

1



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Review: The Basics of DNA Inheritance

The diagram illustrates the inheritance of 22 pairs of autosomal chromosomes. At the top, 22 pairs of chromosomes are shown, each with a different color. Below, a tree shows that each parent (2 PARENTS) receives 50% of their chromosomes from each of their two grandparents (4 GRANDPARENTS). A child then receives 50% from each parent. Text at the bottom states: "Each human cell has 22 chromosomes split from the mother's and father's cells".

Each human cell has 22 chromosomes split from the mother's and father's cells

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Y-DNA Testing

- Y chromosome passed from father to son

The diagram shows a male lineage where the Y chromosome is passed from father to son. A blue arrow traces the path from a male in the second generation back to a male in the first generation. The rest of the family tree shows other family members, but the Y chromosome is only passed through the male line.

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mtDNA Testing

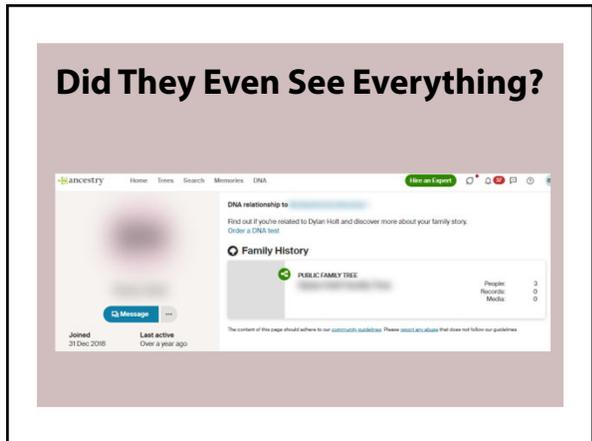
- Inherited from mother to child
- Males inherit mtDNA, but do not pass mtDNA to their child

The diagram shows a female lineage where mitochondrial DNA (mtDNA) is passed from mother to child. A red arrow traces the path from a female in the second generation back to a female in the first generation. The rest of the family tree shows other family members, but mtDNA is only passed through the female line.

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Getting the Most From Your Results

- Provide a well-researched and documented tree at the testing company website. Try to go back 8 generations to your 6th great-grandparents where possible.
- Link your test to yourself at Ancestry, MyHeritage and FamilyTreeDNA.
- Update your Profile with surname and location information.

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Benefits of Sharing / Going Private



The screenshot shows a family tree with several individuals listed. On the left, a tree structure is partially visible. On the right, a list of names and birth dates is shown, including: Henry Thurston Child II (1891-1970), Elizabeth Peltz Heiman (1914-1972), Willard A. Challenger (1910-1982), Daisy Dolores Horton (1915-2009), Severo Osalle (1910-1982), Juan Antonio Paulino (1910-1999), Luz Petita Grullon (1917), William Chapin Child (1891-1970), Lucy Bula Healy, Gilbert Wayne Heiman, Mary Nelson Kelly, Alton R. Challenger, Elizabeth D. Beverance, Alfred Boston Horton, Daisy Alice Wright, Emeraldo Osalle, Virginia de Vargas, Jose Domingo Basile, Ana Rufina Garcia, Francisco P. Padilla, Mercedes D. Quiñonez, and Ramona Grullon.

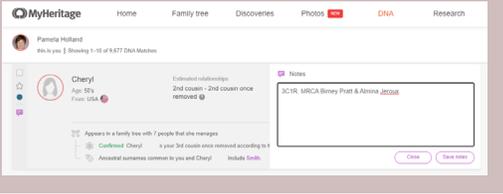
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Organizing Your Results

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Write Notes

- Most Recent Common Ancestors/Couple
- Surnames and/or Locations



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Create Groups and Labels

- Colored dots for ancestral lines or theories



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Interpreting Your Results

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Working with Your Matches

- Start by sorting into your 4 grandparent lines. For example, see the Leeds Method.
- Write Notes.
- At Ancestry & MyHeritage use the colored dot groups and labels.
- Work back to older generations.

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What is the Leeds Method?

- Method devised by genetic genealogist Dana Stewart Leeds
- Involves visually clustering 2nd-3rd cousin matches to identify the great-grandparents' lines
- The shared matches are reviewed from this list and assigned a color in a spreadsheet

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Leeds Method

	A	B	C	D	E	F	G	H	I	J	K
J.D.											
A.S.											
J.M.											
H.S.											
DNA Match 1											
P.R.											
J.F.											
C.K.											
C.G.											
V.D.											
J.Y.											
DNA Match 2											
G.L.											
J.S.											
M.N.											
DNA Match 3											
S.C.											
DNA Match 4											
K.D.											
H.B.											
DNA Match 5											
D.K.											
L.G.											
S.S.											
M.L.											

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Identifying a Match

- Family member you recognize
- Information in their trees
- Shared surnames
- Common locations
- Paternal/Maternal or Parent1/Parent2 side

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Ancestor Hints

Ancestry
Common Ancestor

MyHeritage
Theory of Family Relativity

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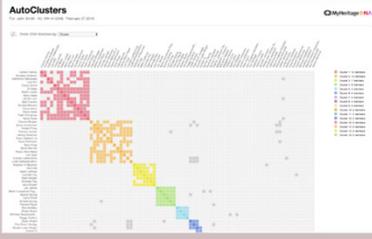
Other Ways to Identify a Match

- Build out a match's tree
- Look at Shared Matches
 - Maybe you already identified how you are related to a shared match
 - Evaluate carefully
 - Triangulate results: matching DNA segments between at least 3 people from different families

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Other Company Tools

- MyHeritage – AutoClusters report

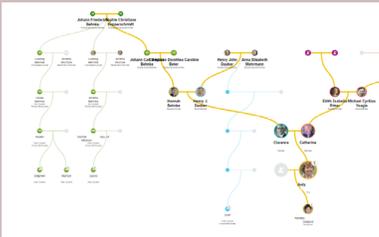


The screenshot shows the MyHeritage AutoClusters interface. It features a large heatmap where each square represents a genetic cluster. The clusters are color-coded: red/pink at the top left, yellow in the middle, and green and blue at the bottom right. A legend on the right side lists various ethnicities corresponding to the colors. The top of the page has the 'AutoClusters' title and the MyHeritage logo.

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Other Company Tools

- 23andMe – Family Tree



The screenshot displays the 23andMe Family Tree. It is a complex, multi-generational genealogical chart with numerous nodes representing individuals. The chart is color-coded by generation and includes various icons for different types of relationships and events. The top of the page has the title '23andMe Family Tree' and the 23andMe logo.

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Identifying a Match Without Contact

- Do they use their username in other mediums
- Various online searches and directories
- If you later do have contact, consider how much information to share

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No Response? No Problem

Jennifer has 15 surnames
This can help you navigate who in your family both of you are related to.

Bulcher, Doty, Kinzler, Turner, Tabor, Poly, Biles, Sturm, Hodge, Taber, Winans, Koon, Steiger, Bramhall

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Tip

The trees of your matches may not be accurate

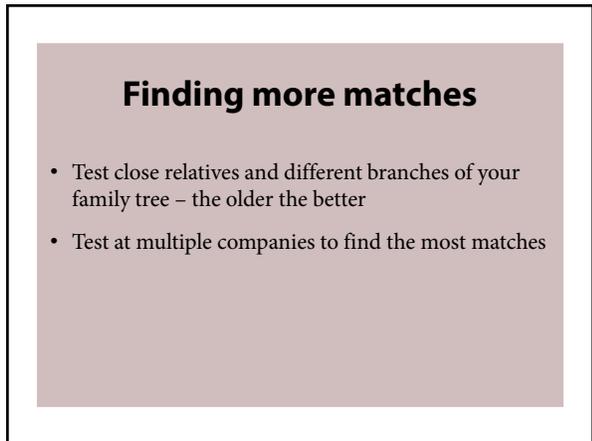
26

QUESTIONS?

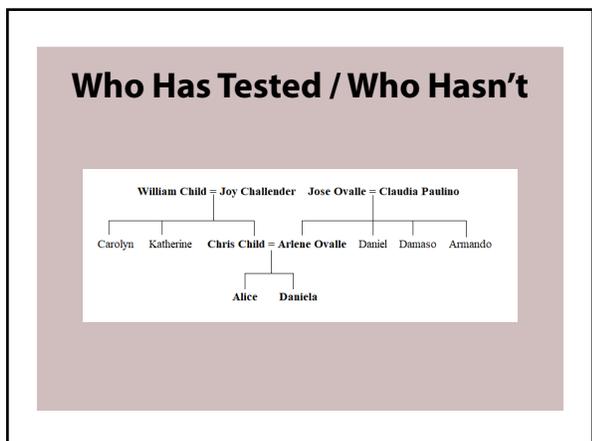
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Finding Other Participants

- You need to compare your results to other individuals to confirm or reject a hypothesis
- Their DNA may hold valuable clues for your existing theories
- Your DNA may be “useless” for your project or theory

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Tip

Complete a Tree of Living Descendants

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Reverse Genealogy

- Use vital records and census research up until 1950
- Look for obituaries with children and more current addresses
- Use online resources such as telephone, property, and voter records
- Facebook and social media can be your friend!

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Finding the “Ideal” DNA Participant

- Complete your living tree and identify the best possible descendants
- Find two independent lines that can help with your research
- Try to have back up candidates too
- Caution them about unexpected results

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Appropriate Approaches to Requesting a Stranger’s DNA

- Consider what you’re asking of people – it could be a sensitive topic
- Carefully explain why you need their participation and provide as much information as you can
- Be truthful and honest with your intentions
- Offer to pay for their test
- Share your genealogical information

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The Best Methods of Communication

- Facebook or Social Media
- Email
- Phone
- Physical address
- Contacting someone via their own online tree
- Queries in print/online

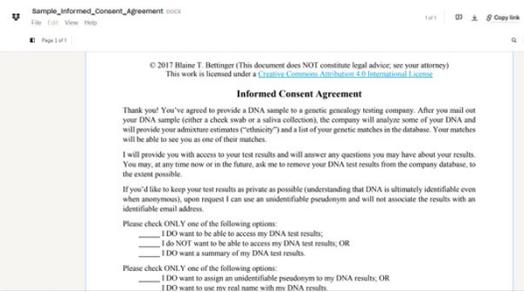
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Informed Consent Agreements

- Help ensure that the tester is aware of what may come up in their DNA results
- Allows tester to specify how they want to receive their DNA results and/or permit data to be uploaded elsewhere
- Genetic genealogist Blaine Bettinger prepared forms available under Creative Commons license.
- This is NOT a legally binding form

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Informed Consent Agreement Sample

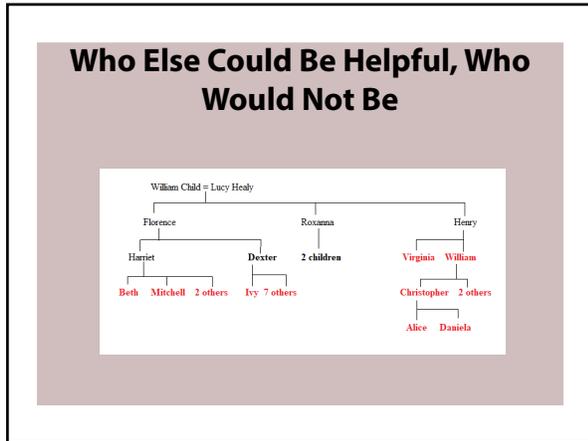


38

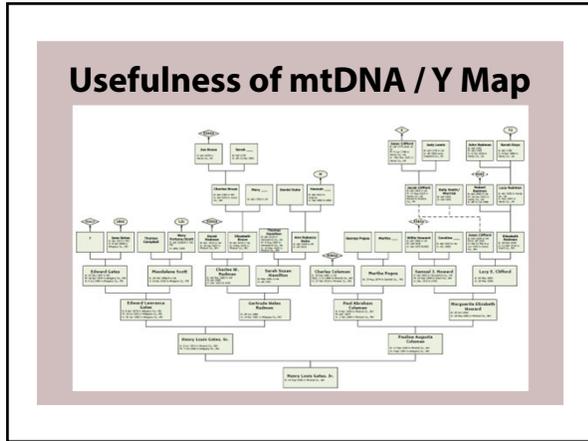
Goal

- Getting the most senior generation at any given point that descends from your deceased ancestor. Siblings, cousins, etc. will have different inherited DNA from these ancestors.

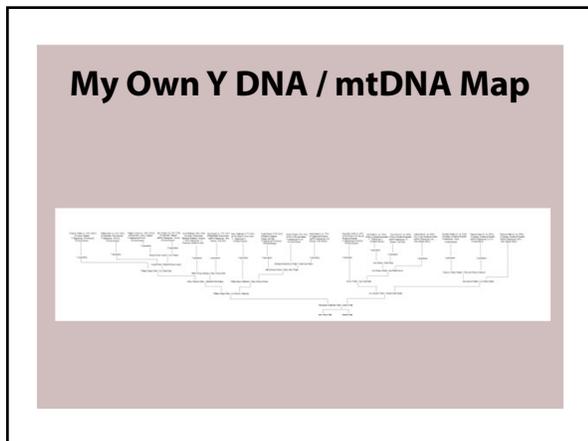
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Do You Even Need Them?

Maternal Haplogroup

Maternal haplogroups identify unbroken lines of women that all trace back to the same ancient common ancestor.

You	Morgan
L2b1a	L1c1d
See full report	See full report

Because your haplogroups do not match, you are most likely not recently related through a direct line of female ancestors.

Paternal Haplogroup

Paternal haplogroups identify ancient lines of men that all trace back to the same common ancestor.

You	Morgan
Not available	R-L51
	See full report

Although women inherit roughly 56% of their DNA from their fathers, they do not inherit Y chromosomes and, as a result, do not have paternal haplogroups.

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Asking Your Own Relatives

- You may discover a recent surprise




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Chasing the Y

Person	Relationship	Y-DNA Haplogroup	Public Inherited Tree	Common Ancestor
Christopher Child	Son	R-1A2 (M) 2016 shared DNA	102 people	Common ancestor
David Child	Nephew	R-1A2 (M) 2016 shared DNA	102 people	Common ancestor
Allen Child	Nephew	R-1A2 (M) 2016 shared DNA	102 people	Common ancestor
John	1st cousin 1/2 removed or half granduncle	R-1A2 (M) 2016 shared DNA	102 people	Common ancestor
Harlan	1st cousin 1/2 removed	R-1A2 (M) 2016 shared DNA	102 people	Common ancestor
2nd cousin	2nd cousin	R-1A2 (M) 2016 shared DNA	102 people	Common ancestor
2nd cousin or half 1st cousin 1/2 removed	2nd cousin or half 1st cousin 1/2 removed	R-1A2 (M) 2016 shared DNA	102 people	Common ancestor

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Reaching Out to People That Have Already Taken One DNA Test

Common Ancestors

According to Ancestry member trees, these are the common ancestors that connect Joy Challenger and Jackwright. View a common ancestor to see the relationship path that connects them.

Joy Challenger and Jackwright could be 2nd cousins through:

- Abraham Hendrickson Wright**
Great-grandfather
1840-1922
[View Relationship](#)
- Sarah Jane Haines**
Great-grandmother
1854-1928
[View Relationship](#)



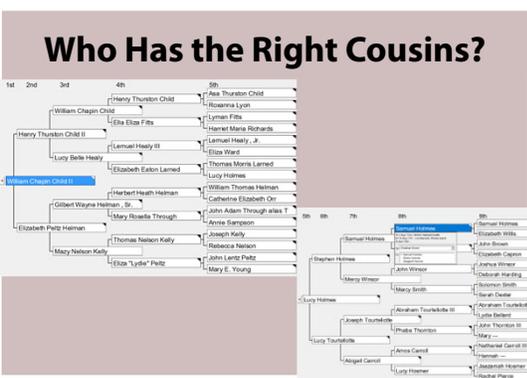
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Still No Solution

Markers Tested	Genetic Distance	Big Y STR Differences	Y Haplogroup	Paternal Country of Origin	Paternal Earliest Known Ancestor	Match date
1 to 87	1 step Link on Family Tree	Not Available	R4C259	Canada	Franklin George Wright b. 1882...	Match date: April 03 2017
1 to 87	1 step Link on Family Tree	Not Available	R4C259	England	Peter Wright (1740-1823) b. NY 4 v...	Match date: April 03 2017
1 to 111	1 step Link on Family Tree	Not Available	R8Y71827	Canada	Arroy Wright (1826-1946) b. Can...	Match date: December 27 2023

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Who Has the Right Cousins?



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Different Levels Between the Same Generation

The screenshot displays three columns of family members, each with a profile picture, name, and a brief description of their genetic relationship to the user. The descriptions include terms like 'Half 2nd cousin', '2nd cousin', and '1st cousin', along with match dates and genetic distance information.

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Matches to Holmes Men Elsewhere in America, Some with Proven English Origins

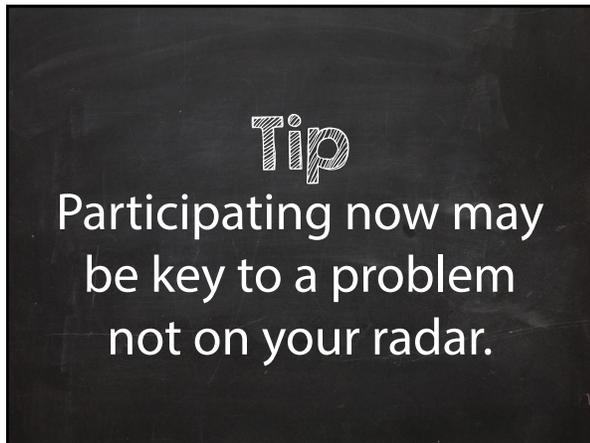
The screenshot shows a list of matches for the surname 'Holmes'. Each match entry includes the match's name, a 'Markers Tested' count, 'Genetic Distance' (e.g., 5 steps), 'Big Y STR Differences', 'Y Haplogroup', 'Paternal Country of Origin', and 'Paternal Earliest Known Ancestor'. The matches listed are 'Berginck Holmes', 'Mr. Douglas W. Holmes', and 'Mr. Gordon Houston Holmes'.

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Other Places to Look

The screenshot shows the homepage of the Guild of One-Name Studies. It features a search bar with the text 'Is your surname here?', a '2,248 members' badge, and a 'SEMINAR BOOKING NOW OPEN' announcement for a seminar on 8 March 2025 in Amersham, Buckinghamshire, England. There are also buttons for 'ABOUT THE GUILD', 'HOW TO JOIN US', and 'Find Out More'.

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Chasing the mt

Haplogroup T

The mitochondrial haplogroup T is best characterized as a European lineage. With an origin in the Near East greater than 45,000 years ago, the major sub-lineages of haplogroup T entered Europe around the time of the Neolithic: 10,000 years ago. Once in Europe, these sub-lineages underwent a dramatic expansion associated with the arrival of agriculture in Europe. Haplogroup T2 is one of the older sub-lineages and may have been present in Europe as early as the Late Upper Palaeolithic.

You can also [view other haplogroups here](#).

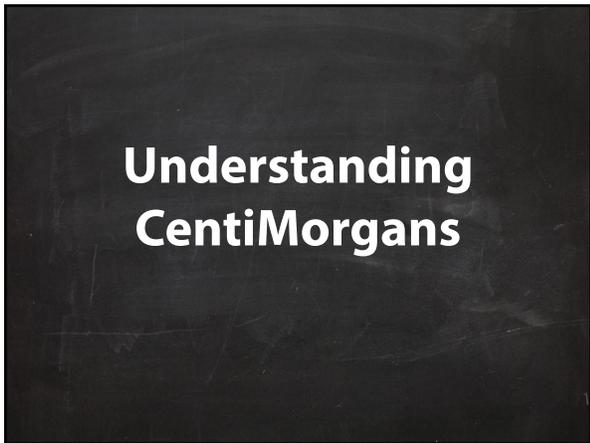
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What is a CentiMorgan

$$P(\text{recombination}|\text{linkage of } d \text{ cM}) = \sum_{k=0}^{\infty} P(2k + 1 \text{ crossovers}|\text{linkage of } d \text{ cM})$$

$$= \sum_{k=0}^{\infty} \frac{e^{-d/100} (d/100)^{2k+1}}{(2k+1)!} = e^{-d/100} \sinh(d/100) = \frac{1 - e^{-2d/100}}{2}$$

- A unit for measuring genetic linkage

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Shared cM Project

- Project of Blaine Bettinger, the Genetic Genealogist
- Understanding averages over time of shared centiMorgans between different levels of kinship
- Data on the International Society of Genetic Genealogists Website (ISOGG)

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The Shared cM Project – Version 4.0 (March 2020)

Blaine T. Bettinger
www.TheGeneticGenealogist.com
CC 4.0 Attribution License

How to read this chart:
 Relationship: Ance/Unce, Aunt/Uncle, Grandchild, etc.
 Average: Average cM shared.
 Range (min-max): Range of cM shared.

Relationship	Average cM	Range (min-max)
Self	3400	3400-3400
Parent	2500	2500-2500
Child	2500	2500-2500
Sibling	2300	2300-2300
Half Sibling	1750	1750-1750
Grandparent	1750	1750-1750
Grandchild	1750	1750-1750
Uncle/Aunt	1300	1300-1300
Niece/Nephew	1300	1300-1300
Half Uncle/Aunt	1000	1000-1000
Half Niece/Nephew	1000	1000-1000
Great-Grandparent	850	850-850
Great-Grandchild	850	850-850
Great-Uncle/Aunt	700	700-700
Great-Niece/Nephew	700	700-700
Other Relationships	0-500	0-500

Minimum was automatically set to 0 cM for relationships more distant than Half 2C, and averages were determined only for submissions in which DNA was shared

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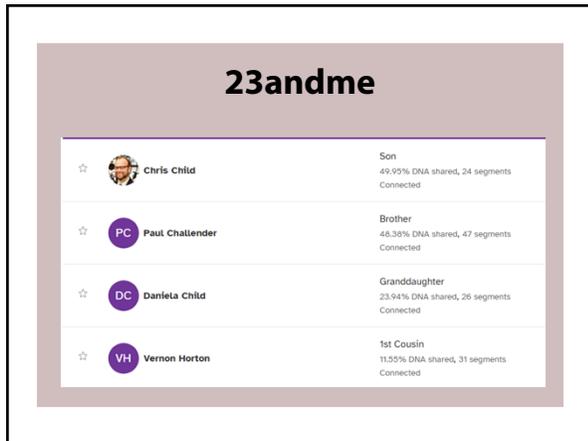
Tip

Shared cMs alone are not proof of a specific kinship

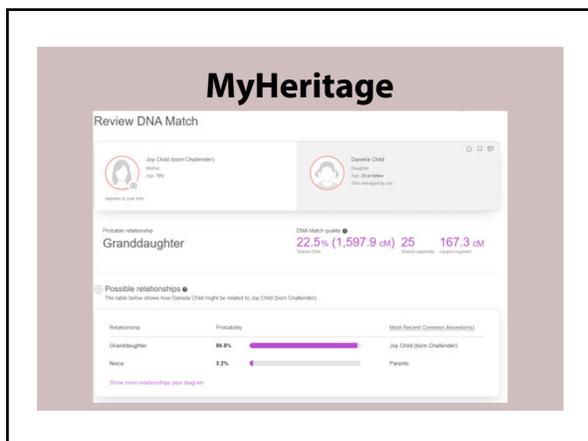
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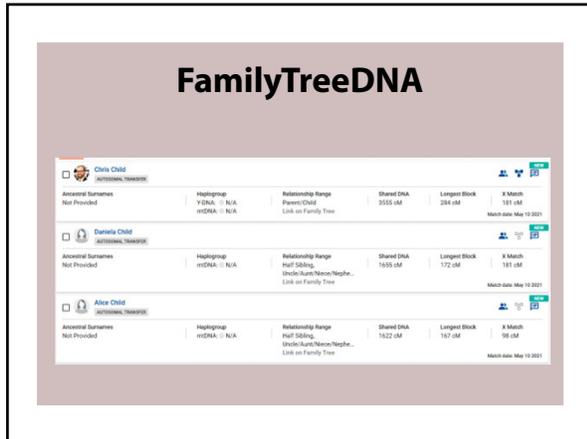
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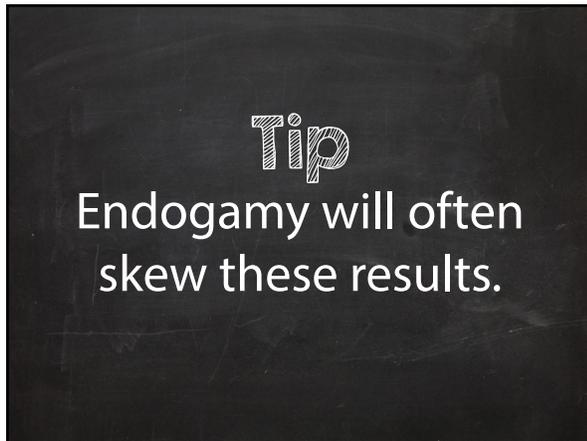
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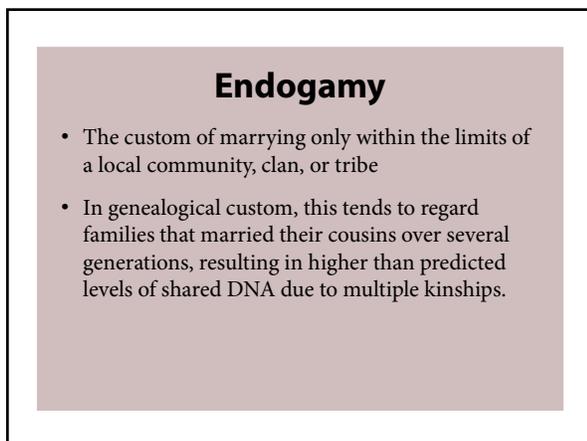
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Endogamous Ancestry (Extreme)

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One Quarter "Endogamous"

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See How Matches Compare with the "Less Endogamous"

Langley matches

George Langley (1846-1924) = Clara Emma Shorey (b. 1857)

Frank Elmer Langley (1877-1953) = Maria Wright	Perry Langley (1877-1960) = Euphemia Clark	
Wallace Langley alias Elmer Wallace (1900-1954) = Hope Weidman Potter (1897-1986) = William Edward Wanamaker (1866-1920)	Clayton Langley (1909-1970) = Blanche Eva Humphrey (1915-1965)	Winifred Langley (1902-1982) = Maud Langley (1911-1993)
Ernest Francis Wanamaker (1923-2011) = Thelma Odessa Porter (1925-2009)	Violet M. Langley = Alden L. Richardson	Vernon E. Langley = Beverly D. Knowles
Kevin Wanamaker	D.R.	J. Langley

Kevin and J. are predicted to be first to second cousins (378 cM along 15 segments).
 Kevin and D.R. are predicted to be second to third cousins (265 cM along 13 segments).

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A Very Close Match Yet No Common Ancestors Until the 18th Century

Francisco González
 Age: 70s
 DNA managed by Francisco González
[Contact Francisco](#)

Estimated relationships
 1st cousin once removed - 2nd cousin once removed

DNA Match quality
 Shared DNA: 2.4% (171.0 cM)
 Shared segments: 14
 Largest segment: 21 cM

Appears in a family tree with 5,669 people, managed by Francisco González from Dominican Republic

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How Many Times Related?

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Tejada / Gonzalez Descents

- Two Tejada siblings marry two Gonzalez siblings
- Zoila descends from both couples due to her grandparents (married in 1885) being third cousins
- Francisco descends from one couple 4 times, and the other 5 times.
- 18 unique ways they are 4th cousins or 4th cousins once removed

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Siblings Versus Half-Siblings

- Full siblings average 2613 cM (50%), ranging from 1613 to 3488
- Half siblings average 1759 cM (25%), ranging from 1160 to 2436
- Individuals between 1613 and 2436 (21 to 32%) are “within the overlap” of sibling versus half sibling

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Other Considerations

- Maternal half siblings will share the same mtDNA
- Paternal half brothers will share the same Y-DNA
- Paternal half-sisters will have the same side of one part of their x DNA



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First Cousins Versus Half-First Cousins

- First cousins average 866 cM (12.5%), ranging from 396 to 1397
- Half first cousins average 449 cM (6.25%), ranging from 156 to 979
- Individuals between 396 to 979 are “within the overlap” over first cousins versus half first cousins

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Smaller Overlaps

- Half siblings average 1759 cM (25%), ranging from 1160 to 2436
- First cousins average 866 cM (12.5%), ranging from 396 to 1397
- Levels under 1160 can corroborate a first cousin kinship, while levels over 1397

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Staying Organized

- The likelihood of multiple siblings being beyond the overlap for particular kinships goes down
- Group matches by the particular half, quadrant, eight, etc.
- Keep in mind of identical twins, endogamous ancestry, and half level kinships
- Not all matches are what they first appear to be

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QUESTIONS?

Hire Research Services
research@americanancestors.org

Chat with a Genealogist
AmericanAncestors.org/chat

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Consultations

Book a one-on-one consultation with a genealogist and receive help with your family history research!

AmericanAncestors.org/Expert-Help/Consultations



SCAN ME

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AmericanAncestors.org

A National Center for Family History, Heritage & Culture

Search Events Join Give 10 Million Names Publications Expert Help Tools Signature Projects Centers & Initiatives

Making Connections: Interpreting DNA Test Results 2025

Thank you for registering for the online course, **Making Connections: Interpreting DNA Test Results**

Advances in DNA have had huge implications for the field of genealogy and with the rise in popularity of commercial testing, the possibilities of connecting with previously unknown relatives is greater than ever. But how do you leverage your results in your family history research? Whether you're new to DNA testing or you have already taken a DNA test(s), this course will provide you with the knowledge, tools, and strategies to interpret your results, make important genealogical connections, and take your family history research to the next level.

This course includes five 90-minute classes, Q&A with instructors, and exclusive access to handouts and recordings of each presentation.

Join the Live Broadcasts

Click here to join the live broadcasts: <https://boom.us/j/9278270072>

Live broadcasts: Wednesdays, January 29, February 5, 12, 19, and 26, 6:00 - 7:30 PM ET

AmericanAncestors.org/making-connections-interpreting-dna-test-results-2025

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