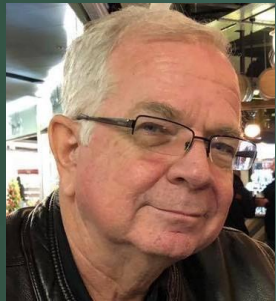


Intro to DNA and Genetic Genealogy

March 2022



KEN WATERS

@FAMILYTREEAZ

[HTTP://FAMILYTREEAZ.COM/PRESENTATIONS](http://familytreeaz.com/presentations)

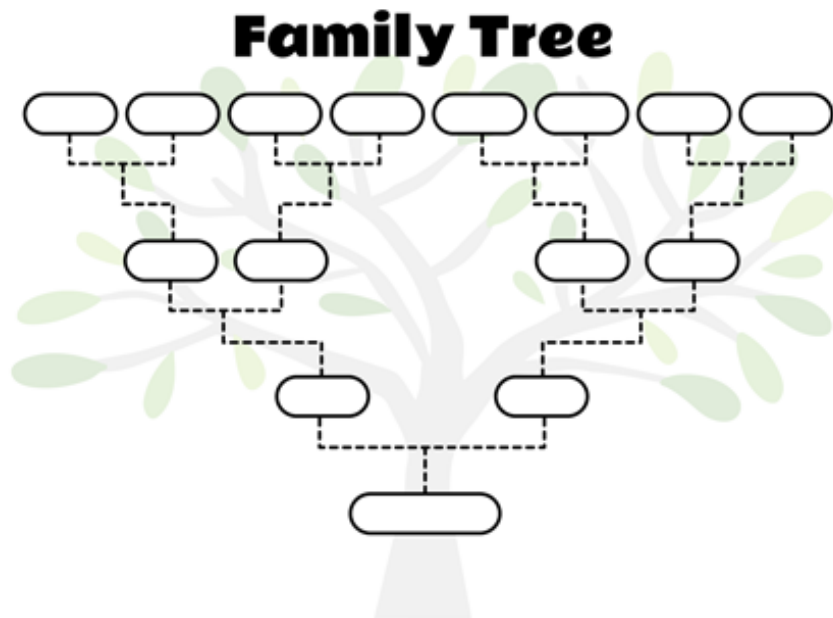
KEN@FAMILYTREEAZ.COM





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

What is genetic genealogy?



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

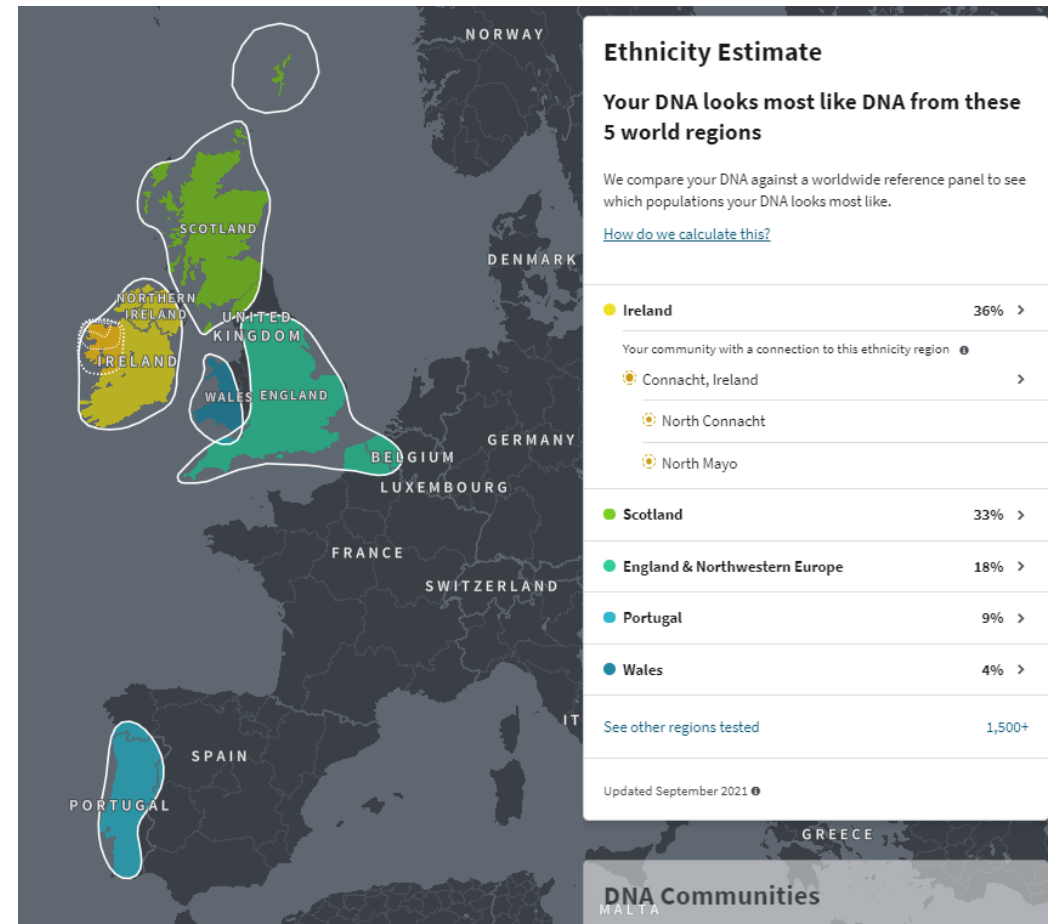
First step: answer some questions

- ▶ [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

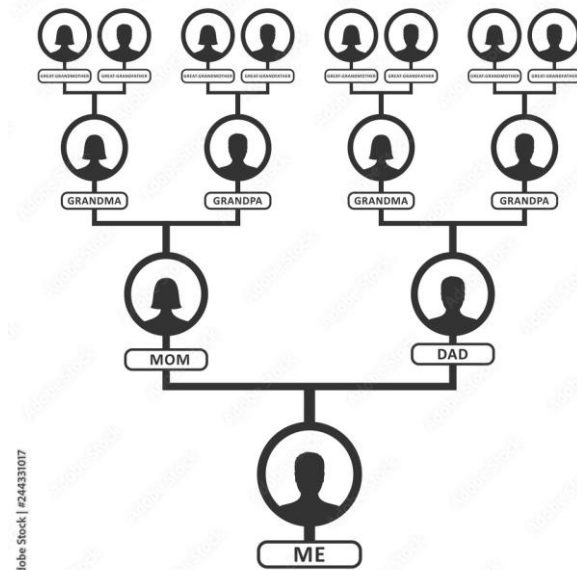
E.g., Do I carry the BRCA gene?



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



Adobe Stock | #244331017

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





Basics --- What You Need to Know About DNA

3 Types of DNA

- ▶ Autosomal
 - ▶ 22 chromosomes
 - ▶ + 1 sex chromosome “X”
- ▶ Y-DNA
- ▶ Mitochondrial DNA (mtDNA)

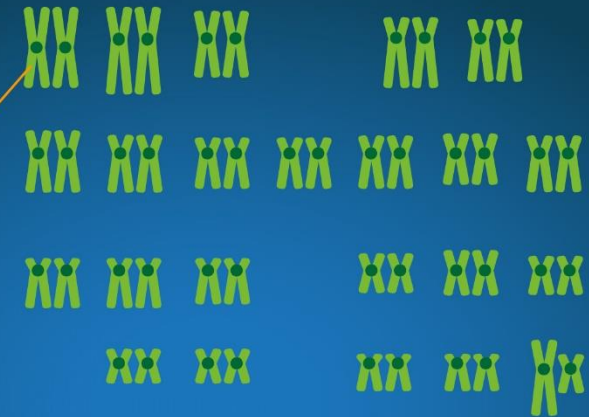
What is DNA? -- chromosomes

- ▶ 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



CHROMOSOMES

NHGRI FACT SHEETS
genome.gov



Human Chromosomes
23 Pairs



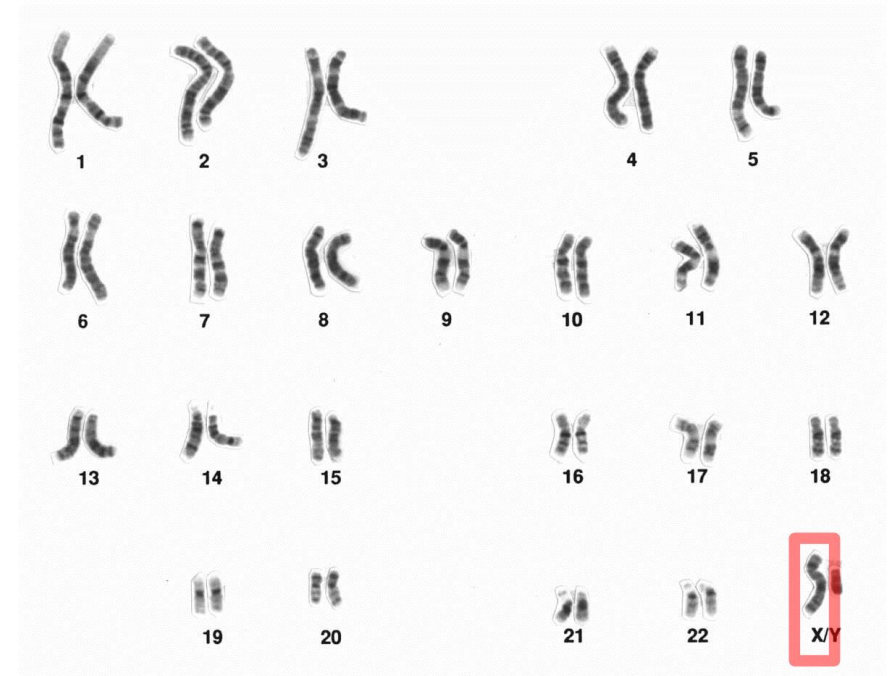
Telomere

Centromere

Telomere

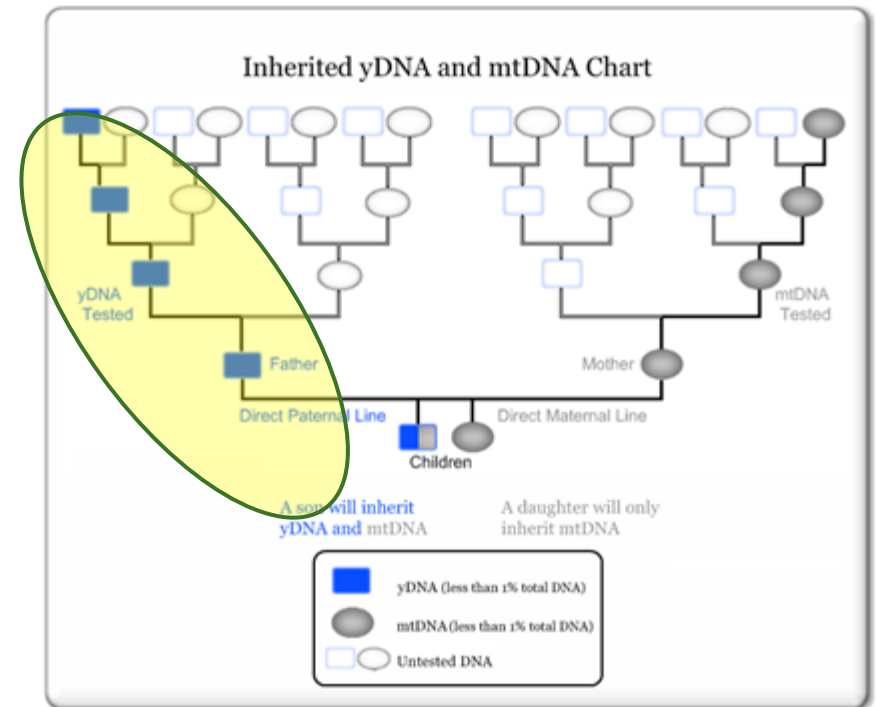
What is X-DNA?

- ▶ 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
- ▶ Males have one 'X' chromosome (from mother) and one 'Y' chromosome (from father)
- ▶ Important Note: not all testing companies report X-DNA matches



What is DNA? – Y-DNA

- ▶ ***ONLY*** found in males
- ▶ Similar to mtDNA inheritance Y-DNA is only passed along the patrilineal line
 - ▶ Father's father's father's....[etc.]



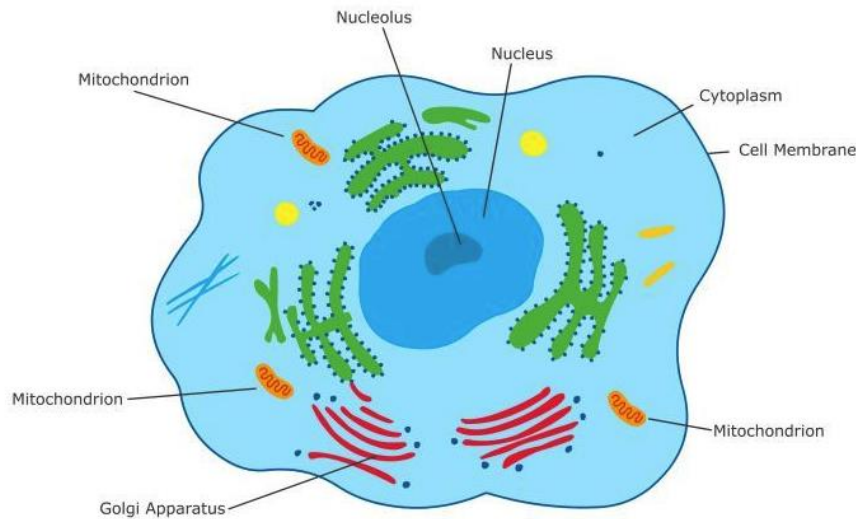
Source: <https://phillipsdnaproject.com/faq-sections/304-ancestor-dna-chart>

What is DNA? -- mitochondrial

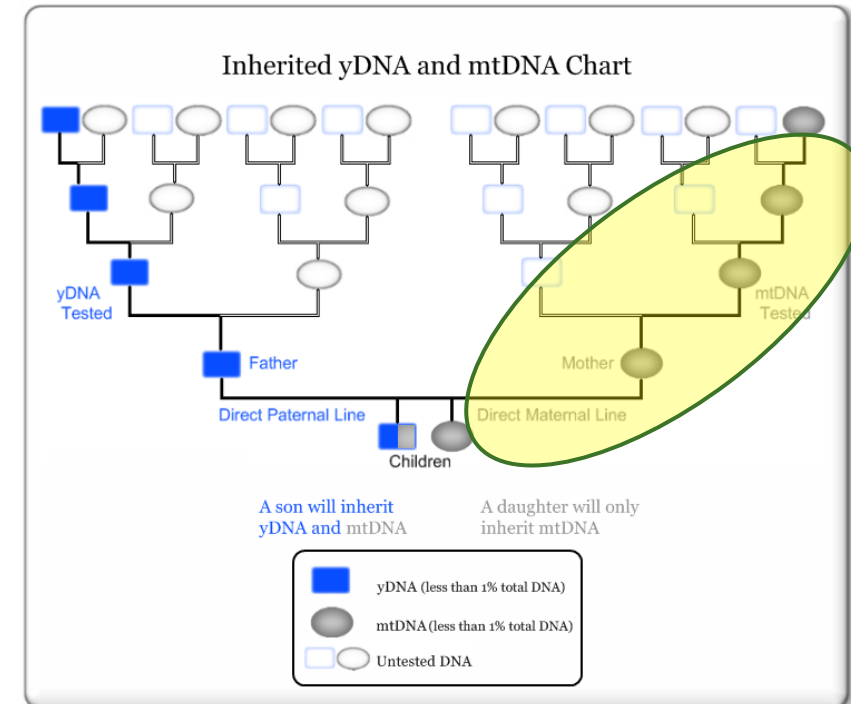
IMAGE

Cell diagram showing mitochondria

- ▶ 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.]



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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
 - ▶ New kid on the block!
 - ▶ More expensive (~\$1000) but cost is going down

Testing company options -- Autosomal

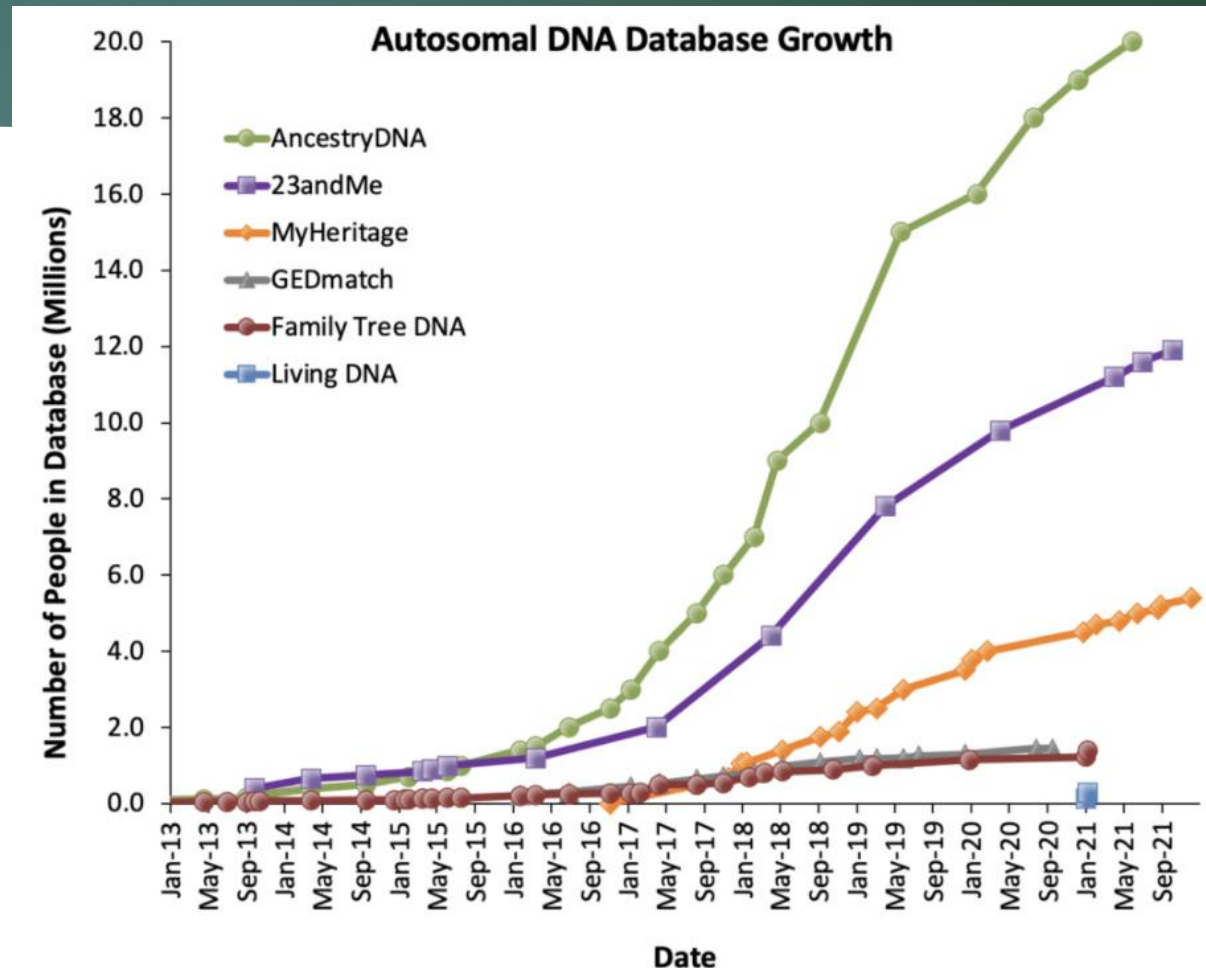
- ▶ There are 5 known, reputable, and trusted companies at this time:
 - ▶ **Ancestry**
 - ▶ **Family Tree DNA**
 - ▶ **MyHeritage**
 - ▶ **23andMe**
 - ▶ **Living DNA**
- ▶ There are others out there but not recommended for a variety of reasons

What to look for with testing companies

- ▶ What all 5 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





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**
- ▶ 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



Aspects of Each Testing Company

▶ 23andMe

▶ Pluses:

- ▶ **Large database of testers, 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
- ▶ Will not accept DNA kits from other companies



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

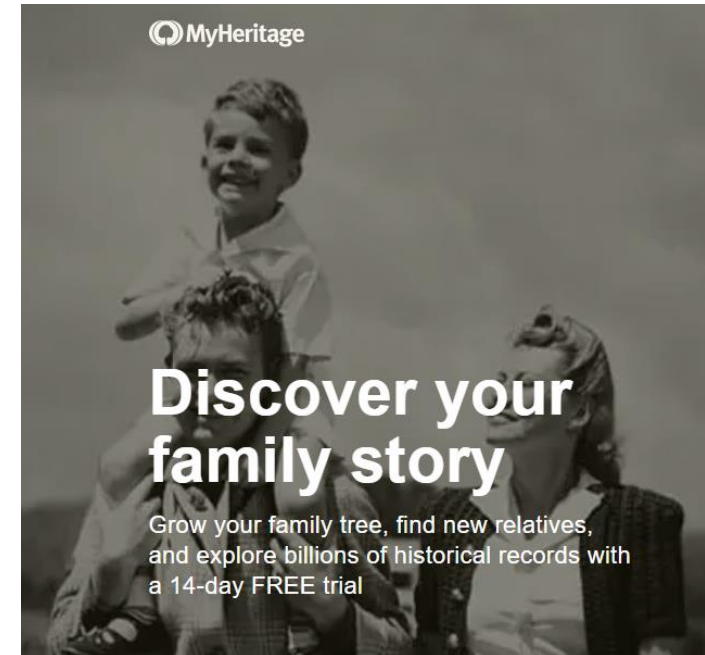
▶ Negatives:

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



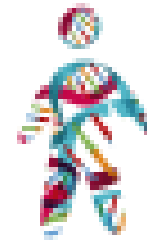
Aspects of Each Testing Company

- ▶ 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**



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
 - ▶ Negatives:
 - ▶ **Very, very small database**
 - ▶ No family trees
 - ▶ No chromosome browser
 - ▶ No research database
 - ▶ Wacky ethnicity estimates
 - ▶ Worst analysis tools of all the companies
 - ▶ No matching of Y-DNA or mtDNA



Living **DNA**
YOUR ANCESTRY

3 of the 5 testing companies allow uploading

 MyHeritage

 ancestry

 23andMe

 FamilyTreeDNA

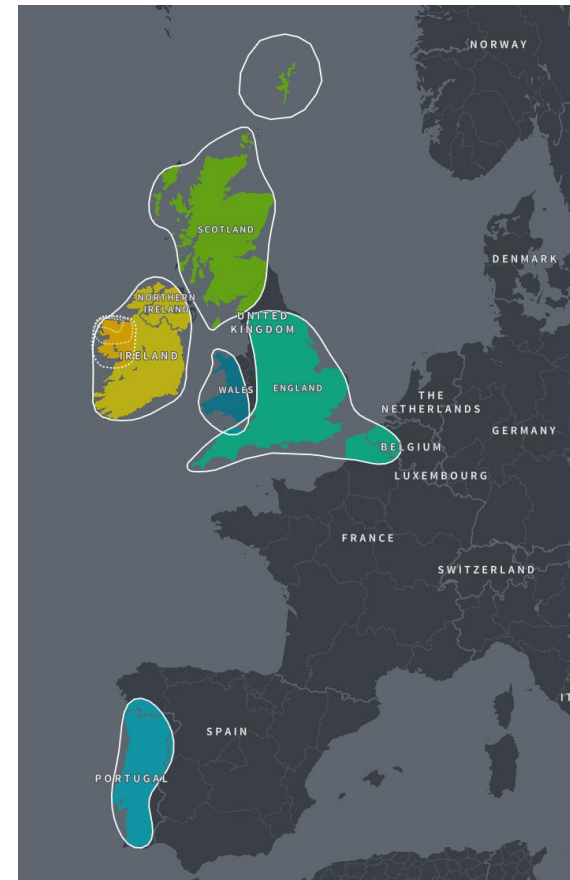
 Living DNA
YOUR ANCESTRY

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)

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%

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%

Nice sub-county detail!



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%

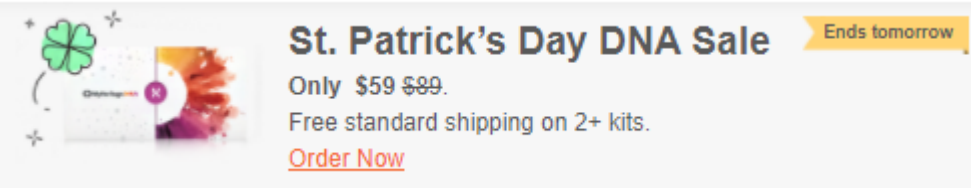
FTDNA

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



The banner features a green four-leaf clover on the left, a DNA double helix in the center, and a yellow ribbon on the right. The text is in a clean, sans-serif font.

St. Patrick's Day DNA Sale Ends tomorrow
Only \$59 ~~\$99~~.
Free standard shipping on 2+ kits.
[Order Now](#)

Testing strategies

- ▶ First, ask yourself a few questions:
 - ▶ Why do you want to test? (recall the reasons brought up earlier)
 - ▶ How much can you spend or are you willing to spend?
 - ▶ Are you searching for a specific answer that may require looking for matches in many places?
- ▶ Based on the answers to those questions you can begin to devise a testing plan

Testing strategy #1

- ▶ General questions on family tree
- ▶ Willing/able to spend maybe \$200 or so
- ▶ Testing Plan:
 - ▶ Wait for good sales and then test with the 2 companies that don't allow uploads: Ancestry and 23andMe
 - ▶ Download the results from one or both of them and then upload to sites that do allow uploads (MyHeritage, FamilyTreeDNA, LivingDNA, GedMatch)
 - ▶ Pay small upgrade fees to get full tools

Testing strategy #2

- ▶ Limited budget: \$50
- ▶ Testing Plan:
 - ▶ Wait for good sale and then test with Ancestry
 - ▶ Download the raw DNA and then upload to sites that do allow uploads (MyHeritage, FamilyTreeDNA, LivingDNA, GedMatch)
 - ▶ Skip the upgrades as at least you will get matches for free

Testing strategy #3

- ▶ Special situation---trying to solve unknown parentage
- ▶ Willing to spend whatever it takes (anywhere from \$200 up)
- ▶ Testing Plan:
 - ▶ Test with both Ancestry and 23andMe
 - ▶ Upload to sites that do allow uploads (MyHeritage, FamilyTreeDNA, LivingDNA, GedMatch)
 - ▶ Pay for upgrades on all sites
 - ▶ **Buy additional kits when on sale (recommend Ancestry) to use to test known family members or suspected family relations who may help solve the mystery**
 - ▶ We call this “targeted testing”

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
- ▶ 3 of the 5 companies (Ancestry, FTDNA, MyHeritage) 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)
 - ▶ 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

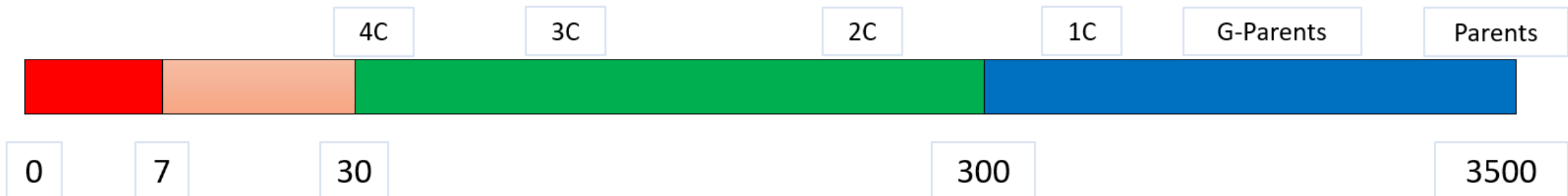




DNA Test Interpretation

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

- ▶ Numeric measure of “relatedness”
- ▶ From 0 to 3500
- ▶ 3500 indicates parent/child
- ▶ 0 indicates no DNA shared
 - ▶ 0 doesn't necessarily mean two people are NOT related; just not sharing DNA



Concept of “relatedness”

From:

https://dnapainter.com/tools/sharedc_mv4

- ▶ Measured by **CentiMorgans** (abbreviated “cMs”)
- ▶ Range from 0 to ~ 3500
- ▶ 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	

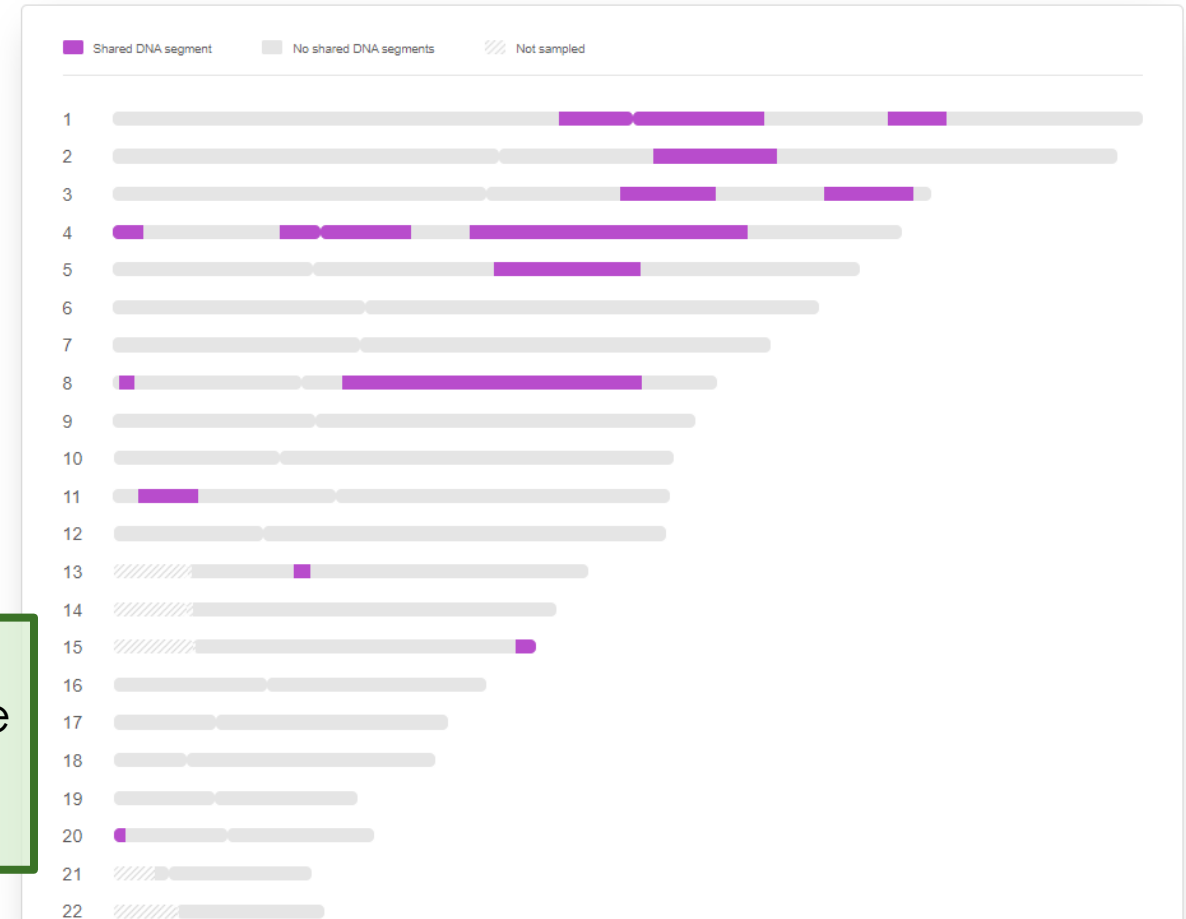
What is a Chromosome Browser?

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

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

Chromosome Browser – Shared DNA Segments
Melissa Fleck and you share 15 DNA segments.

Advanced options ▾



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?
- ▶ If using Ancestry:
 - ▶ Enter notes about what you know about them
 - ▶ Use Tag Groups to identify them

Kenneth Richard Waters's DNA Match

Filter by: Unviewed Common ancestors Messaged Notes Trees Shared DNA Group

Parent/Child

- Joan Anita Craddock Parent/Child Shared DNA: 3,474 cM across 46 segments 1,797 People Common ancestor
- [Redacted] Parent/Child Shared DNA: 3,470 cM across 60 segments 2,185 People Common ancestor
- [Redacted] Parent/Child Shared DNA: 3,466 cM across 62 segments 2,185 People Common ancestor

Full Sibling

- [Redacted] Brother Shared DNA: 2,491 cM across 63 segments 2,185 People Common ancestor

Close Family

- Ernest Howard Waters Close Family-1st Cousin Shared DNA: 1,583 cM across 41 segments 2,185 People Common ancestor

1st Cousin

- [Redacted] 1st-2nd Cousin Shared DNA: 941 cM across 36 segments 5 People Common ancestor
- [Redacted] 1st-2nd Cousin Shared DNA: 716 cM across 23 segments 2,185 People Common ancestor

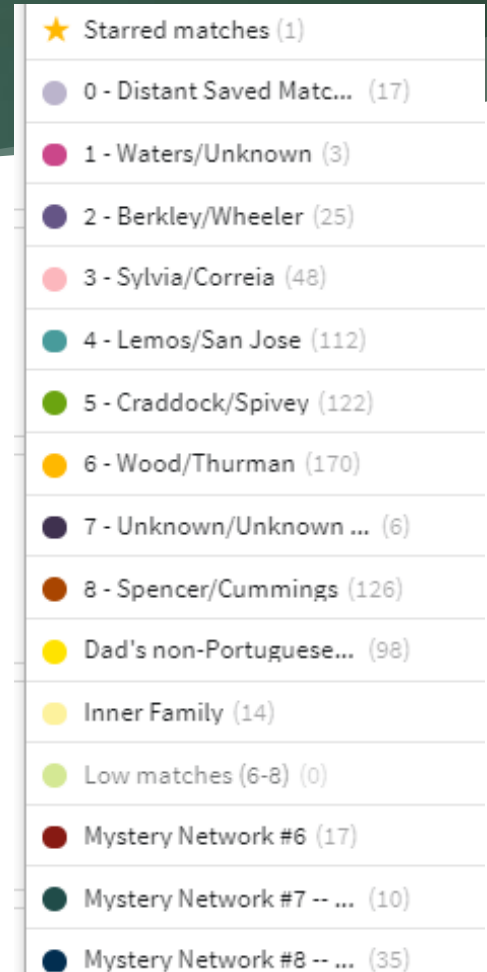
2nd Cousin

Tag Groups:

- Create custom group
- Starred 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

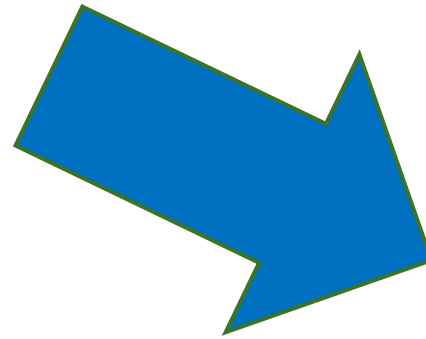
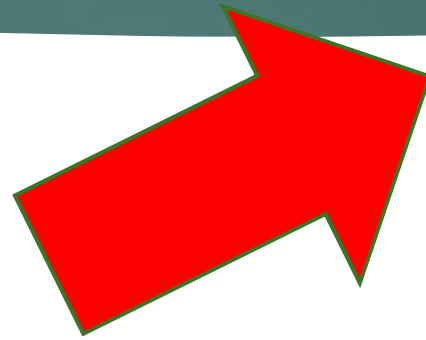
- ▶ On Ancestry, Using Tag Groups in combination with Notes and Shared Matches:
 - ▶ Group your matches by dividing them
 - ▶ First, Paternal vs. Maternal side
 - ▶ Then, work on Grandparents
 - ▶ Continue to divide matches



A screenshot of the AncestryDNA match tag interface. It shows a list of tag groups, each with a colored circular icon and a count of matches in parentheses. The tags are: 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

Create new label

Label name

0 / 100

Label color:



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

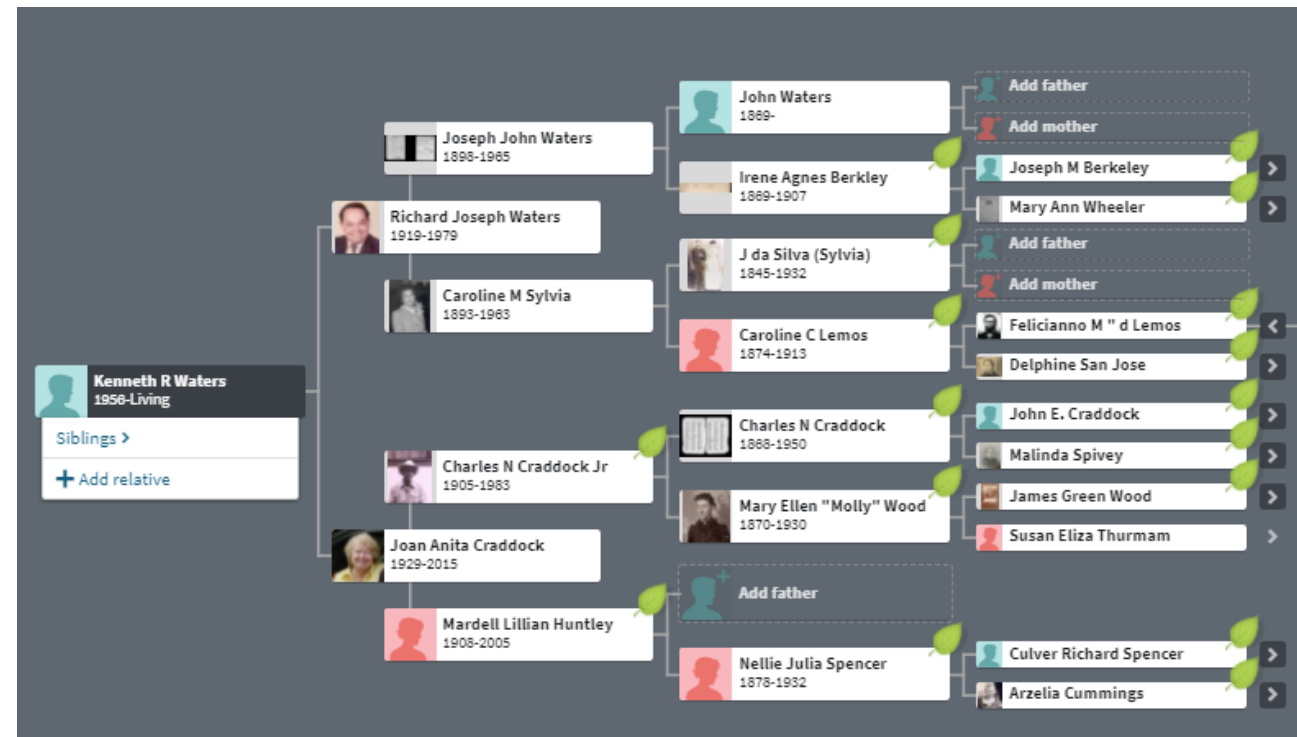
 Message

Joined
22 Mar 2008

Last signed in
Last month

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

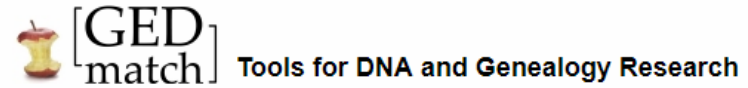




Other Useful Tools

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:

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

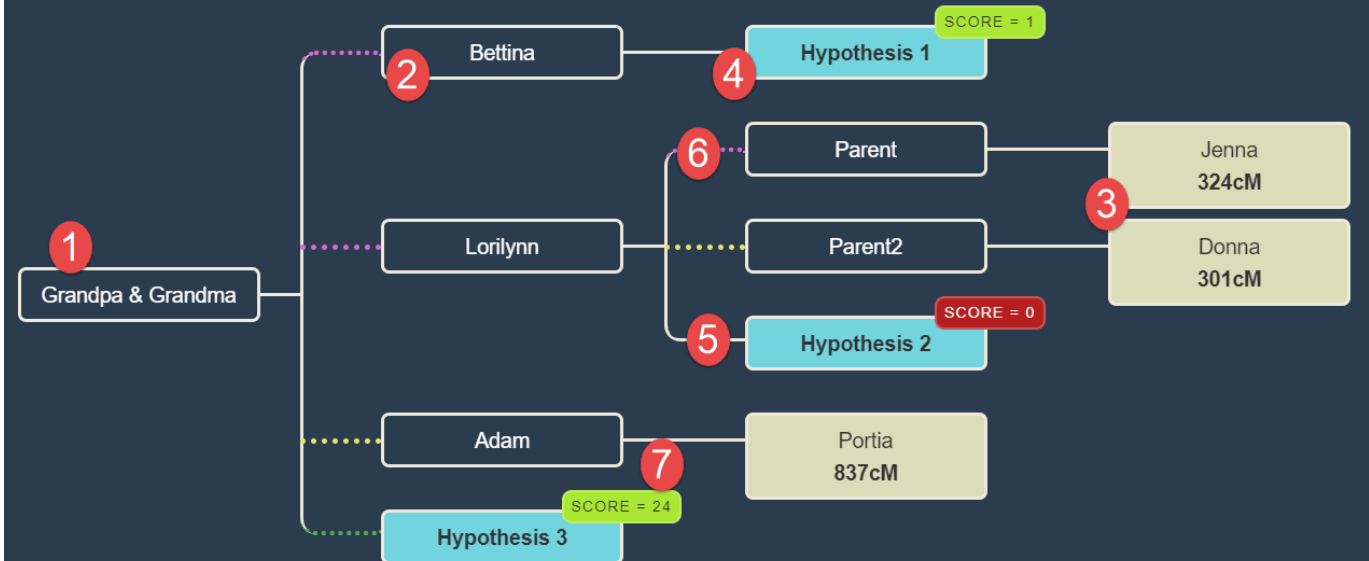
- ▶ WATO=What Are The Odds?
- ▶ Test hypotheses using DNA test strength levels (measured in cMs)

Target name: Mandy

My research question is:

How is Mandy related to Donna, Jenna, and Portia?

Hover over a person for options.



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 by relationship type: CLOSE FAMILY, 1ST COUSIN, and 2ND COUSIN. Each match entry includes a star icon, a profile picture, a name, a relationship description, a possible range, a confidence level (Extremely High), the number of shared cM, and a 'View Match' button. The matches listed are:

- CLOSE FAMILY**
 - Granddaughter, 1952/40. Possible range: Close family - 1st cousins. Confidence: Extremely High. 1,255 people shared.
 - Grandson, 1879/41. Possible range: Close family - 1st cousins. Confidence: Extremely High. 1,255 people shared.
- 1ST COUSIN**
 - Joan's 1st cousin, son of her aunt Laverne Craddock. 812/38. Possible range: 1st - 2nd cousins. Confidence: Extremely High. 4,499 people shared.
- 2ND COUSIN**
 - 1C1R, 443/16. Granddaughter of Walter Craddock, Joan's uncle. Possible range: 1st - 2nd cousins. Confidence: Extremely High. No family tree. Last logged in 2 days ago.
 - Joan's 1st cousin 1x removed, grandson of her aunt Laverne. 429/25. Possible range: 1st - 2nd cousins. Confidence: Extremely High. 5 people shared. Last logged in Aug 27, 2017.
 - 354/21, 1C1R, grandson of her Aunt Laverne. Possible range: 1st - 2nd cousins. Confidence: Extremely High. No family tree. Last logged in Aug 17, 2017.
 - Craddock 278 cM, 14 segs. Possible range: 2nd - 3rd cousins. Confidence: Extremely High. No family tree. Last logged in Sep 28, 2017.
 - (managed by [redacted]) 263/17. 1C1R granddaughter of Joan's Aunt Laverne. Possible range: 2nd - 3rd cousins. Confidence: Extremely High. 4,499 people shared. Last logged in Aug 2, 2018.
 - 205/12. 1C2R, grandson of Beverly Auld, great-grandson of Joan's Aunt Laverne. Possible range: 2nd - 3rd cousins. Confidence: Extremely High. No family tree. Last logged in Aug 4, 2018.



My Top 10 DNA Tips

My top 10 tips

- ▶ #1: Test only with the 5 trusted companies (Ancestry, 23andMe, FTDNA, MyHeritage, Living DNA)




My top 10 tips

- ▶ #2: Download the DNA data and upload it to as many sites as you can

Actions

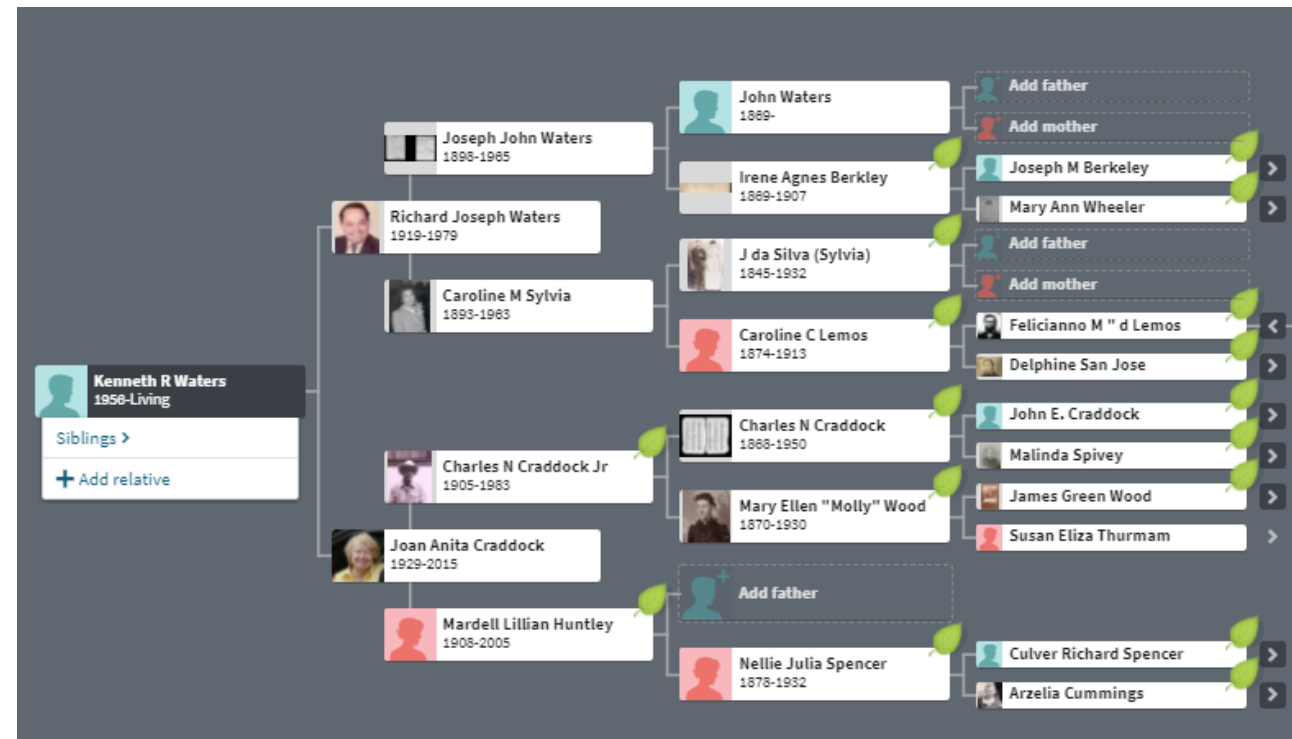
Download DNA Data Download ▾
Download a .zip file of your DNA data.
[What is DNA Data?](#)

FAMILY FINDER - DOWNLOADS

Download Your Data 
Raw Data

My top 10 tips

- ▶ #3: Build a single family tree that is accurate and supportable with good-quality records and keep that family tree PUBLIC (!) and make sure it's attached to your DNA record (aim for QUALITY, not QUANTITY)



My top 10 tips

- ▶ #4: Build private trees for all your hypothesis tests (“what if”) to see what hints can be found to help solve mysteries and build your public tree up

Save Your Tree ✕

Name Your Tree *

Allow others to view this tree (people marked "living" are hidden). [How does this help me?](#) ▼

Save tree Cancel

We value your privacy. [Read our privacy policy](#)

Private Tree

This setting allows you to keep your tree "private" so that other users cannot view the contents of your tree.

What does "private" mean?

Limited information about deceased individuals in your tree (name, birth year, and birthplace) will still appear in Ancestry search results. However, no one can view your actual tree without your permission. If another member wants to view your tree, they can contact you anonymously through our Connection Service to request more information. Keep in mind that these individuals may also have helpful information to share with you.

Also prevent your tree from being found in searches.

Note: Although your privacy setting will change immediately to public or private, it usually takes about a month for this update to be reflected in the search index.

My top 10 tips

- ▶ #5: Learn to use useful tools such as DNAPainter and its relationship estimator (Shared cM Project)

The screenshot shows the DNAPainter website homepage. At the top, there is a navigation bar with 'DNA PAINTER', 'Tools', 'Help', 'Subscribe', and 'Blog'. Below this is a main header with the text 'DNA Painter is an award-winning website that can help demystify your DNA results'. There is a search bar with the placeholder 'Search the site' and a 'Go' button, and a 'Register for a free account' button. Below the header is a section titled 'WHAT YOU CAN DO AT DNA PAINTER' with four featured cards:

- Visualize your direct line**: Create an elegant, searchable page for your direct ancestors and enhance it with custom visualisations such as religion, country of birth and age of death. Links: More info, FAQ, Create an ancestral tree.
- Map segments of DNA to ancestors**: Chromosome mapping is a fascinating puzzle that helps you to decode your inheritance by tracking known matches and comparing them to others. Links: More info, Example map, Create new map.
- Figure out how you're related to a DNA match**: Enter the number of cMs of DNA you share with a match and the shared cM tool will help you consider possible relationships. Links: More info, Visit the Shared cM tool.
- Use matches to identify an unknown ancestor**: If you have a group of matches you can fit into a family tree, "What are the Odds?" (WATO) can help you figure out how you might be related to them. Links: WATO FAQ, Visit WATO.

The Shared cM Project 4.0 tool v4

[Read more about the tool and this update](#)

March 2020

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](#)

Last updated 26th March 2020

Other versions

Filter

Enter the total number of cM for your match here:

reset

or enter %

Then any relationships that fit will stand out below

New [Click on any relationship to view a histogram](#)

[Read more about cousin relationships](#)

My top 10 tips

- ▶ #6: Be prepared to deal with unexpected surprises!

10 PHILADELPHIA WEATHER LOCAL SPORTS ENTERTAINMENT INVESTIGATORS VIDEOS NEWSLETTERS

DNA TESTING

'I Was Numb': Family Secrets Come to Light as DNA Testing Gains Popularity

Two families with lifelong secrets unearthed because of home DNA test kits are now dealing with the truth. Here's what their stories tell us about the shock that can come from new ancestry technology, and how to deal with it.

By Jim Rosenfield and NBC10 Investigators • Published on November 4, 2019 at 12:47 pm

[f](#) [t](#) [e](#)



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<https://www.nbcphiladelphia.com/investigators/i-was-numb-family-secrets-come-to-light-as-dna-testing-gains-popularity/2117880/>

My top 10 tips

- ▶ #7: Use well-crafted, well-thought out messaging to DNA matches to share information and test your hypotheses

Hi Elaine, my name is Ken Waters. I'm writing to you due to research I'm doing on [REDACTED] DNA as well as her aunt. You match [REDACTED] who is my [REDACTED]. It appears very likely that you share a common ancestor with her on the [REDACTED] line. I viewed your tree with [REDACTED] in it and was wondering if you have any information on any other [REDACTED]'s in your line? Thank you! My email is ken@familytreeaz.com. --Ken

My top 10 tips

- ▶ #8: Regularly check for new matches

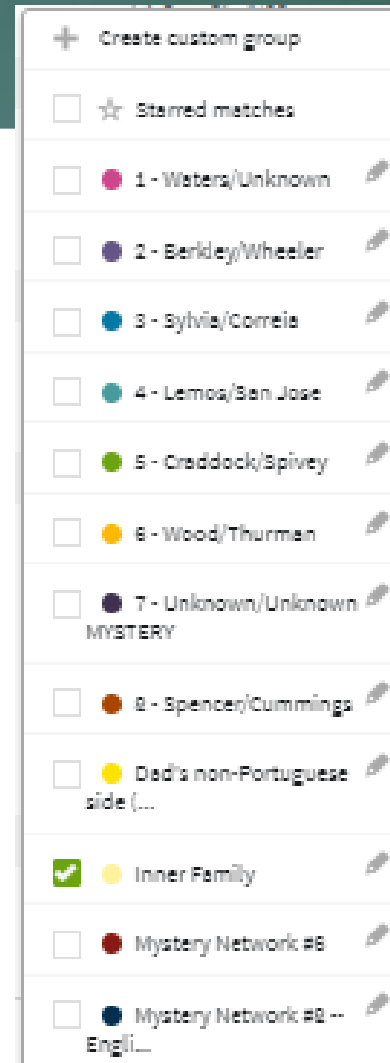
🔍 Search | Sort ^

Relationship
Close to distant

Date ✓
Newest to oldest

My top 10 tips

- ▶ #9: Sort your matches (starting at the top) into family groups
 - ▶ I like to use Ancestry's Tag feature to sort into my 8 great-grandparent lines



My top 10 tips

- ▶ #10: Learn more (go to conferences, attend local meetings (e.g., East Valley DNA SIG), watch videos, take classes [like mine!])



**Phoenix East Valley DNA Special
Interest Group**

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]

DNA PAINTER

DNA Painter is an award-winning website that can help demystify your DNA results

→ Top FAQs

Search the site

[Register for a free account](#)

GEDmatch

Login

Email Address *

Password *

Not yet registered? [Click Here!](#)

[Forgot Password?](#)

Site policy: [Click HERE](#)

DNAGedcom [Log In / Register](#)

Home Information DNA Kits Family Tree DNA 23andMe Autosomal Tools GWorks (Gedcom)

WELCOME TO THE DNAGEDCOM TOOLS SITE

To use this site, you must [Register](#). Registering simply gives an ability to associate your information with your login.

We have a robust User group where you can ask questions and find out the latest. Go to <https://www.facebook.com/groups/DNAGedcomUserGroup>

DNAGedcom Client requires a [subscription](#). After you [subscribe](#), you can install the application for [Windows](#) or for [Mac](#).

NEW: We have a new [help system](#) for DNAGedcom Client hosted on our sister site Genetic.Family. [Help](#)

If you want help with the GWorks system, please check out the documentation at [Kitty Blog Post](#) or https://www.dnagedcom.com/docs/GWorks_Howto_Updated.pdf

If you are an adoptee looking for help, please visit at <http://www.DNAAdoption.com>

Slides from Jamboree can be found [here](#)

We have old documentation on some of the features of DNAGedcom at [What can you do on DNAGedcom?](#) (TO BE UPDATED)

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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

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

Questions?

► Contact:

Ken Waters

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

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

