

Testing level	cases
111 markers	7
67 markers	67
37 markers	92
25 markers	14
12 markers	71

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The second sub-branch, distinguished from others by the value of DYS439 between 9 and 11, is by far the largest. Based on the available test results, all of its members are expected to be positive for SNPs L816, L817, L818. We estimate the total number of persons in the J-L816 subclade that tested at Family Tree DNA to exceed 400, of which more than 250 are members of various public projects (see Unique vs. Total Haplotypes and Testing Depth charts above).

The estimated TMRCA of the J-L816 subclade is 1050 ybp (standard deviation: 80 years), based on known 67-marker haplotypes as well as the average of estimates based on known 25-, 37-, 49-, 67-marker haplotypes (see also TMRCA chart below). To provide a context, this was the time marked by the decline of Mesopotamian Jewish community following the occupation of Baghdad by Buwayhid emirs, the golden age of Caliphate of Cordoba, and the fall of the Khazar khaganate; it preceded the devastation of Ashkenazi Jewish communities during the first crusade by about 150 years.
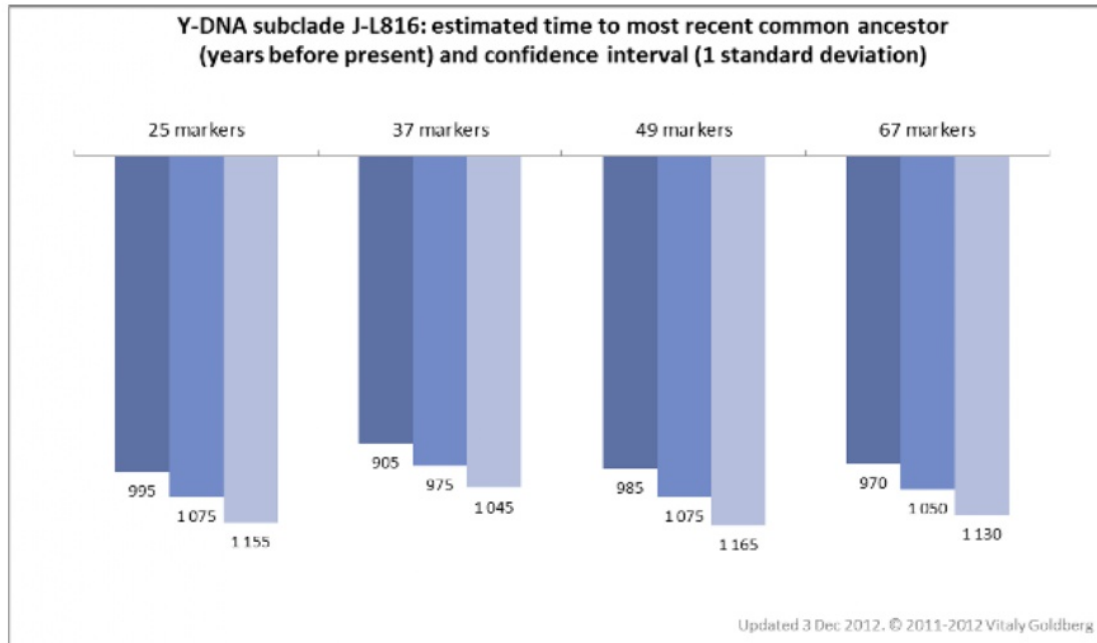
Further dividing the J-L816 subclade into subgroups at the current level of our knowledge represents a much more complicated task. For the purposes of our FTDNA project, we use three types of subgroups based on 67-marker and 37-marker phylogenetic trees.

The first type (coloured in light blue) includes **Subgroup D** (estimated TMRCA: ~575 ybp), **Subgroup G** (estimated TMRCA: ~400 ybp), and **Subgroup H** (estimated TMRCA: ~275 ybp) - relatively large and stable structures discernible on both 37- and 67-marker phylogenetic trees. Members within these subgroups can be considered relatively close cousins.

The second type (coloured in light pink) includes **Subgroups B, C, E, F**. Members within these subgroups are not very close to each other; however, phylogenetic trees give reasons to believe that lineages included in each particular subgroup emerged during the same period of time. We prefer to combine them for convenience / readability purposes rather than create separate subgroups for only 1-2 persons.

The third type (coloured in aqua marine) includes **Subgroups I and J**. Formally, they might be viewed as representing a single lineage - the one most reproductively successful and thus the largest in the J-L816 subclade. However, lack of consistency between the "core" segments of 37-marker- and 67-marker trees shows that these groups are prone to a relatively high chance of including matches that result from haplotype convergence rather than recent common ancestry and may not be confirmed at a higher level of testing.


Reconstructing History

The task of reconstructing the history of J-L817 clade based on known geographic origins of its present-day members is quite challenging. Below we discuss a number of possibilities in the context of major branches discussed above.

Of the cases with DYS390=24, DYS385a=18, DYS439>=12, one originates from Syrian Jews, and another one from China. This does not provide any clues for historical reconstruction, except for a suggestion that the Chinese case may be somehow linked to Radhanite merchants. It must also be kept in mind that the TMRCA of this branch and the remainder of DYS390>=24, DYS392>=13 cases in haplogroup J-P58 (J1c3), according to our estimates, exceeds 5 thousand years.

The DYS390=24, DYS385a=15, DYS439>=12 branch includes a Kurdish person, which may turn out to be important for the reconstruction of history of J-L817 clade. In the light of this Kurdish connection and the fact that the neighbouring L816+, DYS390>=24, DYS439~10 branch is predominantely Jewish, it makes sense to mention the semi-independent Mesopotamian kingdom Hadyab (Adiabene in Greek), which existed between 1st century BCE and 3rd century CE on roughly the same territory as modern Iraqi Kurdistan and, like the latter, had its capital in the city of Erbil. More specifically, our attention is attracted by the fact that in the 1st century CE, the royal house of Adiabene and some of their subjects converted to Judaism. Adiabene and its relationship with the Jews are mentioned in the Talmud and by Josephus.

It must be noted that known DYS439>=12 cases (confirmed or expected to be L817+ L818+ L816-) are very rare and estimated to share a common ancestor with L816+, DYS439~10 persons at a much earlier time - the beginning of 1st millenium BCE (this dating may, however, change substantially if more DYS439>=12 cases are found / upgraded to 37 or more markers). On the other hand, the J-L816 subclade is estimated to share a common ancestor at the end of the 1st millenium CE. Thus, the hypothesis linking the history of Adiabene and the Y-DNA clade in question remains purely speculative at this stage.

The J-L816 subclade is notable for its size and predominance of one genetic group, Ashkenazi Jews, among its members. Spanish and Portuguese persons make up less than 2% of known J-L816 cases. People with known origin from countries outside of traditional Ashkenazi areas constitute another 7%. The remaining 91% originate from territories that before WWI were ruled by one of the three empires - Russia, Germany or Austria-Hungary (see Geographic Origins chart below).
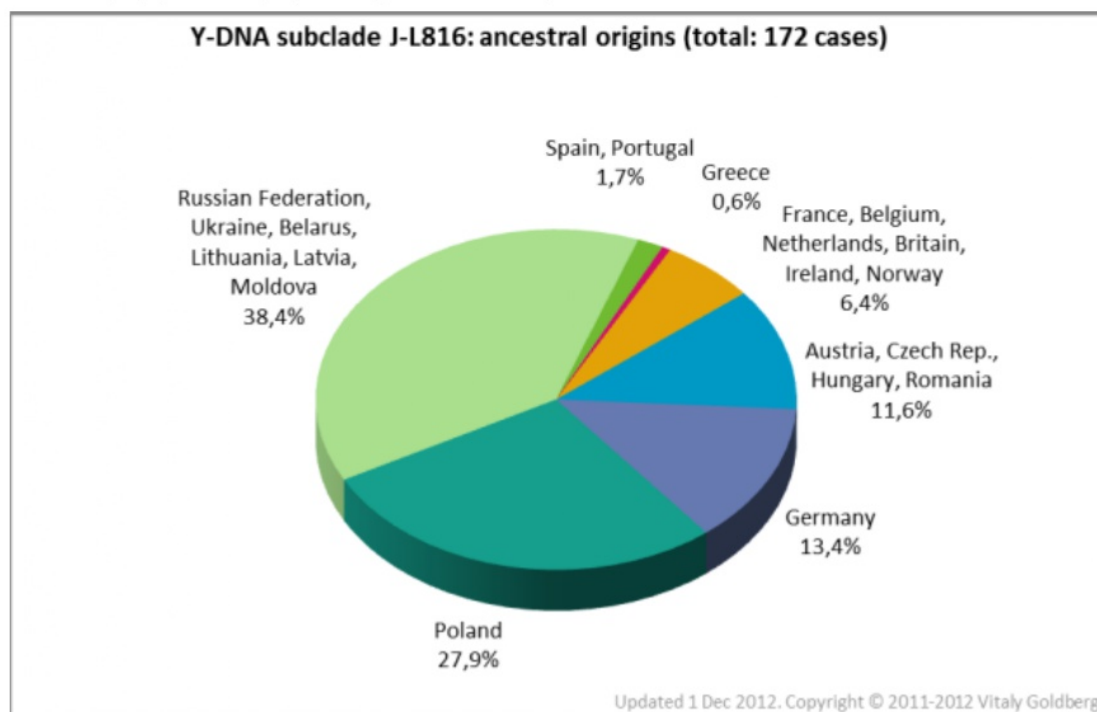
Based on the predominance of Jews among modern J-L816 people, it seems safe to assume that their 10th century ancestor was Jewish as well. Substantial genetic distance separating J-L816 from its closest related branches may be the sign of a genetic bottleneck. The events of the first crusade, which are often considered to be the bottleneck that gave rise to many modern Ashkenazi Jewish lineages in different Y-DNA haplogroups, are within two standard deviations range from the estimated TMRCA of J-L816. However, given that not a single J-L816 case has been found thus far in persons with recent Middle-Eastern ancestry, we think that reasons, which caused the bottleneck in this case, lie in the history of the Middle East rather than Europe. Below we discuss some speculative scenarios of the early history of J-L816.

One possible major reason for a Jewish man or family to seek a better life outside of the Middle East during the period in question could be increased persecution of Jews by Buwayhid emirs, which became de-facto rulers of Iraq in 945 CE, and the resulting decline of Mesopotamian Jewish community. A logical destination in Europe for a Jew fleeing from Iraq in the second half of 10th century would be Al-Andalus, then ruled by Caliphate of Cordoba, which had just passed the climax of its glory at the time, hosted a prosperous Jewish community and, being dominated by Arab / Muslim culture, would not represent significant integration challenges for an Iraqi Jewish immigrant. We cannot exclude the possibility that the European destination of

J-L816 ancestors was Italy, Southern France, or even one of Jewish communities along the Rhine, but in our view that would be a more complicated hypothesis.

This Andalusian scenario may explain known Spanish / Portuguese cases of J-L816, but it creates another problem. While a majority of Sephardim moved to Northern Africa, Ottoman Empire or the Netherlands following the expulsions from Spain in 1492 and Portugal in 1497, J-L816 cases originating from areas associated with post-expulsion Sephardic Jews are very rare. A possible explanation could be that many J-L816 persons moved to Central Europe at a much earlier time than 1492. Since the second half of 11th century, there were plenty of reasons that could motivate Andalusian Jews to migrate. Initially, many of them moved to Christian kingdoms in the northern part of Iberian peninsula, following the 1066 Granada Massacre and growth of persecution under increasingly fundamentalist Berber Muslim rulers. Since the middle of 13th century, life of Jews in the Christian states of Iberia was getting increasingly complicated as well, culminating in the massacre of 1391 and mass conversions to Christianity. Additionally, we must take into account that some J-L816 families could move to Central Europe after initially migrating to Sephardic lands. Thus, a suggestion can be made that the share of Ashkenazim among J-L816 persons grew very large due to relatively favourable conditions for Ashkenazi Jews over the course of subsequent history, while the lineages that baptized and stayed in Spain and Portugal or moved to Maghreb or Ottoman Empire had fewer chances to achieve similar reproductive success. Still, even taking the above explanations into account, rarity of Sephardic J-L816 cases casts certain doubt on the Andalusian scenario.

As TMRCA of J-L816 roughly coincides with the fall of the Khazar Khaganate in the second half of 10th century, this event also needs to be considered as a possible cause of the bottleneck. Being part of clearly middle-eastern haplogroup J-P58 (J1c3), J-L816 has nothing to do with nomadic Khazars as ethnic group, but the subclade's early history could be affected by the existence of Khazar state whose ruling elite converted to Judaism in late 8th or early 9th century, and / or Jewish Radhanite merchant network, which had one of their trading routes going from Western Europe through Slavic and Khazar lands to China. Returning to the Kurdish / Adiabene connection discussed above, we note that the Schechter Letter mentions Jews who migrated from (or via) Persia and Armenia to areas controlled by nomadic Khazars to flee persecution. It is conceivable that after the fall of Khazar Khaganate a Jewish man or family, especially one connected to the Radhanites, could move from (or via) Khazaria to one of the Jewish communities along the Rhine or Rhone rivers, or even to the Iberian peninsula. This scenario is a better fit to the observed concentration of J-L816 lineages in Ashkenazi areas. Presence of a small number of Spanish / Portuguese or Sephardic Jewish cases does not necessarily contradict it, as a limited number of J-L816 persons could well move further westward for whatever reason over the period after the initial emigration to Europe and late 14th century. Still, we think the Khazar/Radhanite scenario is more complicated and thus less probable than the Andalusian one.

In any case, as long as available non-Ashkenazi cases of J-P58 persons with DYS390>=24 and DYS392>=13 remain extremely rare, all the possibilities discussed above remain highly speculative. Thus, the members of J-L816 subclade can so far feel free to imagine their 10th century ancestors in many different ways, be it a venerable Rabbi of Sura academy moving with his family from one Mediterranean Jewish community to another on the way to Cordoba, a clan of Baghdadi bankers who sail the Mediterranean on their ship with numerous bodyguards, seeking to exploit business opportunities opening in Al-Andalus, a bold Radhanite merchant surviving perils of the collapsing Silk Road and escaping from the burning capital of Khazaria to settle on the banks of Rhone, or (which is most likely) an average Jewish man that was lucky enough to take his family out of trouble. Our hope is that in the future, as penetration of genetic testing grows, especially in the Middle Eastern nations, we will be able to reconstruct the history of broader J-L817 clade and its J-L816 lineage with the help of science rather than speculations on the verge of historical fiction.

Appendices

Phylogenetic trees undelying the above analysis are available on J-L817 Facebook group (membership is granted to J-L817 persons, persons managing their Family Tree DNA kits, and researchers studying the J-L817 Y-DNA subclade).