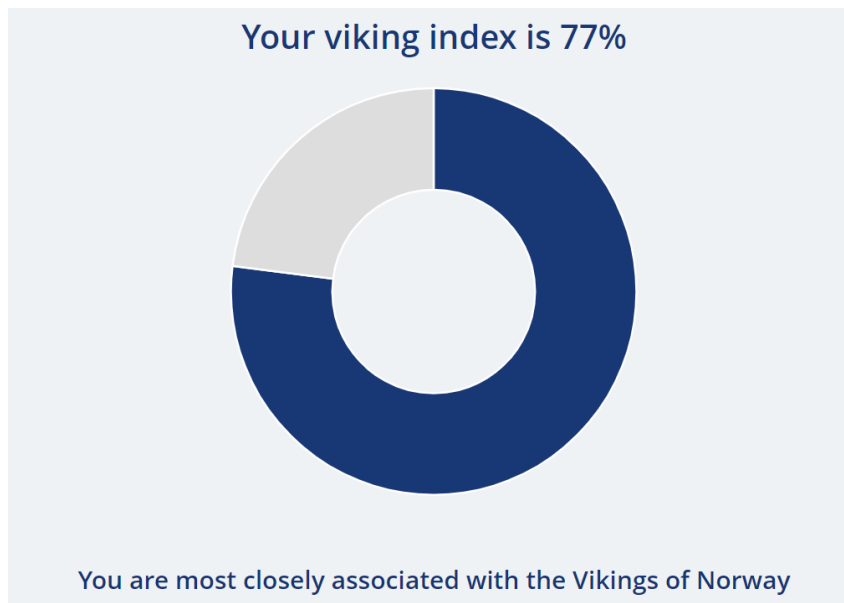


# VIKING AUTOSOMAL HERITAGE FOR DKF BASED ON THE ANALYSIS OF PUBLISHED ANCIENT DNA STUDIES BY COMMERCIAL COMPANIES

The primary source for the percentage and other estimates pertaining to Viking ancestry comes from the following study: Margaryan et al., “*Population Genomics of the Viking World*”, Nature, 585, 2020, 390-396 (see [here](#)). The algorithm used by the various commercial companies is unknown, and the results cannot be taken at face value. Furthermore, the approach used by each of these companies is quite different, from providing an “index” based on the other customers who have submitted their DNA for analysis; to a comparison of a customer’s data to individual ancient DNA samples to find the most similar Viking sample; to offering percentages of DNA from Viking (e.g., Jutland, Denmark) and non – Viking (e.g., Gauls from Burgundy, France) sources.

## 1) Living DNA:

The results of their testing are:



The interpretation is as follows:

### **“Viking Index**

*The Viking index represents the amount of DNA that you share with ancient Vikings. First, the genetic similarities between your DNA and the DNA obtained from ancient viking and non-viking samples are computed. This allows us to estimate how much DNA you share with each group. In order to then interpret and contextualise this calculation we compare your value to that of all other Living DNA users. This yields your Viking Index score. The Viking Index score allows you to see where your result falls in comparison to the whole range of Viking Indexes across the Living*

*DNA user base. For example, if your Viking Index is 80%, this means that your DNA is more similar to Viking DNA than 80% of all Living DNA customers.*

### ***The Viking Population Match***

*The Viking Population match indicates which Viking population your DNA is most similar to. We have identified 4 distinct Viking populations from our analysis of ancient DNA. These are Norwegian Vikings, Swedish and Danish Vikings, British and North Atlantic Vikings, and Eastern European Vikings. We compare your DNA data to genetic models describing the genetic similarity and variability of these populations in order to identify your closest match.”*

So, in a nutshell, their analysis shows that my DNA:

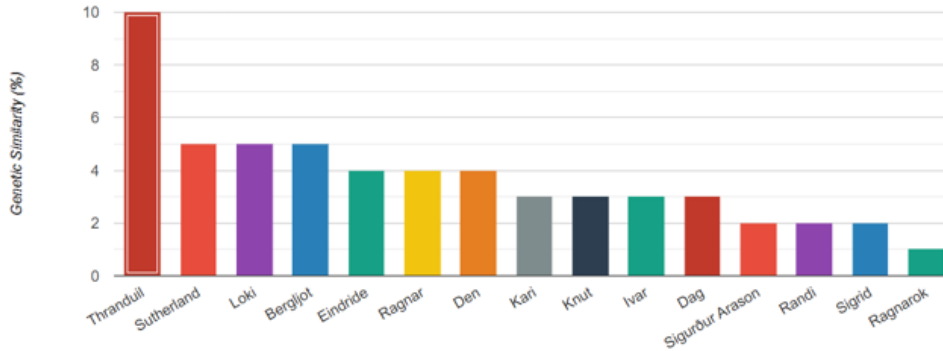
- a) Is more similar to Viking DNA than 77% of the customers of Living DNA.
- b) Is most similar to that of Norwegian Vikings.

### 2) **Ancient DNA Origins:**

The testing offered by this company only explores a customer’s similarity to a very small number of ancient DNA samples from Medieval Iceland. The data is questionable on the basis of very small (15) and highly geographically specific (to Iceland) samples. The results are seen below.

## 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 Viðar 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.



These data are virtually meaningless except to people who have Icelandic roots.

### 3) yourDNAportal:

What follows are the test results from DNA Portal which purport to demonstrate the early ancestry of DKF. While the algorithm is unknown, the author is well familiar with the excellent ancient DNA studies which DNA Portal uses to make their estimates.

## Foundations of the Modern World, 500 BC - 1000 AD

This test is focused on the Late Antiquity/Early Medieval period. All the samples are drawn from official published sources and are the result of a careful selection process that satisfies very strict parameters. Many samples are exclusive, resulting from average values within a homogeneous genetic/cultural cluster.

### Main Test Run

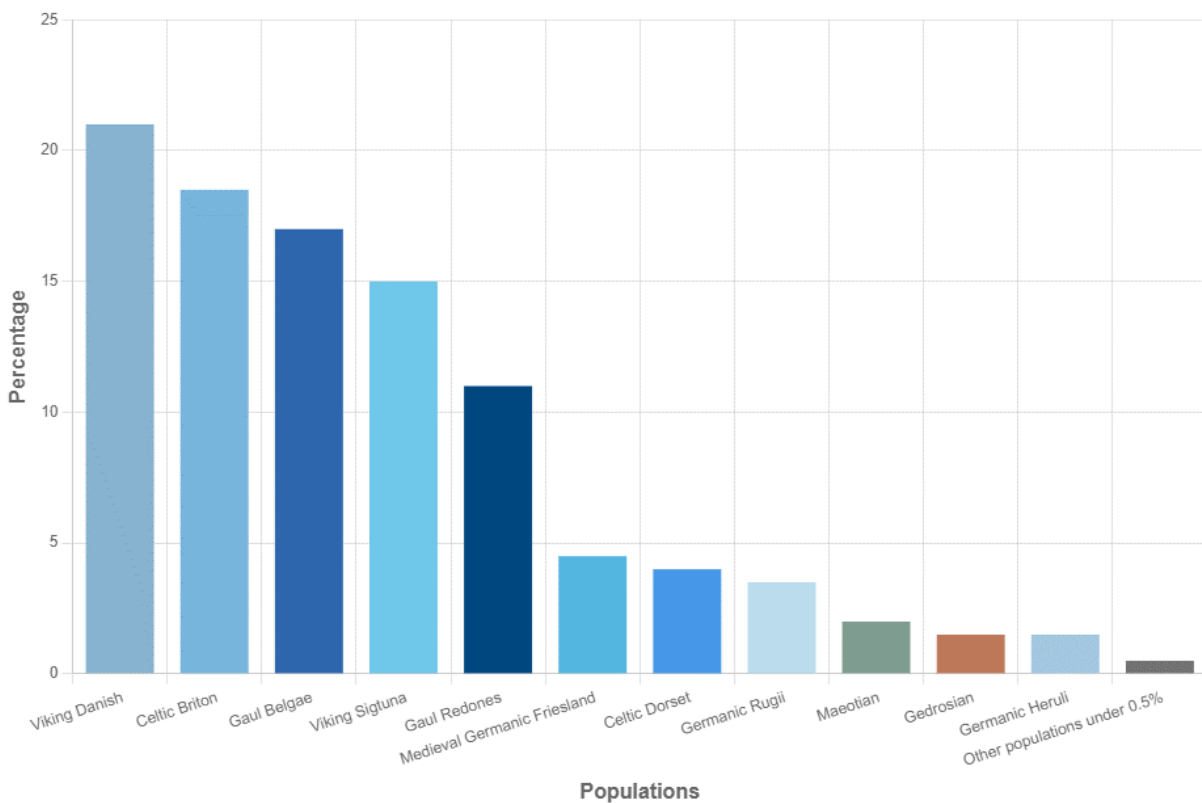
This mathematical setting divides your genome into 200 fragments, with each fragment representing 0.5% of your genome. This enables the capture and identification of even the most distant origins.



## Population

## Value

● Viking Danish	21%
● Celtic Briton	18.5%
● Gaul Belgae	17%
● Viking Sigtuna	15%
● Gaul Redones	11%
● Medieval Germanic Friesland	4.5%
● Celtic Dorset	4%
● Germanic Rugii	3.5%
● Maeotian	2%
● Gedrosian	1.5%
● Germanic Heruli	1.5%
● Vedic India	0.5%



## First Two Populations by Percentage – Description:

See below in Second Test Run – Same results except higher percentages of each.

### Second Test Run

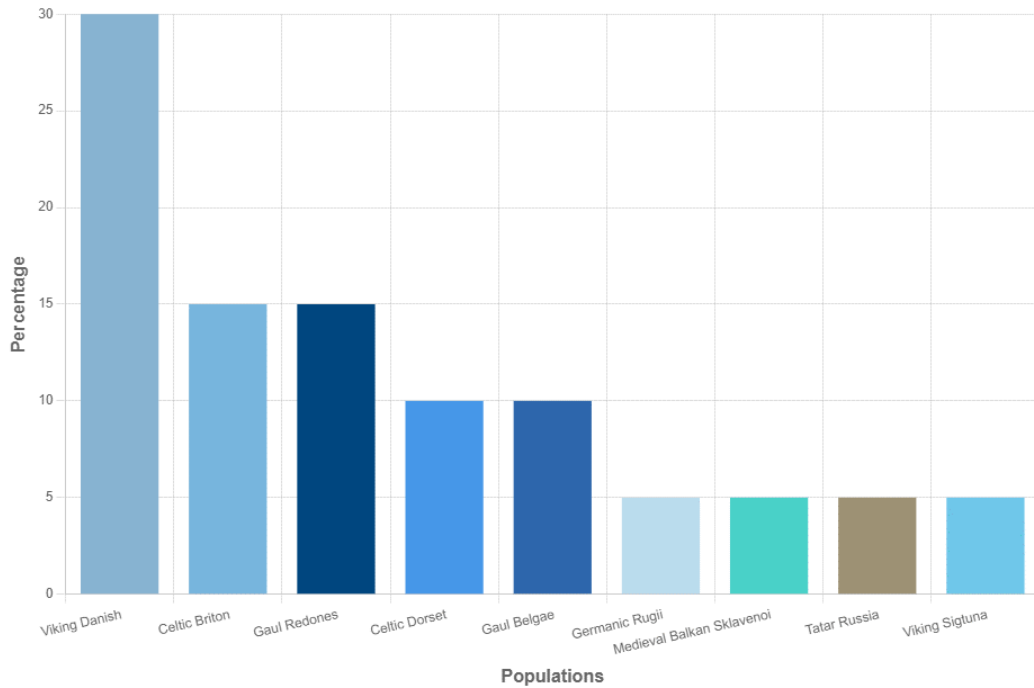
This mathematical setting divides your genome into 20 fragments, with each fragment representing 5% of your genome. By not focusing on the most distant ancestry, it offers an excellent and balanced estimate of ethnicity with a lower margin of error.



### Population

### Value

● Viking Danish	30%
● Celtic Briton	15%
● Gaul Redones	15%
● Celtic Dorset	10%
● Gaul Belgae	10%
● Germanic Rugii	5%
● Medieval Balkan Sklavenoi	5%
● Tatar Russia	5%
● Viking Sigtuna	5%



**First Two Populations by Percentage – Description:**

Populations

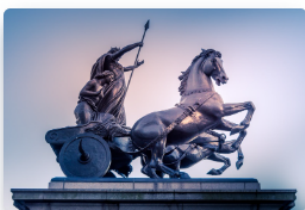


**Viking Danish : 30%**

The Iron Age is the last part of the ancient history, in North Jutland, it is estimated to have started in 500 B.C. and ended in 700 A.D. It was during this time, that Iron was becoming a valuable good, and they started to mine and melt it down. In the Iron Age far travelling and trading of goods already existed, this is evident from 2,500-year-old objects with Celtic motives found in North Jutland. Around the year 1-400 A.D., the origin of the goods changed, in this time lots of goods, jewellery and more were traded with the Roman Empire. Later on, another change is evident as the style of the goods changed to become more similar to that of the Germanic. The Viking Age marked the end of the Iron Age. In many movies and stories the Viking Age sounds like a violent period, but the vikings did so much more than just plundering and conquering. The vikings were explorers, they travelled far and wide across the seas and through the rivers, they traded with many nations and colonized newly discovered areas. There is still so much to learn about the vikings in North Jutland.

References:

– <https://www.nature.com/articles/s41586-020-2688-8>



**Celtic Briton : 15%**

The Brittons (Old English Bryttas, Welsh: Brythoniaid, Cornish: Brythonion, Breton: brezhoned) also known as Celtic Britons or Ancient Britons, were indigenous Celtic people who inhabited Great Britain from at least the British Iron Age into the Middle Ages, at which point their culture and language diverged into the modern Welsh, Cornish and Bretons (among others). They spoke the Common Brittonic language, the ancestor to the modern Brittonic languages.

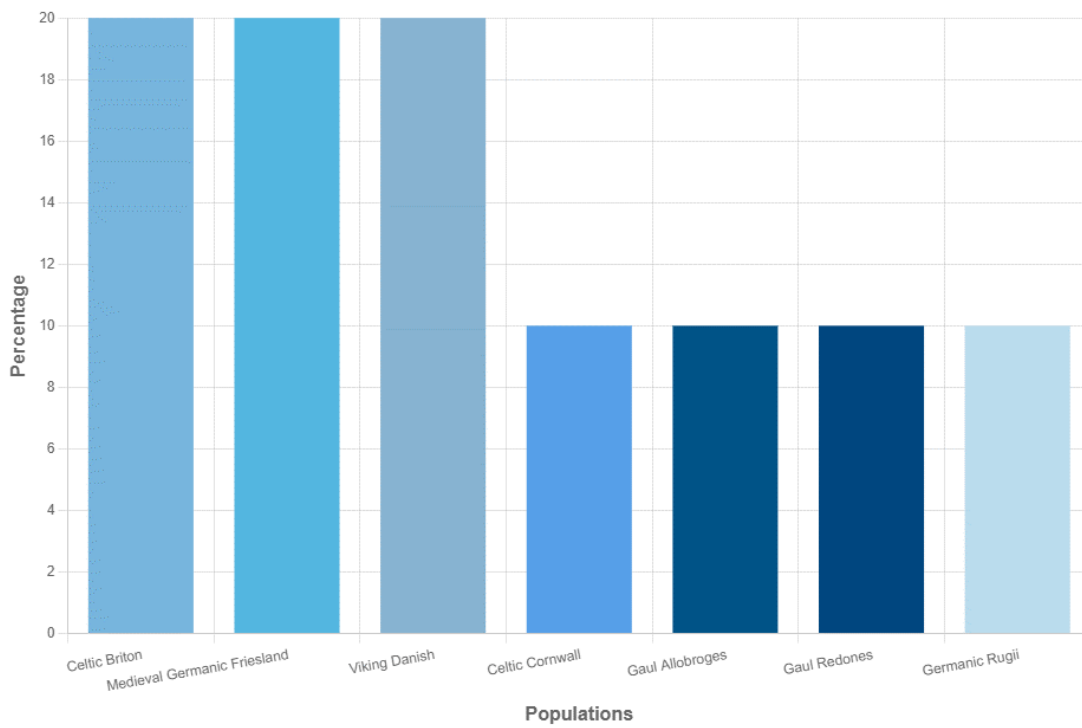
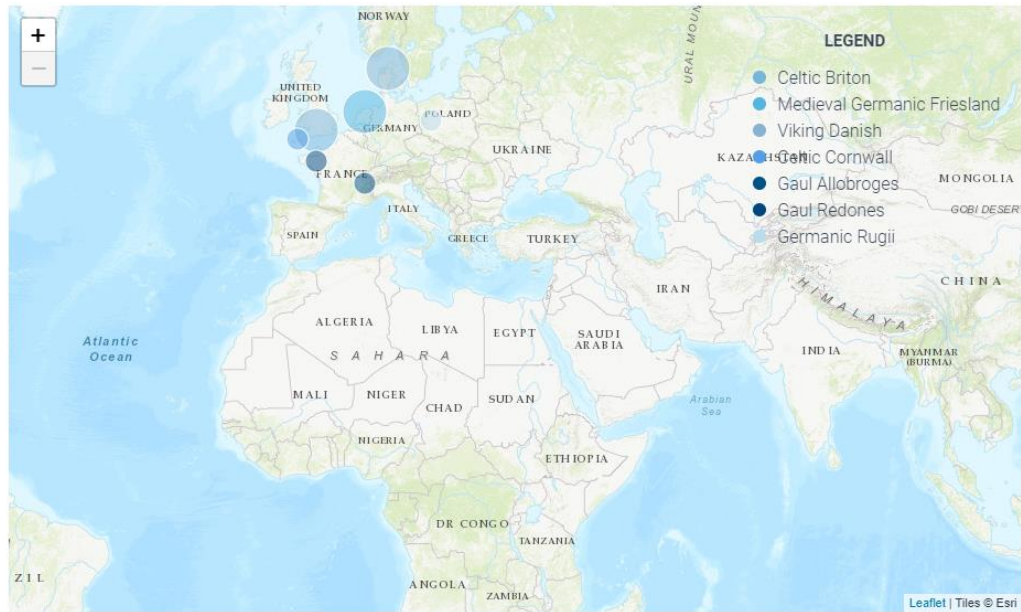
References:

– <https://www.nature.com/articles/ncomms10326>



### Third Test Run

This mathematical setting divides your genome into 10 fragments, with each fragment representing 10% of your genome. This setting is very useful in providing a reliably accurate estimate of ethnicity, with a lower margin of error.





## First Two Populations by Percentage - Descriptions:

### Populations



#### Celtic Briton : 20%

The Brittons (Old English Bryttas, Welsh: Brythoniaid, Cornish: Brythonion, Breton: brezhoned) also known as Celtic Britons or Ancient Britons, were indigenous Celtic people who inhabited Great Britain from at least the British Iron Age into the Middle Ages, at which point their culture and language diverged into the modern Welsh, Cornish and Bretons (among others). They spoke the Common Brittonic language, the ancestor to the modern Brittonic languages.

References:

– <https://www.nature.com/articles/ncomms10326>



#### Medieval Germanic Friesland : 20%

The Frisii began settling in Frisia around 500 BC. According to Pliny the Younger, in Roman times, the Frisians (or, as it may be, their close neighbours, the Chauci) lived on terps, man-made hills. According to other sources, the Frisians lived along a broader expanse of the North Sea (or 'Frisian Sea') coast. Frisia at this time comprised the present-day provinces of Friesland and North Holland. Frisians appear to have been among the Germanic groups who invaded Britain during the so-called Migration period (Völkerwanderung), as Angles and Saxons travelled from their home base through Frisian territory in what is now Northern Germany and Central Netherlands.

### Fourth Test Run

This mathematical setting divides your genome into 2 parts, with each fragment representing half of your genome. This setting is very useful for both highly mixed and more homogenous ethnicities. This approach gives a very reliable, albeit generalised, interpretation of one's ethnicity.

### Populations

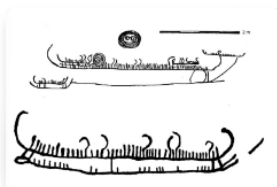


#### Gaul Redones : 50%

The Redones (Gaulish: Rēdones; also Riedones or Rhedones) were a Gallic tribe dwelling around their capital Condate (modern Rennes) during the Iron age and the Roman period. Caesar mentions them among the civitates maritimae or Armoricae.

References:

– <https://www.biorxiv.org/content/10.1101/712497v2.full>



#### Viking Geats : 50%

The Geats (/ˈɡiːts, ˈɡeɪts, ˈjæts/ GHEETS, GAY-ets, YATS; Old English: gēatas [ˈjæotas]; Old Norse: gautar [ˈgaut̪r]; Swedish: götar [ˈjøːtar]), sometimes called Goths, were a North Germanic tribe who inhabited Götaland ('and of the Geats') in modern southern Sweden during the Middle Ages. They are one of the progenitor groups of modern Swedes, along with Swedes and Gutes. The name of the Geats also lives on in the Swedish provinces of Västergötland and Östergötland, the Western and Eastern lands of the Geats, and (though not with the English exonym Geats) in many other toponyms.

References:

– <https://www.nature.com/articles/s41586-020-2688-8>

#### 4) **23andMe**

Recently this company added a new feature entitled “**Historical Matches**”. It is better designated as, “**Explore Ancient and Historical Groups**”. The data comes from recent studies in Ancient DNA from across the world (10 geographical categories). Keeping in mind that these samples comes from the Bronze, Iron and Medieval Ages, it would be rare to have any chromosomal segment matches beyond a very limited size (expressed in cM). Generally a match appears to be flagged at 4 cM plus.

The results include one “Iron Age Tagar” (Scythian) in Russia; and “Late Bronze Age Central Steepe” from Kazakstan. All the rest (12) are from the “Viking Age” – 4 Sweden, 4 Norway, 1 Iceland, 2 Denmark and 2 United Kingdom.

The most significant find is individual VK358 (from the Margaryan et al., 2020 study). This female was buried in a stone lined cyst at Gardslosa, Oland, Sweden. This location is on the second largest island in the country, located off the southeast coast of the mainland. The amount of shared DNA with this individual is 0.14% involving two segments and 10.01 cM. Considering that I share at that level with many 4<sup>th</sup> cousins, the find is quite astounding. 23andMe adds that 6.03% of their customers share DNA with VK358, which is more DNA sharing than 99.60% of those who shared some DNA with this individual. Based on archaeological work, “*many of the island’s inhabitants were non-local, as the strontium and oxygen isotopes sampled from their remains did not match local signatures, indicating that they spent their early lives elsewhere*”. However an examination of the raw data in the Margaryan et al. study shows that in terms of autosomal DNA, VK358 demonstrated 0% UK-Like, .001% Denmark-Like, 0.734% Sweden-Like, 0% Norway, .0111 Polish-Like, 0% Italy-Like, and 0.254% Finish-Like DNA. Considering the proximity of Oland to Finland, it appears that the 73% Swedish and 25% Finish strongly suggest that VK358 was a local.

## Viking Age Individual VK358



**Genetic Sex**  
Female

**Time Period**  
899 CE to 1168 CE

**Burial Location**  
Gärdslösa, Öland  
Sweden



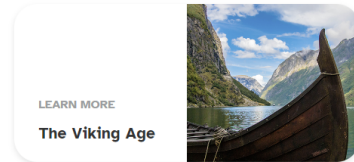
### About Viking Age Individual VK358

Viking Age Individual VK358's remains were excavated from a site in Gärdslösa parish on the island of Öland, in present-day Sweden. Öland is the second largest island in Sweden, and is located just off the southeastern coast of the Scandinavian Peninsula. As of 1972 the island has been connected to the mainland by a 3.5 mile long bridge. Archaeological investigations of late Iron Age populations in Öland suggest that many of the island's inhabitants were non-local, as the strontium and oxygen isotopes sampled from their remains did not match local signatures, indicating that they spent their early lives elsewhere.

Viking Age Individual VK358 was buried in a small stone coffin, known as a cist, which was excavated in 1941. Based on skeletal analysis alone archaeologists were able to confidently determine that VK358 was a young adult, however they were initially uncertain of VK358's sex, initially assigning a tentative sex of "male?" However, subsequent DNA analysis revealed that VK358 was genetically female, highlighting the uncertainty associated with sex assignment for ancient individuals, particularly based on skeletal analysis alone.

Isotopes sampled from Viking Age Individual VK358's remains indicated that she did not grow up in the local area.

[Read less ^](#)



## Your genetic relationship

### Predicted relationship

Very distantly related

### Shared DNA

0.14%

10.01 centiMorgans

2 segments

### See how you compare

**6.03%** of 23andMe customers share identical DNA with Viking Age Individual VK358.

You share more DNA with this individual than **99.60%** of 23andMe customers with matches to Viking Age Individual VK358.

### Conclusions:

The scientists who devised this test appear to have used many of the most up to date and respected published and peer reviewed **ancient DNA studies** in order to make their comparisons. For example, most of the "Viking" categories come from the Margaryan et al. (Nature, 2020) study entitled, "*Population Genomics of the Viking World*".

The above data comports well with the known ancestry of the author based on geographical and genealogical considerations. As to the “Living DNA” findings, the author’s maternal great great grandfather was born on the Island of Yell, Shetland Islands and the genealogy illustrates that he was 75% Norn – speaking Norwegian Viking ancestry, likely from the 9<sup>th</sup> century. With respect to the yourDNAportal results, the majority of the author’s ancestors (over 50%) came from the Danelaw in England (East Anglia to Northumberland on the eastern coast of England) and so “Danish Vikings” as the major genomic category in the analyses is realistic. “Viking Sigtuna” relates to a Swedish population with links to Denmark and may be one component of this group. The 23andMe data further suggest that the author’s DNA has a significant component Scandinavian component.

The other categories would reflect the regional ancestry of the author in ancient times including the Iceni Tribe of Norfolk, and the Gauls who came to England during Iron Age times. Clearly “Celtic Briton” and “Celtic Dorset” might include modern Scottish or Irish heritage as well as reflecting ancient Brithonic links. It is more difficult to explain the link to the south – central region of Asia as found in the 23andMe data, however the author’s DNA (in some results) has a modern component from this area of the world.

It is surprising not to see “Anglo-Saxon” among the population categories used here since this was the focus of the 2022 ancient DNA study by Gretzinger et al. published in Nature – although the data may be used in subsequent updated analyses.

Dr. David K. Faux

8 January 2023; 11 May 2023; 19 March 2024