

COMPARISON OF DNA ANCESTRAL VALUES ASSIGNED TO THE GENOME OF DAVID K FAUX BY THE MAJOR COMMERCIAL TESTING COMPANIES

Introduction: The questions to be explored here, using the genome of DKF, are:

- 1) How similar (consistent) are the ancestry estimates provided by the “big five” (and other) DNA testing companies?
- 2) How accurate are these ancestry estimates, in other words, which equate well with a robust genealogy such as that of DKF (most lines traced beyond the 18th Century and confirmed via autosomal matches with cousins from the 2nd to 9th generation)?

23andME:

European	99.2%
● Northwestern European	99.2% ▾
● British & Irish	86.8% >
<p style="margin-left: 20px;">Greater London, United Kingdom</p> <p style="margin-left: 20px;">County Cork, Ireland</p> <p style="margin-left: 20px;">+17 regions</p>	
● Scandinavian	6.6% >
● French & German NEW	0.3% >
● Finnish	0.2% >
● Broadly Northwestern European	5.3% ▾
Western Asian & North African	0.5%
● North African	0.5% >
Trace Ancestry	0.2% ▾
Unassigned	0.1% ▾

ANCESTRY:

● England & Northwestern Europe	55%
● Scotland	29%
Your community with a connection to this ethnicity region ⓘ	
● North East Scotland & the Northern Isles	
● Orkney & Shetland	
● Germanic Europe	8%
● Ireland	4%
● Norway	2%
● Wales	2%

FAMILY TREE DNA:

Europe	100%
Western Europe	
● Ireland	38%
● Scandinavia	25%
● Central Europe	23%
● England, Wales, and Scotland	11%
Eastern Europe	
● Magyar	3%

MY HERITAGE:

EUROPE

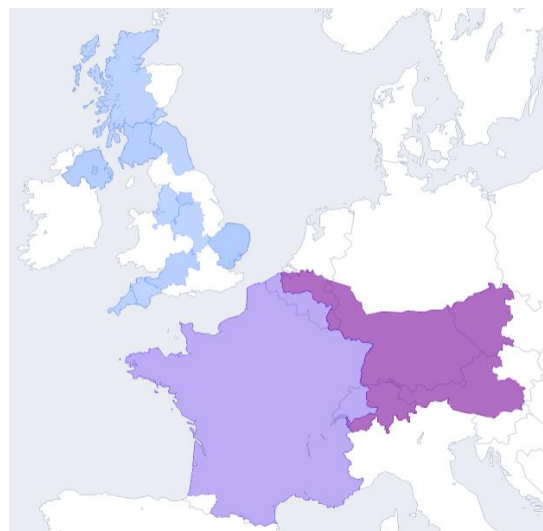
- **English** **36.6%**
- **Scandinavian** **31.0%**
- **Irish, Scottish, and Welsh** **25.3%**
- **Iberian** **7.1%**



LIVING DNA (PEOPLE OF THE BRITISH ISLES STUDY):

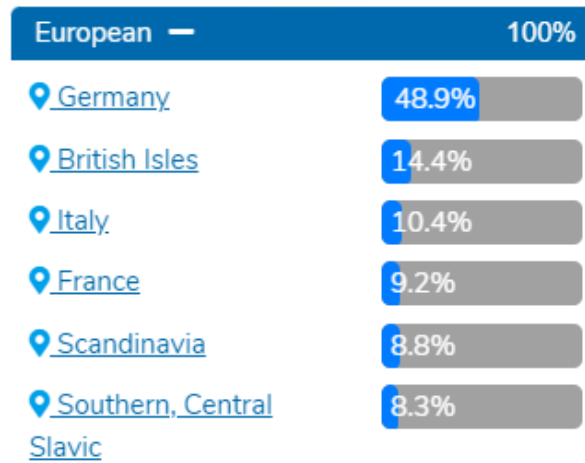
Europe	100%
<hr/>	
● Great Britain and Ireland	51.9%
● East Anglia	12.1% >
● South Yorkshire	11.9% >
● Northern Ireland and Southwest Scotland	8.3% >
● South Central England	6.8% >
● Cornwall	2.4% >
● Northwest Scotland	2.3% >
● Northumbria	2.2% >
● Devon	2.1% >
● Central England	1.9% >
● Northwest England	1.9% >
● Europe (North and West)	48.1%
● South Germanic	38.8% >
● France	9.3% >

Map of Above Regions

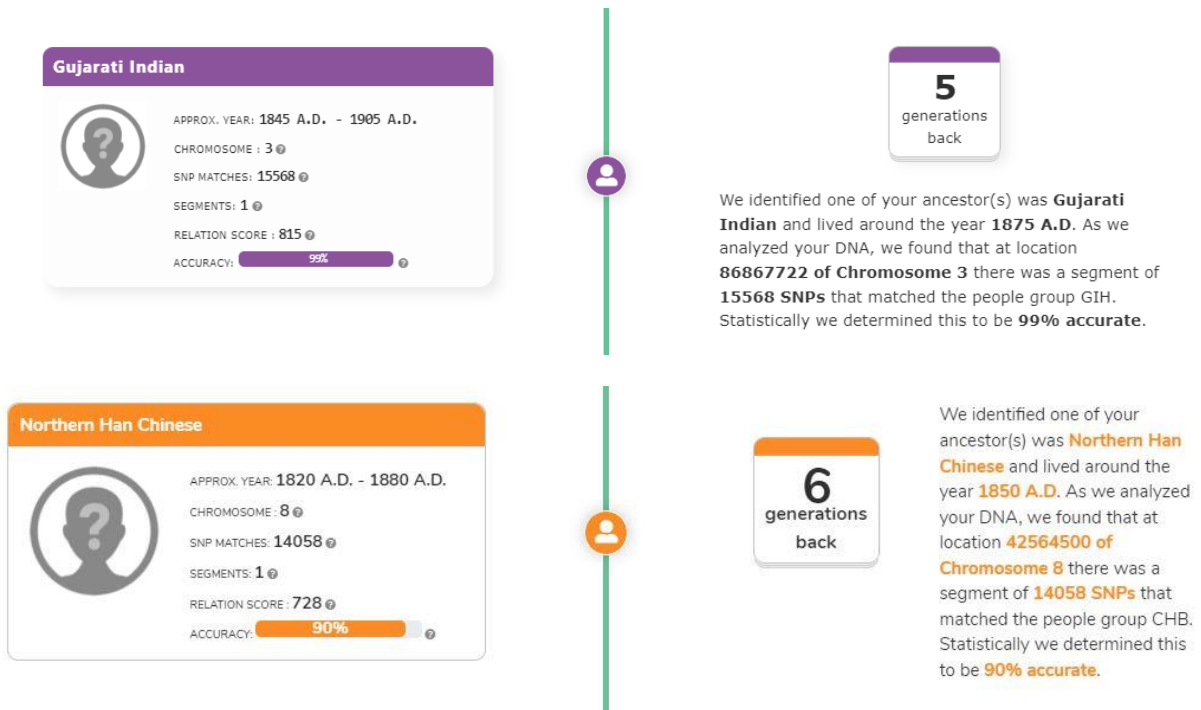


CRI GENETICS:

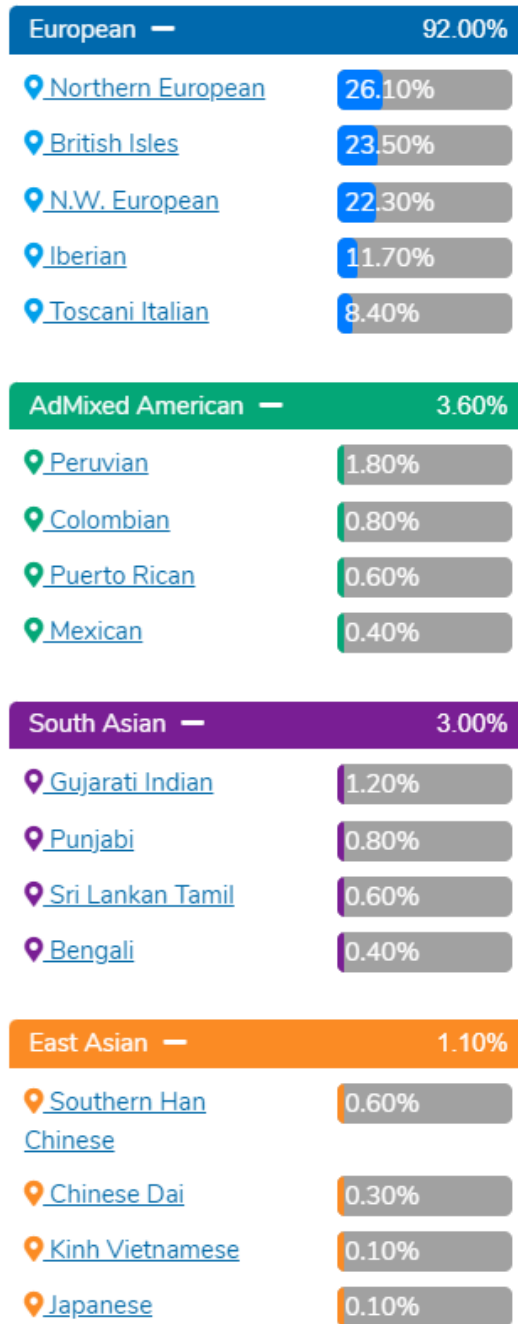
“Recent Analysis”



“Advanced Timeline” (Examples)



Advanced Ancestry Analysis” – “Oldest Ancestries” – “Beyond 5 Generations”

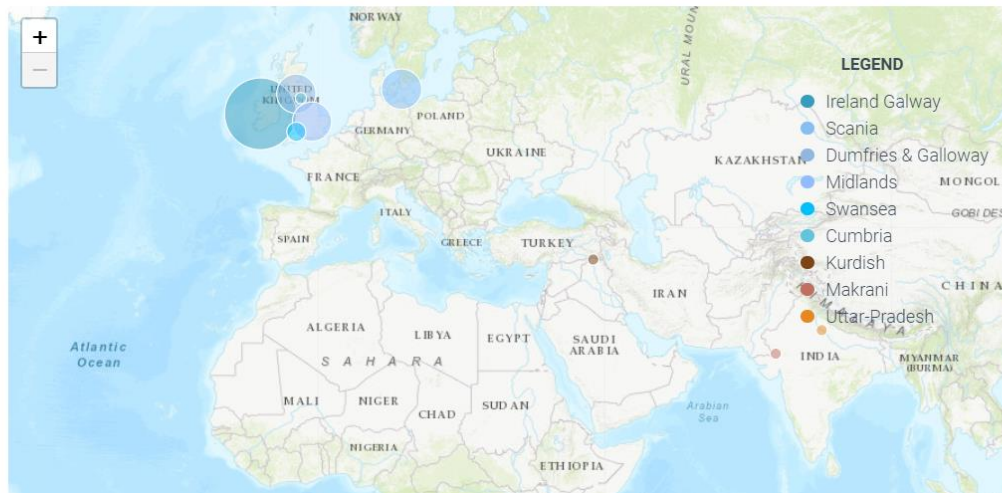


yourDNAportal:

Eurasia: Modern

Main Test Run

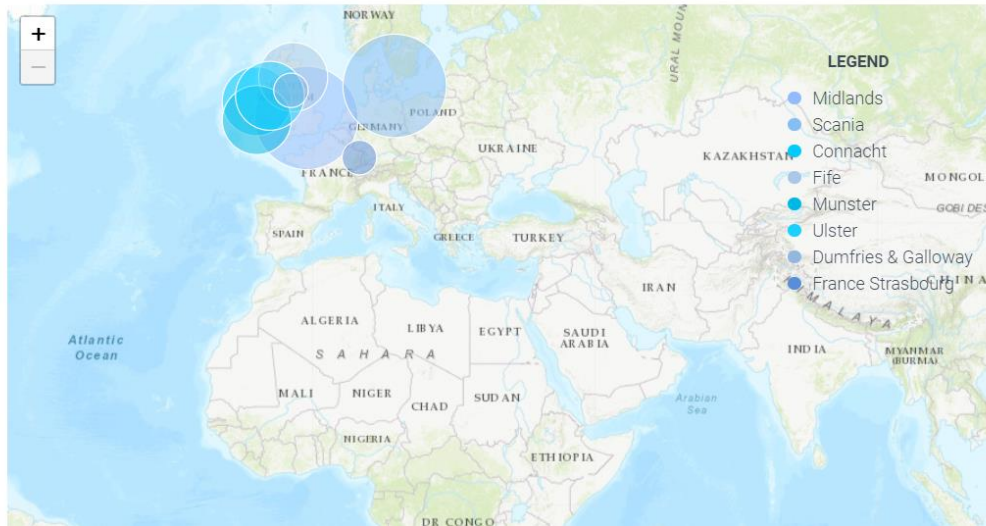
This mathematical setting divides your genome into 200 fragments, with each fragment representing 0.5% of your genome. This enables the capture and identification of even the most distant origins.



Population	Value
● Ireland Galway	32%
● Scania	18%
● Dumfries & Galloway	17.5%
● Midlands	17.5%
● Swansea	8.5%
● Cumbria	5%
● Kurdish	0.5%
● Makrani	0.5%
● Uttar-Pradesh	0.5%

Second Test Run

This mathematical setting divides your genome into 16 fragments, with each fragment representing 6.25% of your genome. This setting is very useful in estimating modern ethnic groups, since this fragment corresponds perfectly to the DNA theoretically inherited from an individual's great-great-grandparents (6.25% = great-great-grandfather).



Population

Value

● Midlands	18.75%
● Scania	18.75%
● Connacht	12.5%
● Fife	12.5%
● Munster	12.5%
● Ulster	12.5%
● Dumfries & Galloway	6.25%
● France Strasbourg	6.25%

WE GENE:

● European	99.96%	^
● French	99.95%	
● Others	0.01%	
<hr/>		
● Others	0.04%	

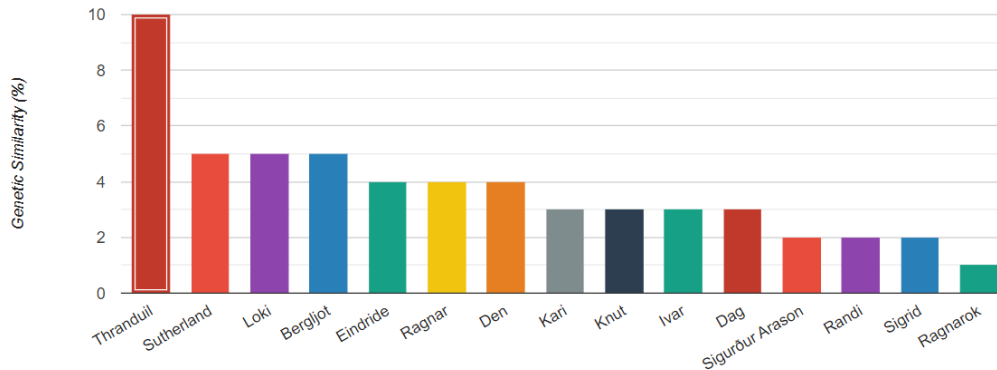
European	99.96%
French	99.95%
Sardinian	0.00%
Finnish/Russian	0.00%
Hungarian	0.00%
Balkans	0.00%
English	0.00%
Spanish	0.00%
Ashkenazi	0.00%

Chinese	0.01%
Tungusic	0.00%
Southern Han Chinese	0.00%
Northern Han Chinese	0.00%
Naxi/Yi	0.00%
Mongolian	0.00%
Uyгур	0.00%
Dai	0.00%
Lahu	0.00%
She	0.00%
Gaoshan	0.00%
Tibetan	0.00%
Hmong-Mien	0.00%

ANCIENT DNA ORIGINS:

Genetic similarity to Medieval Icelandic Vikings

Your genetic similarity to individual members of this culture is shown below. Click on the bar to see the story of each ancient individual. All the ancient individuals were found in archeological excavations. They were dated and associated with this culture by archeologists. The ancient DNA of all individuals was extracted from their bones and sequenced in special genetic labs that specialize in paleogenomic. With the exception of ancient Vikings, all the ancient individuals in our tests were buried without personal identifiers. Their names were thereby given by our team according to their culture, and their life story was reconstructed by our team of geneticists, historians, and archeologists.



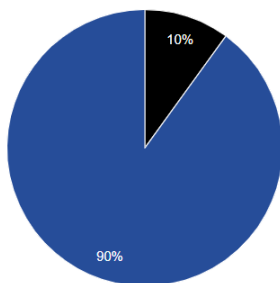
Thranduil's Genetic Story

Thranduil's skeleton was excavated at Víðar in Iceland, located at 65.69N -17.37E, and carbon-dated to the year 885. His mitochondrial haplogroup was determined to be K1c1b and his Y-Chromosomal haplogroup was R1a1a1b. Thranduil was aged 35-45 years old when he died. When he was alive, Thranduil might have been a slave. Known as thralls, slaves made up a large portion of the Viking population. Thranduil might have been captured on a raid or born into slavery. He would have spent his days working on a farm or constructing buildings, canals or roads.

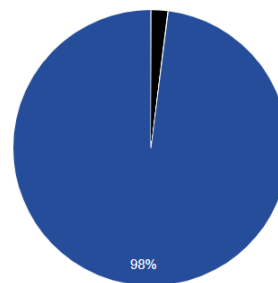
Genetic similarity to Medieval Icelandic Vikings

The left chart shows (in black) your highest genetic similarity to the ancient individuals in this test and your average genetic similarity to all the individuals in this test.

Your highest genetic similarity is with Thranduil

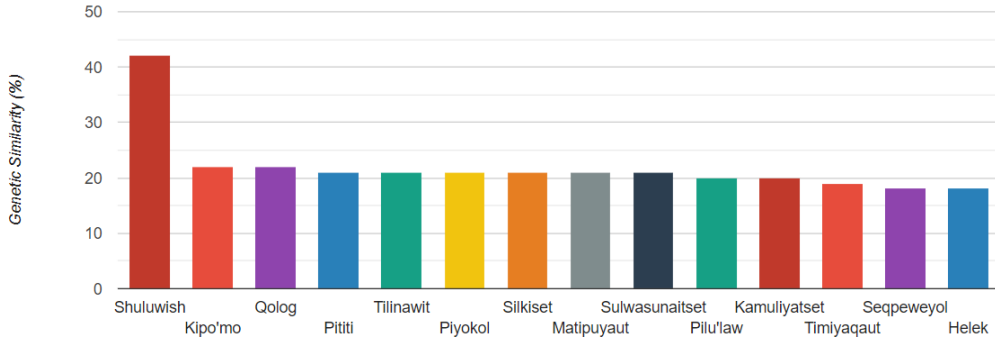


Your average genetic similarity to the Medieval Icelandic Vikings



Genetic similarity to Paleo Indians

Your genetic similarity to individual members of this culture is shown below. Click on the bar to see the story of each ancient individual. All the ancient individuals were found in archeological excavations. They were dated and associated with this culture by archeologists. The ancient DNA of all individuals was extracted from their bones and sequenced in special genetic labs that specialize in paleogenomic. With the exception of ancient Vikings, all the ancient individuals in our tests were buried without personal identifiers. Their names were thereby given by our team according to their culture, and their life story was reconstructed by our team of geneticists, historians, and archeologists.



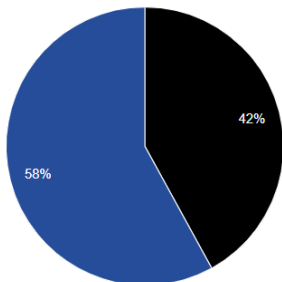
Shuluwish's Genetic Story

My name is Shuluwish and I lived in Point Sal in 1680 AD. My origins and life story were reconstructed by the Ancient DNA Origins scientists according to their knowledge of my people, my genetic data, and the archeological evidence. Although my father is a generous man, no one ever takes advantage of his kindness. He commands respect and when I asked him how he managed to be compassionate and still have boundaries, he told me the story of Coyote's dream. Coyote once dreamed that he saw three men working. When he asked them why they were working so hard creating shell money beads, they responded, "We have been sent to do this work by a man who lives in the west. We have been attentive, for if we do not pay strict attention, we will come to the same end which we all come and face him who sent us here." Coyote listened attentively to the moneymaker, and when he finished, he remained silent for a little while, thinking. Then Coyote said, "It is well that you are working but it is also good if the person for whom you are working has something, for if he has nothing at all there is nothing in it." He knew it was Death that had the three men working there. Then he spoke to the men, "Remember that when death comes, we have to leave our bones right here in this earth. I am going. I will see you again in front of the man who has brought you here."

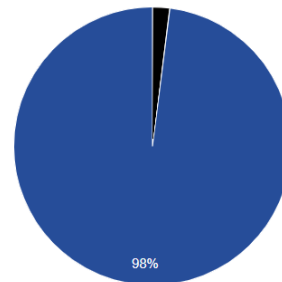
Genetic similarity to Paleo Indians

The left chart shows (in black) your highest genetic similarity to the ancient individuals in this test and your average genetic similarity to all the individuals in this test.

Your highest genetic similarity is with Shuluwish



Your average genetic similarity to the Paleo Indians



Summary Remarks:

As can be seen above, there is little consistency in the ancestry estimations – they vary dramatically from company to company. What is consistent, however, is the assignment of the author’s genome to Europe ancestry. This fits with the genealogy, in other words, with the exception of about 1 to 2%, the author’s ancestors over the past 500 years were from Northwestern Europe. The primary differences relate to the within Europe estimates.

Britain: The author’s primary ancestry, about 70%, comes from England – largely East Anglia, north to Northumberland along the eastern coast. **Ancestry** separates Britain into England, Scotland, Wales and Ireland. They report that the author’s genome is 55% England which is a good estimate; as is the 29% Scotland; the 4% Ireland and 2% Wales. This comports very well with the paper trail, with the awareness that Scotland and Ireland can be difficult to differentiate due to for example the “Plantation Irish” (from Scotland in the early 1600s). There has also been considerable mixing of Scotland with Irish immigrants (e.g., the Scotti).

Lumping England, Scotland, Ireland and Wales together, as is done with **23andMe**, and assigning to author’s DNA sample to 86.8% here (“Britain and Ireland”) makes little sense. Academic studies have, for example, shown significant differences in particular between England and Ireland.

Family Tree DNA deviates significantly from the author’s paper trail by assigning 38% Ireland, and 11% England and Scotland – which is far off the mark. **CRI Genetics** is also wildly off with only 14.4% “British Isles”. **My Heritage** is a close approximation, yielding 36.6% English, and 25.3% Irish, Scottish and Welsh.

One might assume that **Living DNA**, accessing the extensive “Population of the British Isles” data, would be the most accurate. It has been revised or updated recently, however this effort has, in this instance, served to distort the ethnic estimates. In its previous iteration, the results did not include the present Continental results. Now they divide the genome almost 50/50 into Great Britain and Ireland (51.9%) and South Germanic and France (48.1%) – inflating the latter well beyond what is seen in the genealogy. However, they provide estimates for regions within Great Britain and Ireland – and these are reasonably accurate (although the percentages are too low). For example, East Anglia leads with 12.1%, South Yorkshire with 11.9%, and thirdly 8.3% Northern Ireland and Southwest Scotland. Some estimates such as 2.4% Cornwall cannot be supported by the genealogy. However, these findings are overshadowed by the inflated Germany estimates, which are not as accurate. However, in the earlier version of this test the results showed more regions within Britain, and most of these could be confirmed by the genealogy.

Germany and France: Most companies do not parse the results into only German. Among those that do, the estimates range from 48.9% to 3%. Others realize that it is difficult to

separate Germany and France but **Ancestry** give 8% for Germanic Europe, **23andMe** 0.3% for a combined estimate, and **My Heritage** 38% Southern Germany and 9% France; **Family Tree DNA** does not have a German category only “Central European” – at 23%; and **CRI Genetics** gives an estimate that would have the author with a German parent – 48.9%; and finally **Living DNA** with 38.8% German and 9.3% France. The author’s ancestry from this area of Europe is in fact all Southern Germany and extends back to Colonial American times. The true value based on the clear paper trail is close to 6%. However, the vagaries of DNA inheritance, and perhaps the “pedigree collapse” (marriage of cousins in this lineage), might mean that 6% is on the low side.

Scandinavia: The third major European ancestry category is Scandinavian. Here **23andMe** assigned 6.6% and 0.2% Finish; **Ancestry** with Norway at 2%; **Family Tree DNA** with Scandinavian at 25%, **CRI Genetics** estimating Scandinavian at 8.8%; **My Heritage** with 31% Scandinavian; and **Living DNA** not recorded. Having a great great grandfather born on Yell in the Shetland Islands (a Norwegian colony until 1466), and knowing that he was $\frac{3}{4}$ Norn – speaking native and $\frac{1}{4}$ Scottish incomer one might expect about 5% Scandinavian (Norway) – although, as noted above, there is a lot of the unexpected and randomness in the inheritance of DNA.

Other: Most of the other ancestries such as **Family Tree DNA**’s Magyar at 3% and **My Heritage**’s 7.1% Iberian cannot be substantiated with genealogical evidence. **CRI Genetics** has provided a “Beyond 5 Generations” category with in addition to European, also 3.60% Admixed American; 3.0% South Asian; and 1.10% East Asian. It is difficult to know what to make of these categorizations. The same can be said of **yourDNAportal** in the sense that when viewing the above results for “Eurasia” the categories are far removed from what is known from the paper trail. They have a number of other categories including “Pangea”, “Native American” and “African” (e.g., Modern, Ancient, North African). The results here will be the subject of other reports added to the author’s website.

Somewhat similar to **yourDNAportal** is **Ancient DNA Origins** which appears to be the (very) new kid on the block. The results appear to be “contrived”. The author chose “Medieval Icelandic Vikings” and “Paleo Indian” for which a separate fee was charged (as is the case with **yourDNAportal** where you pay to “unlock” each of the many categories). The above results from **Ancient DNA Origins** are questionable. Ultimately the author received an overall score for each of these broad categories of 2% total. That might just be a coincidence, or the fallback number to ensure customer satisfaction (zero can be “deflating”). It will likely be some time before there is feedback from the genetic genealogy community that will enable potential buyers to assess what they are buying.

My Heritage offers a listing of the matches by country. The results for the author are consistent with the genealogy and countries where individuals are more likely to take a DNA

test – mostly English - speaking countries such as Australia. The other matches begin with Norway (143), Sweden, Germany, the Netherlands down to countries where there is only a single match such as Korea (likely most are of British or partly British ancestry). The highest number of matches are from “Germanic” countries – an unsurprising result.

Many of these companies do not put a great deal of effort into assessing minority ancestry, and often due to a paucity of reference samples or an algorithm which leaves something to be desired. Some companies have categories such as “Broadly Northwestern European” which at least offers an estimate for a Continental region, although this is far from specific in geographical terms. In all fairness, it is also a fact that it is difficult to impossible to differentiate between some European populations, for example Southern English and the Netherlands. There are a number of other reasons for this lack of specificity, including the possibility of false positives and false negatives, and the cost of doing a detailed analysis using say a principal components analysis to tease out minority ancestry is probably commercially impractical.

Conclusion: There is a striking amount of inconsistency in the estimates of European ancestry provided by each of these DNA testing companies. The author has also tested with a number of companies which are no longer in business, but whose output was just as skewed as many of the above. These companies include the first out of the gate, **deCODEme**, as well as **DNA Tribes**, and **DNA.LAND**. Today the “big five” are considered (by the International Society of Genetic Genealogists – ISOGG) to be **23andMe**, **Ancestry**, **Family Tree DNA**, **My Heritage**, and **Living DNA**. See their comparison chart [here](#). **YourDNAportal**, **CGI Genetics** and **Ancient DNA Origins** have yet to make their mark. **WE GENE** is a Chinese company, which, in the last 5 years, has not really made any detectible progress at least in the testing of European Ancestry (most seem to be assigned to the “French” category). They also record percentages of “phantom” ancestries such as “Chinese” or “other” which do not show up further in the list of groups tested.

Without a genealogy to guide the author it would be impossible to know which of the above to incorporate into one’s identity. In an old add on TV, **Ancestry** showed a man who thought he was Irish, but learned via DNA testing that he was wrong, he was German so Lederhosen and slap dancing now became new passions or behaviours. Claims such as these are very concerning since, although “DNA never lies”, it can be wildly misinterpreted. Most concerning would be those who are adopted and rely on these tests to offer guidance as to where the roots of their biological ancestry are to be found. At the continental level all work reasonably well, however the findings relative to, for example, groups within Europe, might obtain hints relating to Northern and Southern Europe, but a finer grained analysis is often an illusion.

The author has been taking these tests since 2000, over 20 years, and still, after all this time, still gets hugely divergent results as seen above. There is little on the horizon to suggest that the next 20 years will provide circumstances where all companies agree on at least the major components of the test takers ancestry beyond the continental level. Buyer beware – a robust genealogy (supported by multiple matches to 3rd to 6th cousins) is vastly more reliable than “ethnic – ancestry” testing available today – at least in relation to Europe.

In the experience of the author, those wishing to learn whether they have “minority ancestry” of, for example, Native American heritage (below about 2%) may get good validation from **23andMe**. Here 23andMe depict this ancestry in “chromosome paintings”. There are, however, many other useful tests that have been developed by “citizen scientists” and which can be accessed via **Gedmatch** or **yourDNAportal**. The output often varies significantly from test to test, although some appear to provide estimates in the below 2% range which are close to the expected values based on a solid genealogy. There are relevant studies of these findings in studies found in the DNA section of the author’s website.

Gedmatch offers the option to parse results into maternal and paternal components if an individual can submit the genome of one of their parents. An example is where one parent (e.g., father) is 100% English and the other (e.g., mother) of largely European but mixed - Colonial ancestry. Using a test which has a large well – selected palate of reference samples, then the results of a test using only the mother’s half of the genome should be the one which has evidence of any noteworthy “minority ancestry” (e.g., Native American / East Asian since it is often difficult to differentiate between the two; and African). The father’s results “should” be very close to 100% European. Furthermore, the author has taken tests used in academic settings, but not employed by commercial test companies. Again, the results of some of this testing is available in other articles in the DNA section of the author’s website.

Dr. David K. Faux

14 January 2023