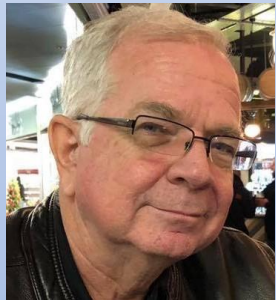


Intro to DNA and Genetic Genealogy



July 15, 2023
Mesa Red Mountain Library



Ken waters
@familytreeaz

<http://familytreeaz.com/presentations>

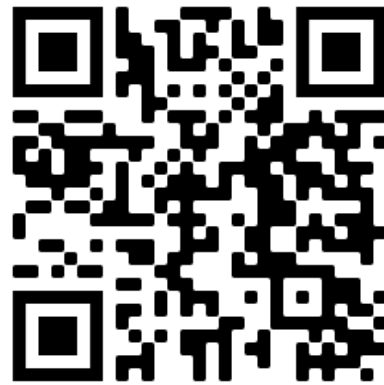
Satwatcher.gen@gmail.com



Illustrations of.com #60477

All slides and handouts can be found at:

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

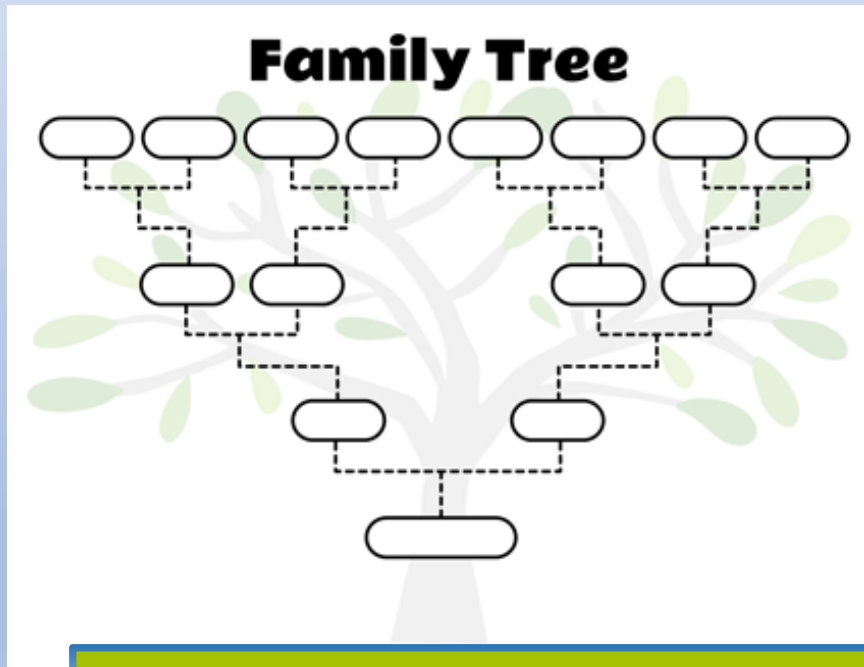


QR Code: take photo to
open to presentations

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.

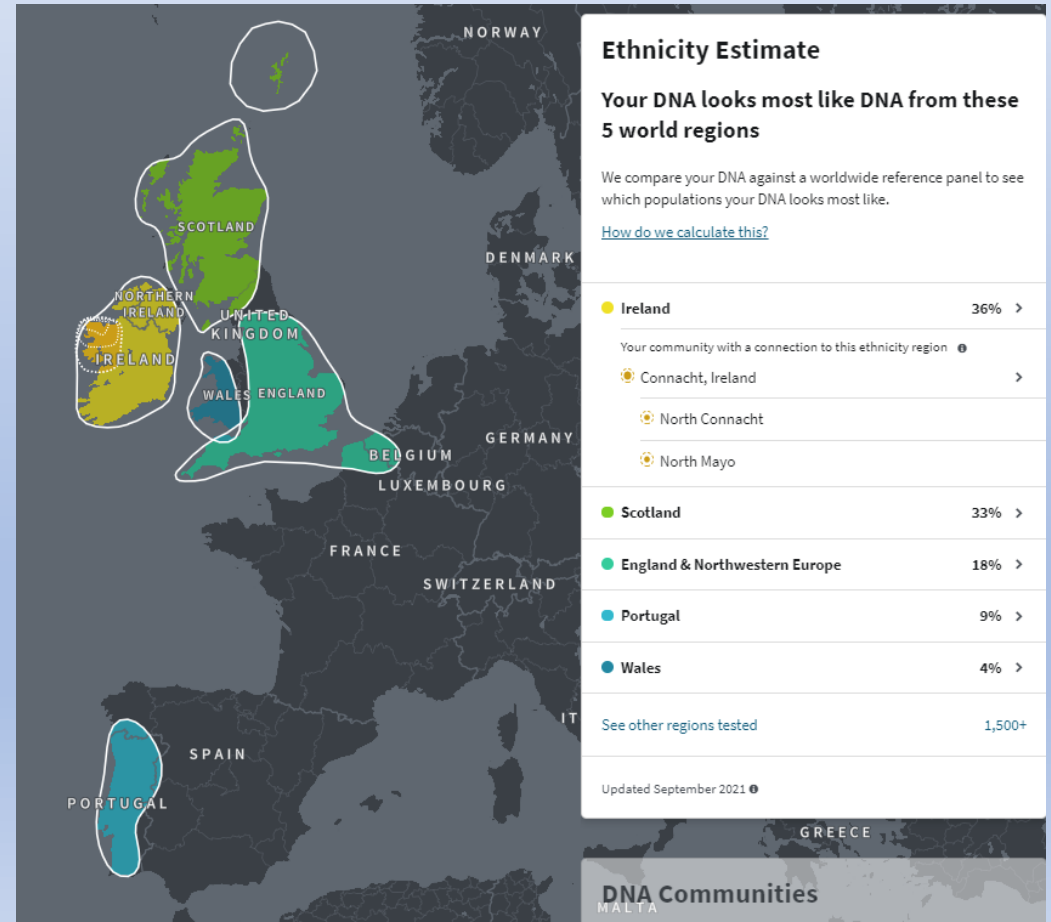
First step: answer some questions

- 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??

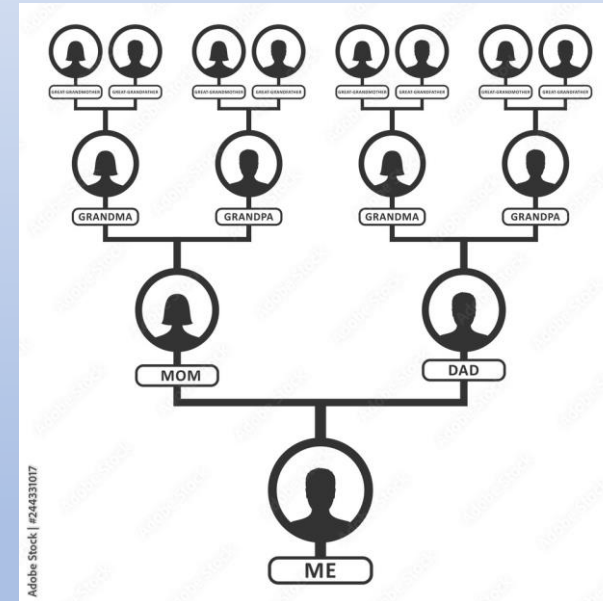
2. Curious about health aspects
E.g., Do I carry the BRCA gene?



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

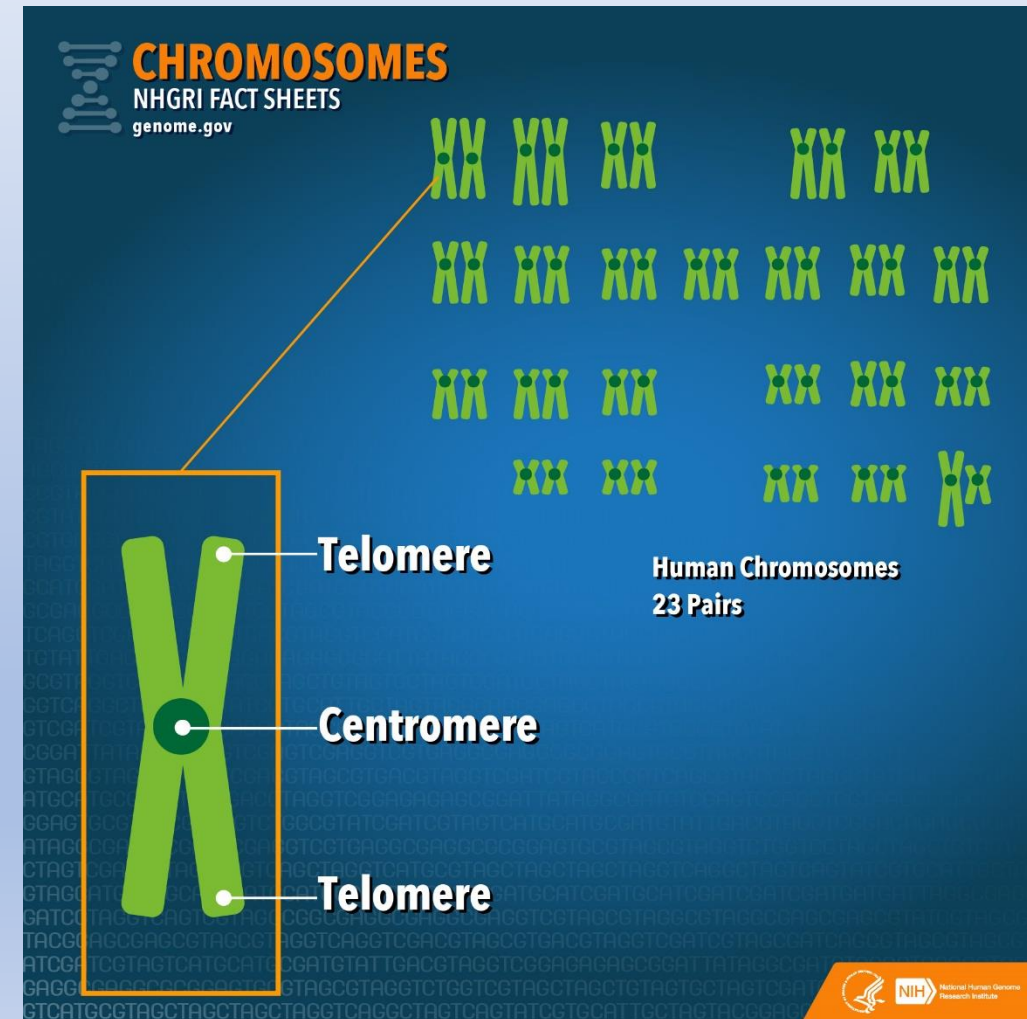
- 22 chromosomes
- + 1 sex chromosome “X/Y”

- **Y-DNA**

- **Mitochondrial DNA (mtDNA)**

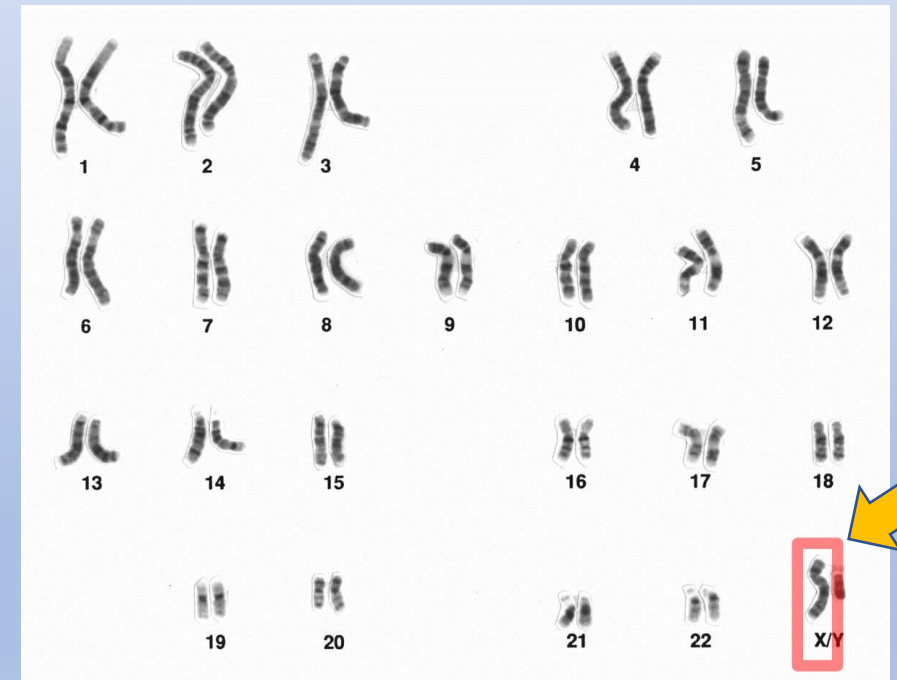
What is DNA? -- chromosomes

- 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



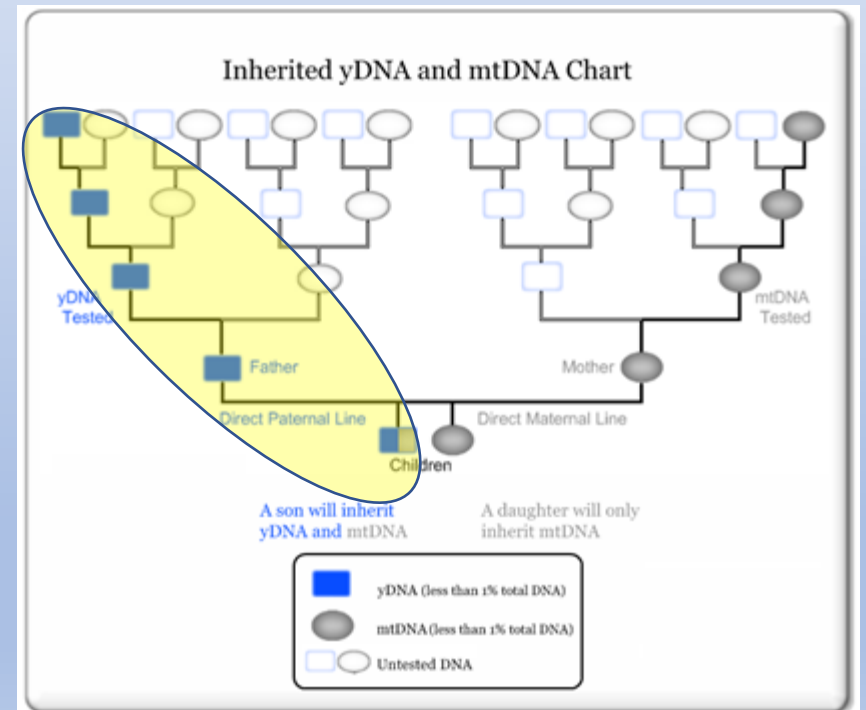
What is X-DNA?

- 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

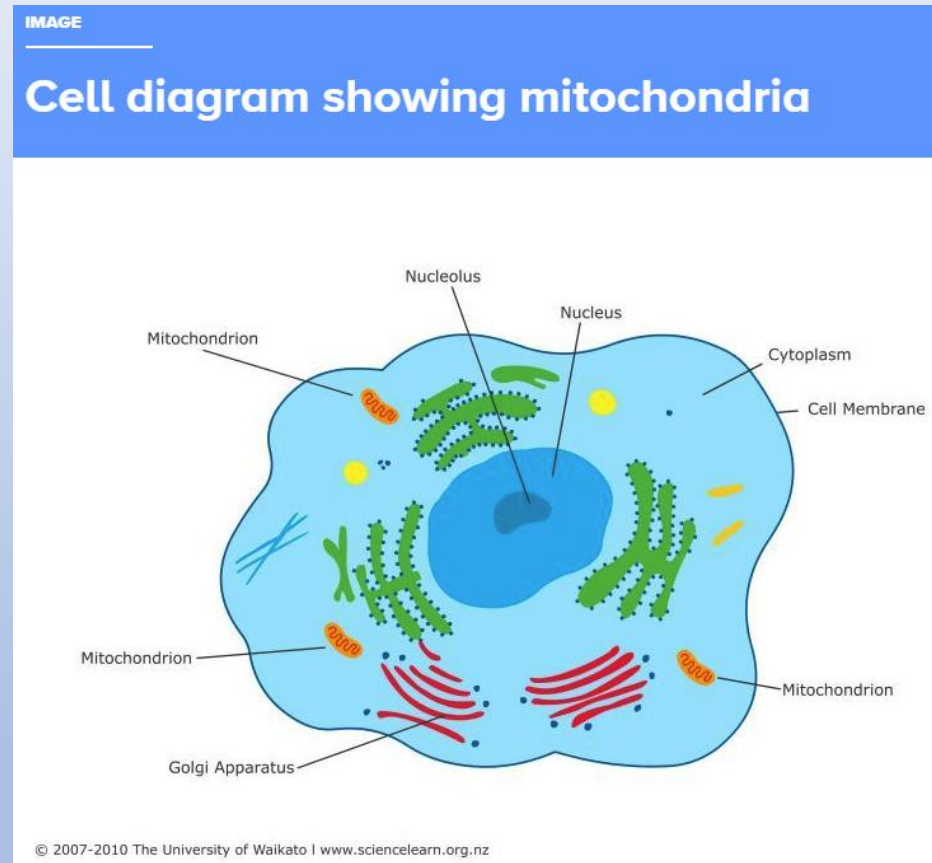
- ***ONLY*** found in males
- Only passed along the patrilineal line
 - Father's father's father's....[etc.]
- Females wanting to test Y-DNA should find a male in the line that they want to test (e.g., an uncle, brother, father, 1st cousin)



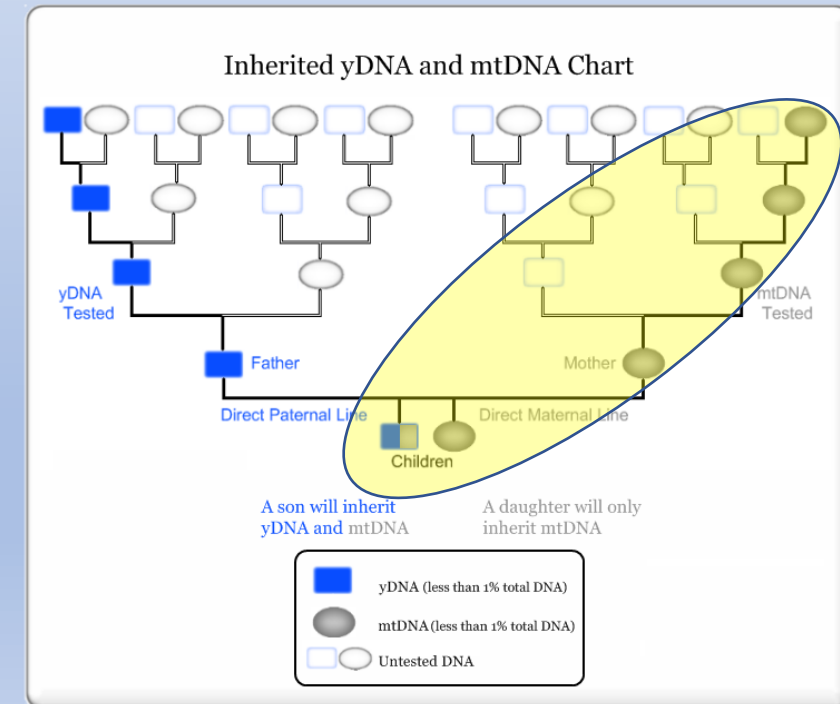
Source: <https://phillipsdnaproject.com/faq-sections/304-ancestor-dna-chart>

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.]



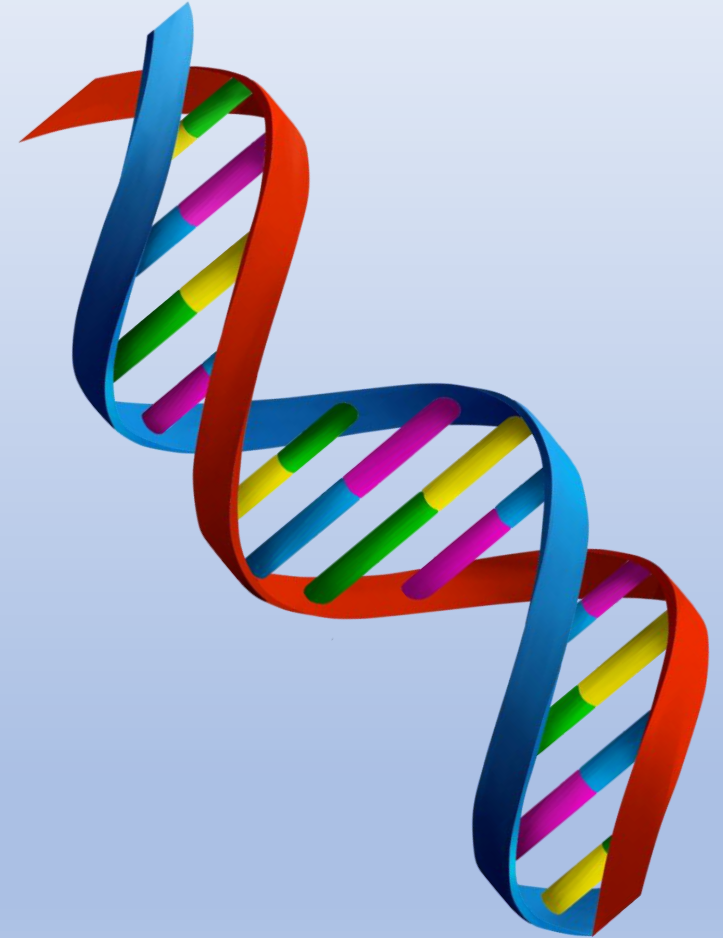
Tip: Mitochondrial DNA is often abbreviated to mtDNA



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 4 known and recommended companies at this time:
 - **Ancestry**
 - **Family Tree DNA**
 - **MyHeritage**
 - **23andMe**
- One more: Living DNA (**not recommended** at this time due to small database and lack of tools)
- There are others out there but not recommended for a variety of reasons



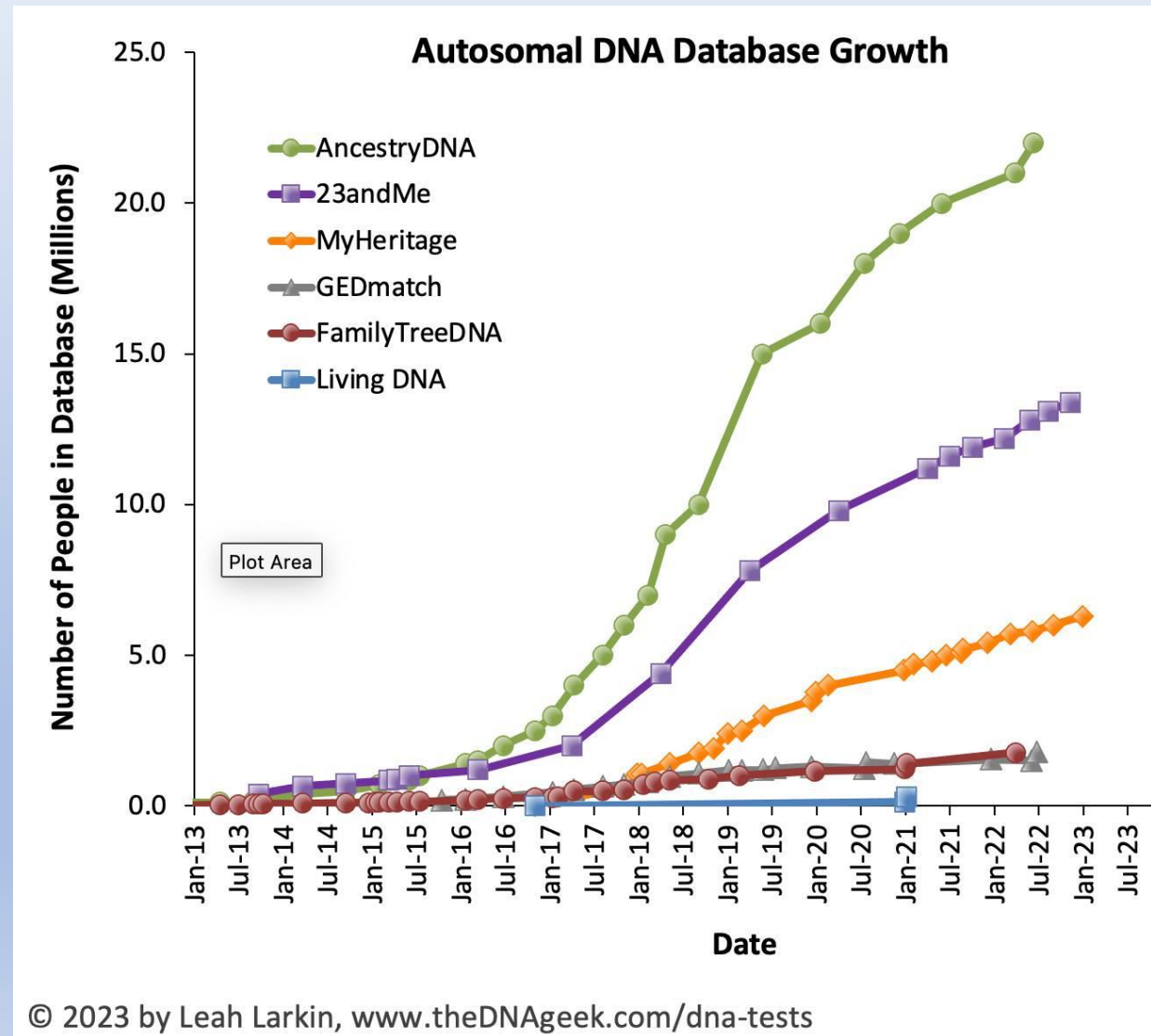
What to look for with testing companies

- 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

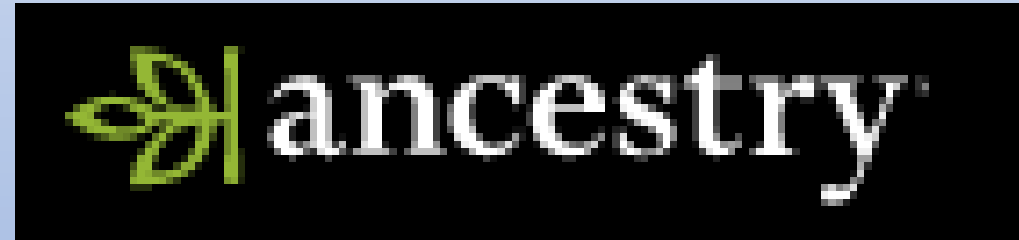


Deeper Dive into the Testing Companies

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

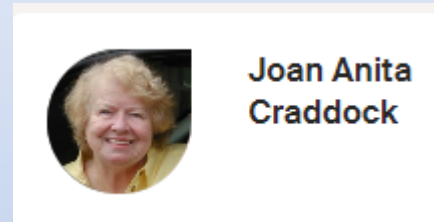
Aspects of Each Testing Company

- 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



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

Public linked tree
2,843 People
Common ancestor



Mother, 3474/46.

A screenshot of the Ancestry DNA matches page for "Ken Waters's DNA Matches". The page title is "Ken Waters's DNA Matches" with a sub-header "View [DNA] Waters Tree Email:satwatcher.gen@gmail.com". Below the title are navigation tabs: "All matches" (selected), "By parent", "BETA", "By ancestor", and "By location". A filter bar shows "Filter by:" with options: "Unviewed", "Common ancestors", "Notes", "Trees", "Shared DNA", and "Groups". A search and sort icon is on the right. The main content is a list of matches, each with a profile picture, name, relationship, shared DNA, side view, tree link, common ancestor hint, and a "View match" button. The matches listed are:

- Joan Anita Craddock: Mother, 3,474 cM | 50% shared DNA, Maternal side. Public linked tree, 2,843 People, Common ancestor. View match.
- Frank Waters: Daughter, 3,470 cM | 50% shared DNA, Both sides. Public linked tree, 2,843 People, Common ancestor. View match.
- William Waters: Son, 3,466 cM | 50% shared DNA, Both sides. Public linked tree, 2,843 People, Common ancestor. View match.
- Frank Waters: Brother, 2,491 cM | 44% - 51% shared DNA, Both sides. Public linked tree, 2,843 People, Common ancestor. View match.
- Frank Waters: Uncle, 1,583 cM | 23% shared DNA, Paternal side. Public linked tree, 2,843 People, Common ancestor. View match.
- Ken Waters: 1st cousin, 941 cM | 13% shared DNA, Paternal side. Public linked tree, 27 People, Common ancestor. View match.
- Michael Waters: 1st cousin, 716 cM | 10% shared DNA, Paternal side. Public linked tree, 2,843 People, Common ancestor. View match.
- Frank Waters: 1st cousin, 604 cM | 9% shared DNA, Paternal side. Public linked tree, 11 People, Common ancestor. View match.
- Ken Waters: 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: schwatdchergen@gmail.com

All matches **By parent** **IEEA** By ancestor By location

Updated Dec 2022

Maternal

16,621 matches

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

Common communities: Missouri Settlers

Ethnicity inheritance: Maternal

Paternal

9,214 matches

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

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

Ethnicity inheritance: Paternal

Both sides

3 matches

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

Why are some matches related to both parents? They could descend from both parents, be distant relatives who have segments matching both sides, or come from a small population (like an island) that both parents belong to.

Unassigned

2,284 matches

Why are some matches unassigned? If a match appears in this category, it could be because their test was processed after our last update or because we don't have enough information to assign them to one parent or the other.

ThruLines

Filters

ThruLines®
ThruLines shows you 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, 1928-2015)

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, 1866-)
- Irene Agnes Berkley (Great-grandmother, 1868-1907)
- Joao John da Silva (Sylvia) (Great-grandfather, 1845-1922)
- Caroline C. Lemos (Great-grandmother, 1874-1913)

2nd Great Grandparents

- Charles Noble Craddock (Great-grandfather, 1868-1950)
- Mary Ellen Wood (Great-grandmother, 1870-1930)
- Nellie Julia Spencer (Great-grandmother, 1878-1932)
- 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, 1894-1904)
- Deifina 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

The screenshot shows the 'Shared Matches' page for a match with 'S.R.'. At the top, there is a profile picture of S.R. and a pink circle with 'SR'. Below this, it says 'You and S.R.', 'S.R.'s test is managed by:', '4th - 6th Cousin | Maternal side', and '< 1% shared DNA: 51 cM across 2 segments'. There are buttons for 'Connect to tree', 'Message', and 'Edit Relationship'. Below these are options to 'Add/edit groups' and a group named 'GM. Raymond,Schell,Farrell,Lander...'. The interface has tabs for 'Trees', 'Ethnicity', and 'Shared Matches' (which is selected). A filter bar shows 'Unviewed', 'Common ancestors', 'Notes', 'Trees', and 'Groups'. The main content area is titled 'Distant Family' and lists several matches with their relationship to the user, shared DNA amount, and whether they are linked to a tree. Each match has a 'Do you recognize them?' prompt with 'Yes' and 'Learn more' buttons.

Match Name	Relationship	Shared DNA	Tree Status	Recognize?
[Name]	4th - 6th Cousin 41 cM < 1% shared DNA Maternal side	41 cM	No Trees	Do you recognize them? Yes Learn more
[Name]	4th - 6th Cousin 29 cM < 1% shared DNA Maternal side	29 cM	Private unlinked Tree	Do you recognize them? Yes Learn more
[Name]	4th - 6th Cousin 34 cM < 1% shared DNA Maternal side	34 cM	Unlinked Tree	Do you recognize them? Yes Learn more
[Name]	4th - 6th Cousin 29 cM < 1% shared DNA Maternal side	29 cM	Unlinked Tree	Do you recognize them? Yes Learn more
[Name]	4th - 6th Cousin 29 cM < 1% shared DNA Maternal side	29 cM	Unlinked Tree	Do you recognize them? Yes Learn more
[Name]	4th - 6th Cousin 29 cM < 1% shared DNA Maternal side	29 cM	Public linked tree 4 People	Do you recognize them? Yes Learn more
[Name]	4th - 6th Cousin 29 cM < 1% shared DNA Maternal side	29 cM	Public linked tree 45 People	Do you recognize them? Yes Learn more

Aspects of Each Testing Company

- 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

23 and Me Matches

- Name
- Amount of Shared DNA (using % rather than centiMorgans)
- Relationship estimate

DNA Relatives

Get started with your predicted relationships, then connect and message to learn more.

Filters Showing 1503 of 1503 relatives Sort by Strength of Relationship

Search keywords
Name, location, notes

Reset

Notifications

Profile features and activity

Mother's side/Father's side

Ancestor birthplaces

Connections

Family names

☆ MC	Michelle Chapman	1st Cousin 12.88% DNA shared, 28 segments Connected
★ MH	Michelle Hanson	1st Cousin, Once Removed 5.04% DNA shared, 15 segments
☆ DT	David Taylor	1st Cousin, Once Removed 3.10% DNA shared, 9 segments Invitation sent
☆ CR	Chris	2nd Cousin 3.37% DNA shared, 13 segments Invitation sent
☆ TW	Teresa Williams	2nd Cousin 3.23% DNA shared, 12 segments Invitation sent
☆ SM	Sharon Morgan	2nd Cousin 3.09% DNA shared, 15 segments Connected
☆ ME	Michelle Mendenhall	2nd Cousin 2.84% DNA shared, 12 segments Connected
☆	Michelle Spivey (Lambert)	2nd Cousin 2.68% DNA shared, 10 segments Connected
★ HS	Helen Hutchinson	2nd Cousin 2.55% DNA shared, 7 segments Connected
☆	Helen Thomas	2nd Cousin 2.41% DNA shared, 9 segments Connected
☆ FB	Frank Bailey	2nd Cousin, Once Removed 2.59% DNA shared, 8 segments Invitation sent
☆ CW	Christine Williams	2nd Cousin, Once Removed 2.25% DNA shared, 7 segments Invitation sent

23 and Me Matches in Common

- Relatives in Common can be very instrumental to determining how you are related to a match

You have Relatives in Common
Each Relative in Common shares at least one small segment of DNA with Michael.

Relative in common	You	Michael	DNA Overlap ⓘ
MH	1st Cousin, Once Removed (5.04)	Distant Cousin (0.08)	No
CR	2nd Cousin (3.37)	Sister (49.67)	Request sent
[User]	2nd Cousin (2.41)	3rd Cousin (1.55)	Yes
CW	2nd Cousin, Once Removed (2.25)	3rd Cousin (1.14)	Request sent
[User]	2nd Cousin, Once Removed (2.19)	Daughter (50.00)	Yes
BV	3rd Cousin (1.01)	3rd Cousin (0.85)	Yes
DH	3rd Cousin (0.90)	5th Cousin (0.11)	Yes
JM	3rd Cousin (0.78)	3rd Cousin (0.62)	Yes
LV	3rd Cousin (0.67)	4th Cousin (0.45)	Yes
LA	3rd Cousin (0.66)	4th Cousin (0.41)	Yes

1 2 3 4 5 6 7 8 9 10 Next >

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...

Name	Ancestral Surnames	Haplogroup	Relationship Range	Shared DNA	Longest Block	X Match	Match date
Waters	Not Provided	Y-DNA: N/A mtDNA: N/A	Parent/Child Link on Family Tree	3565 cM	284 cM	No Match	May 12 2021
Joan Waters	Not Provided	mtDNA: N/A	Parent/Child MOTHER	3565 cM	284 cM	181 cM	May 12 2021
Waters	Not Provided	mtDNA: N/A	Parent/Child Link on Family Tree	3557 cM	284 cM	181 cM	May 12 2021
Waters	Not Provided	Y-DNA: N/A mtDNA: N/A	Full Sibling Link on Family Tree	2634 cM	198 cM	122 cM	May 12 2021
Ernest Waters	Not Provided	Y-DNA: N/A mtDNA: N/A	Half Sibling, Uncle/Aunt/Niece/Neph... UNCLE	1655 cM	168 cM	No Match	May 12 2021
Waters	Not Provided	Y-DNA: N/A mtDNA: N/A	1st Cousin - 2nd Cousin, Great/Half... Link on Family Tree	767 cM	129 cM	No Match	May 14 2021
Donna	Not Provided	mtDNA: N/A	1st Cousin - 2nd Cousin, Great/Half... Link on Family Tree	624 cM	88 cM	No Match	May 14 2021
June	Not Provided	mtDNA: N/A	1st Cousin - 2nd Cousin, Great/Half... Link on Family Tree	444 cM	69 cM	No Match	May 12 2021

Aspects of Each Testing Company

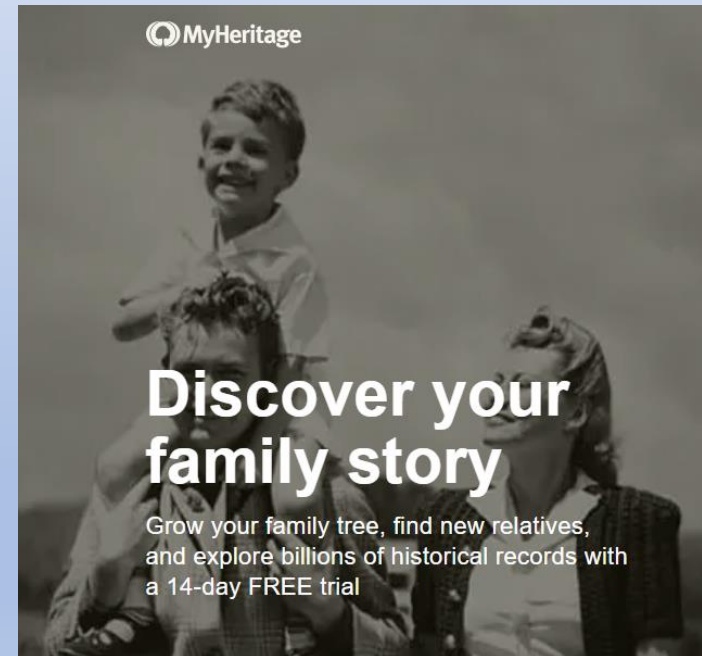
- MyHeritage

- 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)

10.5% (741.7 cM)
Waters
Great-niece

50.0% (3,541.9 cM)
Waters
Son

MyHeritage Home Family tree Discoveries Photos DNA Research

Flash DNA Sale
Only \$39 \$89
FREE shipping on 2+ kits
Order now
Sale ends in 3 days

Ken Waters, this is you -
Overview Ethnicity Estimate DNA Matches DNA Tools
Test additional family members
Get suggestions

Showing 1-10 of 14,473 DNA Matches

Match	Probable relationship	DNA Match quality	Shared DNA	Shared segments	Largest segment	Actions
Waters Son Age: 30's DNA managed by you Nathan Waters appears in your family tree. He is your son.	Son	50.0%	3,541.1 cM	22	284.3 cM	Review DNA Match View tree
Waters Daughter Age: 30's DNA managed by you Paula Waters appears in your family tree. She is your daughter.	Daughter	49.9%	3,540.7 cM	22	284.3 cM	Review DNA Match View tree
Joan Waters (born Craddock) Mother Age: 80's DNA managed by you Joan Waters (born Craddock) appears in your family tree. She is your mother.	Mother	49.8%	3,533.9 cM	22	284.3 cM	Review DNA Match View tree
Waters Age: 70's DNA managed by you Frank Waters appears in your family tree.	Brother	38.4%	2,581.4 cM	55	186.9 cM	Review DNA Match View tree
Ernest Howard Waters Age: 90 or above DNA managed by you Ernest Howard Waters appears in your family tree.	Uncle	22.8%	1,612.7 cM	35	133.4 cM	Review DNA Match View tree

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)

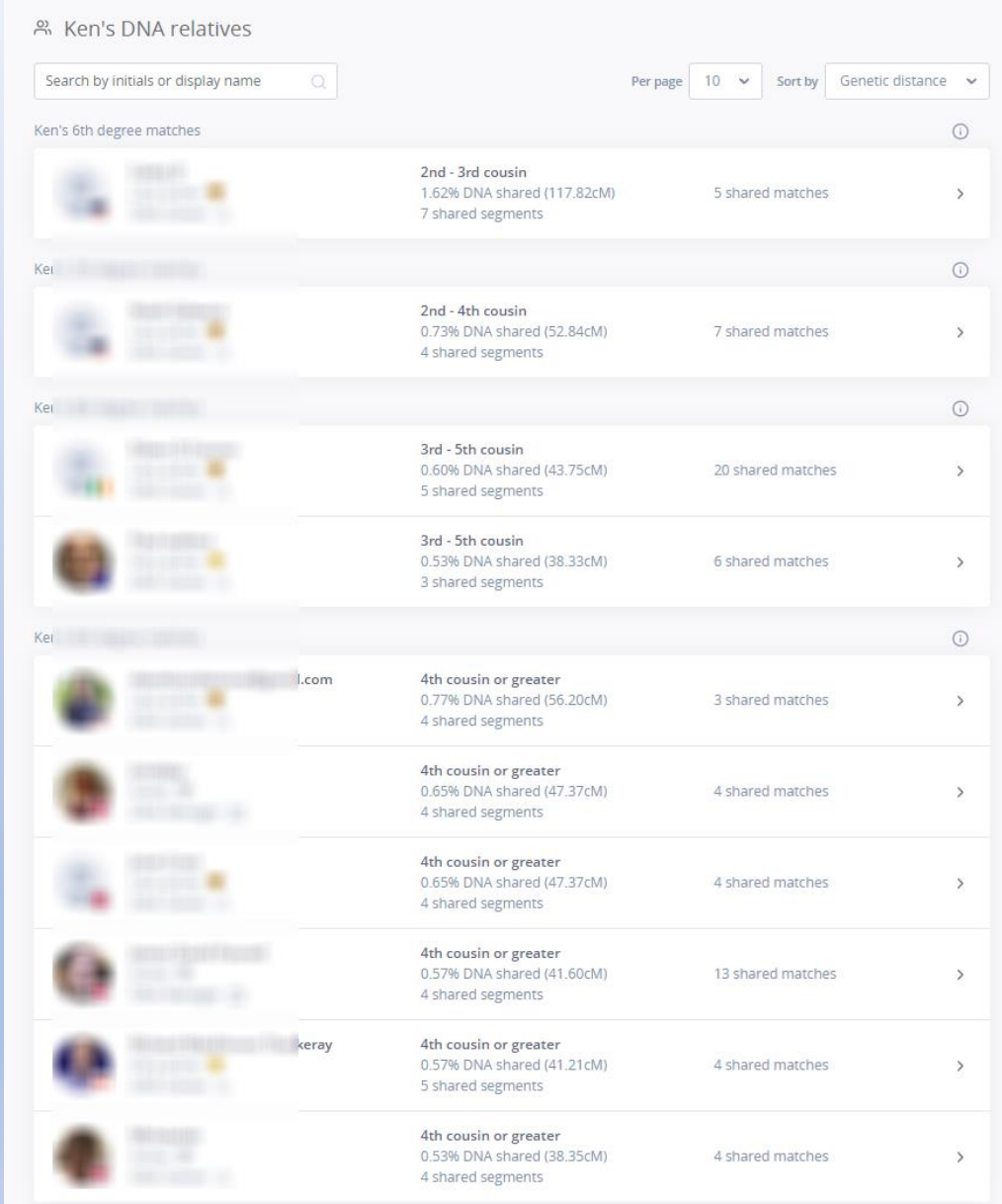


NOTE: I no longer recommend testing with Living DNA due to a lack of tools and matches. If you're interested in trying them then you may want to just try a free upload of your DNA to see what you come up with.

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



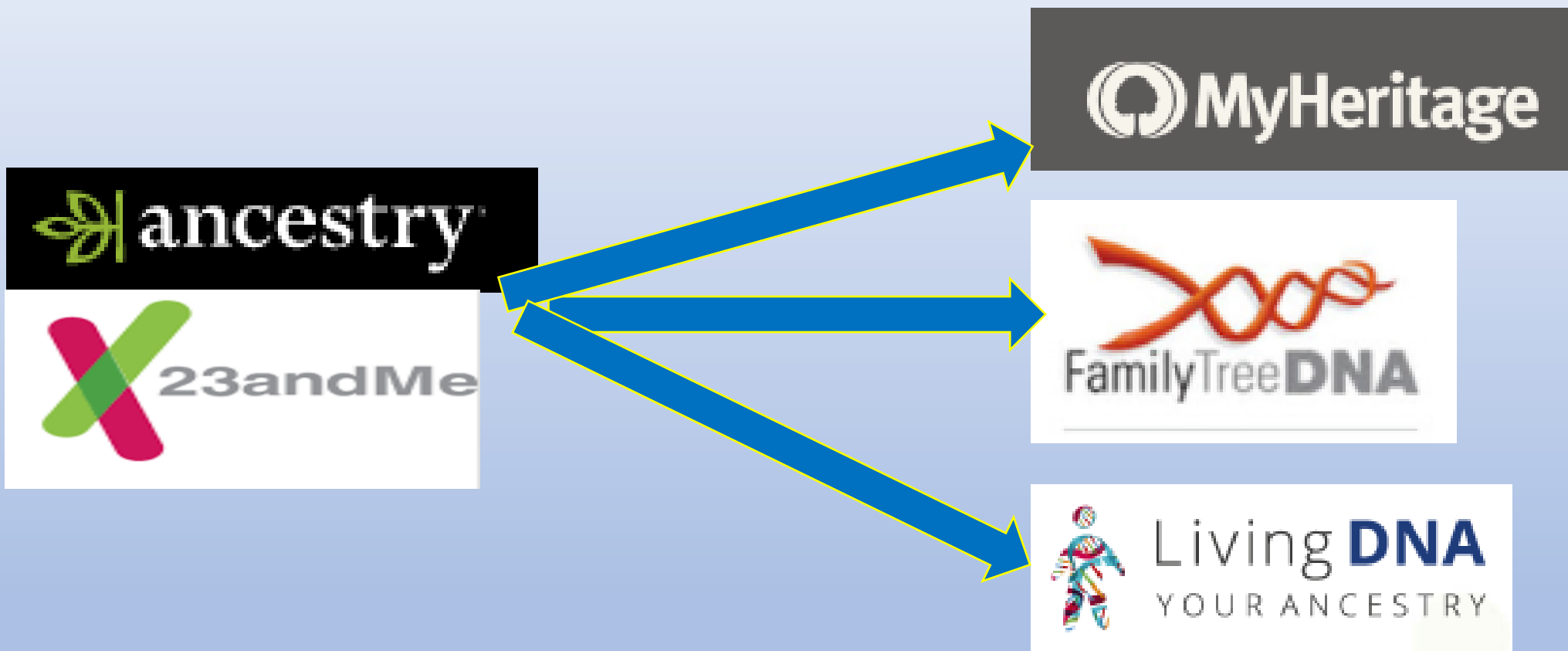
Ken's DNA relatives

Search by initials or display name

Per page 10 Sort by Genetic distance

Match	Relationship	DNA Shared	Shared Matches	Shared Segments
Ken's 6th degree matches				
[Profile]	2nd - 3rd cousin	1.62% DNA shared (117.82cM)	5 shared matches	7 shared segments
Ken's 6th degree matches				
Kei [Profile]	2nd - 4th cousin	0.73% DNA shared (52.84cM)	7 shared matches	4 shared segments
Ken's 6th degree matches				
Kei [Profile]	3rd - 5th cousin	0.60% DNA shared (43.75cM)	20 shared matches	5 shared segments
Kei [Profile]	3rd - 5th cousin	0.53% DNA shared (38.33cM)	6 shared matches	3 shared segments
Ken's 6th degree matches				
Kei [Profile]	4th cousin or greater	0.77% DNA shared (56.20cM)	3 shared matches	4 shared segments
Kei [Profile]	4th cousin or greater	0.65% DNA shared (47.37cM)	4 shared matches	4 shared segments
Kei [Profile]	4th cousin or greater	0.65% DNA shared (47.37cM)	4 shared matches	4 shared segments
Kei [Profile]	4th cousin or greater	0.57% DNA shared (41.60cM)	13 shared matches	4 shared segments
Kei [Profile]	4th cousin or greater	0.57% DNA shared (41.21cM)	4 shared matches	5 shared segments
Kei [Profile]	4th cousin or greater	0.53% DNA shared (38.35cM)	4 shared matches	4 shared segments

3 of the 5 testing companies allow uploading

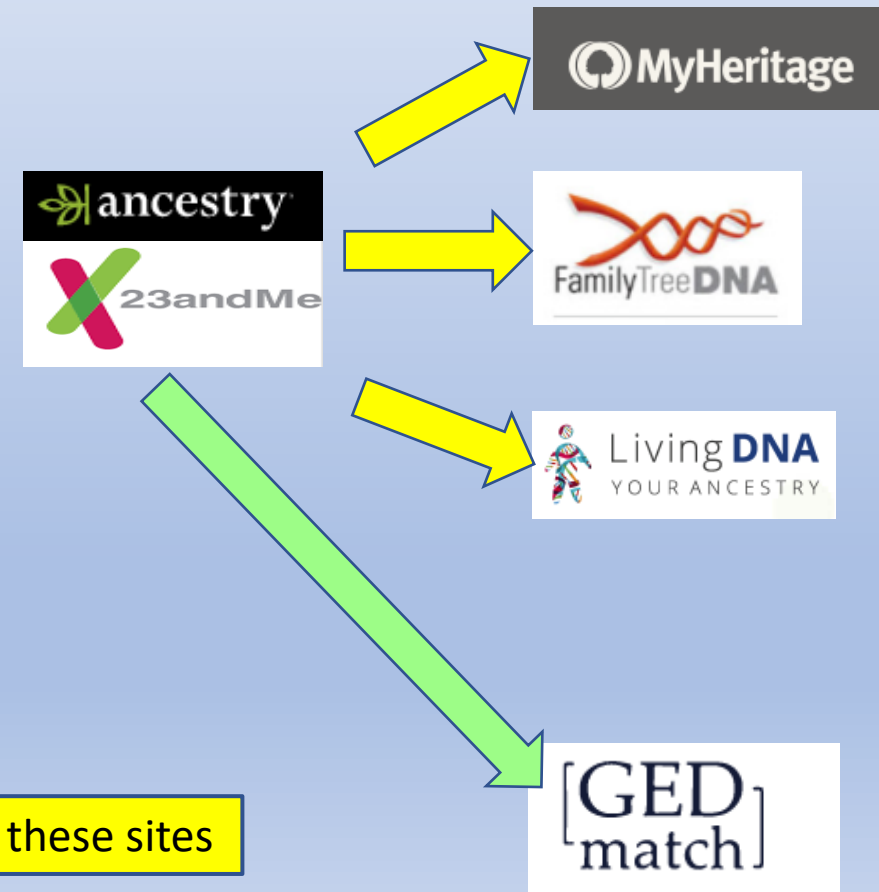


Allows you to use test results from one company to compare to other databases --- more matches!

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

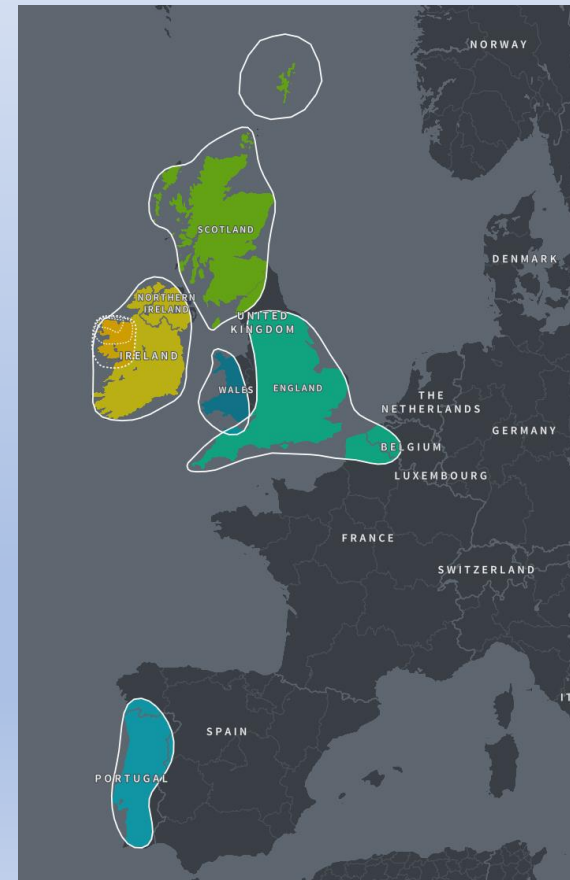
Recommended Strategy

- 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!

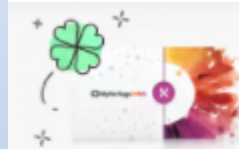
- Try to take advantage of frequent sales with the testing companies
- Typical regular price is \$99 often discounted to \$59, \$49, even \$39
- For example:
 - DNA Day
 - St Patrick's Day
 - Fathers Day
 - Mothers Day
 - Thanksgiving
 - Black Friday
 - Christmas

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

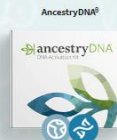
Only \$59 ~~\$89~~

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

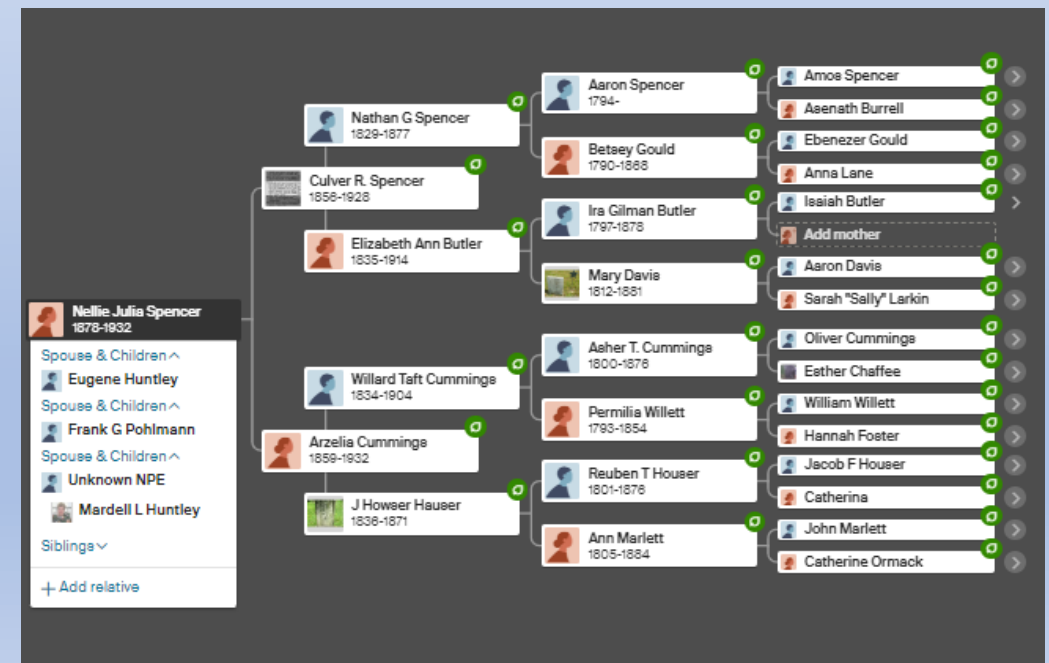
Price

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

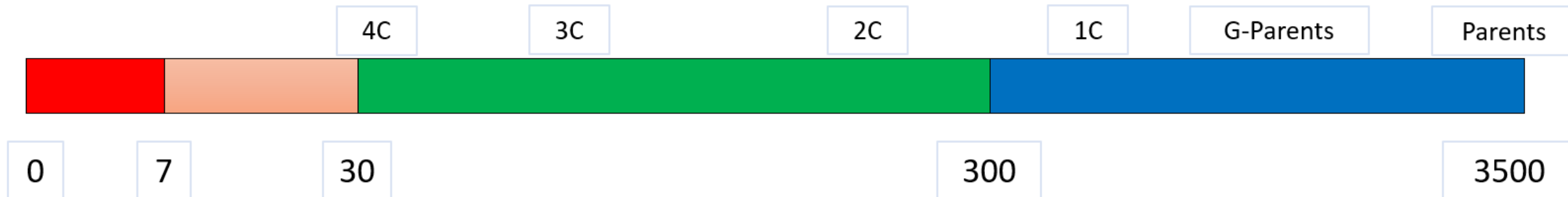


DNA Test Interpretation

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



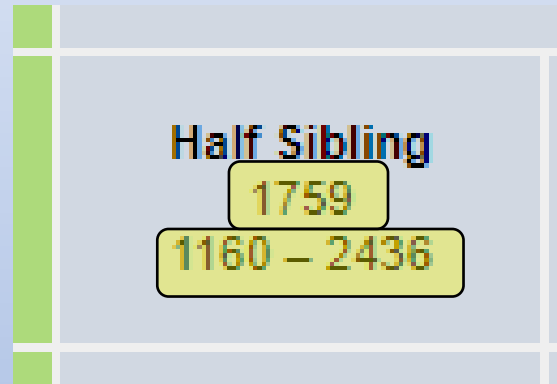
Concept of “relatedness”

- 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

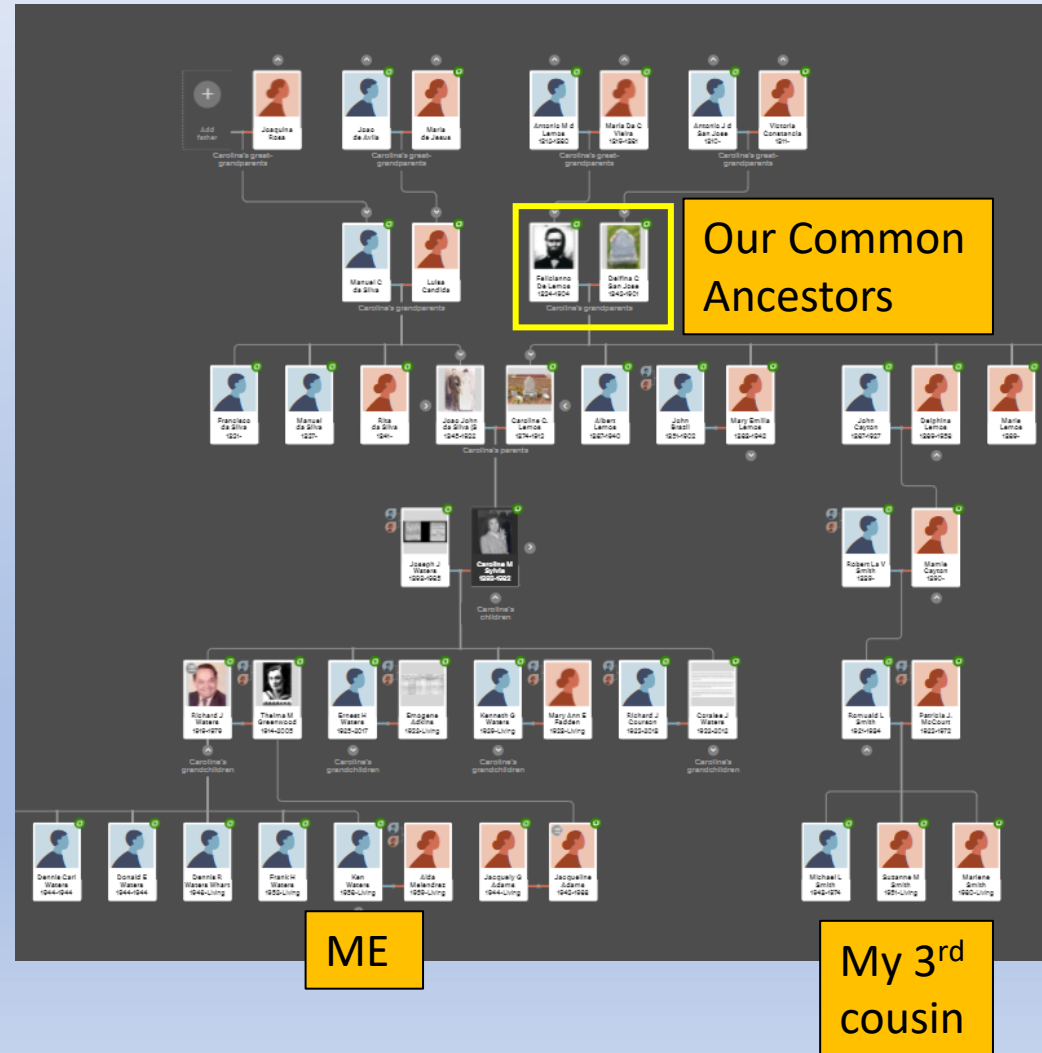


								Great-Great-Grandparent	GGGG Aunt / Uncle		
								Great-Great-Grandparent	GGG Aunt / Uncle		
Half GG-Aunt / Uncle 187 12 – 383	Great-Grandparent 881 464 – 1486						Great-Great-Aunt / Uncle 427 191 – 885				
Other Relationships											
	Half Great-Aunt / Uncle 432 125 – 765	Grandparent 1766 1156 – 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

Kenneth Richard Waters's DNA Matches

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

Full Sibling

- [Redacted] Brother Shared DNA: 2,491 cM across 63 segments 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 2,185 People Common ancestor Add/edit groups Paternal Uncle, 1583/41.

1st Cousin

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

2nd Cousin

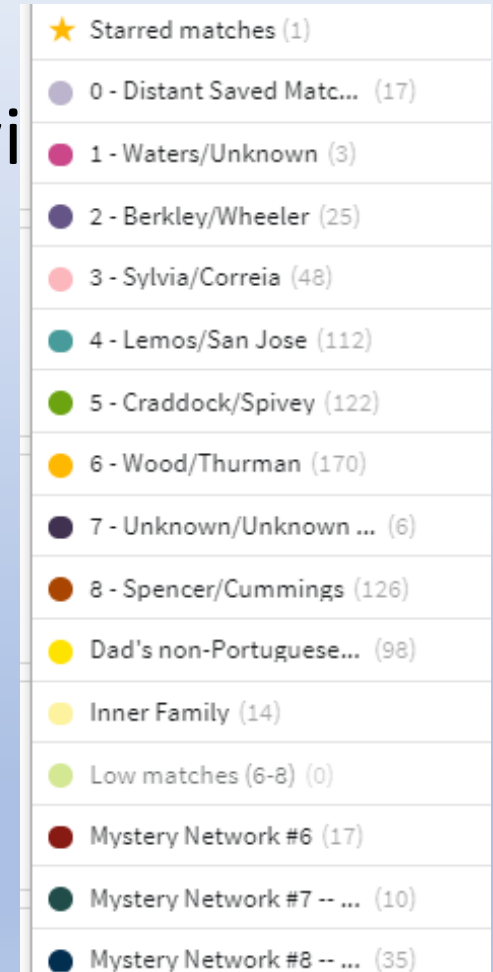
Add/edit groups
1st cousin, son of paternal uncle Ernie. 716/23.

+ Create custom group

- Stared matches
- 1 - Waters/Unknown
- 2 - Berkeley/Wheeler
- 3 - Sylvia/Correia
- 4 - Lemos/San Jose
- 5 - Craddock/Spivey
- 6 - Wood/Thurman
- 7 - Unknown/Unknown MYSTERY
- 8 - Spencer/Cummings
- Dad's non-Portuguese side (...)
- Inner Family
- Mystery Network #8
- Mystery Network #8 -- Engli...

Divide and conquer

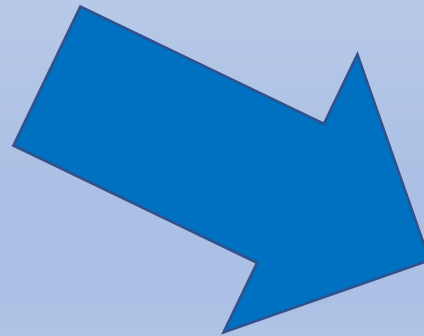
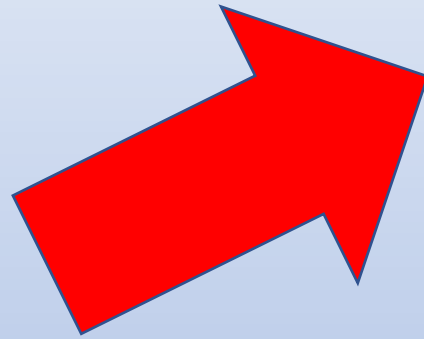
- On Ancestry, Using Tag Groups in combination with Shared Matches:
 - Group your matches by dividing them
 - First, Paternal vs. Maternal side
 - Then, work on Grandparents
 - Continue to divide matches



A screenshot of the AncestryDNA interface showing a list of match tag groups. Each group is represented by a colored circle followed by the tag name and the number of matches in parentheses. The groups are listed from top to bottom: 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), and Mystery Network #8 -- ... (35).

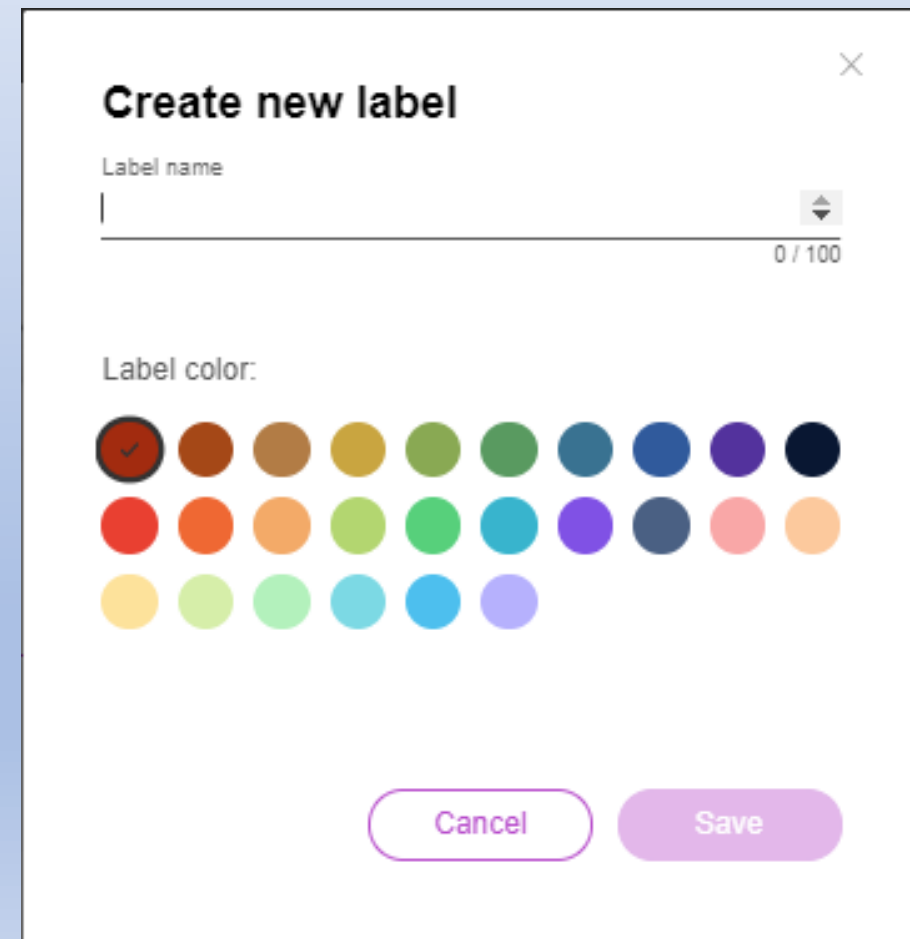
★ Starred matches (1)
0 - Distant Saved Matc... (17)
1 - Waters/Unknown (3)
2 - Berkley/Wheeler (25)
3 - Sylvia/Correia (48)
4 - Lemos/San Jose (112)
5 - Craddock/Spivey (122)
6 - Wood/Thurman (170)
7 - Unknown/Unknown ... (6)
8 - Spencer/Cummings (126)
Dad's non-Portuguese... (98)
Inner Family (14)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

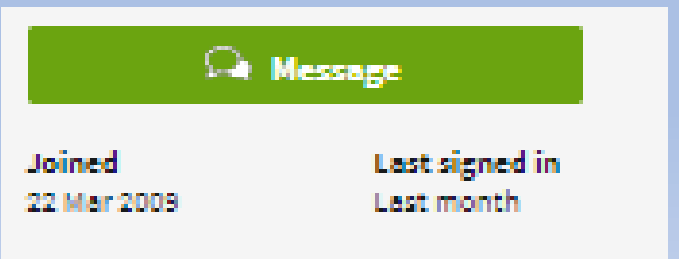
- My Heritage also has feature similar to Ancestry Tag Groups
- 30 “dots” versus 24 on Ancestry



The screenshot shows a 'Create new label' dialog box with a close button (X) in the top right corner. Below the title, there is a 'Label name' input field with a character count of '0 / 100' on the right. Underneath, the 'Label color' section displays a grid of 30 color swatches arranged in three rows: the first row has 10 swatches, the second row has 10, and the third row has 6. The first swatch in the first row is selected, indicated by a checkmark. At the bottom of the dialog, there are two buttons: 'Cancel' and '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

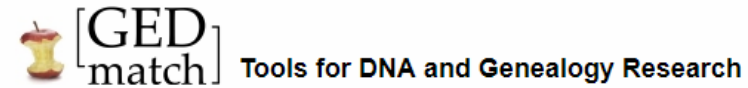
- DNA comparisons are great but mean nothing without genealogical context
- This means:
 - FAMILY TREES!
- Suggestions:
 - Be sure to always have a good tree, 5+ generations if possible
 - Keep it public and attached to your DNA kit (you can always have other trees private)
 - Backup your tree (store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

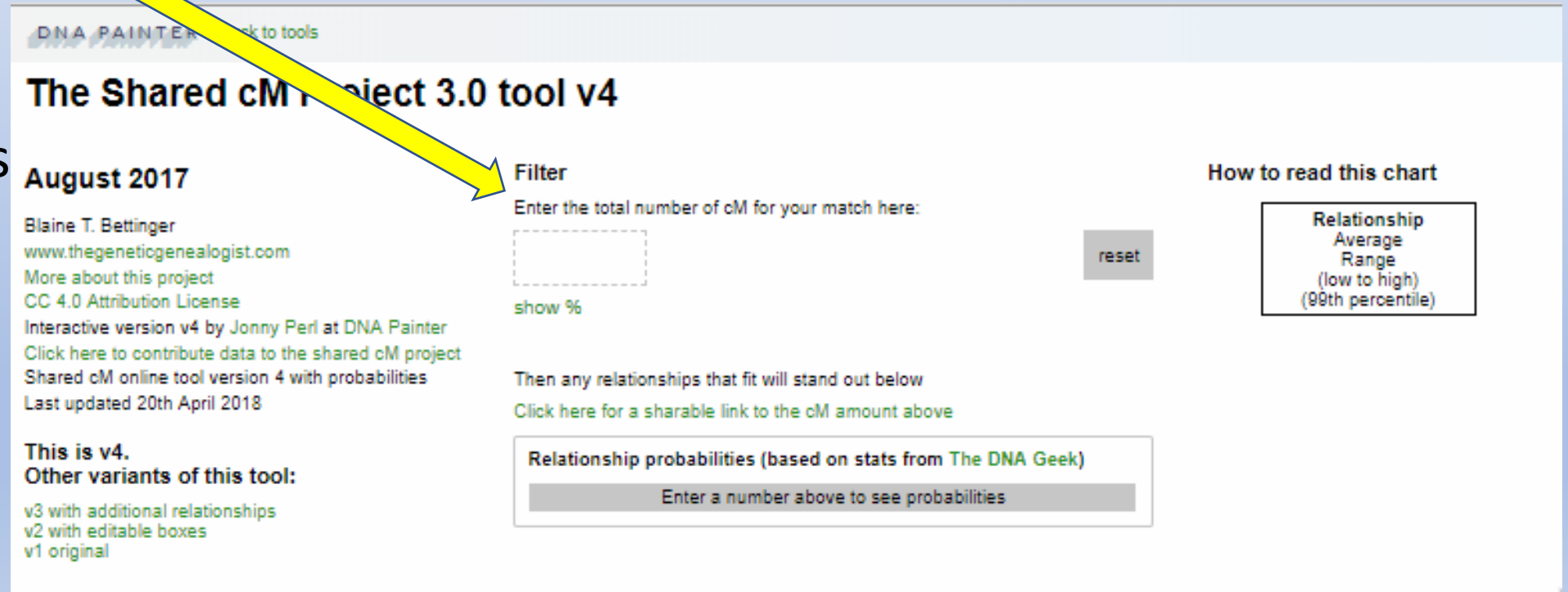
Not Registered? Click [HERE](#) to register at the main site - when registered return to this page to access genesis.gedmatch.com

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 %](#)

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

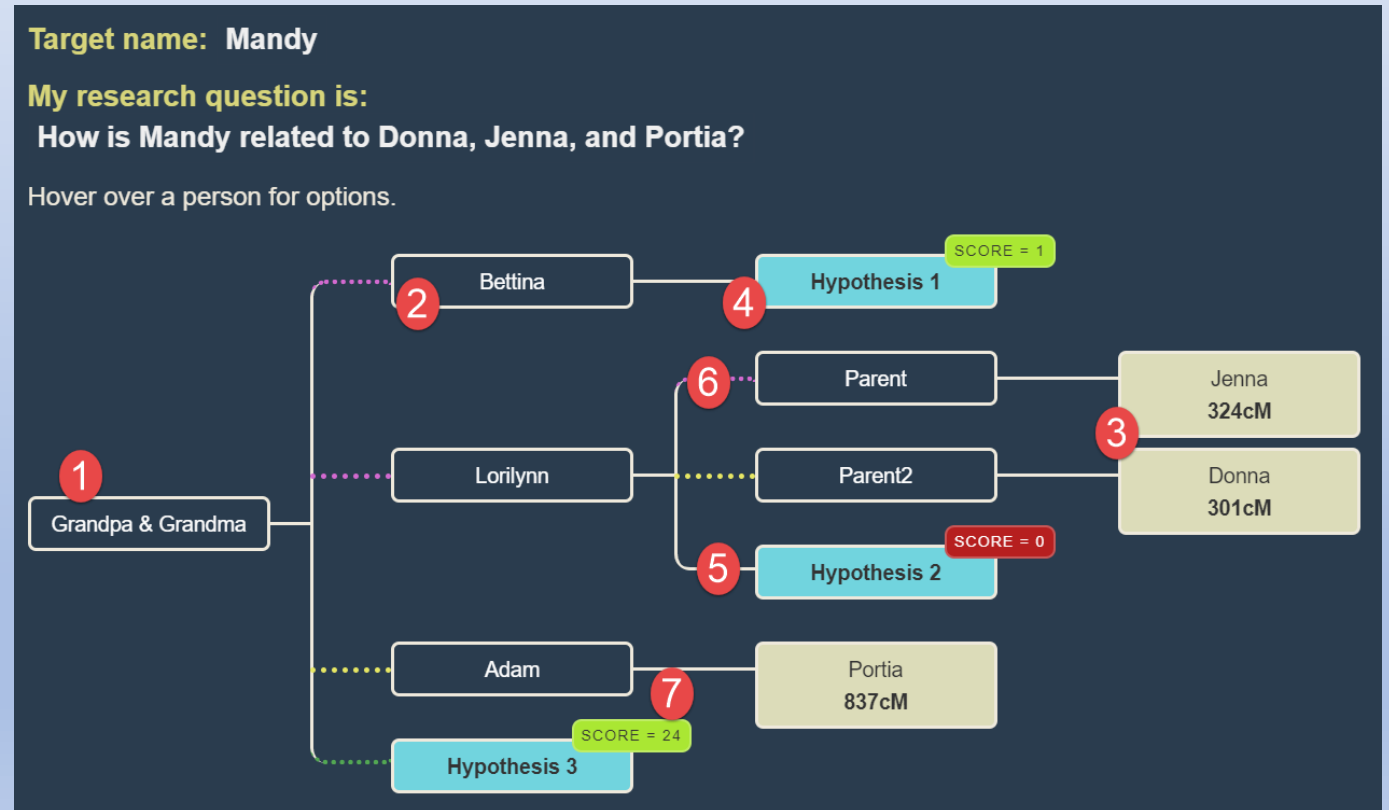
Relationship probabilities (based on stats from [The DNA Geek](#))

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.

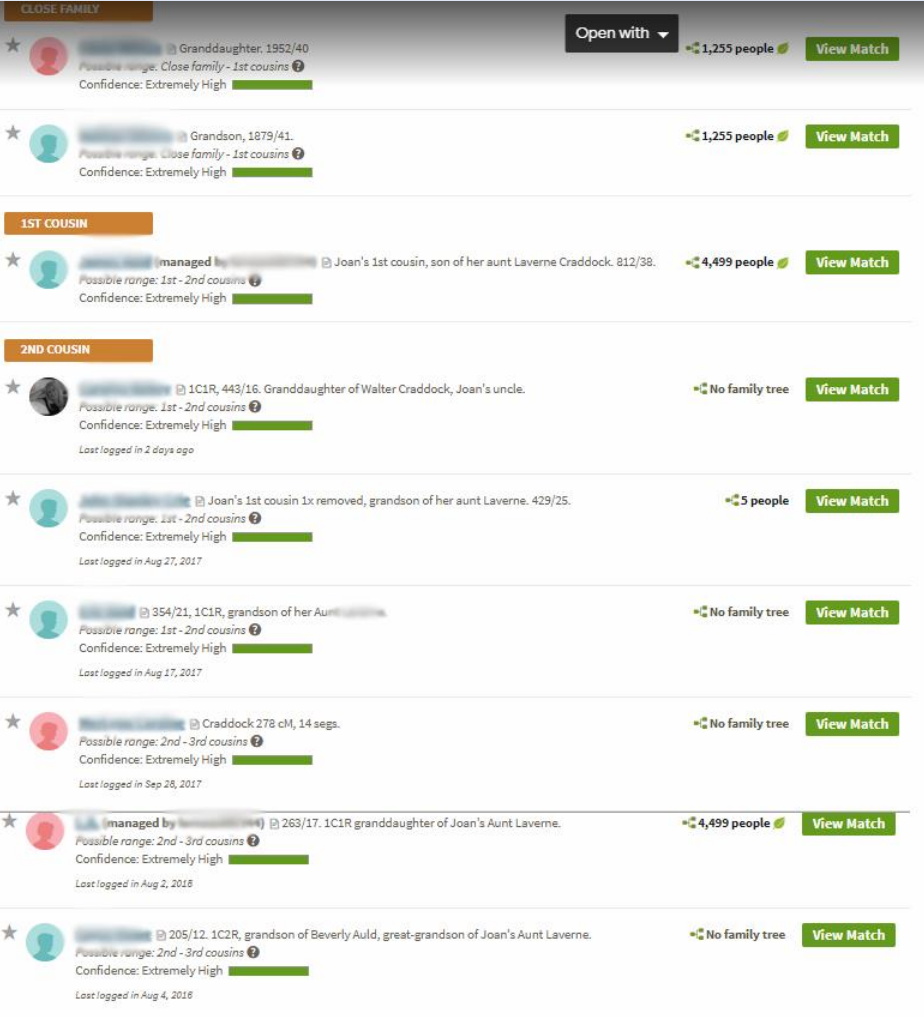
[redacted] could be your 1st cousin 1x removed through:



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



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



The screenshot shows a list of shared matches on AncestryDNA. The matches are categorized into 'CLOSE FAMILY', '1ST COUSIN', and '2ND COUSIN'. Each match entry includes a profile picture, a star icon, a name and birth/death dates, a 'Possible range' of relationships, a 'Confidence' level (Extremely High), the number of shared cM, and a 'View Match' button. The matches are sorted by confidence level.

Category	Name & Dates	Possible Range	Confidence	Shared cM	Action
CLOSE FAMILY	[redacted] Granddaughter, 1952/40	Close family - 1st cousins	Extremely High	1,255 people	View Match
	[redacted] Grandson, 1879/41	Close family - 1st cousins	Extremely High	1,255 people	View Match
1ST COUSIN	[redacted] (managed by [redacted]) Joan's 1st cousin, son of her aunt Laverne Craddock. 812/38.	1st - 2nd cousins	Extremely High	4,499 people	View Match
	[redacted] 1C1R, 443/16. Granddaughter of Walter Craddock, Joan's uncle.	1st - 2nd cousins	Extremely High	No family tree	View Match
2ND COUSIN	[redacted] Joan's 1st cousin 1x removed, grandson of her aunt Laverne. 429/25.	1st - 2nd cousins	Extremely High	5 people	View Match
	[redacted] 354/21, 1C1R, grandson of her Aunt [redacted]	1st - 2nd cousins	Extremely High	No family tree	View Match
	[redacted] Craddock 278 cM, 14 segs.	2nd - 3rd cousins	Extremely High	No family tree	View Match
	[redacted] (managed by [redacted]) 263/17. 1C1R granddaughter of Joan's Aunt Laverne.	2nd - 3rd cousins	Extremely High	4,499 people	View Match
	[redacted] 205/12. 1C2R, grandson of Beverly Auld, great-grandson of Joan's Aunt Laverne.	2nd - 3rd cousins	Extremely High	No family tree	View Match

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]

The screenshot shows the DNA Painter website. At the top, it says "DNA PAINTER" in blue and orange. Below that, a text block reads: "DNA Painter is an award-winning website that can help demystify your DNA results". To the right of this text is a graphic of a DNA double helix with several circular portraits of people integrated into it. Below the text, there is a link that says "→ Top FAQs". At the bottom, there is a search bar with the text "Search the site" and a "Go" button. A large purple button at the very bottom says "Register for a free account".

The screenshot shows the GEDmatch login page. At the top, there is a hamburger menu icon and the GEDmatch logo. Below that, the word "Login" is centered. There are two input fields: "Email Address *" and "Password *", each with a small icon to its right. Below the fields is a green button labeled "LOGIN". At the bottom, there are three links: "Not yet registered? Click Here!", "Forgot Password?", and "Site policy: Click HERE".

The screenshot shows the DNAGedcom website. At the top left is the DNAGedcom logo. To the right is a navigation menu with links for "Home", "Information", "DNA Kits", "Family Tree DNA", "23andMe", "Autosomal Tools", and "GWorks (Gedcom)". In the top right corner, there are "Log In" and "Register" buttons. Below the navigation is a heading "WELCOME TO THE DNAGEDCOM TOOLS SITE". The main content area contains several paragraphs of text with various links, including "Register", "User group", "subscription", "help system", "documentation", and "adoptivee". At the bottom, there is a link for "What can you do on DNAGedcom? (TO BE UPDATED)".

The screenshot shows the Legacy Family Tree Webinars website. At the top left is the Legacy Family Tree Webinars logo. To the right are navigation links for "Upcoming Webinars", "Webinar Library", and "Speakers". Below the navigation is a large heading "Enrich your genealogy knowledge anytime, anywhere". To the right of this heading is a search bar with the text "Search for a webinar, speaker, or a topic" and a search icon. Below the search bar are three statistics: "1,721 Webinars", "354 Speakers", and "6,336 Syllabus pages". At the bottom, there is a paragraph of text: "Welcome to the world's most popular webinar website for genealogy and DNA testing, where you can enjoy a robust offering of live and recorded webinars presented by top speakers". The bottom right corner features a collage of old photographs and documents.

Much More to All This!

- Identifying DNA Matches (without contacting them)
- Genetic Triangulation
- Advanced shared match grouping and sorting
- Building private trees to test hypotheses
- Auto-clusters
- Solving unknown parentage cases
- Targeted testing strategies
- Combining autosomal tests with Y-DNA and mtDNA tests

Quote of the Day

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

– Ken Waters

Upcoming Classes/Presentations

Saturday, Aug 12, 1 pm

Title: DNA Q & A

Description: Do you have questions about DNA testing? Have you taken a DNA test and need some help? Bring your questions and mysteries to solve.

Saturday, Sept 23, 1 pm

Title: Working with DNA Matches

Description: Okay, you've taken a DNA test and you have matches. Now what? What can you do with them? We'll cover a step-by-step process to: (1) identify them, (2) build a private tree for them, and (3) identify how you are related to them. You can do this too for many of your DNA matches if you wish and we will explain the process.



All library classes that are highlighted in blue are free to attend and require no registration and held at the Red Mountain Mesa Public Library at 635 N Power Rd in Mesa (unless otherwise noted above).

FamilyTreeAZ.com



Presentations:

<http://familytreeaz.com/Presentations>



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Twitter: [@familytreeaz](https://twitter.com/familytreeaz)

Google Voice Phone: (480) 331-5889

