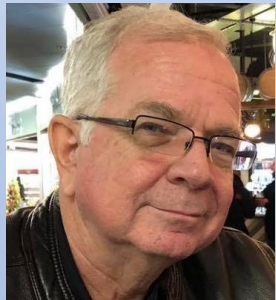


Intro to DNA and Genetic Genealogy



April 14, 2025
Mesa Red Mountain Library



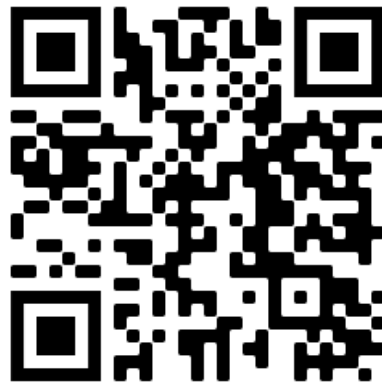
Ken waters

<http://familytreeaz.com/presentations>

Satwatcher.gen@gmail.com



All slides and handouts can be found at:
<http://www.familytreeaz.com/Presentations/>

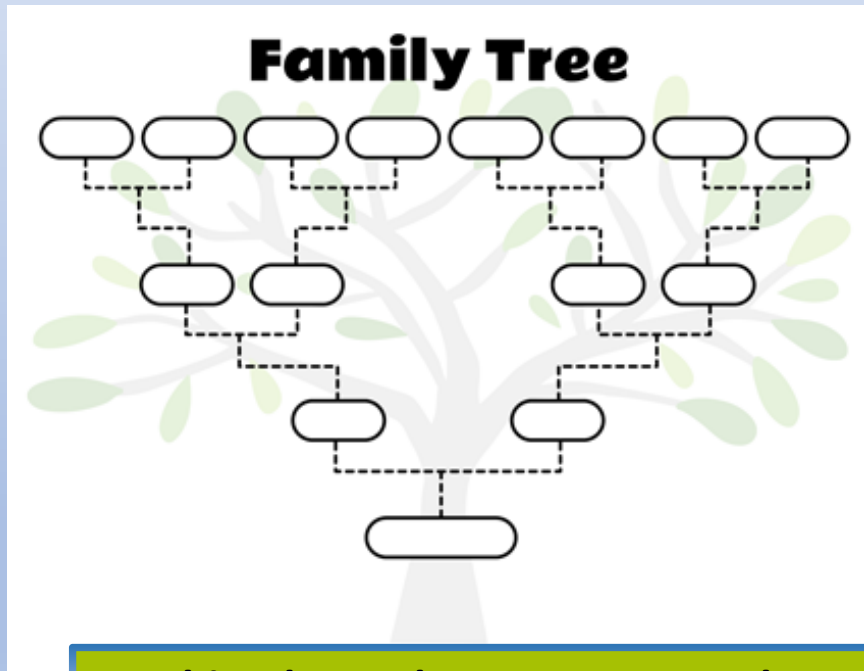


QR Code: take photo to
open to presentations

Topics

- What is DNA?
- Why take a DNA test?
- What are the types of DNA?
- Where can I get a DNA test – what are the testing companies?
- What will I get once the test is completed?
- What 3rd party sites should I consider?

What is genetic genealogy?



Combined Together --- A greater chance of success to solve your family tree mysteries.

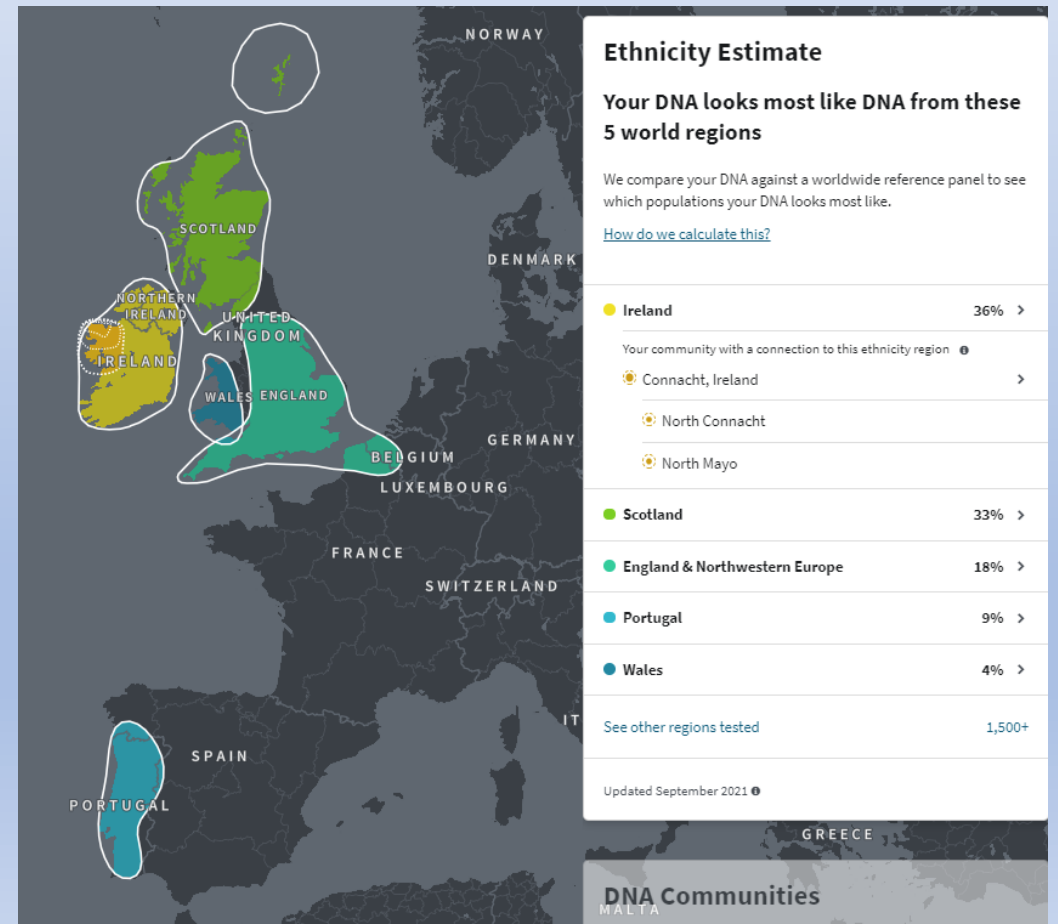
First step: answer some questions

- 1 Why am I interested in taking a DNA test?
- 2 What do I hope to get out of it? (any very specific goals?)
- 3 Do I understand there could be unsettling discoveries that come out?
- 4 Do I have the time and interest to pursue the genealogy aspect?

Why do we take DNA tests??

1. Curious about ethnicity

E.g., Am I part Native American?



Why do we take DNA tests??

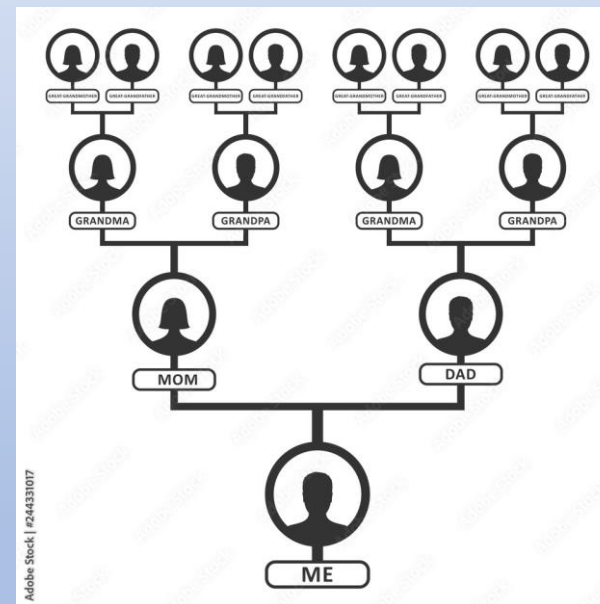
- 2. Curious about health aspects
E.g., Do I carry the BRCA gene?



Why do we take DNA tests??

3. Curious about relationships, i.e., Genealogy

- Unknown parentage (adoption, misattributed parentage, donor conceived)
- Find living cousins
- Help fill in (or confirm) family tree



Assuming it's to learn about family history or solve unknown parentage case...

- What it WILL do:
 - Confirm close relative relationships (e.g., parent/child, full vs. half sibling, etc.) if both individuals take test
 - Introduce you to an amazingly long list of potential cousins (especially for those with strong North American origins such as colonial roots)
 - For unknown parentage cases it's likely to provide valuable hints to help solve the mystery



Assuming it's to learn about family history or solve unknown parentage case...

- What it MAY do:
 - **WARNING!!!!**
 - Uncover dark secret(s) that may or may not greatly upset your family



Assuming it's to learn about family history or solve unknown parentage case...

- What it will NOT do:
 - Absolutely confirm ethnic relationships except in perhaps limited circumstances
 - Fill in all the missing persons (brick walls, etc.) in your family tree



The Time Aspect

- It's fine to take a test just out of curiosity – no real time commitment
 - Might answer a few basic questions for you
 - It really helps others who are using DNA to solve family tree mysteries
- Once you explore the results you just might get *hooked* !!!
 - Can often encourage you to spend more time exploring, especially in identifying those DNA matches and how that can help fill in your tree
- All in all, DNA testing is a wonderful tool to complement your family tree research



<https://giphy.com/explore/wonder>

Basics --- What You Need to Know About DNA

3 Types of DNA

- **Autosomal**

Most DNA tests are autosomal

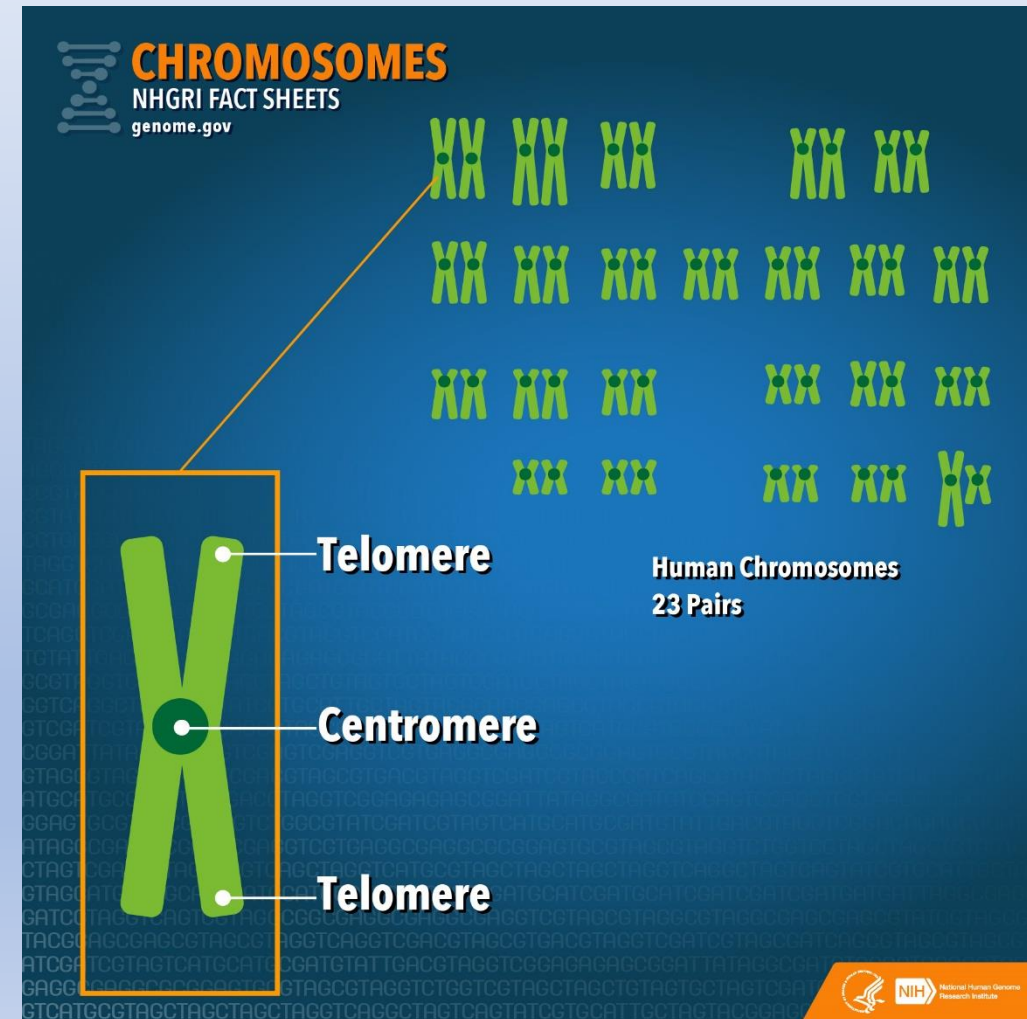
- 22 chromosomes
- + 1 sex chromosome “X/Y”

- **Y-DNA**

- **Mitochondrial DNA (mtDNA)**

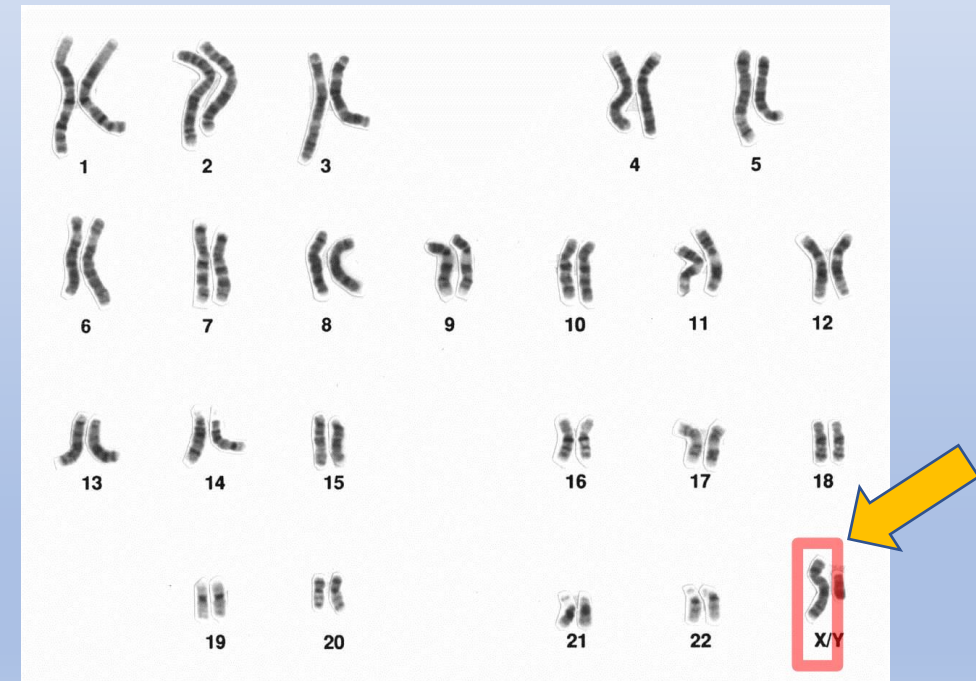
What is DNA? -- chromosomes

- We all have 23 pairs of chromosomes
 - The last pair, 23rd, chromosome is considered the sex chromosome
 - Women have two “X” chromosomes for this whereas men have one “X” and one “Y”
 - Chromosomes 1 through 22 are known as autosomes
 - Foundation of autosomal DNA, or “atDNA” which is the primary DNA used now by DNA testing services



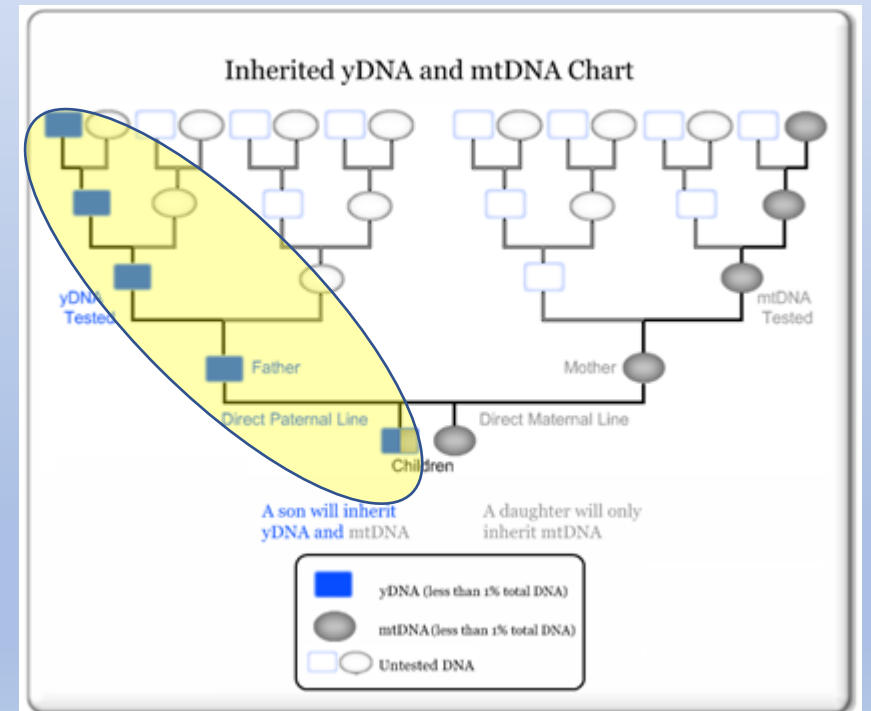
What is X-DNA?

- We all have 22 pairs of autosomal chromosomes
- One additional, the 23rd chromosome, is known as the "sex" chromosome and can at times be useful in evaluating a match.
- Females have two 'X' chromosomes (XX)
- Males have one 'X' chromosome (from mother) and one 'Y' chromosome (from father) (XY)
- **Important Note:** not all testing companies report X-DNA matches



What is DNA? – Y-DNA

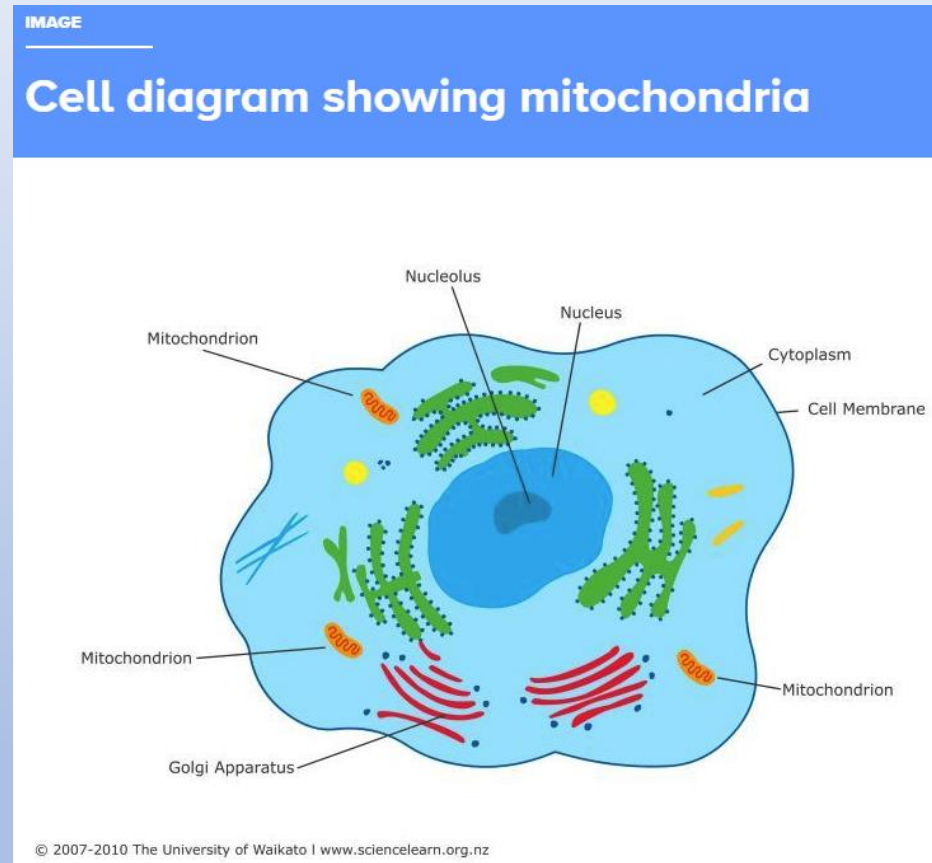
- ***ONLY*** found in males
- Only passed along the patrilineal line
 - Father's father's father's....[etc.]
- Females wanting to test Y-DNA should find a male in the line that they want to test (e.g., an uncle, brother, father, 1st cousin)



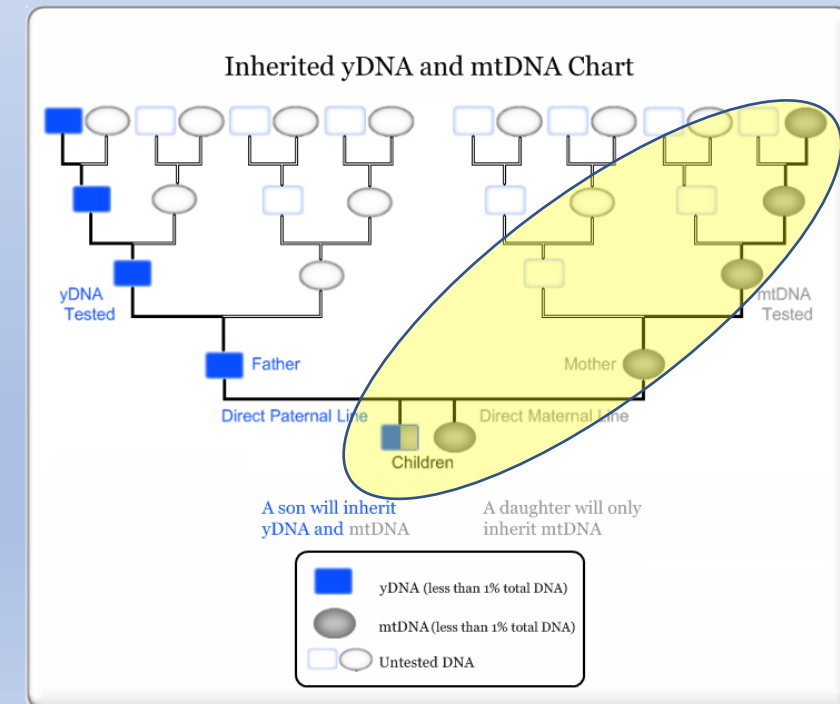
Source: <https://phillipsdnaproject.com/faq-sections/304-ancestor-dna-chart>

What is DNA? -- mitochondrial

- Located outside the nucleus of cells as part of mitochondria
- Males and Females both have
- Has unique characteristic of carrying deep ancestral heritage of matrilineal line
 - Mother's mother's mother's.....[etc.]



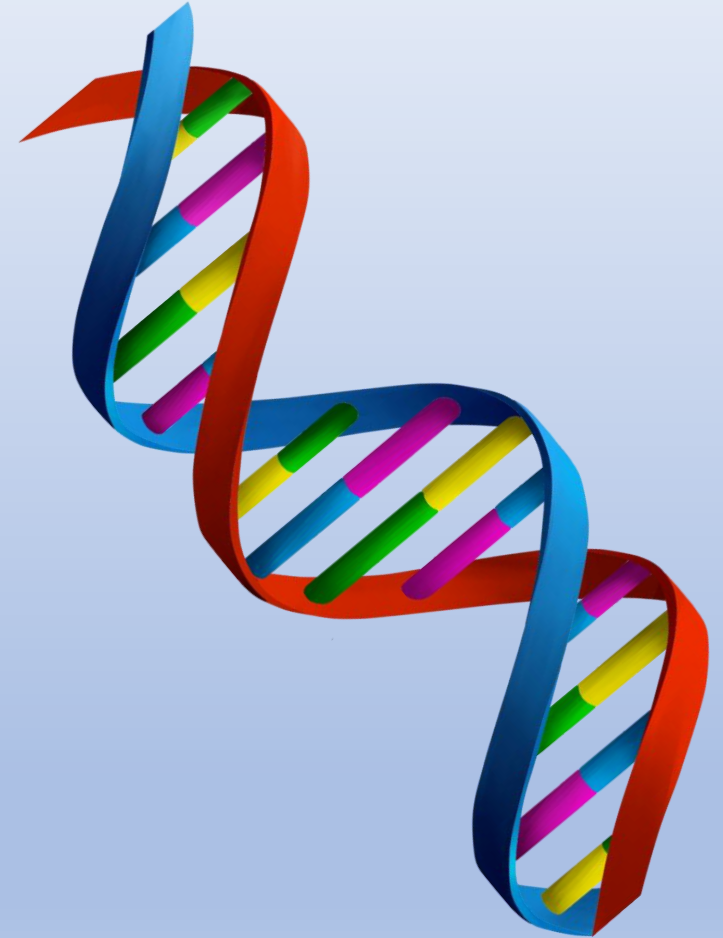
Tip: Mitochondrial DNA is often abbreviated to mtDNA



Testing Companies

Types of DNA tests

- Autosomal
 - The vast majority of DNA tests are this type
 - Relatively inexpensive (\$49-\$99)
 - **FOCUS of this presentation is on Autosomal**
- Y-DNA
 - Only used for male subjects and can find matches along the same patrilineal line
 - Can be expensive (up to \$300 for more precision/markers)
- mtDNA (Mitochondrial)
 - Can be used to solve matrilineal line questions
 - Expensive (~ \$200)
- Full Genome Sequencing (FGS)
 - New kid on the block!
 - More expensive (~\$1000) but cost is going down



Testing company options -- Autosomal

- There are 5 known and recommended companies at this time:
 - Ancestry
 - Family Tree DNA
 - MyHeritage
 - LivingDNA
 - ~~23andMe~~ (currently in bankruptcy)
- There are others out there but not recommended for a variety of reasons



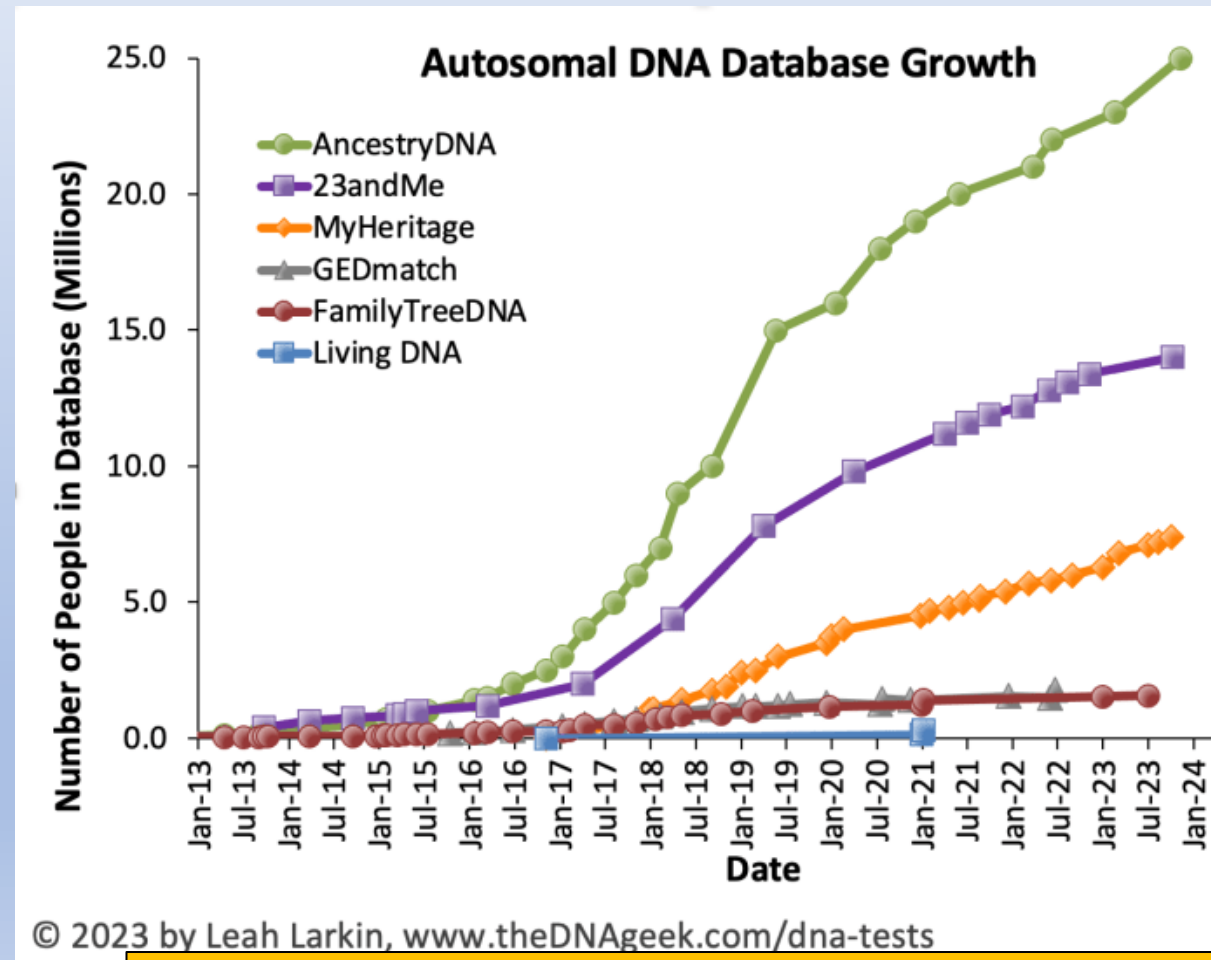
What to look for with testing companies

- What all 4 companies have:
 - Provide ethnicity estimates (emphasis on "estimates")
 - Provide a list of others who match the tester's DNA
 - Ability to download raw DNA data file
 - Test autosomal chromosomes (1-22)
- What some of them have:
 - Provide family trees for your matches
 - Provide health information
 - Ability to group matches that are common to each other
 - Ability to upload raw DNA data file from other companies
 - Test other aspects of DNA such as X-DNA, Y-DNA, and mitochondrial (mtDNA)

Comparative Database Sizes (autosomal kits)

- This chart shows the change over time of the number of DNA kits with each service
- The top 2 services do *not* allow uploads of kits from the other companies

TIP: your chances of finding matches will increase with companies that have more matches



Note: this is the latest available version of this graph

Deeper Dive into the Testing Companies

For each company I will highlight pros and cons including one primary pro and con for each company

Aspects of Each Testing Company

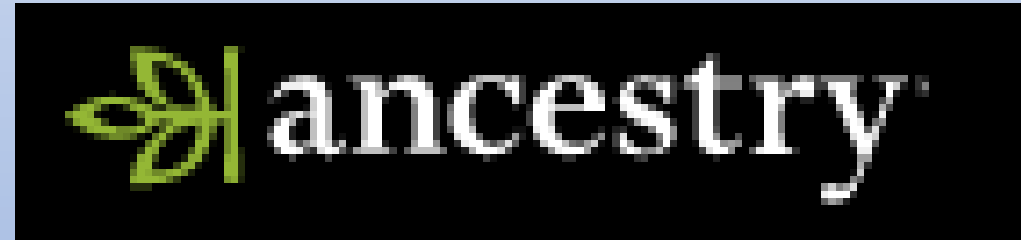
- Ancestry

- Pluses:

- **Largest database of testers, over 23 million**
 - Excellent linkage to a wide array of family trees
 - Useful common ancestor hints
 - Good tools for sorting matches and viewing shared matches
 - Good detailed ethnicity estimates for some


- Negatives:

- **No chromosome browser for advanced work**
 - No display of X-DNA matches
 - Will not accept DNA kits from other companies
 - Tester database is mostly composed of U.S. and Canada test-takers








Ancestry DNA Matches


- Each match includes:
 - Name
 - Relationship estimate
 - Amount of shared DNA
 - SideView estimate (maternal/paternal)
 - Tree, if available
 - Common Ancestor hint, if applicable
 - Tag Group designations (user controlled)
 - User entered Notes

**Joan Anita Craddock**

Mother
3,474 cM | 50% shared DNA
Maternal side

 **Public linked tree**
2,843 People
 **Common ancestor**


 **Mother, 3474/46.**

Ken Waters's DNA Matches
View [DNA] Waters Tree Email:satwatcher.gen@gmail.com



All matches By parent **BETA** By ancestor By location

Filter by: **Unviewed** Common ancestors Notes Trees Shared DNA Groups [Search](#) | [Sort](#)



Parent/Child


**Joan Anita Craddock**

Mother
3,474 cM | 50% shared DNA
Maternal side



 **Public linked tree**
2,843 People
 **Common ancestor**

View match



 


**Joan Anita Craddock**

Daughter
3,470 cM | 50% shared DNA
Both sides



 **Public linked tree**
2,843 People
 **Common ancestor**

View match



 

**Joan Anita Craddock**


Son
3,466 cM | 50% shared DNA
Both sides

 **Public linked tree**
2,843 People
 **Common ancestor**



View match



Half sibling

**Joan Anita Craddock**


Brother
2,491 cM | 44% - 51% shared DNA
Both sides

 **Public linked tree**
2,843 People
 **Common ancestor**



View match



Uncle

**Joan Anita Craddock**


Uncle
1,583 cM | 23% shared DNA
Paternal side

 **Public linked tree**
2,843 People
 **Common ancestor**



View match



1st cousin


**Joan Anita Craddock**

1st cousin
941 cM | 13% shared DNA
Paternal side



 **Public linked tree**
27 People
 **Common ancestor**

View match



 


**Joan Anita Craddock**

1st cousin
716 cM | 10% shared DNA
Paternal side



 **Public linked tree**
2,843 People
 **Common ancestor**

View match



 


**Joan Anita Craddock**

1st cousin
604 cM | 9% shared DNA
Paternal side



 **Public linked tree**
11 People
 **Common ancestor**

View match



 

**Joan Anita Craddock**

Half niece
584 cM | 8% shared DNA
Paternal side

 **Public linked tree**
34 People
 **Common ancestor**

View in tree
[View match](#)

Useful Features of Ancestry DNA

SideView

Ken Waters's DNA Matches
View [DNA] Waters Tree Email: saturdaygen@gmail.com

All matches **By parent** **UEA** By ancestor By location

Updated Dec 2022

Maternal

16,621 matches

View matches Edit parent

Last names in trees: Archer, Auld, Barnes, Craddock

Common communities: Missouri Settlers

Ethnicity inheritance: Maternal

Paternal

9,214 matches

View matches Edit parent

Last names in trees: Lemos, Sylvia, Constança, Avila

Common communities: Southwestern Quebec, New York & Vermont French Settlers

Ethnicity inheritance: Paternal

Both sides

3 matches

View matches

Last names in trees: Abt, Allaby, Allee, Alley

Why are some matches related to both parents?

Unassigned

2,284 matches

View matches

Why are some matches unassigned?

ThruLines

Filters

ThruLines®

ThruLines shows how you may be related to your DNA matches through ancestors you share. You get ThruLines when ancestors from your tree are also in a match's tree. Pick an ancestor to see which matches descend from them. [Learn more about ThruLines.](#)

Parents

Richard Joseph Waters (Father 1919-1979)

Joan Anita Craddock (Mother 1929-2015)

Grandparents

Joseph John Waters (Paternal grandfather 1908-1965)

Caroline Margaret Sylvia (Paternal grandmother 1903-1963)

Charles Noble Craddock (Maternal grandfather 1905-1983)

Mardell Lillian Huntley (Maternal grandmother 1908-2005)

Great Grandparents

John Waters (Great-grandfather 1889-)

Irene Agnes Berkley (Great-grandmother 1868-1907)

Joao John da Silva (Sylvia) (Great-grandfather 1845-1932)

Caroline C. Lemos (Great-grandmother 1874-1913)

Charles Noble Craddock (Great-grandfather 1868-1950)

Mary Ellen Wood (Great-grandmother 1870-1930)

Nellie Julia Spencer (Great-grandmother 1878-1932)

2nd Great Grandparents

Terence Waters (2nd great-grandfather 1825-1902)

Sabina Gallagher (2nd great-grandmother 1830-1901)

Joseph Mortimer Berkeley (2nd great-grandfather 1846-1880)

Mary Ann Wheeler (2nd great-grandmother 1848-1913)

Manuel Correia da Silva (2nd great-grandfather)

Luisa Candida (2nd great-grandmother)

Feliciano Machado De Lemos (2nd great-grandfather 1934-1904)

Defina Candida San Jose (2nd great-grandmother 1843-1901)

Tag groups

☒ ★ Starred matches

☐ 0 - Distant Saved Matches

☐ 1 - Waters/Unknown

☐ 2 - Berkley/Wheeler

☐ 3 - Sylvia/Correia

☐ 4 - Lemos/San Jose

☐ 5 - Craddock/Spivey

☐ 6 - Wood/Thurman

☐ 7 - Unknown/Unknown MYSTERY

☐ 8 - Spencer/Cummings

☐ Berkley/Berkeley line from DC

☐ Dad's non-Portuguese side (...)

☐ DI -- Mom's side

☐ Ferry/Elder on Spencer/Cumm...

☒ Inner Family

☐ Low matches (6-8)

☐ Mystery Network #6

☐ Mystery Network #7 -- Mom's...

☐ Mystery Shipp Network

☐ No idea---no shares

☐ UNKNOWN #9 Mom's Side

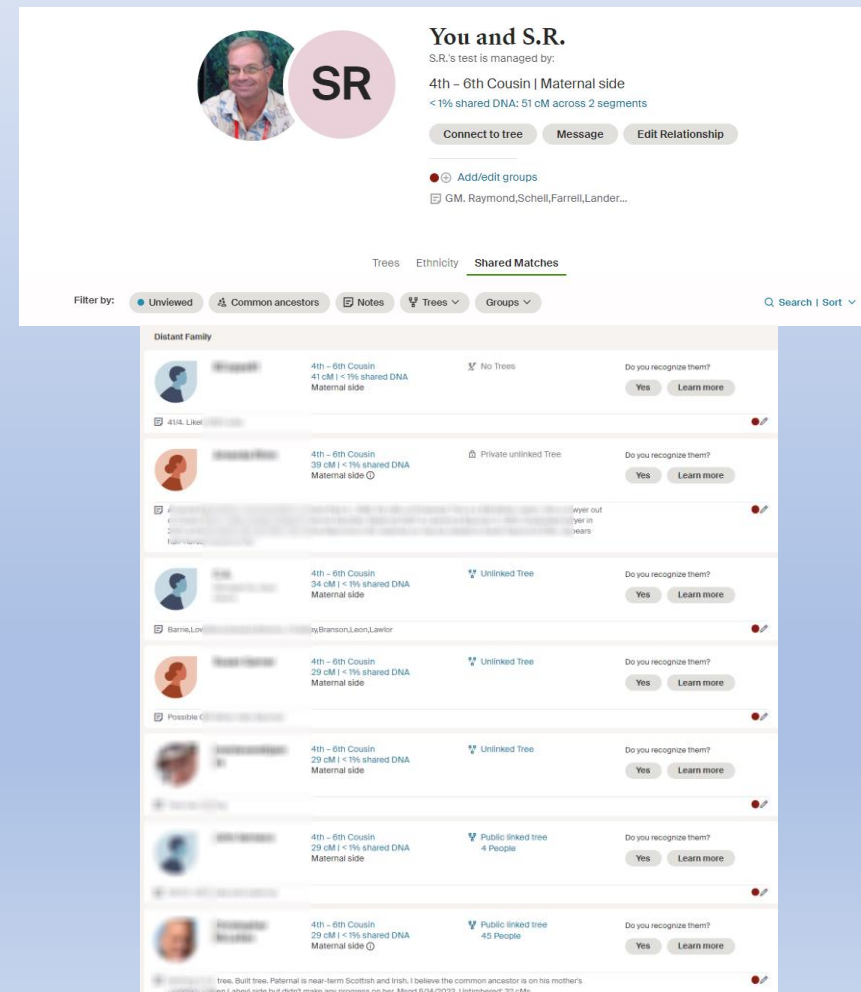
☐ Unknown Mom's Side

☐ Unknown Orphan Cluster

☐ Unknown WBW Stanfield/Ziegl...

Shared Matches in Ancestry DNA

- This, in my opinion, is by far the **MOST USEFUL** tool in Ancestry DNA
- Can help to quickly determine which line a DNA match falls into



23andMe has declared bankruptcy as of March 2025. Its future is unknown and it still holds previously completed DNA tests. At this time I do not recommend purchasing a kit from them due to the uncertainty.

- 23andMe
 - Pluses:
 - **Large database of testers (> 12 million), many not available at other testing companies**
 - Chromosome browser
 - Upgrade to health aspects for those interested
 - Negatives:
 - **Complicated process to share data with DNA matches**
 - No genealogy research database
 - Most kits will be limited to 1,500 closest matches, thus not revealing more distant matches
 - Will not accept DNA kits from other companies



TIP: I found 3 unknown 2nd cousins on 23andMe! 2 of them were adoptees with unknown parentage which I helped them solve

Aspects of Each Testing Company

- FamilyTreeDNA

- Pluses:

- **Ability to re-use DNA sample on other types of test**
 - Rich, long history of working with DNA
 - The “go to” site for testing Y-DNA and mtDNA
 - Chromosome browser
 - Allows uploads from other testing companies

- Negatives:

- **Relatively small database**
 - No genealogy research facilities
 - No capability to manage more than one kit in a single account



Matches in FamilyTreeDNA

- Names
- Estimated relationship
- Shared DNA
- If an “X” match

Family Finder Matches Help

All Matches

Detail View

Table View

☐ Exact Search

Search

All

All (5317)

Paternal (674)

Maternal (2751)

Both (4)

Filter

Sort by

Export CSV

Calculating Family Matching...

Waters

Ancestral Surnames
Not Provided

Haplogroup
Y-DNA: N/A
mtDNA: N/A

Relationship Range
Parent/Child
Link on Family Tree

Shared DNA
3565 cM

Longest Block
284 cM

X Match
No Match

Match date: May 12 2021

Joan Waters

Ancestral Surnames
Not Provided

Haplogroup
mtDNA: N/A

Relationship Range
Parent/Child
MOTHER

Shared DNA
3565 cM

Longest Block
284 cM

X Match
181 cM

Match date: May 12 2021

Waters

Ancestral Surnames
Not Provided

Haplogroup
mtDNA: N/A

Relationship Range
Parent/Child
Link on Family Tree

Shared DNA
3557 cM

Longest Block
284 cM

X Match
181 cM

Match date: May 12 2021

Waters

Ancestral Surnames
Not Provided

Haplogroup
Y-DNA: N/A
mtDNA: N/A

Relationship Range
Full Sibling
Link on Family Tree

Shared DNA
2634 cM

Longest Block
198 cM

X Match
122 cM

Match date: May 12 2021

Ernest Waters

Ancestral Surnames
Not Provided

Haplogroup
Y-DNA: N/A
mtDNA: N/A

Relationship Range
Half Sibling,
Uncle/Aunt/Niece/Neph...
UNCLE

Shared DNA
1655 cM

Longest Block
168 cM

X Match
No Match

Match date: May 12 2021

Waters

Ancestral Surnames
Not Provided

Haplogroup
Y-DNA: N/A
mtDNA: N/A

Relationship Range
1st Cousin - 2nd Cousin,
Great/Half...
Link on Family Tree

Shared DNA
767 cM

Longest Block
129 cM

X Match
No Match

Match date: May 14 2021

Donna

Ancestral Surnames
Not Provided

Haplogroup
mtDNA: N/A

Relationship Range
1st Cousin - 2nd Cousin,
Great/Half...
Link on Family Tree

Shared DNA
624 cM

Longest Block
88 cM

X Match
No Match

Match date: May 14 2021

June

Ancestral Surnames
Not Provided

Haplogroup
mtDNA: N/A

Relationship Range
1st Cousin - 2nd Cousin,
Great/Half...
Link on Family Tree

Shared DNA
444 cM

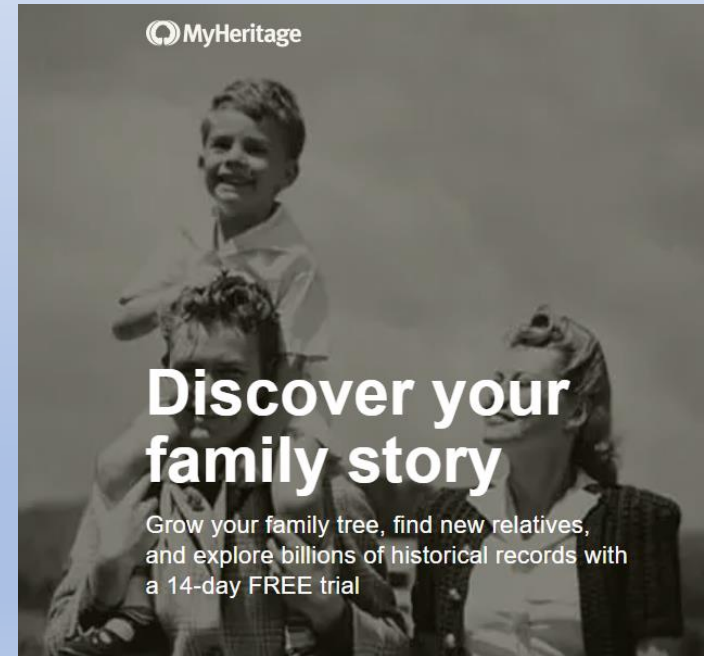
Longest Block
69 cM

X Match
No Match

Match date: May 12 2021

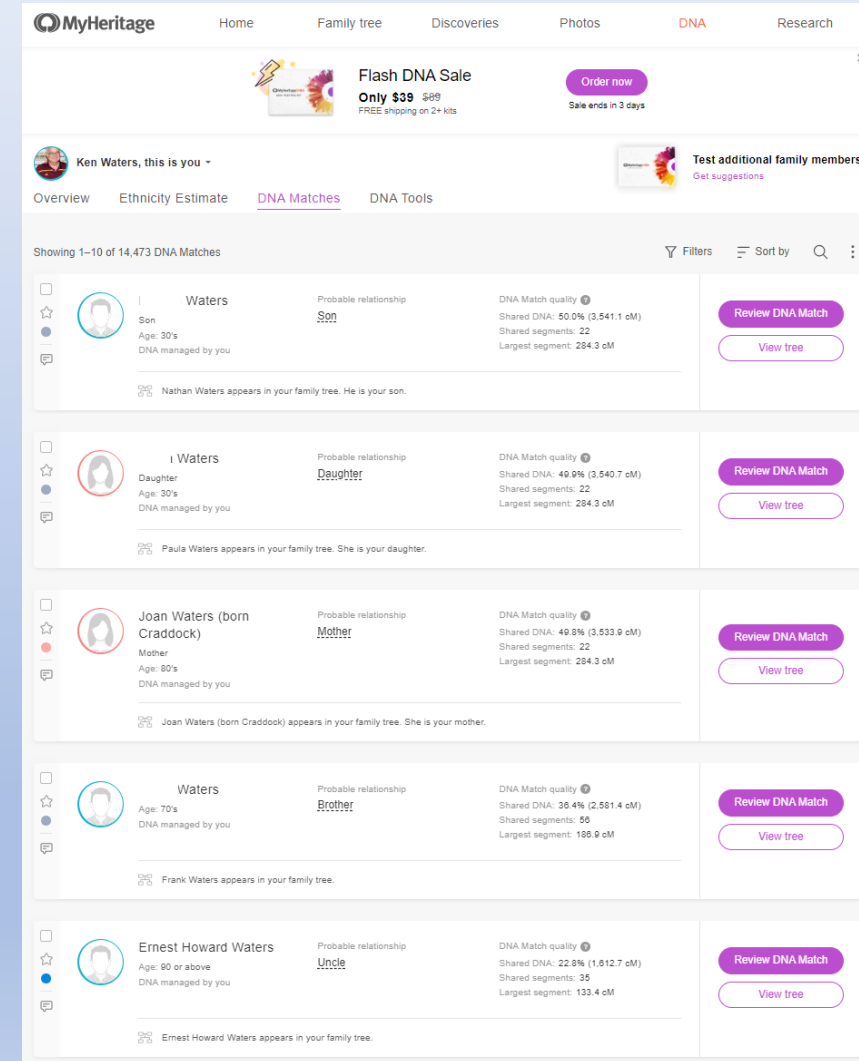
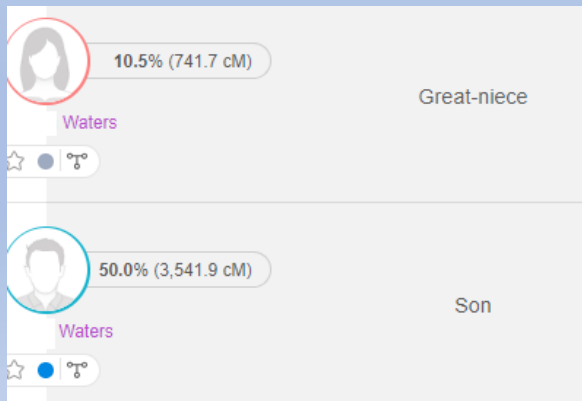
Aspects of Each Testing Company

- MyHeritage
 - Pluses:
 - **Powerful shared matches capabilities**
 - Best chance to find European DNA test takers
 - Robust tools such as auto-cluster available with upgrade
 - Excellent Chromosome browser
 - Genealogy research facilities
 - Allows uploads from other testing companies
 - Negatives:
 - **Smaller database compared to Ancestry and 23andMe**



My Heritage Matches

- Very useful capability to not only see how much DNA you share with the match but also how much your match shares with other matches (can often help to discern parent-child or aunt-uncle relationships)



Aspects of Each Testing Company

- LivingDNA
 - Pluses:
 - **Some emphasis on British Isles**
 - 3-in-1, single kit includes Y-DNA and mtDNA
 - Allows uploads from other testing companies
 - Chromosome browser (added July 2023)
 - Negatives:
 - **Very, very small database**
 - No family trees
 - No research database
 - Wacky ethnicity estimates
 - Worst analysis tools of all the companies
 - No matching of Y-DNA or mtDNA
 - History of trying to sell irrelevant add-ons (e.g., supplements, Viking ancestry)




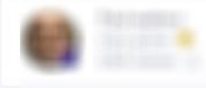








NOTE: I no longer recommend testing with Living DNA due to a lack of tools and matches. If you're interested in trying them then you may want to just try a free upload of your DNA to see what you come up with.

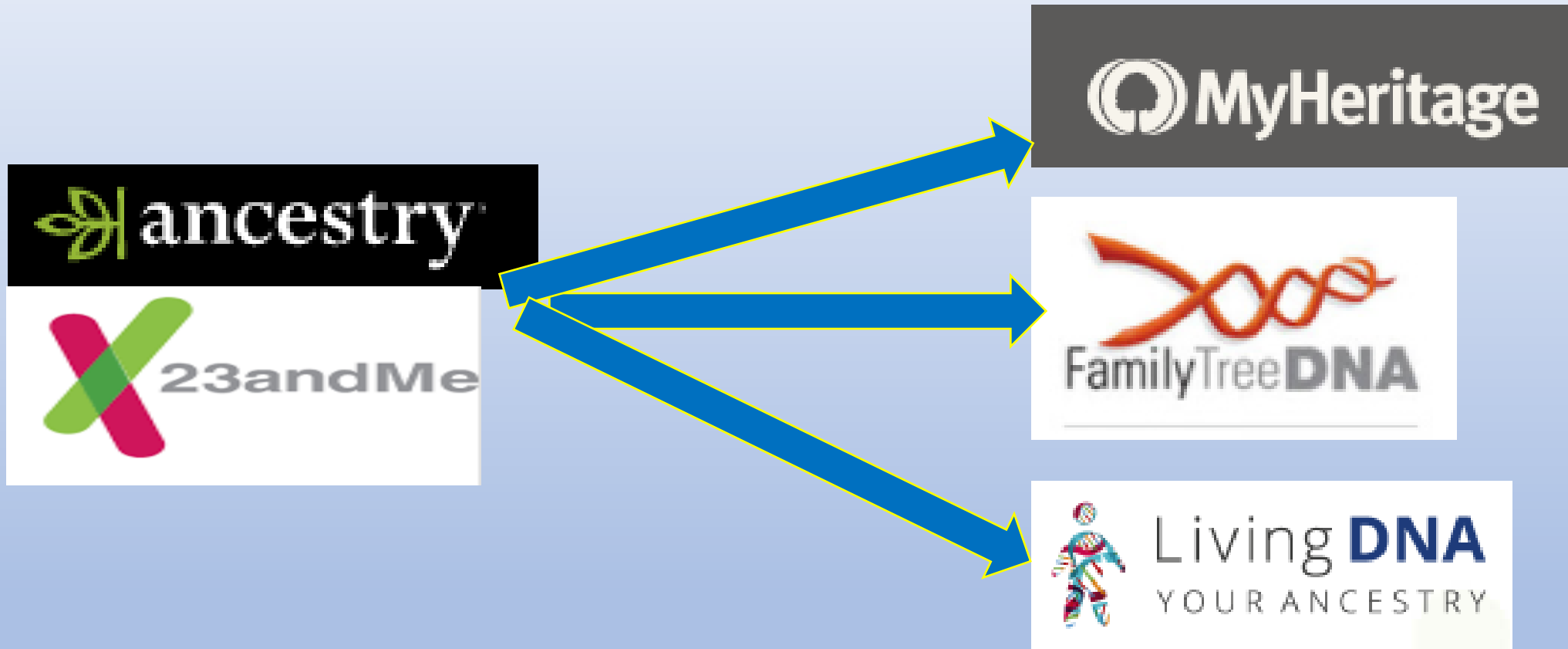
Living DNA Matches

- Very small database
- For me, Living DNA has only 1 kit above 100 centiMorgans whereas I have 47 on Ancestry!

Do not recommend purchasing a kit from Living DNA---instead upload for free

Ken's DNA relatives			
Search by initials or display name		Per page 10	Sort by Genetic distance
Ken's 6th degree matches			
	2nd - 3rd cousin 1.62% DNA shared (117.82cM) 7 shared segments	5 shared matches	>
Ken's 6th degree matches			
	2nd - 4th cousin 0.73% DNA shared (52.84cM) 4 shared segments	7 shared matches	>
Ken's 6th degree matches			
	3rd - 5th cousin 0.60% DNA shared (43.75cM) 5 shared segments	20 shared matches	>
	3rd - 5th cousin 0.53% DNA shared (38.33cM) 3 shared segments	6 shared matches	>
Ken's 6th degree matches			
	4th cousin or greater 0.77% DNA shared (56.20cM) 4 shared segments	3 shared matches	>
	4th cousin or greater 0.65% DNA shared (47.37cM) 4 shared segments	4 shared matches	>
	4th cousin or greater 0.65% DNA shared (47.37cM) 4 shared segments	4 shared matches	>
	4th cousin or greater 0.57% DNA shared (41.60cM) 4 shared segments	13 shared matches	>
	4th cousin or greater 0.57% DNA shared (41.21cM) 5 shared segments	4 shared matches	>
	4th cousin or greater 0.53% DNA shared (38.35cM) 4 shared segments	4 shared matches	>

3 of the 5 testing companies allow uploading

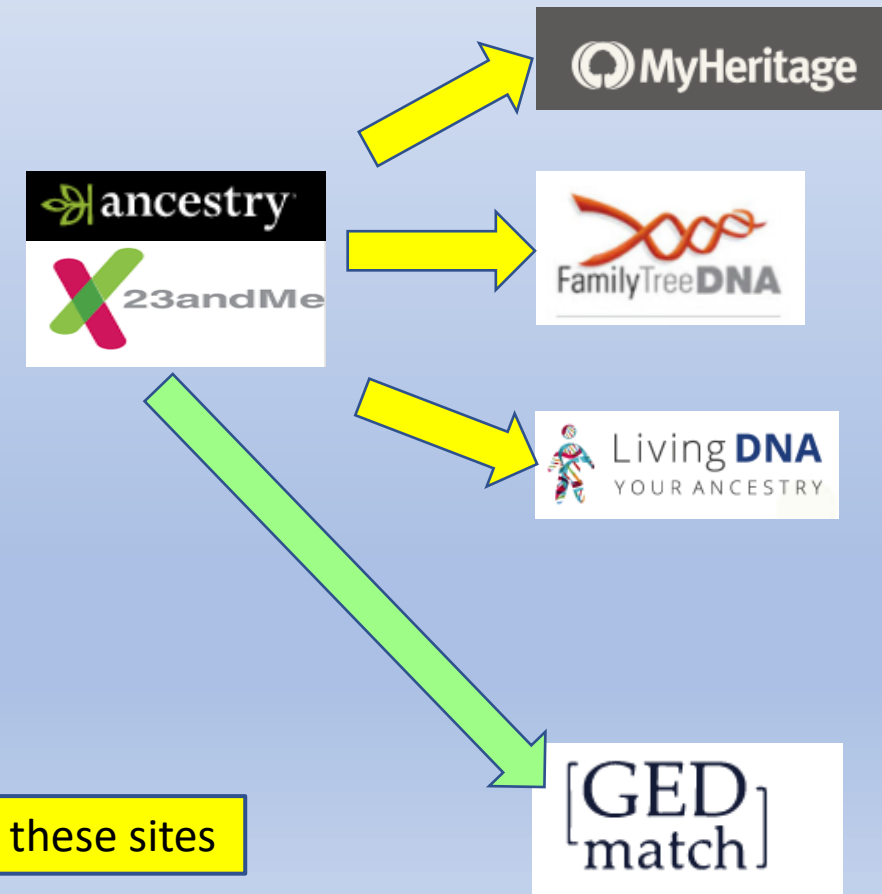


Allows you to use test results from one company to compare to other databases --- more matches!

FREE to upload (nominal cost to use extra analysis tools)

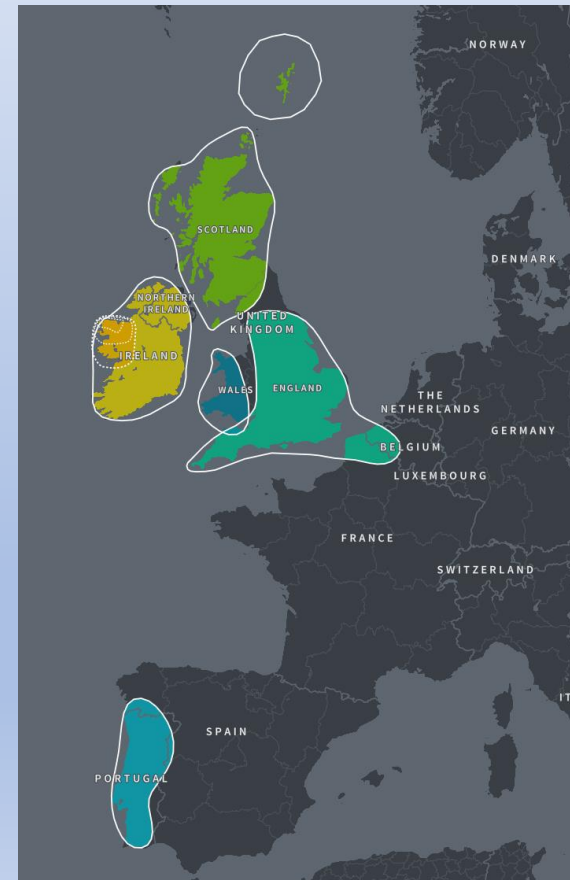
Recommended Strategy

- Test with Ancestry first (largest database, excellent family tree tools)
- After Ancestry, test with 23andMe
- Download your DNA from either Ancestry or 23andMe
- Upload to:
 - My Heritage
 - Family Tree DNA
 - Living DNA
 - GEDMatch (not a testing company)
- The key here is to have your DNA in all 5 testing companies plus GEDMatch



What About Ethnicity Estimates?

- These are purely estimates and should not be relied on to any great extent
- May be interesting to view but of little use for genealogy
- **Wide** variation between companies
- Frequent updates can lead to confusing results



What About Ethnicity Estimates?

MyHeritage

EUROPE	
Irish, Scottish, and Welsh	55.6%
UK and Ireland	
Iberian	25.9%
Scandinavian	18.5%

Nice sub-county detail!

Ancestry

Ireland	36%
Your community with a connection to this ethnicity region	
Connacht, Ireland	
North Connacht	
North Mayo	
Scotland	33%
England & Northwestern Europe	18%
Portugal	9%
Wales	4%

LivingDNA

Europe (North and West)	62.8%
France	56.9%
South Germanic	5.9%
Great Britain and Ireland	30.9%
Ireland	9.2%
Devon	6.6%
South Central England	4.5%
Northern Ireland and Southwest Scotland	3.2%
Southeast England	2.3%
South Wales Border	1.5%
Aberdeenshire	1.3%
Northwest England	1.2%
Cornwall	1.1%
Europe (South)	6.3%
West Iberia	6.3%

French??!!

23andMe

European	99.7%
Northwestern European	85.1%
British & Irish	85.1%
County Mayo, Ireland	
Greater London, United Kingdom	
+18 regions	
Southern European	14.5%
Spanish & Portuguese	13.7%
Azores, Portugal	
+3 regions	
Sardinian	0.6%
Broadly Southern European	0.2%
Broadly European	0.1%
Trace Ancestry	0.3%

FTDNA

Europe	97%
Western Europe	
England, Wales, and Scotland	50%
Ireland	41%
Eastern Europe	
West Slavic	3%
Southern Europe	
Iberian Peninsula	3%
Middle East & North Africa	<3%
Middle East	
Sephardic Jewish	<3%

These are the ethnicity estimates for me as collected, March 16, 2022

Sales!

- Try to take advantage of frequent sales with the testing companies
- Typical regular price is \$99 often discounted to \$59, \$49, even \$39
- For example:
 - DNA Day
 - St Patrick's Day
 - Fathers Day
 - Mothers Day
 - Thanksgiving
 - Black Friday
 - Christmas

HOLIDAY SALE

\$30 off Family Finder Ancestry Testing Service

Discover your origins and connect with your autosomal DNA relatives.

ONLY \$49 USD
Save \$30 (was \$79)

[Learn more](#)



St. Patrick's Day DNA Sale

Ends tomorrow

Only \$59 ~~\$89~~.

Free standard shipping on 2+ kits.

[Order Now](#)

Save up to \$50 on a DNA gift for family.

Surprise them with something truly unique.



Only \$59* ~~\$89~~

[Buy now](#)



Only \$69* ~~\$119~~

[Buy now](#)



In this order

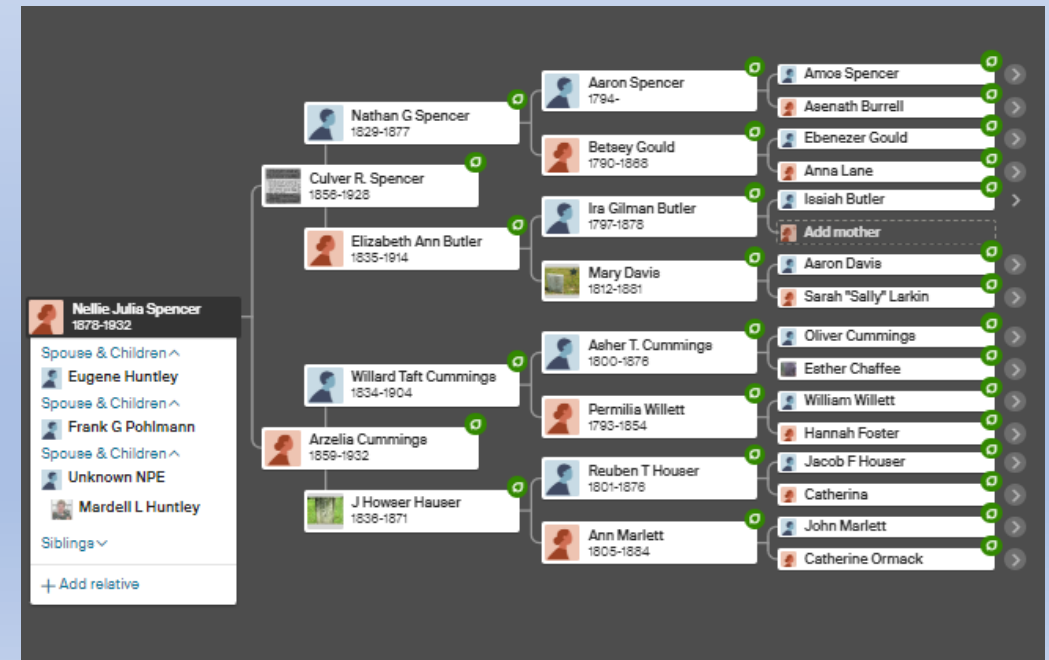
Price

Ancestry + Traits
[REMOVE](#)

~~\$99.00~~ \$79.00
Holiday Offer

DNA kits and Family Trees

- Most powerful way to match other test-takers and know how you are related is through the use of trees
- 4 of the companies (Ancestry, FTDNA, MyHeritage, 23andMe) have capability to store trees
- 1 company (23andMe) can link to FamilySearch tree
- Ancestry has arguably the best provision for family trees



My Suggestions for Family Trees

- For the Family Tree to link to your DNA account I strongly encourage:
 - Make sure it's a PUBLIC tree and searchable
 - Keep it relatively small (50-1,000 people)

TIP: It's fine to have large trees but well-advised to use smaller trees for attaching to your DNA kit
 - Focus on direct ancestors
 - Include Birth-Marriage-Death information
 - Try to go back 5-7 generations (remember autosomal only goes back this far)
 - Use maiden names
 - Use biological lines (not adoptee)
 - If you don't know the identity of an ancestor then don't enter anything for that person

Public linked tree
88,935 People

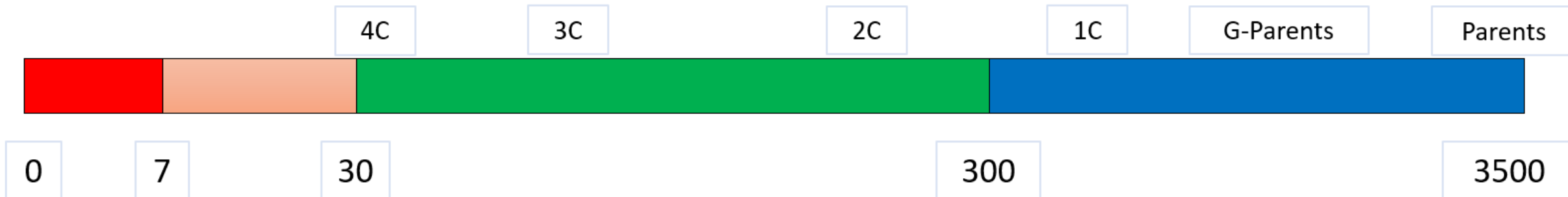


DNA Test Interpretation

First of all --- What is a “CentiMorgan”??

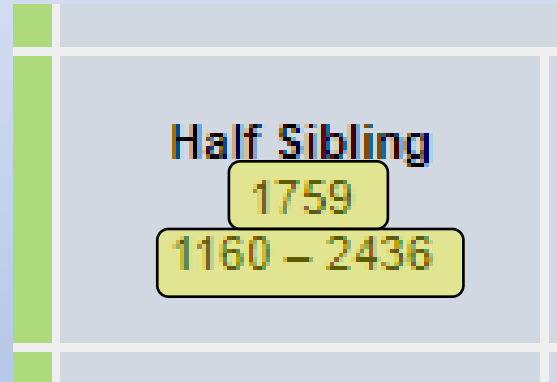
- Numeric measure of “relatedness”
- From 0 to 3500
- 3500 indicates parent/child
- 0 indicates no DNA shared

TIP: Just because you may not share any DNA with someone does not necessarily mean you are not related



Concept of “relatedness”

- Shared cM Project table showing possible DNA shared values
- Higher numbers indicate closer relationships
- Top number in each box is average (mean)
- Bottom is range of numbers that could exist for that relationship

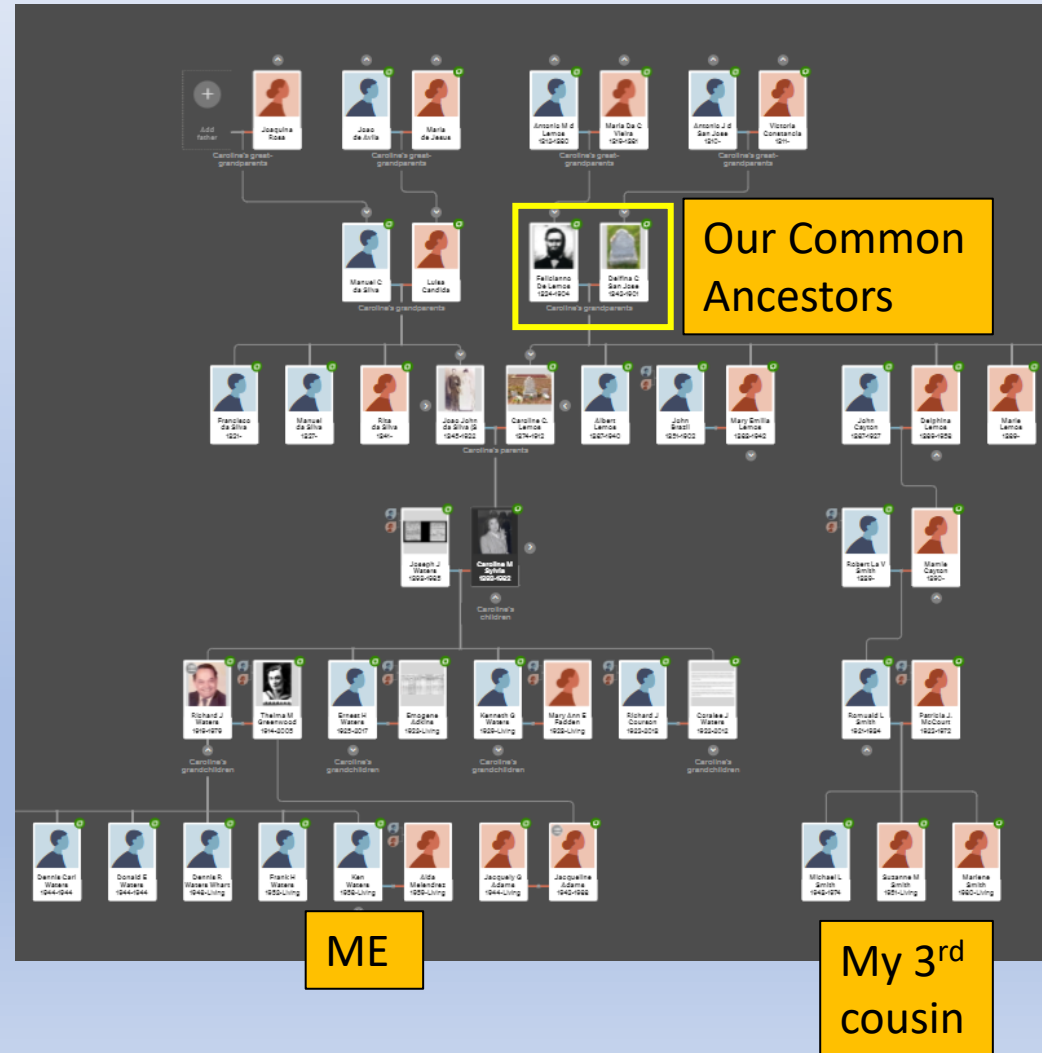


						Great-Great-Grandparent		GGGG Aunt / Uncle															
						Great-Great-Grandparent		GGG Aunt / Uncle															
Half GG-Aunt / Uncle 187 12 – 383		Great-Grandparent 881 464 – 1486					Great-Great-Aunt / Uncle 427 191 – 885																
Other Relationships																							
		Half Great-Aunt / Uncle 432 125 – 765		Grandparent 1766 1156 – 2311				Great-Aunt / Uncle 914 251 – 2108		6C 21 0 – 86													
		Half Aunt / Uncle 891 500 – 1446		Parent 3487 3330 – 3720			Aunt / Uncle 1750 1349 – 2175		6C1R 16 0 – 72														
Half 3C 61 0 – 178		Half 2C 117 9 – 397		Half 1C 457 137 – 856		Half Sibling 1783 1317 – 2312		Sibling 2629 2209 – 3384		SELF		1C 874 553 – 1225		2C 233 46 – 515		3C 74 0 – 217		4C 35 0 – 127		5C 25 0 – 94		6C2R 17 0 – 75	
Half 3C1R 42 0 – 165		Half 2C1R 73 0 – 341		Half 1C1R 226 57 – 530		Half Niece / Nephew 891 500 – 1446		Niece / Nephew 1750 1349 – 2175		Child 3487 3330 – 3720		1C1R 439 141 – 851		2C1R 123 0 – 316		3C1R 48 0 – 173		4C1R 28 0 – 117		5C1R 21 0 – 79		7C 13 0 – 57	
Half 3C2R 34 0 – 96		Half 2C2R 61 0 – 353		Half 1C2R 145 37 – 360		Half Great-Niece / Nephew 432 125 – 765		Great-Niece / Nephew 910 251 – 2108		Grandchild 1766 1156 – 2311		1C2R 229 43 – 531		2C2R 74 0 – 261		3C2R 35 0 – 116		4C2R 22 0 – 109		5C2R 17 0 – 43		7C1R 13 0 – 53	
Half 3C3R		Half 2C3R		Half 1C3R 87 0 – 191		Half GG-Niece / Nephew 187 12 – 383		Great-Great-Niece / Nephew 427 191 – 885		Great-Grandchild 881 464 – 1486		1C3R 123 0 – 283		2C3R 57 0 – 139		3C3R 22 0 – 69		4C3R 29 0 – 82		5C3R 11 0 – 44		8C 12 0 – 50	

<https://dnainter.com/tools/sharedcmv4>

Goal: Find the Most Recent Common Ancestor (MRCA)

- Finding common ancestors allows determination of exact relationship
- Once this is found then we can compare to other matches to help see how they are related as well



What is a Chromosome Browser?

- Comparison of 2 DNA kits showing shared DNA by chromosome
- Available on:
 - Family Tree DNA
 - My Heritage DNA
 - 23 and Me
 - Living DNA
 - GEDMatch



Example of my DNA compared to a 1st cousin once removed showing shared segments

TIP: chromosome browsers can be useful for more advanced and detailed comparisons of DNA matches



First steps

- Review your matches, strongest (highest centimorgans) first
- Try to identify the closest matches
 - Do you know them?
 - How are you related to them?
- Enter notes about what you know about them
- Use Tag Groups (available on Ancestry and My Heritage) to identify them




 Add/edit groups
 1st cousin, son of paternal uncle Ernie. 716/23.

Kenneth Richard Waters's DNA Matches


[List](#) [Map](#)

Filter by: [Unviewed](#) [Common ancestors](#) [Messaged](#) [Notes](#) [Trees](#) [Shared DNA](#) [Groups](#) [Search](#) | [Settings](#)


Parent/Child

 Joan Anita Craddock	Parent/Child Shared DNA: 3,474 cM across 46 segments i	1,797 People Common ancestor	Add/edit groups Mother, 3474/46.
	Parent/Child Shared DNA: 3,470 cM across 60 segments i	2,185 People Common ancestor	Mother's Side Add/edit groups Daughter, 3470/60.
	Parent/Child Shared DNA: 3,466 cM across 62 segments i	2,185 People Common ancestor	Mother's Side Add/edit groups Son, 3466/62.



Full Sibling

	Brother Shared DNA: 2,491 cM across 63 segments i	2,185 People Common ancestor	Mother's Side Add/edit groups Brother, 2491/63.
---	---	--	--

Close Family

 Ernest Howard Waters	Close Family--1st Cousin Shared DNA: 1,583 cM across 41 segments i	2,185 People Common ancestor	Add/edit groups Paternal Uncle, 1583/41.
---	--	--	---

1st Cousin

	1st-2nd Cousin Shared DNA: 941 cM across 36 segments i	5 People Common ancestor	Add/edit groups [redacted]
	1st-2nd Cousin Shared DNA: 716 cM across 23 segments i	2,185 People Common ancestor	Add/edit groups 1st cousin, son of paternal uncle Ernie. 716/23.

2nd Cousin

[+ Create custom group](#)

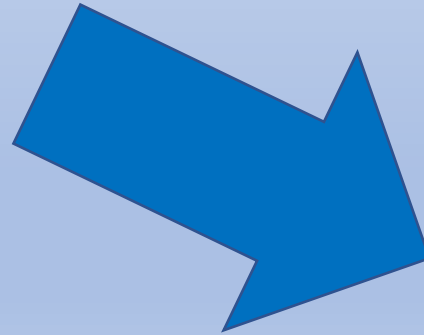
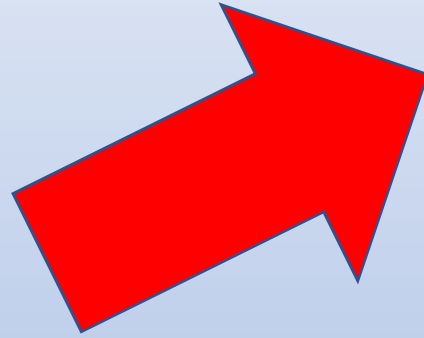
<input type="checkbox"/>	★ Starred matches	
<input type="checkbox"/>	1 - Waters/Unknown	✎
<input type="checkbox"/>	2 - Berkeley/Wheeler	✎
<input type="checkbox"/>	3 - Sylvia/Correia	✎
<input type="checkbox"/>	4 - Lemos/San Jose	✎
<input type="checkbox"/>	5 - Craddock/Spivey	✎
<input type="checkbox"/>	6 - Wood/Thurman	✎
<input type="checkbox"/>	7 - Unknown/Unknown	✎
	MYSTERY	
<input type="checkbox"/>	8 - Spencer/Cummings	✎
<input type="checkbox"/>	Dad's non-Portuguese side (...)	✎
<input checked="" type="checkbox"/>	Inner Family	✎
<input type="checkbox"/>	Mystery Network #8	✎
<input type="checkbox"/>	Mystery Network #8 -- Engli...	✎

Divide and conquer

- On Ancestry, Using Tag Groups in combination with Shared Matches:
 - Group your matches by dividing them
 - First, Paternal vs. Maternal side
 - Then, work on Grandparents
 - Continue to divide matches

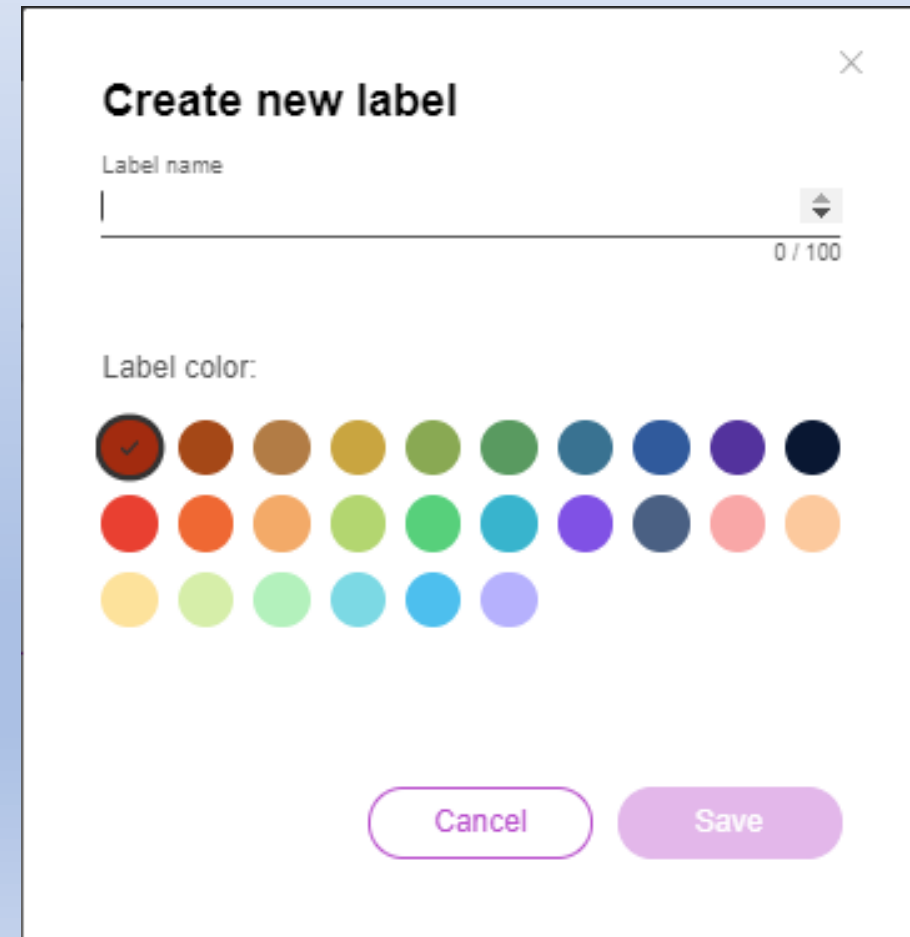
★ Starred matches (1)
0 - Distant Saved Matc... (17)
1 - Waters/Unknown (3)
2 - Berkley/Wheeler (25)
3 - Sylvia/Correia (48)
4 - Lemos/San Jose (112)
5 - Craddock/Spivey (122)
6 - Wood/Thurman (170)
7 - Unknown/Unknown ... (6)
8 - Spencer/Cummings (126)
Dad's non-Portuguese... (98)
Inner Family (14)
Low matches (6-8) (0)
Mystery Network #6 (17)
Mystery Network #7 -- ... (10)
Mystery Network #8 -- ... (35)

The goal: sort your matches into common groups



My Heritage Labels

- My Heritage also has feature similar to Ancestry Tag Groups
- 30 “dots” versus 24 on Ancestry



The screenshot shows a 'Create new label' dialog box. At the top right is a close button (X). Below the title is a text input field for 'Label name' with a character count '0 / 100' on the right. Underneath is a 'Label color:' section with a grid of 30 colored circles. The first circle in the top row is selected, indicated by a checkmark. At the bottom are two buttons: 'Cancel' and 'Save'.

Create new label ✕

Label name 0 / 100

Label color:

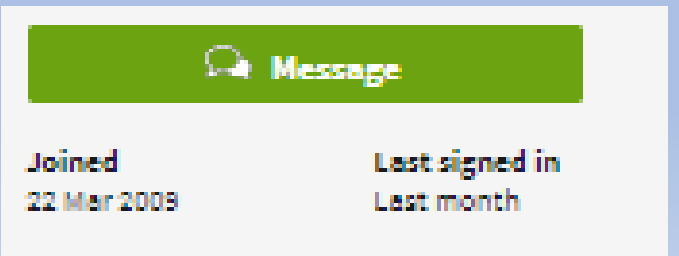
30 color options (3 rows):

- Row 1: 10 colors (dark grey with checkmark, brown, tan, gold, olive, green, teal, blue, purple, black)
- Row 2: 10 colors (red, orange, light orange, lime green, green, cyan, blue, dark blue, pink, peach)
- Row 3: 6 colors (yellow, light green, mint green, light blue, blue, lavender)

Cancel Save

Next steps

- Build your online tree
 - Increases chances to match other test takers---remember, keep it lean
- Upload to other services including GedMatch (basic services are free)
- Start going through your matches, one-by-one
 - “Divide and Conquer” --- sort your matches into the bins of your family tree (start with dividing mother vs. father matches then build back up the tree)
- Communicate with your matches --- email, messaging --- there’s power in sharing
- Learn more
 - Free classes, online and at the library
 - Facebook Groups – Genetic Techniques



It's not genetic genealogy---without the genealogy

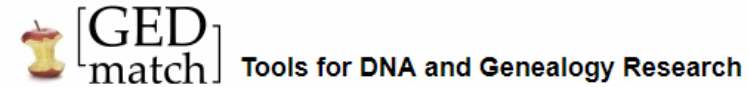
- DNA comparisons are great but mean nothing without genealogical context
- This means:
 - FAMILY TREES!
- Suggestions:
 - Be sure to always have a good tree, 5+ generations if possible
 - Keep it public and attached to your DNA kit (you can always have other trees private)
 - Backup your tree (store on local software)
 - Export your tree in GEDCOM formatUpload your tree (GEDCOM file) to GedMatch and WikiTree



Other Useful Tools

GEDmatch

- A mostly-free public website which accepts DNA data from all 5 testing companies
- <http://gedmatch.com>
- Has more DNA match analytical tools than any of the 5 testing companies
 - Including triangulation
 - Auto-clustering



Welcome to GEDmatch. If you are already registered, just enter your login ID and password in the place provided below.

If you are not previously registered, click on the registration link near the bottom of this page. You will be asked to provide a valid email address and a password. After you are registered, you will be required to accept the GEDmatch Terms of Service. You can read the Terms of Service before you register by clicking on the link at the bottom of this page.

GEDmatch provides applications for comparing your DNA test results with other people. There are also applications for estimating your ancestry. Some applications are free. More advanced applications require membership in the GEDmatch Tier1 program at \$10 per month.

If you have any questions or comments, you can reach us at GEDmatch@Gmail.com

Log In

Email Address:
Password:

Log in

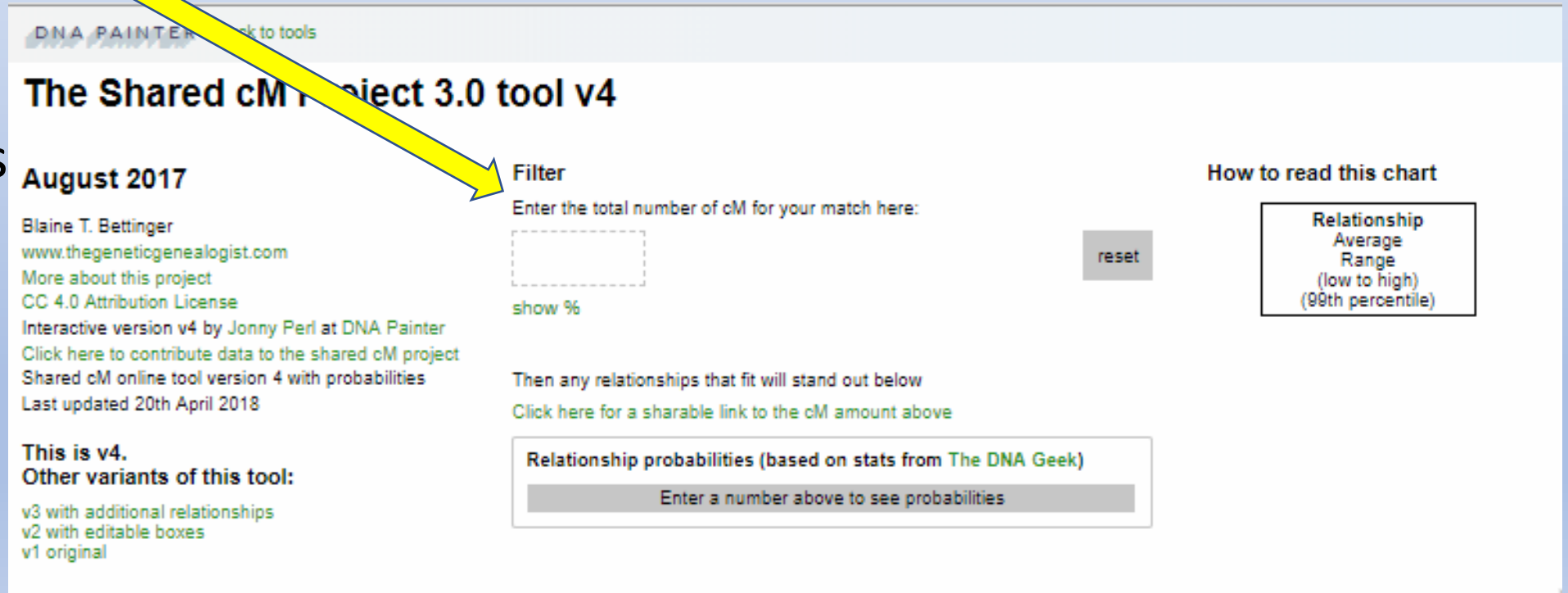
Not Registered? Click [HERE](#) to register at the main site - when registered return to this page to access genesis.gedmatch.com

Forgot your password or wish to change your password? Click [HERE](#) to recover your password at the main site - when recovered return to this page to access genesis.gedmatch.com

Site policy: Click [HERE](#)

Dnapainter's shared cm project

- Enter cM value
- See all the possibilities



DNA PAINTER [Link to tools](#)

The Shared cM Project 3.0 tool v4

August 2017

Blaine T. Bettinger
www.thegeneticgenealogist.com
[More about this project](#)
[CC 4.0 Attribution License](#)
[Interactive version v4 by Jonny Perl at DNA Painter](#)
[Click here to contribute data to the shared cM project](#)
Shared cM online tool version 4 with probabilities
Last updated 20th April 2018

This is v4.
Other variants of this tool:
[v3 with additional relationships](#)
[v2 with editable boxes](#)
[v1 original](#)

Filter
Enter the total number of cM for your match here:

[show %](#)

[reset](#)

Then any relationships that fit will stand out below
[Click here for a sharable link to the cM amount above](#)

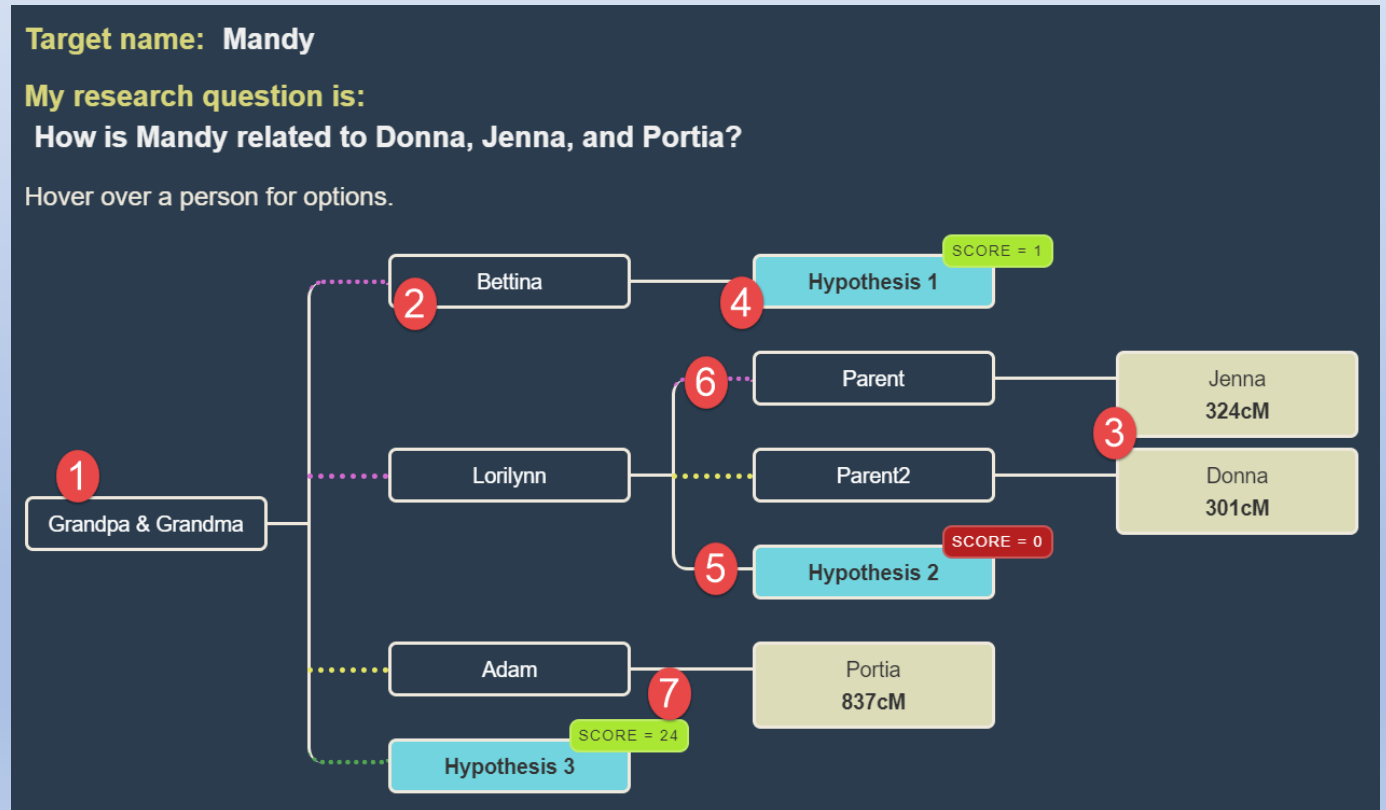
Relationship probabilities (based on stats from [The DNA Geek](#))

How to read this chart

Relationship
Average
Range
(low to high)
(99th percentile)

DNAPainters “WATO” Tool

- WATO=What Are The Odds?
- Test hypotheses using DNA test strength levels (measured in cMs)



Get what you can get from shared matches


- In this case due to good sampling of shared matches I was able to isolate the match to my maternal grandfather
- Some of these are 1st and 2nd cousins to Joan and use the cM values for each match help narrow down the precise line

How are you and [redacted] related?


Common Ancestors 🌳

According to Ancestry member trees, these are the common ancestors that connect you and [redacted]. View a common ancestor to see the relationship path that connects you.

[redacted] could be your 1st cousin 1x removed through:



Charles Noble Craddock
Great-grandfather
1868-1950
[View Relationship](#)



Mary Ellen "Molly" Wood
Great-grandmother
1870-1930
[View Relationship](#)

CLOSE FAMILY

Open with 1,255 people View Match

★ [redacted] Granddaughter, 1952/40
Possible range: Close family - 1st cousins
Confidence: Extremely High

★ [redacted] Grandson, 1879/41.
Possible range: Close family - 1st cousins
Confidence: Extremely High

1ST COUSIN

★ [redacted] (managed by [redacted]) Joan's 1st cousin, son of her aunt Laverne Craddock. 812/38.
Possible range: 1st - 2nd cousins
Confidence: Extremely High

2ND COUSIN

★ [redacted] 1C1R, 443/16. Granddaughter of Walter Craddock, Joan's uncle.
Possible range: 1st - 2nd cousins
Confidence: Extremely High
Last logged in 2 days ago

★ [redacted] Joan's 1st cousin 1x removed, grandson of her aunt Laverne. 429/25.
Possible range: 1st - 2nd cousins
Confidence: Extremely High
Last logged in Aug 27, 2017

★ [redacted] 354/21, 1C1R, grandson of her Aunt [redacted].
Possible range: 1st - 2nd cousins
Confidence: Extremely High
Last logged in Aug 17, 2017


★ [redacted] Craddock 278 cM, 14 segs.
Possible range: 2nd - 3rd cousins
Confidence: Extremely High
Last logged in Sep 28, 2017

★ [redacted] (managed by [redacted]) 263/17, 1C1R granddaughter of Joan's Aunt Laverne.
Possible range: 2nd - 3rd cousins
Confidence: Extremely High
Last logged in Aug 2, 2018

★ [redacted] 205/12, 1C2R, grandson of Beverly Auld, great-grandson of Joan's Aunt Laverne.
Possible range: 2nd - 3rd cousins
Confidence: Extremely High
Last logged in Aug 4, 2018

Resources

- Leeds Method (use a spreadsheet to divide your matches into the 4 grandparent groups)
- <https://www.danaleeds.com/the-leeds-method/>



DANA LEEDS

CREATOR OF THE LEEDS METHOD


[WELCOME](#) [BLOG](#) [THE LEEDS METHOD](#) [ABOUT DANA](#) [CONTACT](#)

The Leeds Method


If you want to learn about the Leeds Method, you've come to the right place! On this page, I have linked to my posts about the Leeds Method and the automated tools based on this method.

Background

In July 2018, I worked with a man who had a huge DNA surprise: his parents were not his biological parents. While helping him identify his biological family, I created the Leeds Method. This method uses a spreadsheet to sort DNA matches into color groups based on shared ancestors. It often creates four groups of DNA matches based on four grandparent lines.




This revolutionary method helps those searching for biological parents and other close biological family members, but it also helps traditional genealogists work with more distant family mysteries.



[Subscribe](#)

Enter your email address to subscribe and receive notifications of new posts by email.

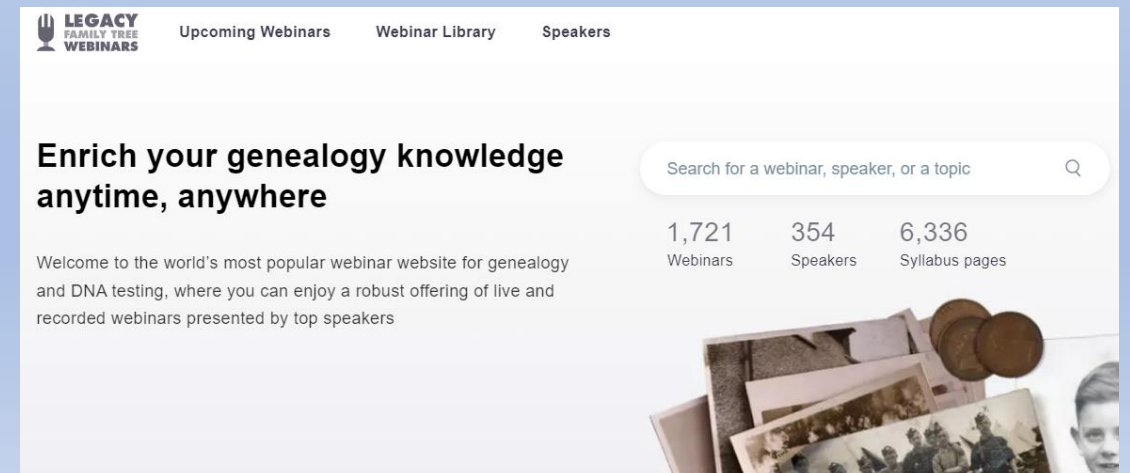
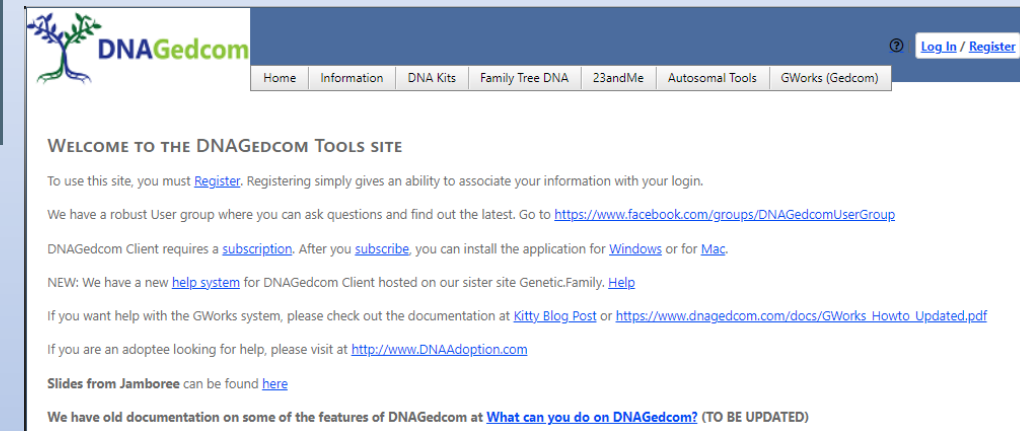
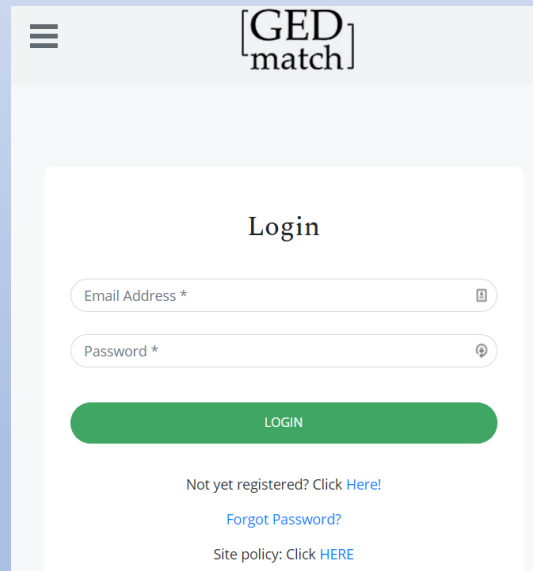
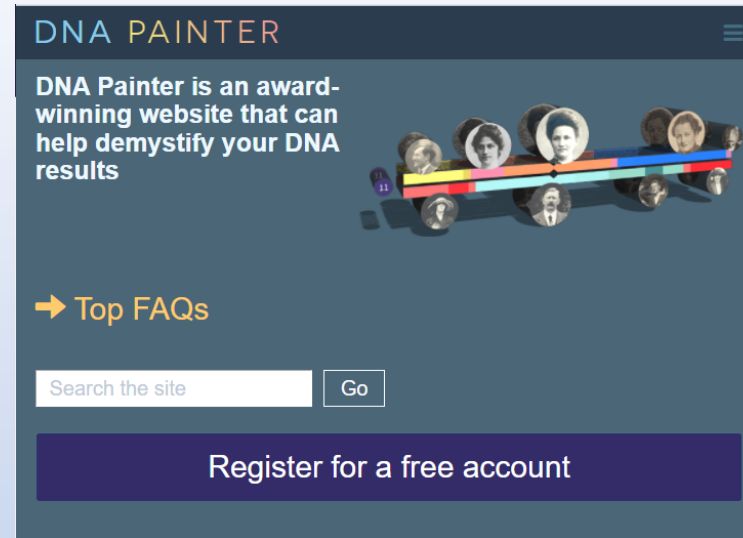


[Subscribe](#)

Join 3,318 other subscribers

Resources

- GEDMatch.com
- DNAPainter.com
- DNAGedcom
- Familysearch.com (to research sources)
- Legacy Family Tree webinars (free for 7 days)
- FindAGrave.com
- ISOGG.org Wiki
- WikiTree.com
- Facebook Group: Genetic Genealogy Tips & Techniques
- Local groups: (for example) Phoenix East Valley DNA Group [on Facebook]



What about....

- Artificial Intelligence (AI)
 - AI is becoming increasingly useful to use with analyzing DNA results
 - ChatGPT is one of the main tools
 - This field is changing rapidly and users are exploring ways to creatively use AI to help with DNA analysis
- Follow Steve Little
(<https://aigenealogyinsights.com/blog/>) or Dana Leeds
(<https://www.danaleeds.com/aigenealogy/>) for more info.

The screenshot shows the profile of Steve Little on the RootsTech website. At the top left is the 'rootstech by FamilySearch' logo, and at the top right is the 'RootsTec' logo. Below the logos is a navigation bar with a 'Back' button. The profile section features a circular profile picture of Steve Little, a man with glasses and a blue shirt. To the right of the photo, it says 'AI Program Director' and 'Steve Little'. Below this is a bio: 'Steve Little is the AI Program Director for the National Genealogical Society and has lifelong passions for language, technology, and genealogy. He completed graduate-level courses in applied linguistics, specializing in natural language processing and computational linguistics, two pillars of today's large language models of AI; his first career was spent in and around libraries...'. There is a 'MORE' link below the bio. Below the bio is a 'View Website' button. At the bottom of the profile section are social media links for LinkedIn, Facebook, and X. Below the profile section is a section titled 'All Sessions and Languages' which displays four session cards. Each card has a video thumbnail, a title, a speaker list, and a '+ Playlists' button. The sessions are: 1. 'Learning to Use AI Tools: Taking Your Prompting Skills to the Next Level' by Steve Little (59:50). 2. 'Guidelines for the Responsible Use of Artificial Intelligence (AI...)' by David Ouimette, Steve Little, Mark Thompson, and Lynn Broderick, Kathy... (1:00:17). 3. 'Beginning with AI Genealogy: Getting Started with Generative Artificial Intelligence in 2025' by Steve Little (59:51). 4. 'AI Genealogy: Year Two: The 2025 Outlook: Where We've Been, Where We'r...' by Steve Little (59:34).

What about...

- Investigative Genetic Genealogy (IGG)
 - Used with DNA samples for the past few years to identify scores of:
 - Deceased individuals
 - Criminal suspects
- Lots of news coverage (starting with the Golden State Killer case)
- More:
https://isogg.org/wiki/Investigative_genetic_genealogy_FAQs



Quote of the Day

*“DNA doesn't lie. But
it sure can be
misinterpreted.”*

– Ken Waters



Presentations:

<http://familytreeaz.com/Presentations>



Contact:

Ken Waters

E-Mail: **satwatcher.gen@gmail.com**

Google Voice Phone: (480) 331-5889

