

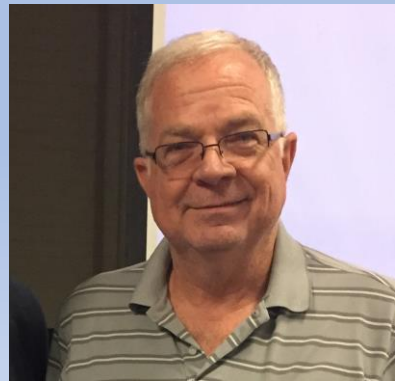
Don't Forget mtDNA

FamilyTreeAZ.com

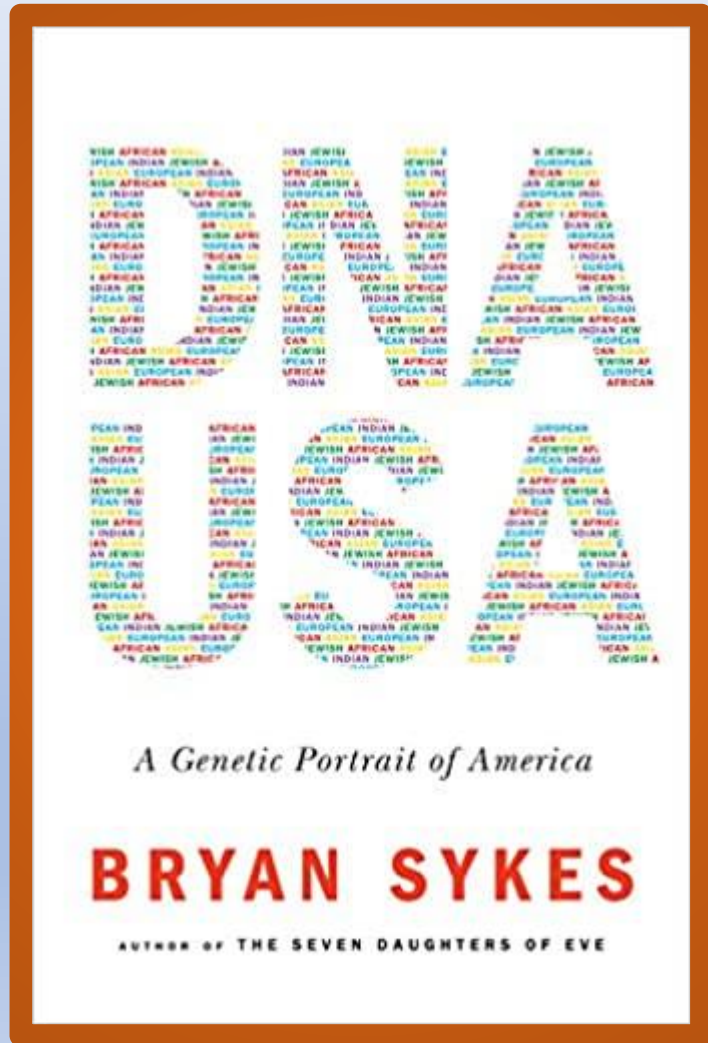


Ken Waters

Jan 7, 2021



Two Inspirations

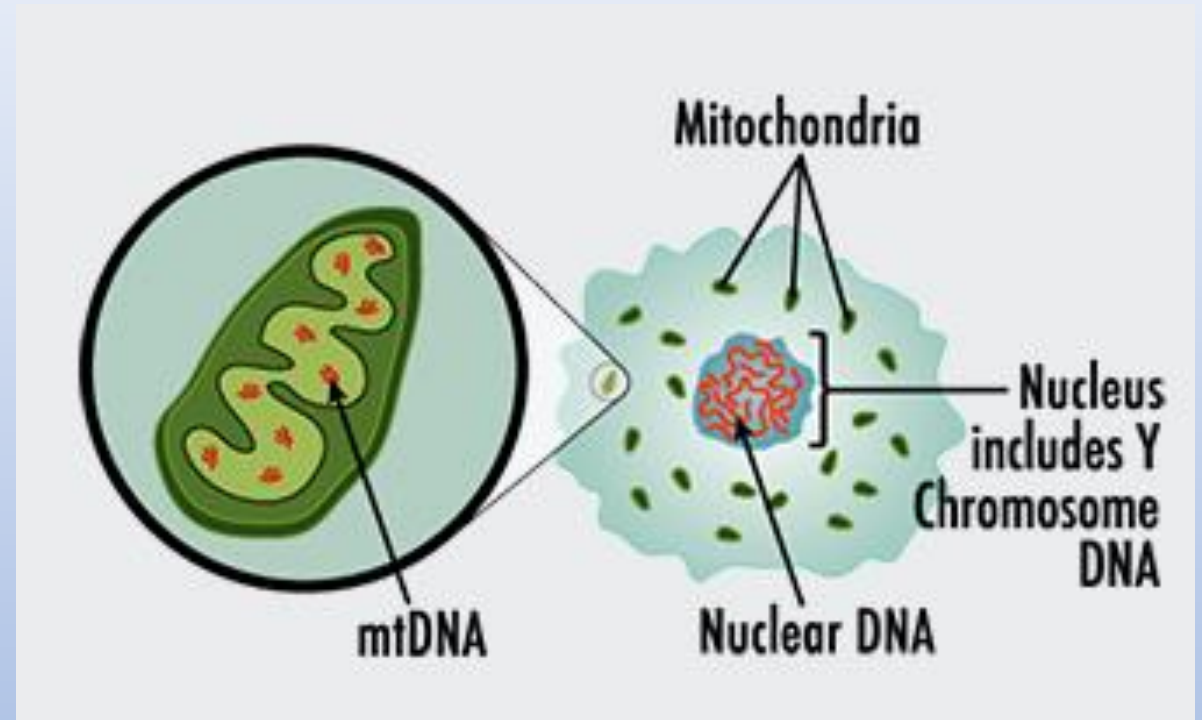


My Matrilinial Line – first 4 generations



What is mtDNA?

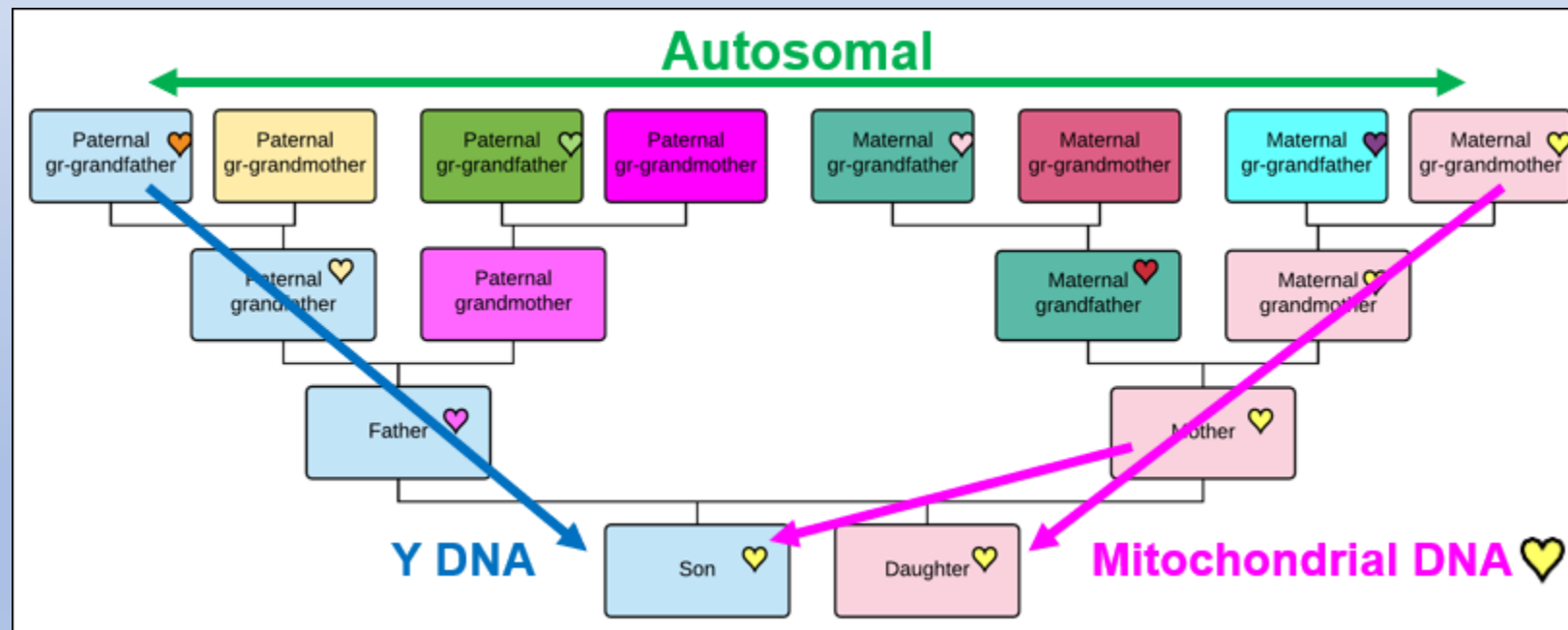
- mtDNA = Mitochondrial DNA
- Part of every cell in our body but is DNA that is NOT part of the nucleus (unlike autosomal and Y-DNA)
- Mutates about every 2,500 years so it is retained through generations



Source: <https://projects.nfstc.org/fse/01/01-08.html>

What is Different about mtDNA for Genealogy?

- Matrilineal inheritance – passed only through females
- Passed for many generations over thousands of years



Courtesy: Roberta Estes at <https://dna-explained.com/wp-content/uploads/2021/01/Y-mtdna-autosomal-pedigree.png>

Who Should Take a mtDNA Test?

- Anyone (male or female) interested in solving a specific matrilineal line
- To complement other DNA tests that might have been done like autosomal and Y-DNA
- Anyone just curious to see what happens

Please be aware --- this is very different from the autosomal tests that many of us have taken

Similar to a Y-DNA test you may receive a limited number of matches, unlike the autosomal test

However, you might have matches with common ancestors many generations back

Some people report disappointment with their results, so Your Mileage May Vary!

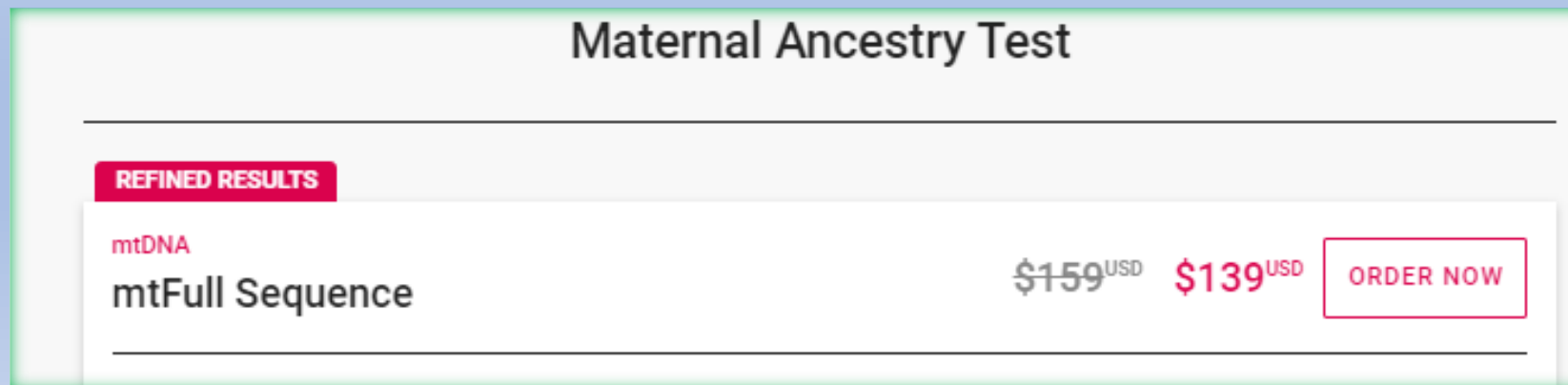
How to Test for mtDNA

- Only 3 of the 5 testing companies currently test for mtDNA
 - Family Tree DNA
 - Living DNA (haplogroup information only)
 - 23andMe (haplogroup only)

- **Only Family Tree DNA has matching**

mtDNA Testing on Family Tree DNA

- Was on sale over the holidays for \$139 – Normal price is \$159
- Recommend only purchasing the “mtFull” test to get all 16,569 markers
 - NOTE: They used to provide a more limited test but I don’t see it available anymore
- If you already have a test with FTDNA then you can reuse the sample with an additional fee



Maternal Ancestry Test

REFINED RESULTS

mtDNA
mtFull Sequence

~~\$159^{USD}~~ **\$139^{USD}** [ORDER NOW](#)

What About Haplogroups?

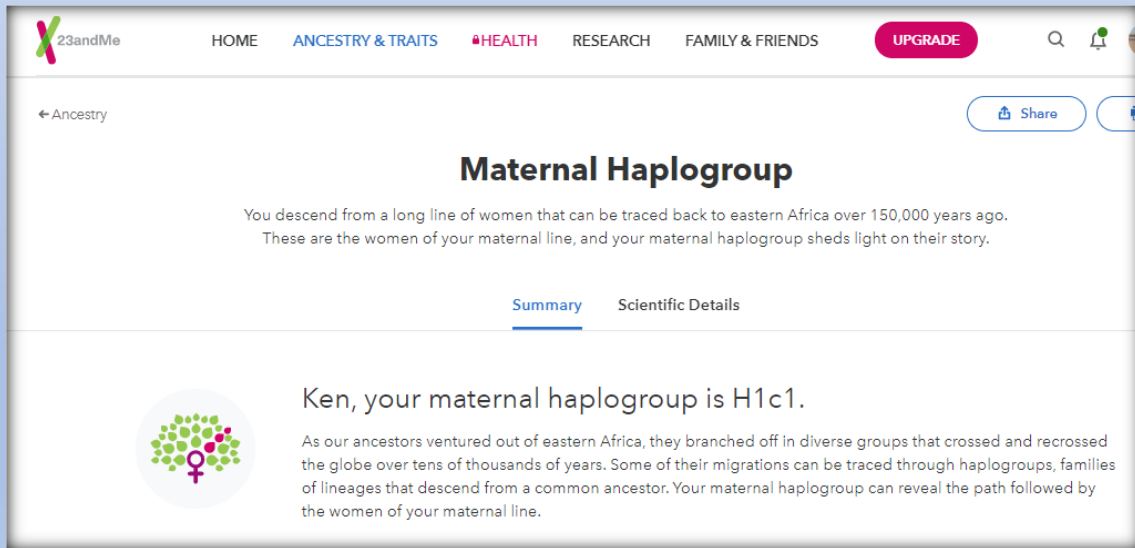
- We have paternal (Y-DNA) and maternal haplogroups
- Indicate deep ancestry (> 500 years to thousands of years)

Confirmed
mtDNA Haplogroup



H1c1

FTDNA



23andMe

HOME ANCESTRY & TRAITS HEALTH RESEARCH FAMILY & FRIENDS UPGRADE

← Ancestry Share

Maternal Haplogroup

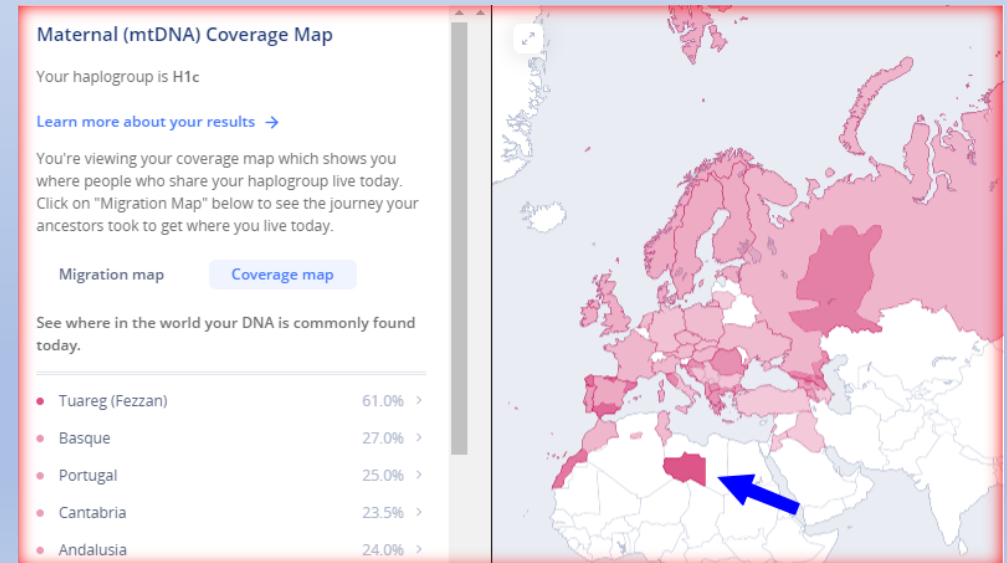
You descend from a long line of women that can be traced back to eastern Africa over 150,000 years ago. These are the women of your maternal line, and your maternal haplogroup sheds light on their story.

Summary Scientific Details

Ken, your maternal haplogroup is H1c1.

As our ancestors ventured out of eastern Africa, they branched off in diverse groups that crossed and recrossed the globe over tens of thousands of years. Some of their migrations can be traced through haplogroups, families of lineages that descend from a common ancestor. Your maternal haplogroup can reveal the path followed by the women of your maternal line.

23andMe



Maternal (mtDNA) Coverage Map

Your haplogroup is H1c

[Learn more about your results](#) →

You're viewing your coverage map which shows you where people who share your haplogroup live today. Click on "Migration Map" below to see the journey your ancestors took to get where you live today.

Migration map Coverage map

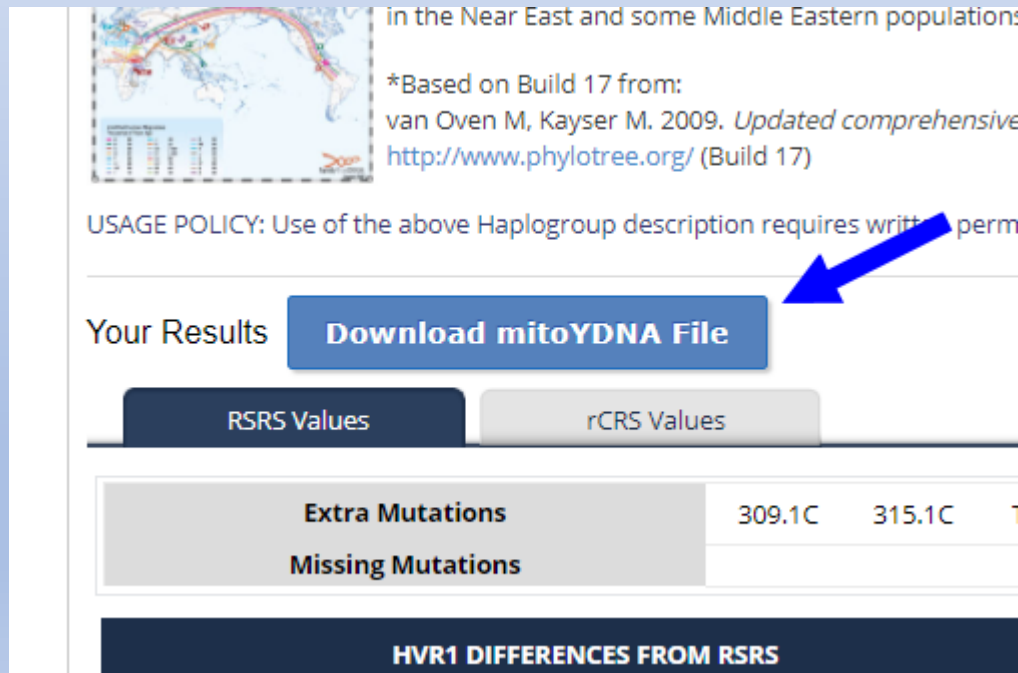
See where in the world your DNA is commonly found today.

• Tuareg (Fezzan)	61.0% >
• Basque	27.0% >
• Portugal	25.0% >
• Cantabria	23.5% >
• Andalusia	24.0% >

LivingDNA

Downloading Raw mtDNA Results from FTDNA

Results in a CSV file ~ 120 KB with 16,569 base markers (NOTE: *not* base pairs as this DNA only comes from mother)



in the Near East and some Middle Eastern populations:
*Based on Build 17 from:
van Oven M, Kayser M. 2009. *Updated comprehensive*
<http://www.phylotree.org/> (Build 17)

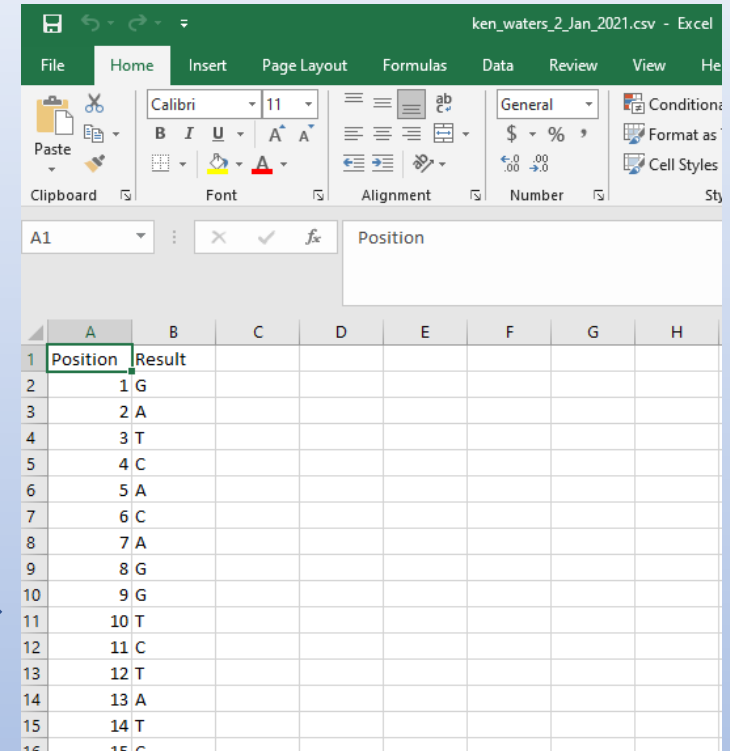
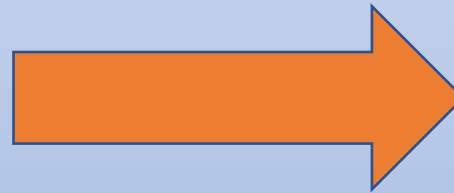
USAGE POLICY: Use of the above Haplogroup description requires written permission.

Your Results **Download mitoYDNA File**

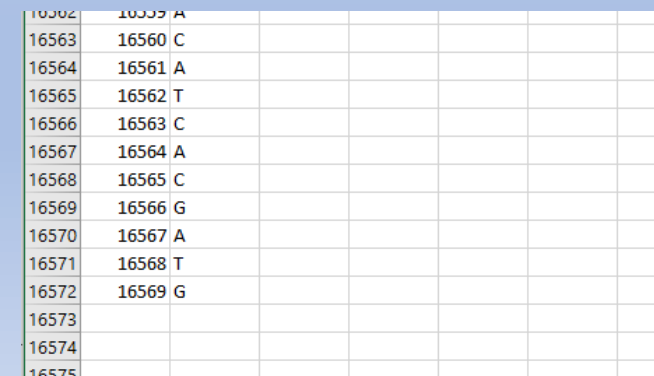
RSRS Values rCRS Values

Extra Mutations	309.1C	315.1C
Missing Mutations		

HVR1 DIFFERENCES FROM RSRS



Position	Result
1	G
2	A
3	T
4	C
5	A
6	C
7	A
8	G
9	G
10	T
11	T
12	C
13	T
14	A
15	T
16	C



16562	16565 A
16563	16560 C
16564	16561 A
16565	16562 T
16566	16563 C
16567	16564 A
16568	16565 C
16569	16566 G
16570	16567 A
16571	16568 T
16572	16569 G
16573	
16574	
16575	

Downloading FASTA Data

- Upload FASTA files to <https://dna.jameslick.com/mthap/FASTA.html>
- The FTDNA web code does not properly download the FASTA file but I was able to dig out the proper direct link and with that I could download the file

download the data, and you further
ation and linking it to your name,
nloading your raw data, you assume the

Download FASTA File: [FASTA](#)

```
B11096-FASTA.fasta - Notepad
File Edit Format View Help
>B11096,HVR2,CR,HVR1
GATCACAGGTCTATCACCCCTATTAACCACTCACGGGAGCTCTCCATGCATTTGGTATTTTCGTCTGGGGGGTATGCACGC
GATAGCATTGCGAGACGCTGGAGCCGGAGCACCCTATGTCGCGAGTATCTGTCTTTGATTCTGCCTCATCCTATTATTTA
TCGCACCTACGTTCAATATTACAGGCGAACATACTTACTAAAGTGTGTTAATTAATTAATGCTTGTAGGACATAATAATA
ACAATTGAATGTCTGCACAGCCGCTTTCCACACAGACATCATAACAAAAAATTTCCACCAAACCCCCCCTCCCCCGCC
TCTGGCCACAGCACTTAAACACATCTCTGCCAAACCCCAAAAAACAAAGAACCCTAACACCAGCCTAACCCAGATTTCAAAT
TTTATCTTTTGGCGGTATGCACTTTTAAACAGTCACCCCCCACTAACACATTATTTTCCCCTCCCCTCCCATACTACCA
ATCTCATCAATACAACCCCCGCCATCCTACCCAGCACACACACACCCGCTGCTAACCCCATACCCCGAACCAACCAAACC
CCAAAGACACCCCCACAGTTTATGTAGCTTACCTCCTCAAAGCAATACACTGAAAATGTTTAGACGGGCTCACATCACC
CCATAAACAAATAGGTTTGGTCTAGCCTTTCTATTAGCTCTTAGTAAGATTACACATGCAAGCATCCCCGTTCCAGTGA
```

FASTA Result

FASTA format

From Wikipedia, the free encyclopedia

In [bioinformatics](#) and [biochemistry](#), the **FASTA format** is a text-based [format](#) for representing either [nucleotide sequences](#) or amino acid (protein) sequences, in which nucleotides or [amino acids](#) are represented using single-letter codes. The format also allows for sequence names and comments to precede the sequences. The format originates from the [FASTA](#) software package, but has now become a near universal standard in the field of [bioinformatics](#).^[4]

The simplicity of FASTA format makes it easy to manipulate and parse sequences using text-processing tools and [scripting languages](#) like the [R programming language](#), [Python](#), [Ruby](#), and [Perl](#).

Contents [hide]

- 1 Original format & overview
- 2 Description line
 - 2.1 NCBI identifiers
- 3 Sequence representation
- 4 FASTA file
 - 4.1 Filename extension
 - 4.2 Compression

FASTA format

Filename extensions	.fasta, .fna, .ffn, .faa, .frn
Internet media type	text/x-fasta
Developed by	David J. Lipman William R. Pearson ^{[1][2]}
Initial release	1985
Type of format	Bioinformatics
Extended from	ASCII for FASTA
Extended to	FASTQ format ^[3]
Website	www.ncbi.nlm.nih.gov/BLAST/fasta.shtml

[\(BACK\)](#)

mthap version 0.19b (2015-05-11); haplogroup data version PhyloTree Build 17 (2016-02-18) +mods
raw data source B11096-FASTA.fasta (16KB)

FASTA format was uploaded. Based on the markers found, assuming the following regions were completely sequenced: HVR1 (16001~16569) HVR2 (1~574) CR (575~16000).

Found 16569 markers at 16569 positions covering 100.0% of mtDNA.

Markers found (shown as differences to rCRS):

HVR2: 263G (309.1C) (315.1C) 318C 477C
CR: 750G 1438G 3010A 4769G 8860G 9150G 13707A 15326G
HVR1: 16193T 16263C (16519C)

Best mtDNA Haplogroup Matches:

1) H1c1

Defining Markers for haplogroup H1c1:

HVR2: 263G 477C
CR: 750G 1438G 3010A 4769G 8860G 9150G 15326G
HVR1: 16263C

Marker path from rCRS to haplogroup H1c1 (plus extra markers):

H2a2a1(rCRS) ⇒ 263G ⇒ **H2a2a** ⇒ 8860G 15326G ⇒ **H2a2** ⇒ 750G ⇒ **H2a** ⇒ 4769G ⇒ **H2** ⇒ 1438G ⇒ **H** ⇒ 3010A ⇒ **H1** ⇒ 477C ⇒ **H1c** ⇒ 9150G 16263C ⇒ **H1c1** ⇒ (309.1C) (315.1C) 318C 13707A 16193T (16519C)

mitoYDNA

- <http://mitoydna.org>
- A free site to upload Y-DNA as well as mtDNA (the CSV file shown a few slides back)

News and Information

If you are shopping and want to help support free and accessible Y and mtDNA data? Check out our store, [mitoYDNA Gear](#) or use mitoYDNA AmazonSmile when making your day-to-day purchases, [mitoYDNA AmazonSmile campaign](#).

We have new Help Videos available on our [mitoYDNA YouTube Channel](#)



mitoYDNA

A Y and mitochondrial DNA Database - Crowdsourced, Free and Accessible

Get the [mitoYDNA Chrome Extension](#) required for downloading your mtDNA file for uploading to mitoYDNA.

Donate



Want to join the discussion? Join us on [Facebook mitoYDNA User Group](#)
[Like](#) [Share](#) 915 people like this. Be the first of your friends.
[Twitter @mitoYDNA](#) [Tweet to @mitoYDNA](#)
[Read the mitoYDNA BLOG](#)

Create New Kit

mitoYDNA ID	First Name	Last Name	Biological Gender	EKA First Name	EKA Last Name	EKA Birth Place	Haplogroup	User Notes
T10183	Ken	Waters	Male	John	Waters	Ireland	M-269	Edit YDNA Delete
T14169	Ken	Waters	Male	Sophia	Armagh	Tewksbury, New Jersey	H1c1	Edit mtDNA Delete

My Match Results

- Closest matches at top, measured by “Genetic Distance”
- Useful:
 - Indicates if they have FF (autosomal test)
 - Tree indicator if exists
 - Earliest matrilineal person in tree

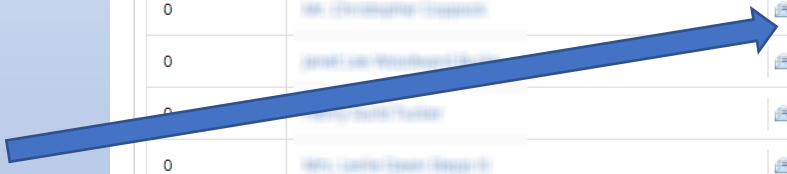
FILTER MATCHES

Show Matches For: Regions: Matches Per Page:

Last Name Starts With: (Optional) New Since:

HVR1, HVR2, CODING REGIONS - 402 MATCHES Page: 1 2 3 4 5 6 7 8 9 10 ...

Genetic Distance	Name	Known Ancestor	mtDNA Haplogroup	Match Date
0	[Name]	FMS	H1c1	11/1/2019
0	[Name]	FMS	H1c1	11/1/2019
0	[Name]	FMS FF	H1c1	11/1/2019
0	[Name]	FMS	H1c1	11/1/2019
0	[Name]	FMS	H1c1	11/1/2019
0	[Name]	FMS FF Fischer	H1c1	11/1/2019
1	[Name]	Dirckje Hermansen, b 1623 and d. 1682	H1c1	11/1/2019
1	[Name]	Muriel Allaire, b. 194		
2	[Name]	Mary Drajski, abt 1862, (?Poland/Germany?)	H1c1	11/1/2019
2	[Name]	Maria Hornmar, abt 1820 - unknown	H1c1	11/1/2019
2	[Name]		H1c1	11/1/2019
2	[Name]	Trienke Frantzen b. 1720 Bennewohld d. 1797 Delve	H1c1	11/1/2019
3	[Name]		H1c1	12/30/2020
3	[Name]	Elizabeth Orr b. 1766 and d. 1803	H1c1	12/17/2020



Dirckje Hermansen, b 1623 and d. 1682




Found one mtDNA ↔ autosomal Match!

- Using my Mom's uploaded kit from Ancestry I found a 41 cM autosomal (FF) match who also matched my mtDNA matches at a Genetic Distance of 0; also matched me at 39 cMs




mtDNA

0		FMS		H1c1	11/1/2019
0		FMS FF		H1c1	11/1/2019
0		FMS FF	Fischer	H1c1	11/1/2019

Mom's
autosomal

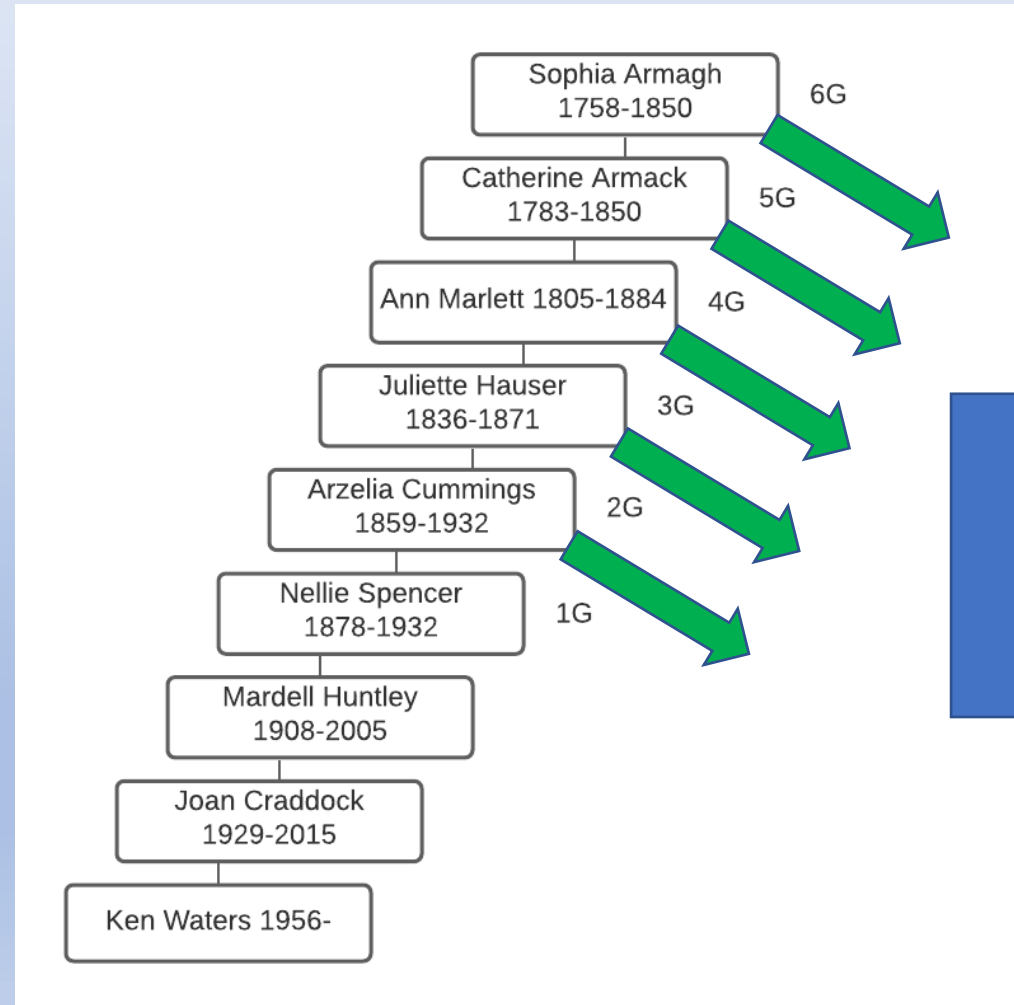
All (3)							
Paternal (0) Maternal (0) Both (0)							
Name	Match Date	Relationship Range	Shared cM	Longest Block	X-Match	Linked Relationship	Ancestral Surnames
	08/16/2019	5th Cousin - Remote Cousin	41	9	X-Match		

Ken's
autosomal

All (5)							
Paternal (0) Maternal (2) Both (0)							
Name	Match Date	Relationship Range	Shared cM	Longest Block	X-Match	Linked Relationship	Ancestral Surnames
	08/16/2019	5th Cousin - Remote Cousin	39	9			

Primary Goal – Compare My Matrilineal Line to Others – Find that Common Ancestor

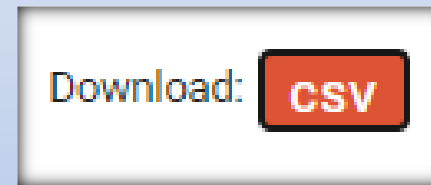
- My known matrilineal line



Possible Cousins
Sharing My
Matrilineal Line

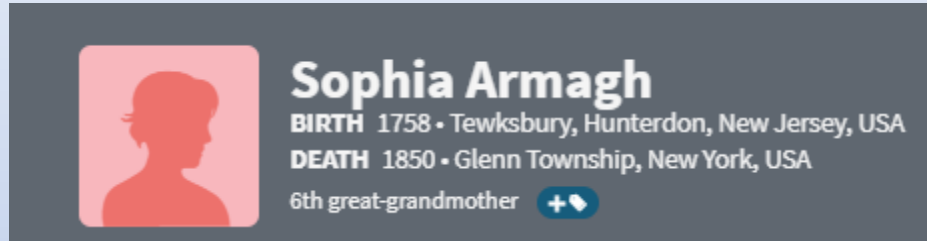
My Project Goal

- Build Q&D (Quick and Dirty) trees in Ancestry (private-unsearchable) for each of the 0 Genetic Distance mtDNA matches
 - Only follow matrilineal line
- Start by downloading Matches (.csv)
- I'm starting with the 6 matches with 0 Genetic Distance (GD)



One Clue Researching My Line – Likely Dutch Heritage

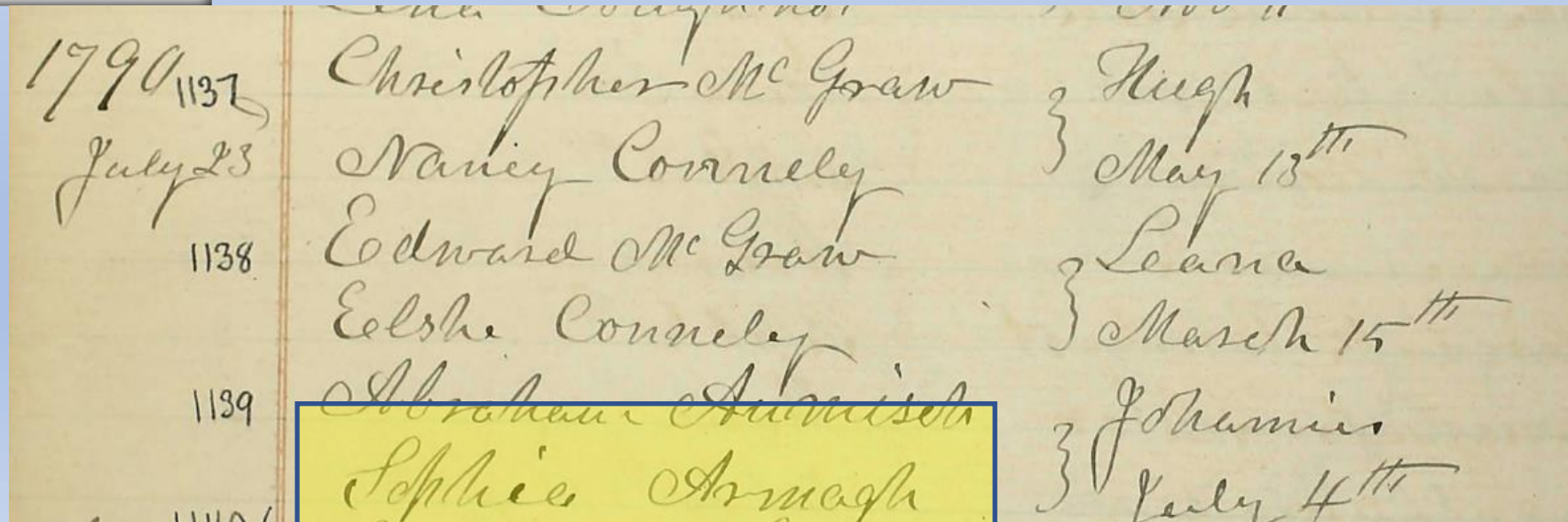
- My earliest known matrilineal ancestor was Sophia Armagh:



Sophia Armagh
BIRTH 1758 • Tewksbury, Hunterdon, New Jersey, USA
DEATH 1850 • Glenn Township, New York, USA
6th great-grandmother

Found a great research source for her—baptism of her son:

U.S., Dutch Reformed Church Records in Selected States,
1639-1989



The Results---after about 4 hours of tedious research

Surname matches!

Match #	Match Birth	Autosomal	Earliest
1	1960	No	Susan Devore 1809 KY
2	1982	Yes, no match	Sarah Devore 1798 VA
3	1948	Yes, no match	None, couldn't determine her mother
4	1948	No	Only back to mother Helen Evelyn James 1914 PA
5	1958	Yes, 41 cM match	I couldn't build her tree but she claims Dirckje Hermansen, b 1623 and d. 1682 from Holland as a matrilineal ancestor—this is same as another of my mtDNA close matches
6	1943	Yes, no match	Shows GGM Louisa Fahrenkamp born in 1852 in Germany

One Other Glimmer of Good Hope

- GD of 1, this match has an ancestor from Holland who settled in the Hudson Valley where my earliest matrilineal ancestor was
- And, Dirckje was also in my Match #5's tree

The image shows a screenshot of a genealogy website. A central profile window is open for 'Dirckje Hermansen'. The profile includes a 'PROFILE' section and a 'Timeline' section with the following information:

Dirckje Hermansen
PROFILE

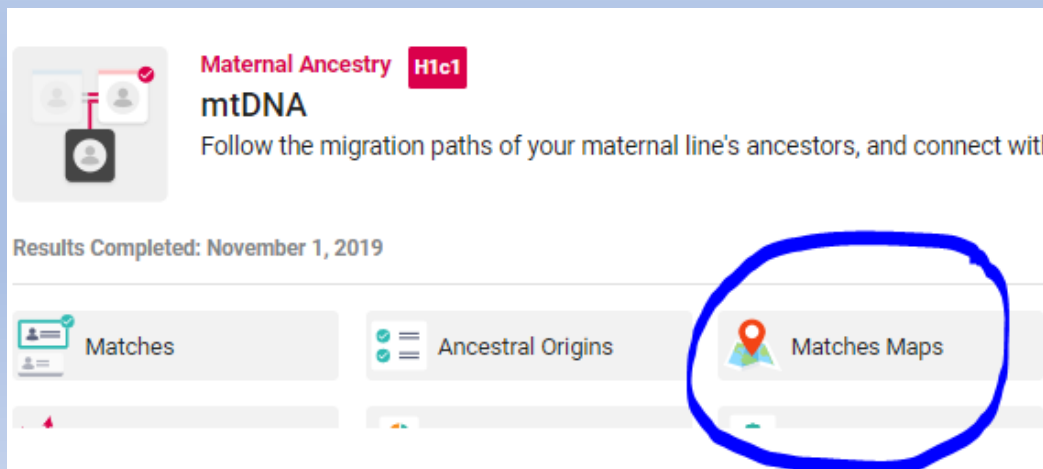
Timeline
b. 1623 - Holland, Reusel-de Mierden, Noord-Brabant, Netherlands
d. 1682 - Kinderhook, Columbia, New York, United States

Ancestral Surnames
???

The background shows a family tree with several names listed on the right side, including Richard Leroy, Gillette Jacquet, FRANCOIS DÉSCHALETS DES..., JACQUETTE CHEVALLEREAU, Cornelies Janszen Damen, Adrienne Cuvellier, Jan Martense Van Alstyne, and Dirckje Hermansen (highlighted with a blue box).

Matches Map

- Be sure to look at the Matches Map on FTDNA
- Can often provide some clues to your matrilineal line
- In my case it supports what I've found to be Holland roots

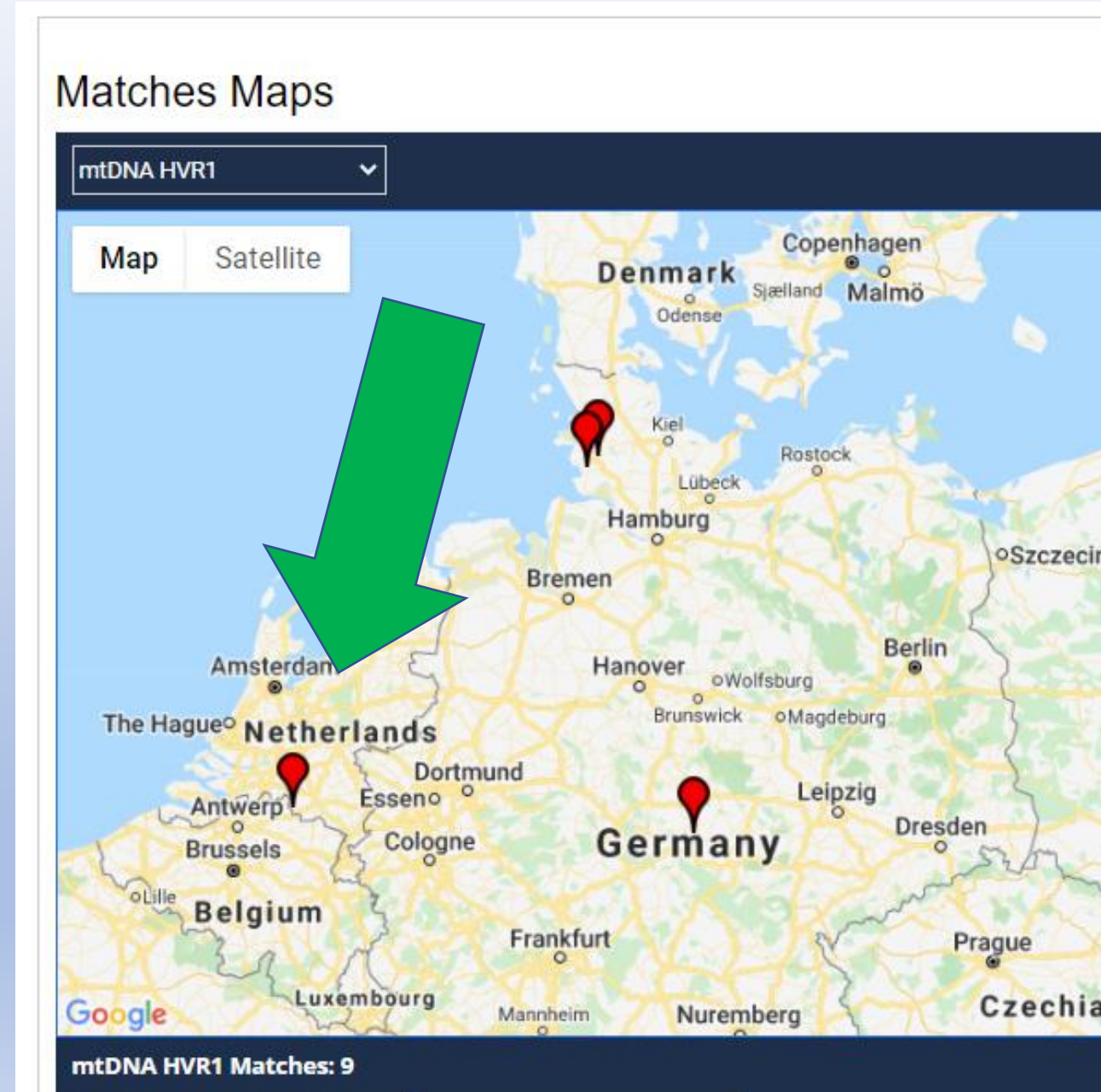


Maternal Ancestry H1c1 mtDNA

Follow the migration paths of your maternal line's ancestors, and connect with

Results Completed: November 1, 2019

Matches Ancestral Origins **Matches Maps**



Matches Maps

mtDNA HVR1

Map Satellite

Denmark Copenhagen Malmö Odense Sjælland

Germany Kiel Lübeck Rostock Hamburg Bremen Hanover Wolfsburg Brunswick Magdeburg Berlin

Netherlands Amsterdam The Hague Antwerp Essen Dortmund Cologne

Belgium Brussels Lille Luxembourg

Germany Frankfurt Mannheim Nuremberg

Czechia Prague

mtDNA HVR1 Matches: 9

In Summary

- mtDNA could be useful to you --- or may not be; YMMV
- I did get something out of it:
 - Confirmed matrilineal heritage back to Holland
 - Found one close match that also matched on autosomal and was able to communicate with her about an ancestor in Holland
 - Traced likely linkage of my 6GGM in Hudson Valley NY to others in the small New Holland community of Kinderhook
 - Two of closest matches I was able to get down to the same matrilineal surname – unfortunately not a familiar surname to my tree

Well, Was it Worth the \$159 for Me?

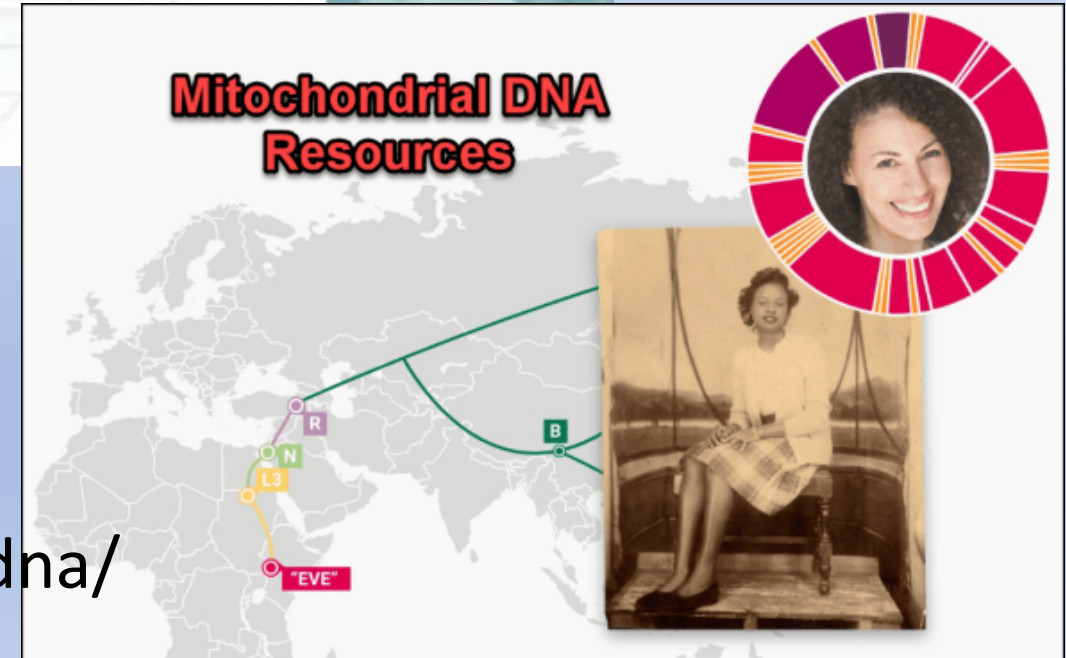


Your Mileage May Vary!!!

Lastly, Some Common Acronyms

- CRS: Cambridge Reference Sequence (mitochondrial full sequence of one European woman from the 1970s)
- rCRS: Revised Cambridge Reference Sequence
- RSRS: Recombined Sapiens Reference Sequence (2012, reference to “mitochondrial Eve”)
- HVR1, HVR2: Hypervariable Regions (more common to change/mutate)
- Note: taking the full mtDNA test returns all bases (1-16,569); HVR1 only returns 16,024 through 16,383; HVR2 only returns 57 through 372.

Good Resource for More Info



- <https://dna-explained.com/mitochondrial-dna/>

“My Journey” Video from FTDNA

- ["My Journey" Video](#)

FamilyTreeAZ.com



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Presentations: <http://www.familytreeaz.com/Presentations/>

Genealogy Presentations

[Closure -- Solving an Adoption Mystery\(Nov 2020\)](#)

[Using GEDMatch's New MRCA Tool \(Sep 2020\)](#)

[Identifying Those DNA Matches \(Mar 2020\)](#)

[My Top 10 Tips for Genetic Genealogy](#)

[Just Tested -- Now What? \(February 2020\)](#)

[Comparison of DNA Testing Sites \(January 2020\)](#)

[DNA Testing Options \(January 2020\)](#)

[DNAPainter \(January 2020\)](#)

[Ancestry Tag Groups \(December 2019\)](#)

[ThruLines \(November 2019\)](#)

[How Am I Related? \(October 2019\) Handout](#)

[Intro to DNA Genetic Genealogy \(September 2019\)](#)