DNA Consultants
Home of the DNA Fingerprint Test

Jane Doe

Native American DNA Ancestry Report

Dxxxx- 870xxxx

A mitochondrial specimen was extracted, amplified by the PCR process and sequenced by DNA Diagnostics Center for markers or mutations in the control sections of the D loop know as Hypervariable Regions I and II, containing everal hundred base pairs of DNA. The differences from the reference series mutations are reported from the lab in the page at the end of this report (rCRS; Andrews; Anderson). A mutation is any inheritable change in a nucleotide in the DNA sequence of genes. Although mutations in the D loop of mitochondrial DNA do not change the individual or have any effect, they have been found useful in tracing female, or mitochondrial, lineages (Richards and Macaulay).

According to Richards et al. (2000), the subject's mutations belong to haplogroup K with the following matches.

Northeast Europe 10	Scandinavia 3	Northwest Europe 14
West Mediterranean 6	North Central Europe 10	Iraq 2
Turkey 3	Alpine 3	Palestine 2
Kurd 3	Armenia 7	Central Mediterranean 9
East Mediterranean 2	Southeast Europe 6	Druze 5
Basque 2	North Caucasus 2	Syrian 2

The haplotype was further defined in Phlyotree.org as K1c. In the Mitochondrial DNA Concordance there were the following exact matches on both sectors (where red indicates a matching, blue an added, and **black** a missing mutation). HVR1 mutations between 16181 and 16189 are generally given little significance as they are faster-mutating and less reliable:

16182[C] 16183[C]16189[C] 16224[C] 16311[C]	•Twgdam; 8; Cauc. Amer.(1)
16182[C] 16183[C]16189[C] 16224[C] 16293[G] 16311[C]	•Miller,96; NOR.0014; Norwegian(1)
16224[C] 16311[C]	•Twgdam; 46(183); Afro-Carib.(1) •Twgdam; 106(TML); Cauc. Amer.(1) •Twgdam; 109(MAM); Cauc. Amer.(1) •Twgdam; 219(95F-165); Cauc. Amer.(1) •Twgdam; 234(95F-320); Cauc. Amer.(1) •Twgdam; 235(95F-331); Cauc. Amer.(1) •Twgdam; 87(BAP614); Hisp. Amer.(1)

	•Richards,96; 55; [4:69]; Basque(1) •Richards,96; G-83; [4:69]; Basque(1) •Richards,96; 72; [4:69]; Bavarian(1) •Richards,96; 426; [4:69]; Cornish(1) •Richards,96; 17; [4:69]; Finnish(1) •Richards,96; 19; [4:69]; German (N.)(1) •Richards,96; 23; [4:69]; German (N.)(1) •Richards,96; 26; [4:69]; German (N.)(1) •Richards,96; 39; [4:69]; German (N.)(1) •Richards,96; 64; [4:69]; German (N.)(1) •Richards,96; 101; [4:69]; German (N.)(1) •Richards,96; 265; [4:69]; German (N.)(1) •Richards,96; 22; [4:69]; Portuguese(1) •Richards,96; 29; [4:69]; Portuguese(1) •Richards,96; 57; [4:69]; Welsh(1) •Richards,96; 154; [4:69]; Welsh(1) •Côrte-Real,96; 101; [4]; Basque(2) •Calafell,96; 5; Bulgar(1) •Calafell,96; 8; Bulgar(1) •Calafell,96; 47; Bulgar(1) •Piercy,93; RC1:48; Cauc. UK(1) •Mountain,95; c1; control(1) •Sajantila,95; F135; Finnish(1) •Miller,96; BLC.0078; Hebridean(1) •Handt,94; x; Ice Man(1) •Miller,96; NIR.0256; N. Irish(1) •Miller,96; NOR.0004; Norwegian(1) •Miller,96; NOR.0027; Norwegian(1) •Miller,96; OSR.0024; Orcadian(1) •Côrte-Real,96; 101; [4]; Portuguese(2) •DiRienzo,91; 35; Sardinian(1) •Pult,94; SW46; Swiss(1) •Francalacci,96; 33; [K]; Tuscan(1) •Sajantila,95; 40; Volga-Finnic(1)
73[G] 146[C] 152[C] 207[A] 263[G] 315.1[C]	•Twgdam; 34(157); Afro-Carib.(1) •Twgdam; 219(95F-165); Cauc. Amer.(1) •Piercy,93; RC1:70; Cauc. UK(1) •Vigilant,89; AA1; Afro-Carib.(1) •Vigilant,89; HDZ9; Hadza(1)

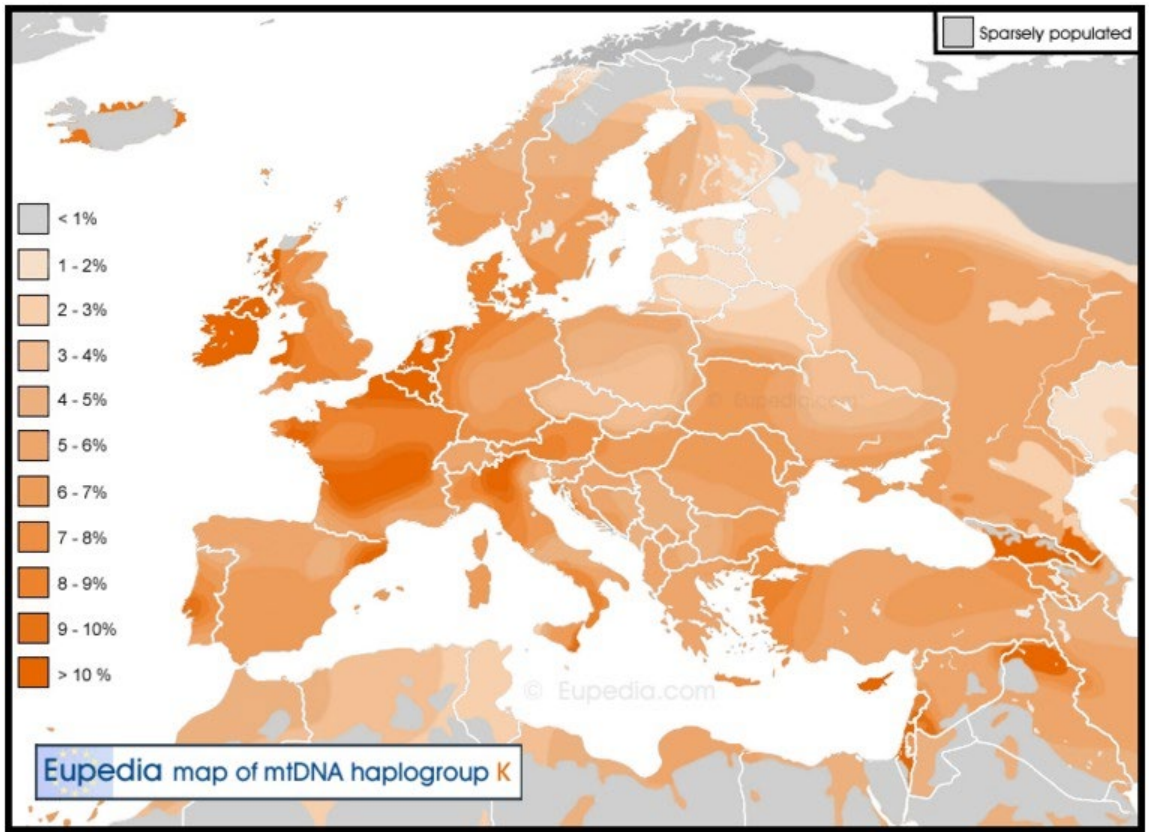
Analysis and Conclusion

On his mother's side, the subject belongs to Eurasian mitochondrial haplogroup K. The founder of lineage K lived in Europe about 12,000 years ago. Approximately 32% of the haplotypes of modern people with Ashkenazi Jewish ancestry are in haplogroup K (Thomas). In Europe it is particularly common around the Alps. Peaks have also been observed in Belgium (14%), Ireland (12%), the Netherlands (10%), Iceland (10%), Denmark (9%) and France (8.5%). In the Eastern Mediterranean and the Middle East, haplogroup K reaches high frequencies in Cyprus (20%), among the Druzes of Lebanon (13%), in Georgia (12%), as well as among the Avars (13%) and the Dargins (12%) of Daghestan. Analysis of the mtDNA of Ötzi the Iceman, the frozen mummy from 3300 BC found on the Austrian-

Italian border, has shown that Ötzi belongs to the K1 subcluster of the mitochondrial haplogroup K, but that it cannot be categorized into any of the three modern branches of that subcluster. K is responsible for about 6% of Europeans today.

The K1c, K2b and K2c subclades never been found among Neolithic farmers to date and do not appear to have Near Eastern roots. They are most common in eastern Europe today, where have originated during the Mesolithic, among Eastern Hunter-Gatherers (EHG), and would have spread with Y-haplogroup R1a during the Bronze Age to Germanic countries and Central Asia, where they are also found at relatively high frequencies. K1c was found in two Mesolithic Greek samples (c. 7550 BCE and 7000 BCE) from Thessaly tested by Hofmanová et al. (2015)

In his popular book The Seven Daughters of Eve, Brian Sykes named the originator of this mtDNA haplogroup Katrine. The clan of Katrine (Greek for pure) is a medium sized clan with 10% of Europeans among its membership. Katrine herself lived 15,000 years ago in the wooded plains of northeast Italy, now flooded by the Adriatic, and among the southern foothills of the Alps. Her descendants are still there in numbers but have also spread throughout central and northern Europe.



Associated Medical Conditions

Coskun et al. (2004) studied the mutations that suppress mitochondrial transcription and replication and reported that haplogroup K could be protective against Alzheimer's Disease (AD).

Hendrickson et al. (2008) studied the role played by mitochondrial function in AIDS progression in HIV-1 infected persons. They found that AIDS progression was slower for members of haplogroups H3, I, K, U, W and X. The follow up study found that haplogroup H was strongly associated with increased lipoatrophy following a antiretroviral therapy.

Haplogroup K is not one of the five classic Native American female lineages A, B, C, E, and X, although it has been identified in the Cherokee, where it is usually ascribed to admixture with Europeans (Schurr; data on file). The evidence from matches is ambiguous. Together with an oral tradition of the maternal line being Native American, however, the haplotype in the subject's case should probably be pronounced Native American.

Susan Levin
Associate Investigator
DNA Consultants
October 25, 2018

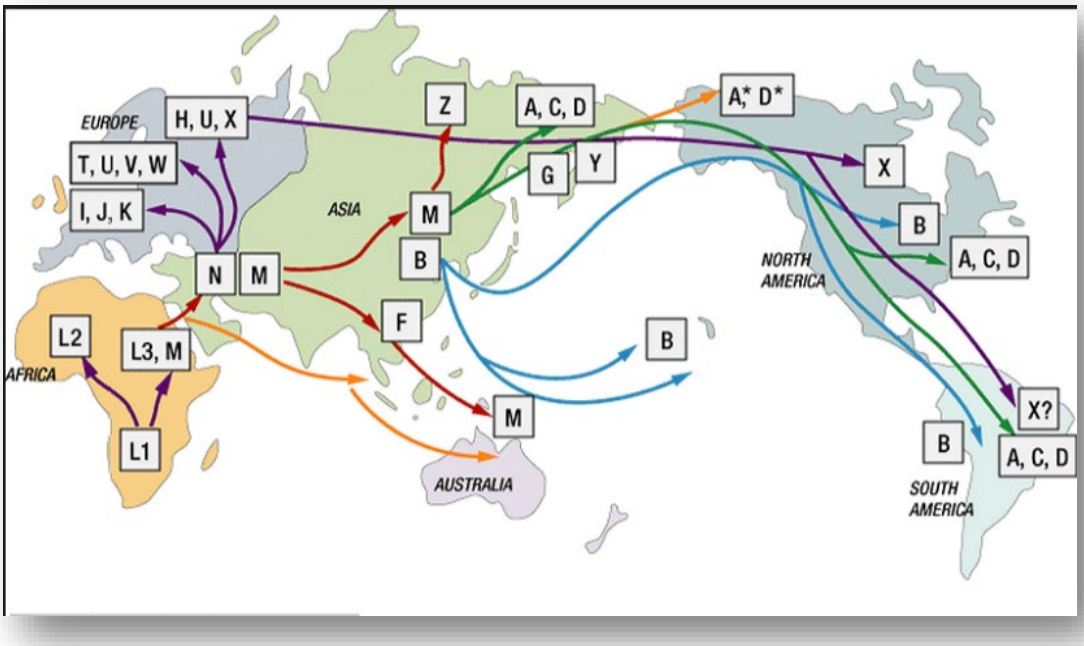
References and Suggestions for Further Reading

1. Achilli, A. et al. (2004) The Molecular Dissection of mtDNA Haplogroup H Confirms That the Franco-Cantabrian Glacial Refuge Was a Major Source for the European Gene Pool. *Am J Hum Genet.* 2004 Nov;75(5):910-8. Divides haplogroup H into 15 subgroups, called H1-H15. H1 and H3 are most common.
2. Anderson, S., Bankier, A. T., Barrell, B. G., de Bruijin, M. H. L., Coulson, A. R., Drouin, J., Eperson, I. C., Nierlich, D. P., Roe, B. A., Sanger, F., Schreier, P. H., Smith, A. J. H., Staden, R., and Young, I. G. "Sequence and organization of the human mitochondrial genomes." *Nature* (1981) 290:457-465.
3. Andrews R.M. *et al* (1999). "Reanalysis and revision of the Cambridge reference sequence for human mitochondrial DNA [letter]." *Nat Genet* 1999; 23:147. The Revised Cambridge Reference Series, cited as rCRS.

4. Richards, M. et al. (2000). "Tracing European founder lineages in the Near Eastern mtDNA pool." *Am. J. Hum. Genet*. 67: 1251-1276. Supplementary Data (by Vincent Macaulay): http://www.stats.gla.ac.uk/~vincent/founder2000/index.html.
5. Richards, M. and Macaulay, V. (2000) "The mitochondrial gene tree comes of age." *Am. J. Hum. Genet.* 68: 1315-20.
6. Sykes, Bryan (2001). *The Seven Daughters of Eve. The Science that Reveals Our Genetic Ancestry.* New York, Norton. Names the founders of Europe's major female haplogroups Helena, Jasmine, Katrine, Tara, Velda, Xenia, and Ursula.
7. Wells, Spencer (2006). *Deep Ancestry: Inside the Genographic Project.* Washington: National Geographic.

Understanding Your Female Lineage

Your haplogroup (H, J, K, L etc.) describes what broad family of female lineages you belong to—the "daughters of Eve." These lines are conventionally called Helena (H), Tara (T), Jasmine (J) and the like and have all been traced back about 20,000-50,000 years to different regions of the world like Western Europe, Northern Europe, the Middle East, Africa or the Americas. Geneticists believe all people alive today are descended from a woman who lived in East Africa about half a million years ago (mitochondrial Eve). A map of female haplogroup migrations clearly shows the human family expanded out of Africa.



A haplotype, as defined in your mitochondrial DNA lab report, is a specific lineage within that haplogroup. Your unique genetic profile reflects your direct line of maternal descent from a common female founder. This is defined by a set of mutations on the control section of your mitochondrial genome passed down only by females. All female-linked relatives of the mother have the same lineage (children, daughter's children, brothers and sisters, mother, maternal grandmother, maternal grandmother's mother etc.).

It is a mistake to say that mitochondrial DNA is the same as the X chromosome. While it is true that females have two X chromosomes and males an X and a Y, mitochondrial DNA is not located on any chromosome but is extra-nuclear material with its own genome.

To categorize your lineage, and identify others who belong to it, your mitochondrial mutations are compared to the Cambridge Reference Sequence. Mutations consist of changes to the expected base in the sequence of your DNA at a nucleotide position—the insertion, duplication or omission of A, C, T or G, the chemical building blocks of a genome. A usually mutates to C, T to G, and vice versa. Mutations are reported from around the world in the Cambridge Mitochondrial DNA Concordance and its successor databases.

How do mutations occur? Are they harmful?

Mutations are changes in the copies of DNA passed from a parent to offspring. They crop up in the DNA record in a random way according to their "molecular clock." In other words, they are not caused by anything. Sometimes the DNA just changes, and this affects a certain position on the long strands of it that are in every cell of your body. In almost all cases, these changes do not do anything. Only in the case of genetic disease do the mutations have any effect on us. Even though they do not do anything, though, they continue to be passed down in exact copies from parent to offspring. So they are useful in identifying individuals who come from the same ancestor. All these descendants are in the same lineage. Once a mutation occurs it stamps that line as unique and distinctive forever. Descendants are said to be "downstream" from that change.

You may notice some matches list a different haplogroup from that assigned to you. *Concentrate on those users that match your exact mutations across the board.* No matter what haplogroup they may report (many haplogroup assignments have been predicted rather than tested) they nevertheless belong to your specific matriline. You share the same ancient or recent female ancestor. Depending on your family history, such matches may be genealogically as well as genetically related to you.

Remember the "distaff side" is not remembered or recorded as scrupulously as the male. The names of female ancestors in family trees are often forgotten or even purposely buried, especially if they were of diverse background, say American Indian, Jewish or a person of color.

The female stories in our past are often at odds with the received, standard version you read about in the history books! The exploration of your mitochondrial lineage can be a

deeply rewarding experience even if you do not turn up a connection with royalty, famous personages or a prestigious surname.

Discussion boards and projects exist for nearly all mitochondrial haplotypes and their subdivisions (H1, H2 etc.). To join one, see the list at the International Society of Genetic Genealogy (http://isogg.org/wiki/MtDNA_haplogroup_projects).

Suggested Reading

1. Eupedia, "Distribution of European Mitochondrial DNA Haplogroups" (major guide to European types), Europe Forum (and other free forums).
2. Cavalli-Sforza, Luigi Luca and Francesco Cavalli-Sforza (1995). *The Great Human Diasporas* (New York: Basic). Wonderful, readable classic on human genetics and prehistory by father and son.
3. Hirschman, Elizabeth C. and Donald N. Yates (2004). "DNA Haplotyping and Diversity: An Anthropogenealogical Method for Researching Lineages and Family Ethnicity." Paper published in the Proceedings of the Fourth International Conference on Diversity in Organisations, Communities and Nations, Los Angeles, Calif., July 6-9, 2004. *International Journal of the Humanities* 2:2043-55.
4. Manco, Jean (2014). *Ancestral Journeys. The Peopling of Europe from the First Venturers to the Vikings.* London: Thames & Hudson.
5. Oppenheimer, Stephen (2006). The Origins of the British. A Genetic Detective Story. New York: Carroll & Graf. ------(2005). *The Real Eve.* New York: Carroll & Graf. ------ (1999).
6. Richards, M. et al. (2000). Tracing European founder lineages in the Near Eastern mtDNA pool. *Am. J. Hum. Genet*. 67: 1251-1276. Supplementary Data (by Vincent Macaulay): http://www.stats.gla.ac.uk/~vincent/founder2000/index.html.
7. Salas, Antonio et al. (2005). "Charting the Ancestry of African Americans." *American Journal of Human Genetics* 77/4:676-80.
8. Schurr, Theodore G. (2000). Mitochondrial DNA and the Peopling of the New World. *American Scientist* 88/3:246-53.
9. Thomas, M.G. et al (2002). "Founding Mothers of Jewish Communities: Geographically Separated Jewish Groups Were Independently Founded by Very Few Female Ancestors." *Am J. Hum. Genet*. 70:1411-1420.
10. Van Oven, M. and M. Kayser (2009). "Updated Comprehensive Phylogenetic Tree of Global Human Mitochondrial DNA Variation." *Human Mutation* 30(2) :E386-E394. http://www.phylotree.org. doi:10.1002/humu.20921.
11. Wells, Spencer (2006). *Deep Ancestry: Inside the Genographic Project.* Washington: National Geographic.
12. Yates, Donald N. and Teresa A. (2014). *Cherokee DNA Studies: Real People Who Proved the Geneticists Wrong.* Phoenix: Panther's Lodge.

For help in evaluating your matches, contact us at dpy@dnaconsultants.com or call DNA Consultants at 888-806-2588 Monday through Friday 10 a.m. to 6 p.m. Mountain Time. We pride ourselves on customized service and will be glad to walk you through your report and answer all your questions personally.

DNA Diagnostics Center

DNA Test Report

For Personal Knowledge Only

C8350

Case	Doe, Jane
Sample Number	8601696-50
Date Collected	
Collected by	

Reference	Nucleotide	Sample Nucleotide	Reference	Nucleotide	Sample Nucleotide
16,182	A	C	146	T	C
16,183	A	C	152	T	C
16,189	T	C	207	G	A
16,224	T	C	263	A	G
16,311	T	C	315	C	CC
73	A	G			

RN: 9345949

Note: Since the samples were not collected under a strict chain of custody by a third neutral party and the Laboratory cannot verify the origin of the samples, this test result may not be defensible in a court of law for the establishment of paternity and other legally related issues. The tested parties' names that may appear on this report have been provided by the client and cannot be verified. The laboratory assumes no responsibility for incorrect or misspelled patient information.

Based on the samples received from the tested parties whose identities cannot be independently verified, I, the undersigned Laboratory Director, declare the genetic data is correct as reported on 10/17/2018.

Debra L. Davis, Ph.D.

End of Report

DNA

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Home of the DNA Fingerprint Test

THIS DOCUMENT CERTIFIES THAT

Jane Doe

ORDERED A NATIVE AMERICAN ANCESTRY REPORT

INDICATING THE FOLLOWING ANCESTRAL LINE

NATIVE AMERICAN MITOCHONDRIAL HAPLOGROUP K1c

Donald N. Yates

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100% DNA Consultants QUALITY SEAL

October 25, 2018