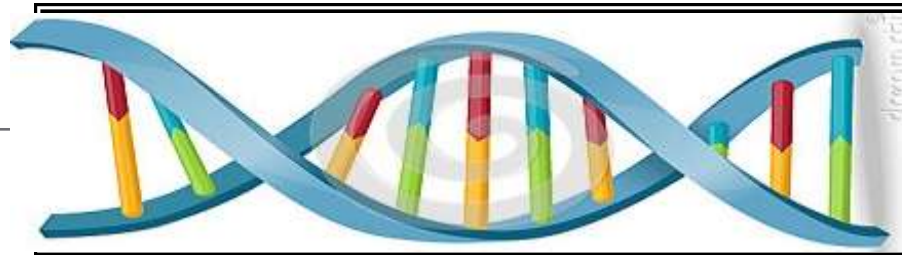
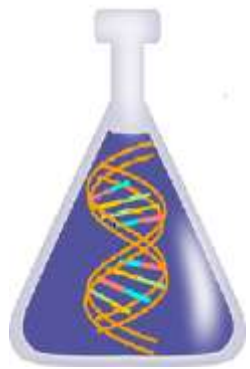


DNA RESULTS AND TRIANGULATION TECHNIQUES



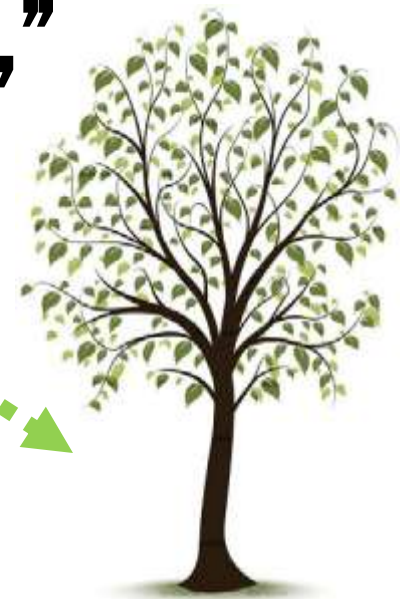
**Kathleen J. Callanan,
Genetic Genealogy Consultant
kjcallanan@torchlake.com**

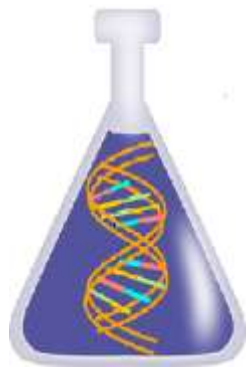


Our Mission:

**Start with “WHAT We Know”
and End with “WHO We Are.”**

**And, Discover
“WHERE We Have Been,”
finding new Cousins
along the Journey.**

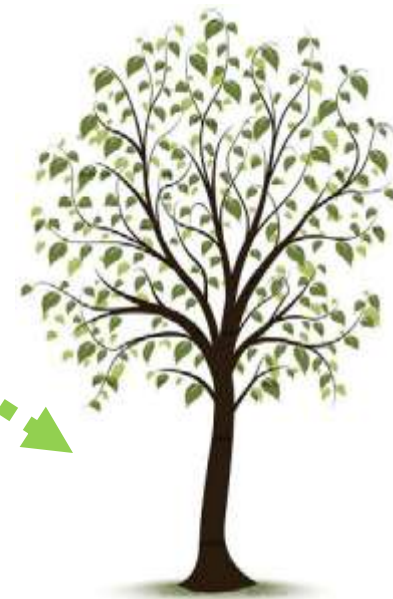


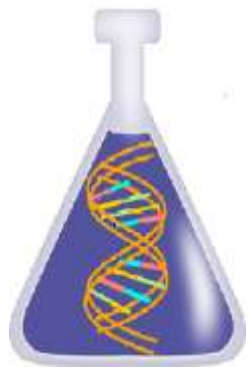


The SALIVA test gives information about the 23 pairs of chromosomes in the human body. One copy came from Mom and one copy came from Dad.

One of four chemicals is attached at each location along the chromosomes.

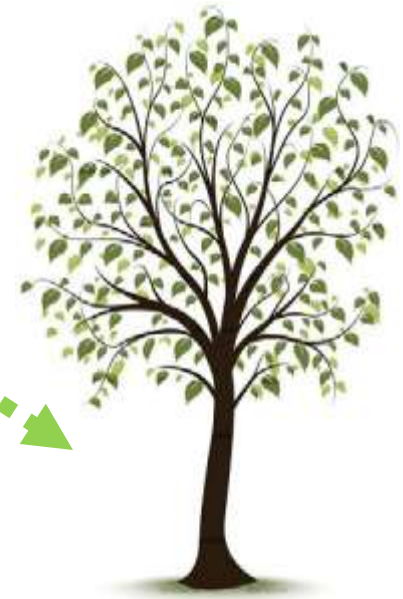
A, C, T, G

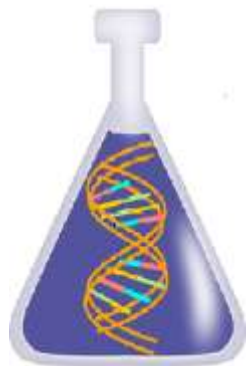




The absence of a chemical at a location is unexpected, or what we would call a mutation. **SINGLE NUCLEOTIDE POLYMORPHISMS, or SNPs for short.**

Sometimes we have more than one chemical attached to a point. This is also an **SNP.**



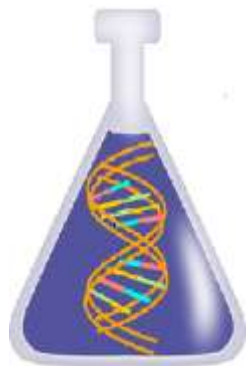


Millions of locations can be tested and recorded, to form the set of what we call, RAW DATA.

We usually do not work directly with the RAW DATA files. The testing companies process and interpret the results for us.

For example, they will determine a match is at the 3rd Cousin level or Who is a MATCH!



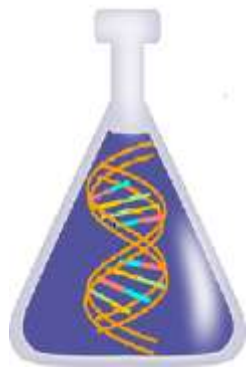


**All three major testing companies
allow downloads of the RAW DATA
for our further use.**

**This data File can be
uploaded to a favorite
Tool Site, called GedMatch.com, for Match
Comparisons across testing companies.**

**And for additional Admixture analysis of
ancestral heritage.**





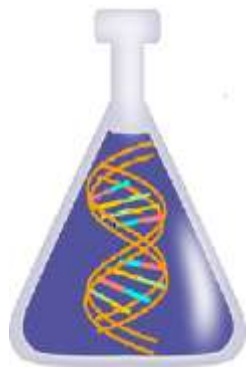
No Need to Worry About Millions of Data Points!

The companies present their data for us in a simple format.

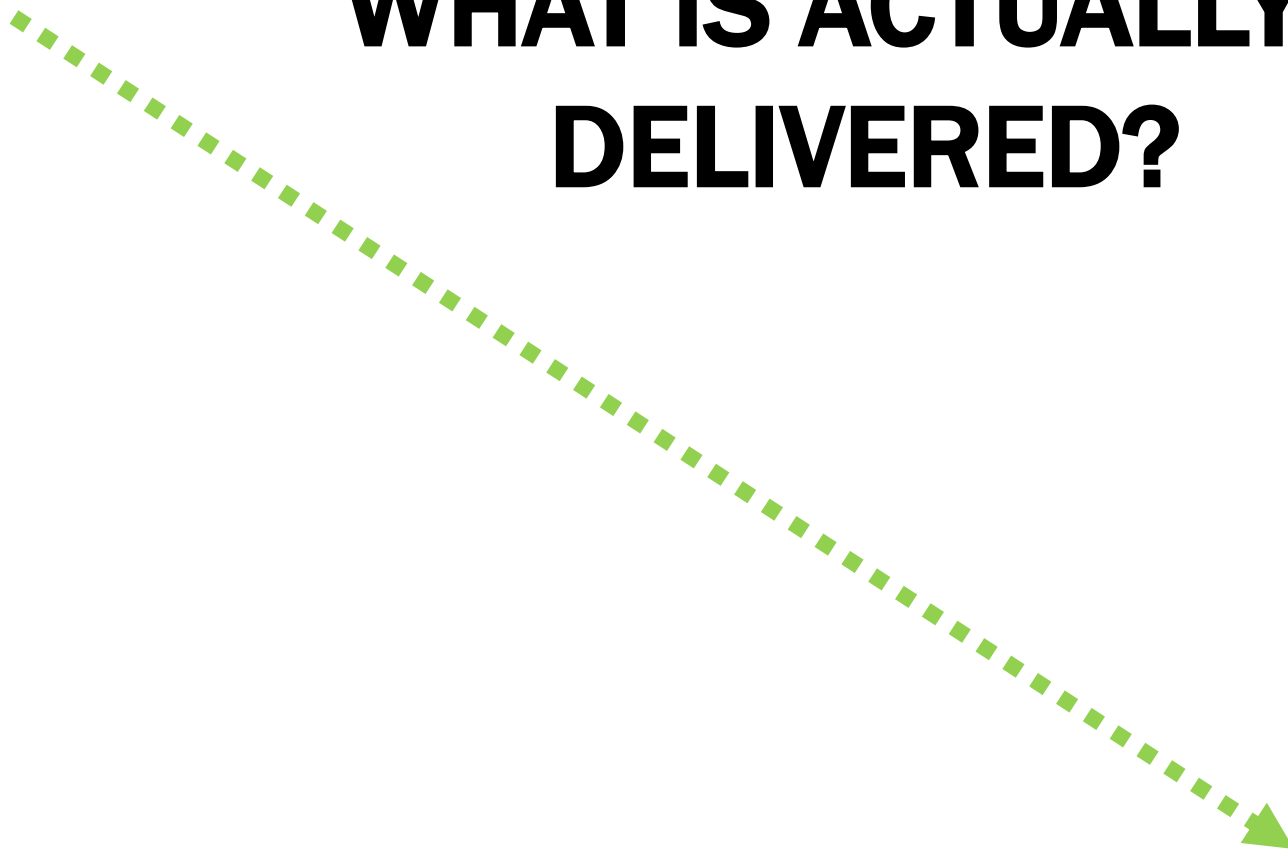
Match names, Estimated Relationships, Surnames, Personal Profiles, and more.

All delivered electronically at our own personal, secure websites.

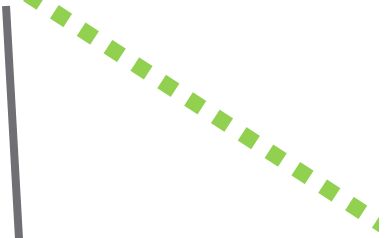
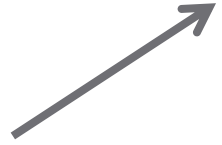




WHAT IS ACTUALLY DELIVERED?



ANCESTRAL COMPOSITION-- ORIGINS



HEALTH ISSUES



**COUSIN
MATCHES**


DNA DATA

TREES





ANCESTRAL COMPOSITION-- ORIGINS



–AncestryDNA: Genetic
Communities, mapping to
31 Biogeographical Regions

–23andMe:

– FTDNA: MyOrigins

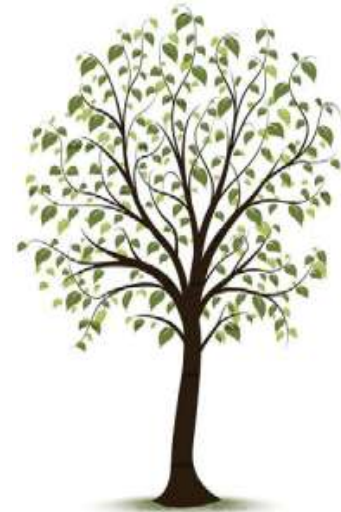


**-23andMe: Health Issues Product
available now.**

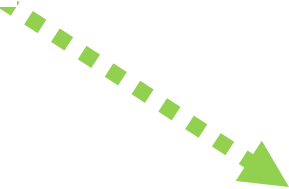
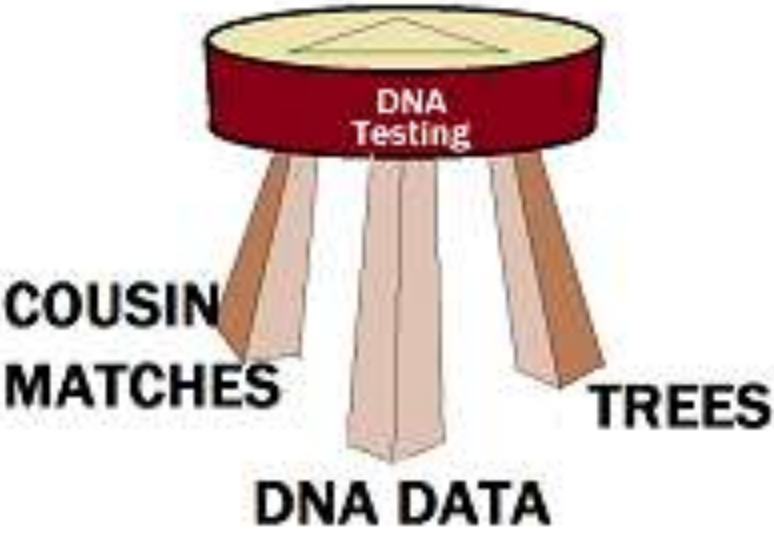
**-AncestryHealth: in Beta
formation**

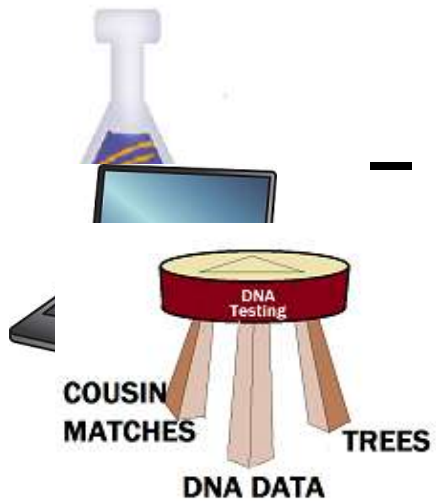


HEALTH ISSUES



WHAT ABOUT THE CORE GENEALOGY INFORMATION?



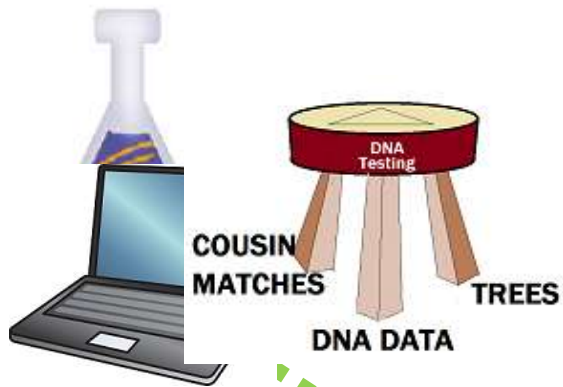


- **NO TREES** are found directly on 23andMe; They use MyHeritage.
- **TREES** are allowed on FTDNA and are used in Phasing Matches.
- **TREES** are allowed on AncestryDNA; HINT Trees, also.

- **TREES** are allowed on GedMatch using a GedCom upload.



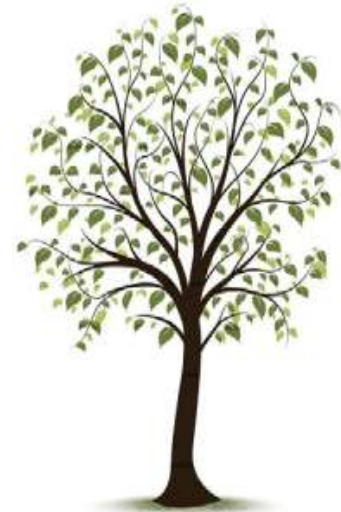
COUSIN MATCHES

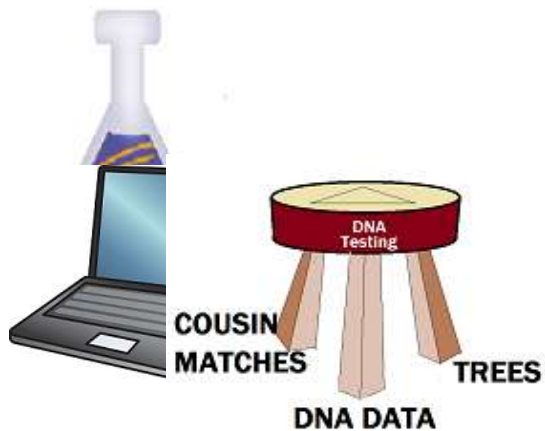


* Name or Nickname,
Estimated Relationship, Profile Info,
Tool for Shared Matches or In-Common-
With Matches, Chromosome Details at
some companies.

And...

A Communications Channel

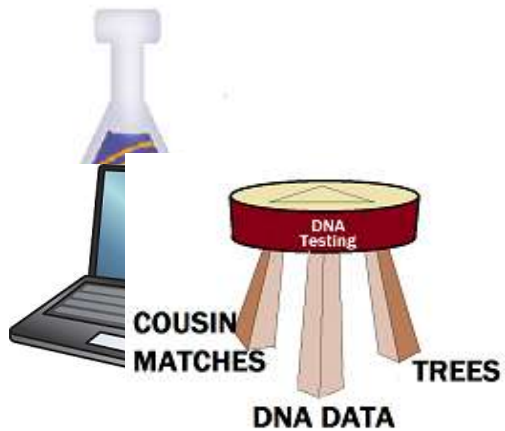




FTDNA Graphic

- CHROMOSOME #
- START LOCATION
- END LOCATION
- LENGTH (cM)
- SNP COUNT
- EST. Relationship



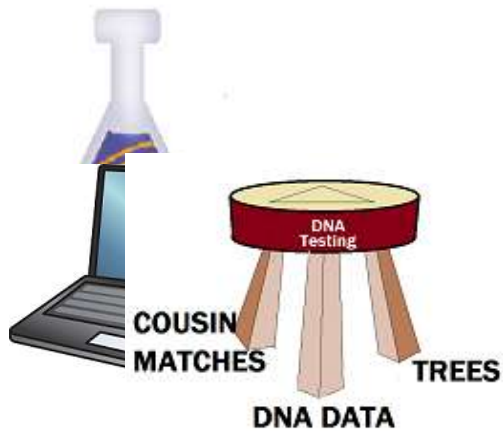


PREMISE:

When Two people whose DNA sequences match identically over a specified minimum range on a particular chromosome, the

match is called
Identical By Descent
because it originated
from a **COMMON ANCESTOR.**

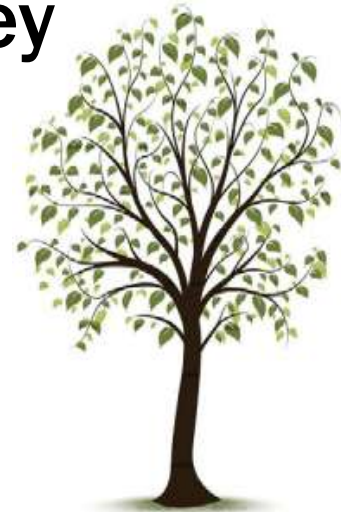


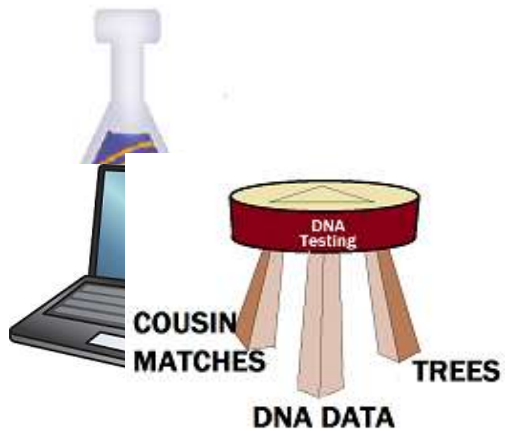


PREMISE:

- When Three people have an identical DNA sequence over a specified range, we call the condition, “**OVERLAPPING SEGMENTS.**”

If they mutually match each other, they form a “**TRIANGULATION GROUP.**”
All three members of the TG will share a **COMMON ANCESTOR.**



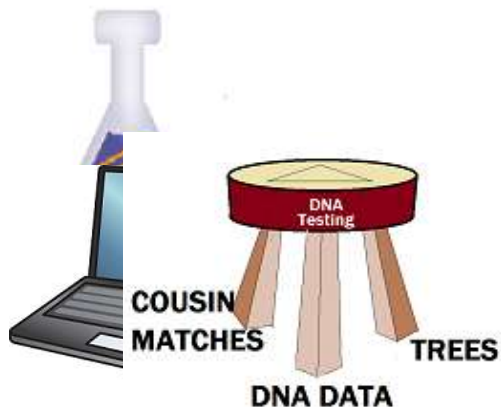


KEYPOINT

All members of the TG must mutually match each other to guarantee their DNA comes from the same side of your family; that is, either from Mom's copy or from Dad's copy.



HOW DO WE ACCESS THE DATA?



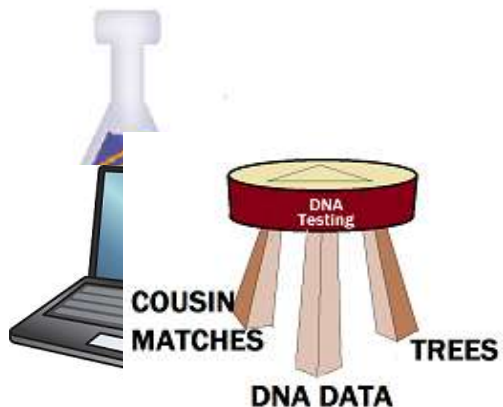
– **FTDNA:** Use the link in the **Chromosome Browser Tool:**
“Download all Matches to Excel.”

-23andMe:

**Tools>DNA Relatives> and
go to bottom of page:**

“Download aggregate data”





For AncestryDNA:

- * **Data Entry for AncestryDNA results is done MANUALLY, using the results of your comparisons at GedMatch.com.**

- **There is no AncestryDNA tool to provide you with the data.**





FTDNA Browser Results

116838_Chromosome_Browser_Result

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW

Paste Calibri 11 A A B I U Font Alignment Number

	A	B	C	D	E	F	G	H
1	NAME	MATCHNA	CHROMOS	START LOC	END LOCA	CENTIMOF	MATCHING	SNPS
2	Kathleen J	(John) Mar	1	1.6E+08	1.62E+08	2.31	600	
3	Kathleen J	(John) Mar	3	41139912	44793840	2.57	800	
4	Kathleen J	(John) Mar	3	1.3E+08	1.33E+08	2.56	700	
5	Kathleen J	(John) Mar	5	1.38E+08	1.41E+08	2.77	500	
6	Kathleen J	(John) Mar	6	56460410	65132087	2.12	600	
7	Kathleen J	(John) Mar	6	92503116	95146721	2.15	600	
8	Kathleen J	(John) Mar	7	98754182	1E+08	2.09	500	
9	Kathleen J	(John) Mar	10	92242261	94771837	1.54	600	
10	Kathleen J	(John) Mar	13	1.01E+08	1.04E+08	8.09	1200	
11	Kathleen J	(John) Mar	15	79057322	81981187	2.2	500	
12	Kathleen J	(John) Mar	17	23720820	26727500	2.87	500	
13	Kathleen J	(John) Mar	18	23287051	25213638	1.71	500	
14	Kathleen J	(John) Mar	22	28034125	30768802	3.7	592	

REFORMAT NEXT



Chromosome Browser Results FTDNA

116838_Chromosome_Browser_Res

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW

Clipboard Font Alignment Number

Calibri 11 A A B I U A \$ % , .00

	A	B	C	D	E	F
1	NAME	Chr	START	END	cM	SNPs
2	(John) Mark K	1	160,060,960	161,744,911	2.31	600
3	(John) Mark K	3	41,139,912	44,793,840	2.57	800
4	(John) Mark K	3	129,723,971	133,141,799	2.56	700
5	(John) Mark K	5	138,196,426	140,861,658	2.77	500
6	(John) Mark K	6	56,460,410	65,132,087	2.12	600
7	(John) Mark K	6	92,503,116	95,146,721	2.15	600
8	(John) Mark K	7	98,754,182	100,483,336	2.09	500
9	(John) Mark K	10	92,242,261	94,771,837	1.54	600
10	(John) Mark K	13	101,270,369	104,277,080	8.09	1200
11	(John) Mark K	15	79,057,322	81,981,187	2.2	500

**REMOVE ENTRIES LESS THAN
YOUR THRESHOLD**

23andMe.com Aggregated Results

kathleen-j_callanan_rel

Microsoft Excel ribbon showing FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW tabs. The HOME tab is active, displaying options for Clipboard, Font (Calibri, 11), Alignment, and Number (Percentage).

	A	B	C	D	E	F	G
1	Display Name	Surname	Chromosome	Chromosome	Chromosome	Genetic Distance	# SNPs
2	Brian	F	16	64205743	73586766	7.30146	1482
3	Greg	B	4	16642464	24324261	8.29424	1545
4	Irene	C	5	76092225	82897008	9.1496	1490
5	Nancy	Co	5	64626453	73848992	10.96373	1515
6	William	M	18	45536694	53906628	9.10094	1863
7	Elior	D	4	1.78E+08	1.83E+08	9.0132	1186
8	Patrick E	i E	X	70093593	99645707	21.10295	2051

REFORMATED FOR SIMPLICITY

kathleen-j_callai

Clipboard Font Alignment

	A	B	C	D	E	F
1	NAME	Chr	START	END	cM	# SNPs
2	Brian F	16	64,205,743	73,586,766	7.30	1482
3	Greg B	4	16,642,464	24,324,261	8.29	1545
4	Irene C	5	76,092,225	82,897,008	9.15	1490
5	Nancy C	5	64,626,453	73,848,992	10.96	1515
6	William	18	45,536,694	53,906,628	9.10	1863
7	Elior D	4	178,106,593	182,817,317	9.01	1186
8	Patrick E	X	70,093,593	99,645,707	21.10	2051

REFORMATED FOR SIMPLICITY

kathleen-j_callai

	A	B	C	D	E	F
1	NAME	Chr	START	END	cM	# SNPs
2	Brian F	16	64,205,743	73,586,766	7.30	1482
3	Greg B	4	16,642,464	24,324,261	8.29	1545
4	Irene C	5	76,092,225	82,897,008	9.15	1490
5	Nancy C	5	64,626,453	73,848,992	10.96	1515
6	William	18	45,536,694	53,906,628	9.10	1863
7	Elior D	4	178,106,593	182,817,317	9.01	1186
8	Patrick E	X	70,093,593	99,645,707	21.10	2051



**FROM MY HOMEBREW COLLECTION
OF DNA MATCHES ACROSS
COMPANIES...**





HOME BREW COLLECTION: DNA Matches of Kathleen J. Callanan, 4/1/17

<input checked="" type="checkbox"/>	Name	Chromosome	Start	Stop	Longest cM	SNPs
<input type="checkbox"/> 296	Hc Thomas	6	22,000,000	35,000,000	11.30	4601
<input type="checkbox"/> 297	Clarence	6	22,000,000	35,000,000	11.10	4564
<input type="checkbox"/> 298	He , Patrick 3rd-D	6	22,000,000	46,000,000	27.80	7065
<input type="checkbox"/> 299	Cardillo, Sue (Aunt Sue-M)	6	32,888,448	77,216,041	36.71	10335

* **THOMAS, CLARENCE AND PATRICK DEFINITELY OVERLAP EACH OTHER.**

* **AUNT SUE IS TOO CLOSE TO THE EDGE..**





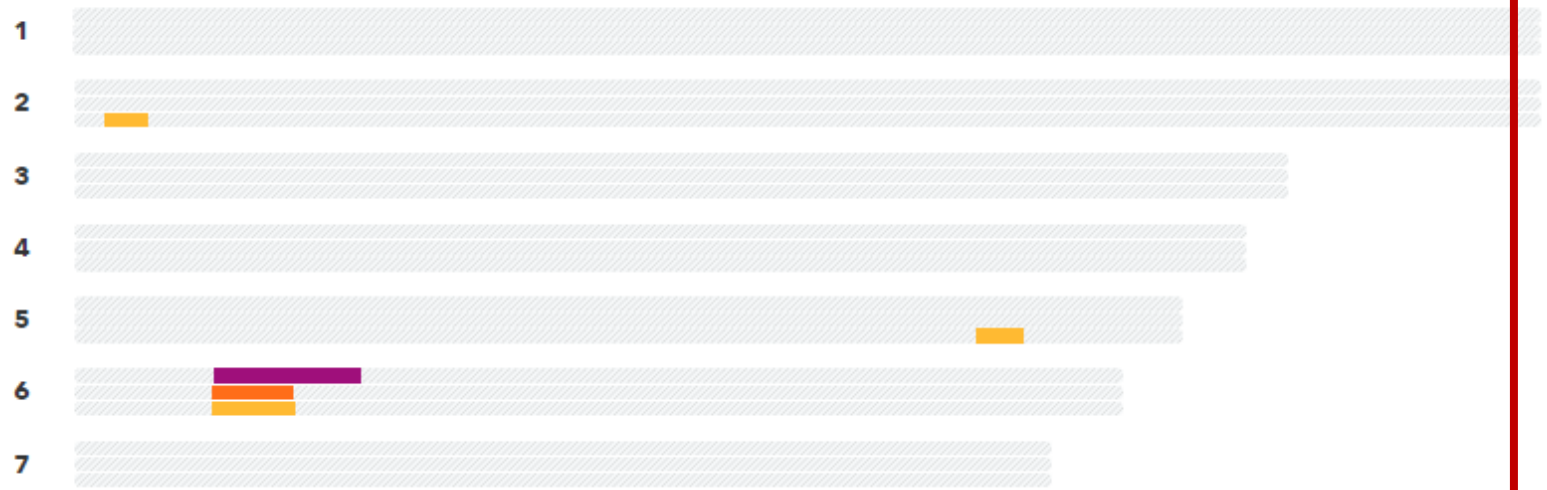
Back to Tools

People

DNA

OVERLAPPING SEGMENTS ON CHR 6.

Person	IBD (cM)	Segments
Kathleen J. Callanan and Patrick He	35	2
Kathleen J. Callanan and CLARENCE T	12	1
Kathleen J. Callanan and thomas ho	78	5





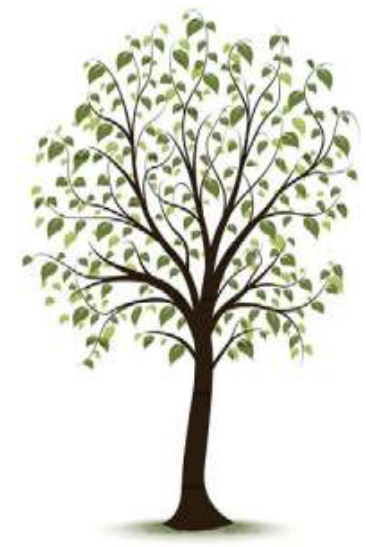
Does Patrick Also Match with Clarence and Thomas??

Now comparing DNA segments.

Update view - [Edit](#)

<p>PH CT</p> <p>Patrick Hei and CLARENCE T</p> <p>Half IBD 0 cM</p> <p>Segments 0</p>	<p>PH TH</p> <p>Patrick Hei and thomas ho</p> <p>Half IBD 0 cM</p> <p>Segments 0</p>
---	--

NO MATCH!!!





The screenshot shows the 23andMe website interface. At the top left is the 23andMe logo. The navigation bar includes 'HOME', 'REPORTS', 'TOOLS', and 'RESEARCH', with a '50+' badge on the right. Below the navigation, there are tabs for 'People' and 'DNA', with 'DNA' being the active tab. The main heading reads 'Now comparing DNA segments.' with a sub-link 'Update view - Edit'. A central card displays the names 'thomas ho' and 'CLARENCE T' with circular icons 'TH' and 'CT' above them. Below the names, it shows 'Half IBD 14 cM' and 'Segments 1'. At the bottom of the page, there is a list of six horizontal bars representing DNA segments, with the sixth bar containing a purple segment.

**OVERLAPPING
COUSINS DO
MATCH ONE
ANOTHER!
=> COMMON
ANCESTOR GROUP**

23andMe

HOME REPORTS TOOLS RESEARCH 50+

People DNA

Now comparing DNA segments.
Update view - [Edit](#)

TH CT

thomas
ho
and
CLARENCE
T

Half IBD
14 cM

Segments
1

1
2
3
4
5
6





BOTTOM-LINE:

**PATRICK IS ON ONE COPY OF
CHROMOSOME 6, WHILE CLARENCE
AND THOMAS ARE ON THE OTHER
COPY.**

**Patrick is a known 3rd Cousin on
Dad's side. =>
Clarence and Thomas are on
Mom's side.**



HOME BREW RECORD: KJCallanan T858271

<input checked="" type="checkbox"/>	Name	Chromosome	Start	Stop	Longest cM	SNPs
<input type="checkbox"/> 850	[REDACTED], Maria	22	37,000,000	45,000,000	11.60	1903
<input type="checkbox"/> 851	[REDACTED], Jane	22	38,093,010	42,905,737	8.01	na
<input type="checkbox"/> 852	[REDACTED], Rebecca	22	38,508,565	44,012,037	11.25	1606
<input type="checkbox"/> 853	[REDACTED], Ciara	22	39,000,000	45,000,000	9.00	1591
<input type="checkbox"/> 854	[REDACTED], James	22	44,874,687	47,390,958	8.90	1038
<input type="checkbox"/> 855	Wessels, Jerry	22	45,017,204	47,538,566	9.60	1041
<input type="checkbox"/> 856	[REDACTED], Jo Ann	22	46,696,901	48,123,243	9.20	787

**Do James, Jerry and Jo Ann
all match each other?**



Surprise! Surprise!

Neither James nor Jo Ann are currently listed in FTDNA or 23andMe, respectively.

I have sent emails to them to see what's happened.





METHODOLOGY:

- * Gather and SORT the Data by:**
 - Chromosome**
 - START Location**
 - END Location**
- * Find OVERLAPPING SEGMENTS**
 - Need 7 cM overlap**
- * Form TRIANGULATION GROUP:**
 - Must match each other**
- * Find COMMON ANCESTOR of TG from Trees**





RULES FOR TG'S:

- * ALL Cousins must match each other mutually, on the same copy of the chromosome; Dad's copy/Mom's copy.**

- * Length of Matching Segment > 7cM:**
 - 15 cM or greater: Gold Standard**
 - 12 cM plus: Silver Standard**
 - 9 cM plus: Lucky Find**

- * SNP counts > 1000: Gold Standard**





AIDS FOR DETERMINING DAD'S COPY VS MOM'S (AT FTDNA)

- * **Physically connect Match Cousins to your FTDNA tree.**



- * **Use IN-COMMON-WITH Tool to infer association of families. Hope that they connect uniquely to Mom or to Dad.**

- * **Use Common Locations for clues.**





AIDS FOR DETERMINING DAD'S COPY VS MOM'S

(AT 23andMe)

- * Use **SHARED MATCHES** list. Those with "Yes" are **OVERLAPPING** or **TG**.
- * Those with "NO" may link to same side of the family.
- * **VERIFY** all overlaps using **DNA comparison tool**.
- * **OBSERVE** estimated relationships.





AIDS FOR DETERMINING DAD'S COPY VS MOM'S

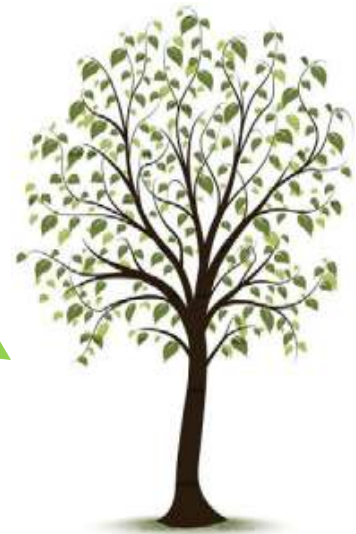
(AT AncestryDNA)

- * No EASY Way.**
- * Use HINT Trees for tree path.**
- * Use GedMatch.com for DNA Data Collection.**
- * Use the One-to-One Compare Tool to determine TG's from Overlapping Segments.**
- * Use info from SHARED MATCHES for possible family alignment.**

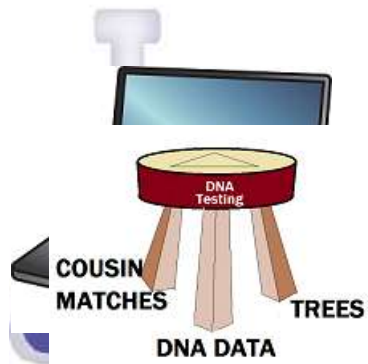




HOW ABOUT A VISUAL REPRESENTATION OF OUR DNA CHROMOSOME BROWSER?



USING KITTY COOPER'S CHROMOSOME SEGMENT MATCHING TOOL

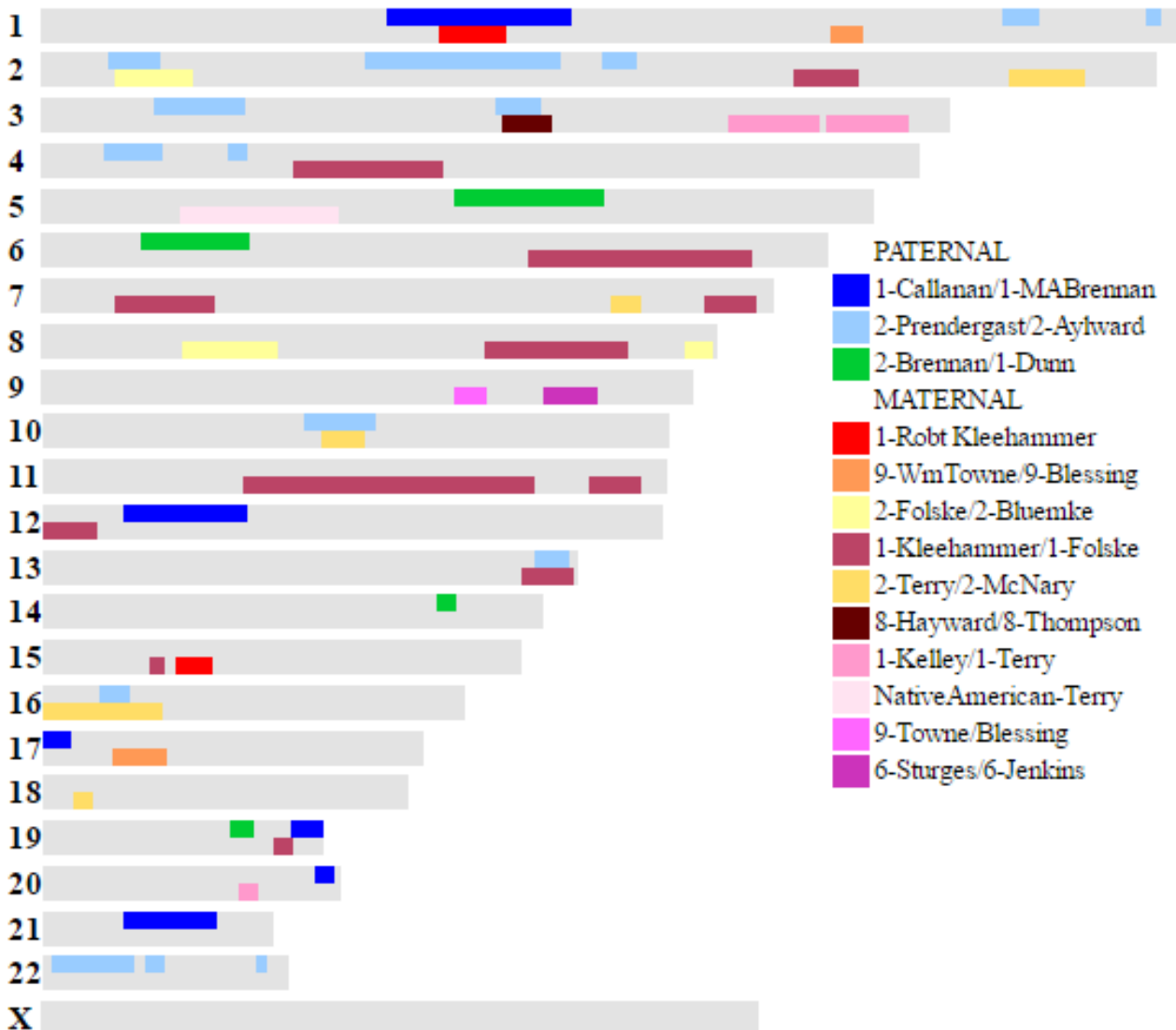


- Identify the **Common Ancestor Couple** by Name, preceded by a generation number for Great Grandparent; ie, **2GGP => 2-Name**.
- Identify the entry as **Paternal** or **Maternal**.
- Enter data of **Chr #**, **START** and **END**, and **P/M**.
- Place information in a **.csv** file per Kitty's instructions and run through her Tool.

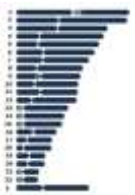
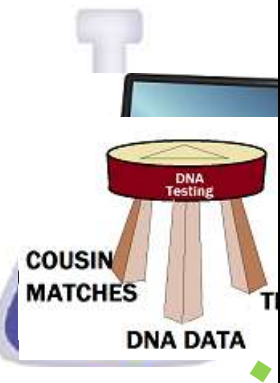


Kathleen J. Callanan

Chromosome Map - Jan 14, 2017 - 19:04 PM CST



Chromosome Mapping Tool by Kitty Cooper at <http://kittymunson.com/dna/ChromosomeMapper.php>



Kathleen J. Callanan

Chromosome Map - Jan 14, 2017 - 19:04 PM CST

COUSIN
MATCH

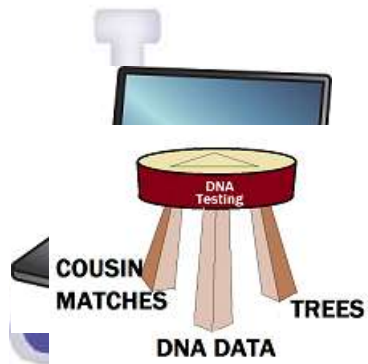


PATERNAL

- 1-Callanan/1-MABrennan
- 2-Prendergast/2-Aylward
- 2-Brennan/1-Dunn

MATERNAL

- 1-Robt Kleehammer
- 9-WmTowne/9-Blessing
- 2-Folske/2-Bluemke
- 1-Kleehammer/1-Folske
- 2-Terry/2-McNary



With Kitty's Tool we can easily identify the family lines for other unknown Cousins who fall onto the same segment.

At least, it is a First Cut Tool...And, we need all the help we can get!



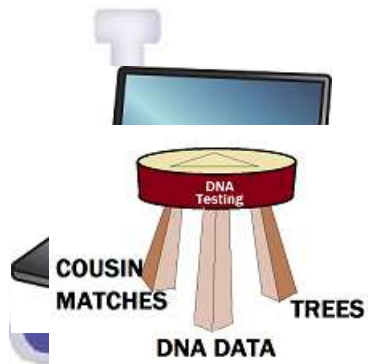
WHAT ABOUT AUTOMATING THE PROCESS?



Work has begun on this idea by several researchers.

- * Available today is the Tier 1 Tool for Triangulation at GedMatch.com, which takes about 10 minutes to identify a TG. But, only for those at GedMatch.
- * DNAgedcom.com reportedly has a tool, but I have not used it to date.





GEDmatch Tier 1 Tool for TRIANGULATION

- Just enter your kit number.
- Set upper sharing limit to 1100 to weed out close relatives, like Siblings, Aunts, and Uncles..
- Check the RESULTS for Duplicates and Other Information.



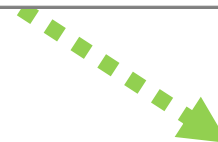


CHROMOSOME 21 RESULTS - T858271

COUSIN
M/

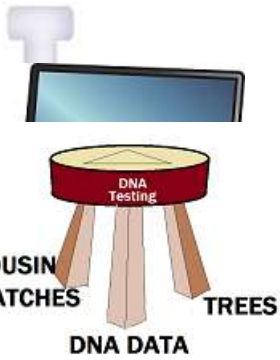
Tier 1 Triangulation - T858271 3/5/17

21						
21	A821037	A362348	9,849,404	18,457,879	13.4	
21	A491658	T090588	15,792,309	21,839,429	13.7	
21	A087927	T090588	15,932,650	21,843,980	13.3	
21	A491658	A087927	15,932,650	22,415,557	14.1	
21	A490836	A087927	18,108,485	22,415,557	9.2	
21	A491658	A490836	18,108,485	22,944,798	9.6	
21	A490836	T090588	18,246,841	22,055,345	8.3	
21	A272294	M309280	34,648,169	41,156,075	15.1	
21	A272294	A018669	35,003,318	40,738,224	13.1	
21	M309280	A018669	35,003,318	40,738,224	13.1	
21	A272294	A243130	35,103,919	40,735,354	12.8	
21	M309280	A243130	35,103,919	40,735,354	12.8	
21	A018669	A243130	35,103,919	40,962,357	13.6	
22						



CHROMOSOME 22 TG RESULTS

- T858271

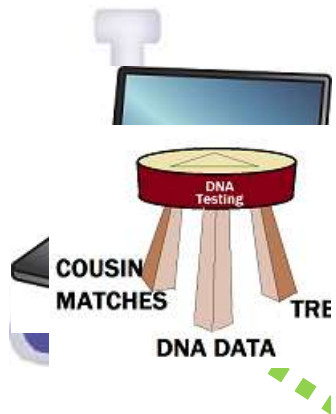


GedMatch Tier1 Triangulation Results, T858271, Chr. 22 – 4/2/17

1648	22								
1649	22	A252324	A050854	23,539,377	32,554,916	17.4			
1650	22	M020928	A050854	23,539,377	32,554,916	17.4			
1651	22	M020928	A252324	23,539,377	32,554,916	17.4			
1652	22	M020928	A805422	25,275,702	32,573,634	12.2			
1653	22	A050854	A734181	25,467,135	32,554,916	11.4			
1654	22	A252324	A734181	25,467,135	32,554,916	11.4			
1655	22	A805422	A734181	25,467,135	32,573,634	11.4			
1656	22	M020928	A734181	25,493,806	32,606,095	11.3			
1657	22	A050854	A805422	25,502,005	32,554,916	11.2			
1658	22	A252324	A805422	25,502,005	32,554,916	11.2			
1659									



CHROMOSOME 22 - DETAILS



MATCH 1 — DUPLICATE DATA, SAME PERSON

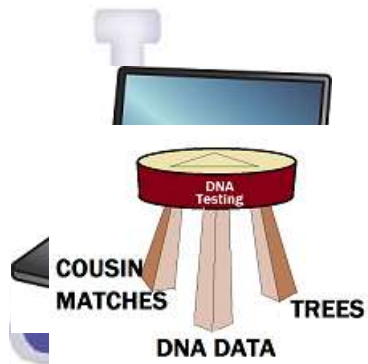
MATCH 2
HAS GOOD
TREE

MATCH 3

MATCH 4

1648	22			
1649	22	A252324	A050854	23,5
1650	22	M020928	A050854	23,5
1651	22	M020928	A252324	23,5
1652	22	M020928	A805422	25,2
1653	22	A050854	A734181	25,4
1654	22	A252324	A734181	25,4
1655	22	A805422	A734181	25,4
1656	22	M020928	A734181	25,4
1657	22	A050854	A805422	25,5
1658	22	A252324	A805422	25,5
1659				





**DO I HAVE ANY KNOWN COUSINS
IN THE RANGE OF 25xx - 32xx?**

Yes – a 3rd Cousin on Dad's side.

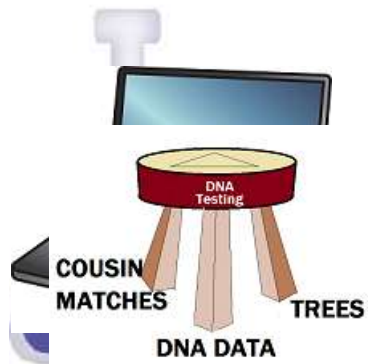
Does he match with Cousin Match 2?

**No, there is no match with
Cousin Match 1, 2, 3, or 4.**

**Conclusion: This TG is from Mom's
side of the Family**



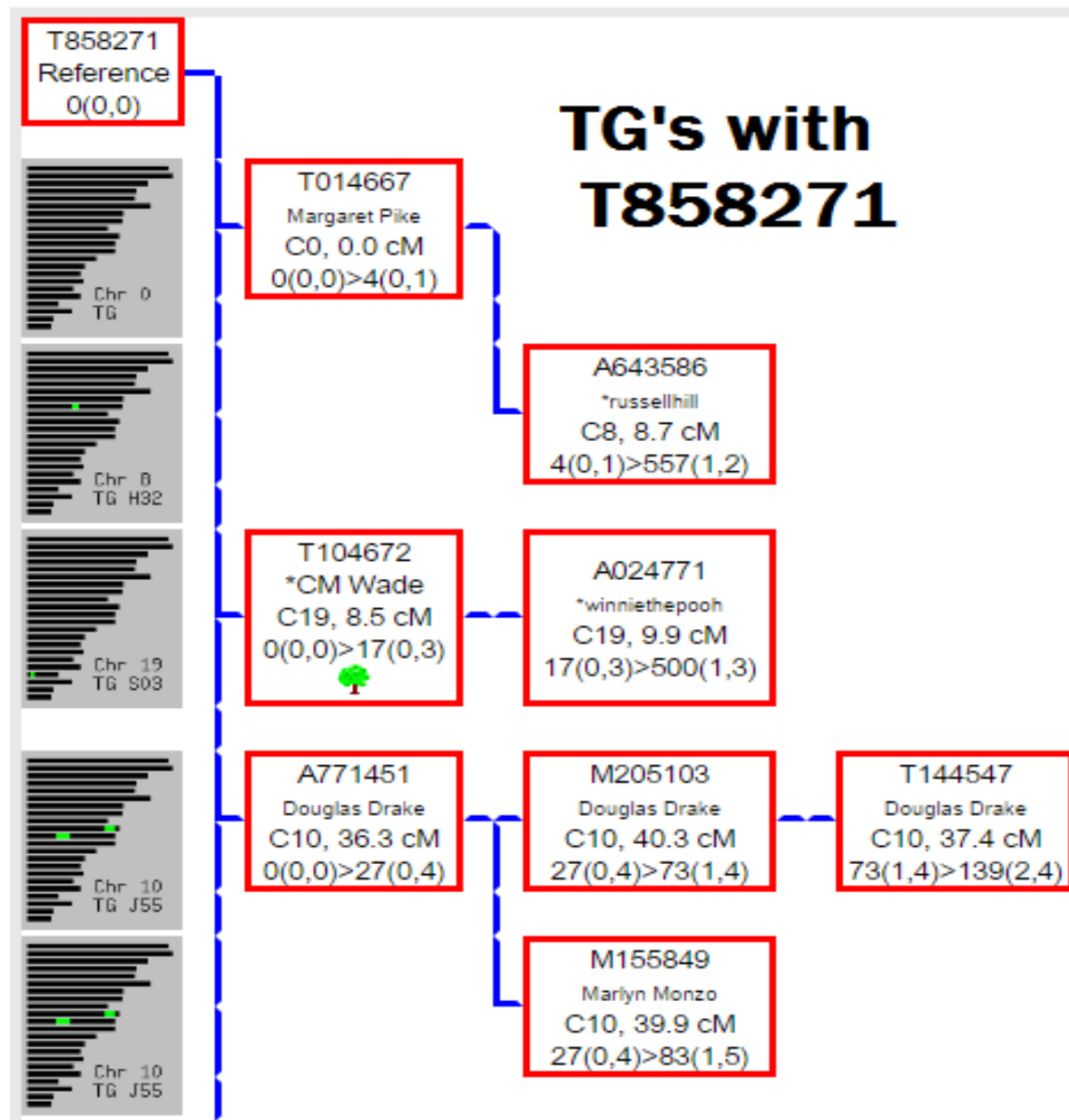
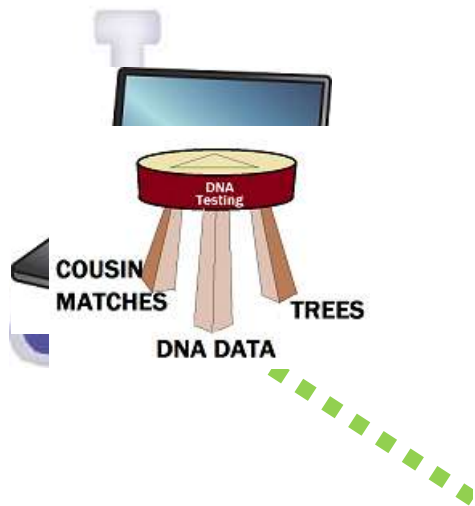
In BETA Testing – Tier 1

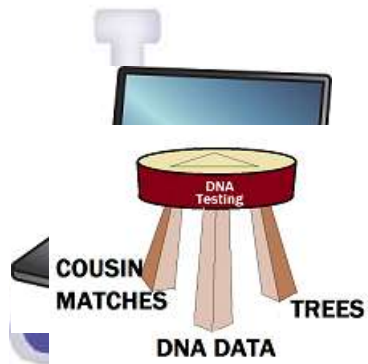


GEDmatch Triangulation Groups

- Set the number of kits and set the matching threshold
- Be sure to **VERIFY** these Matches..



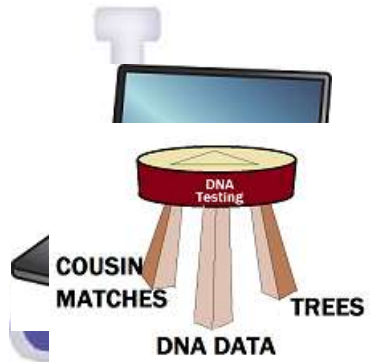




Note the TREE Symbol!
**This can be a time
saver!**



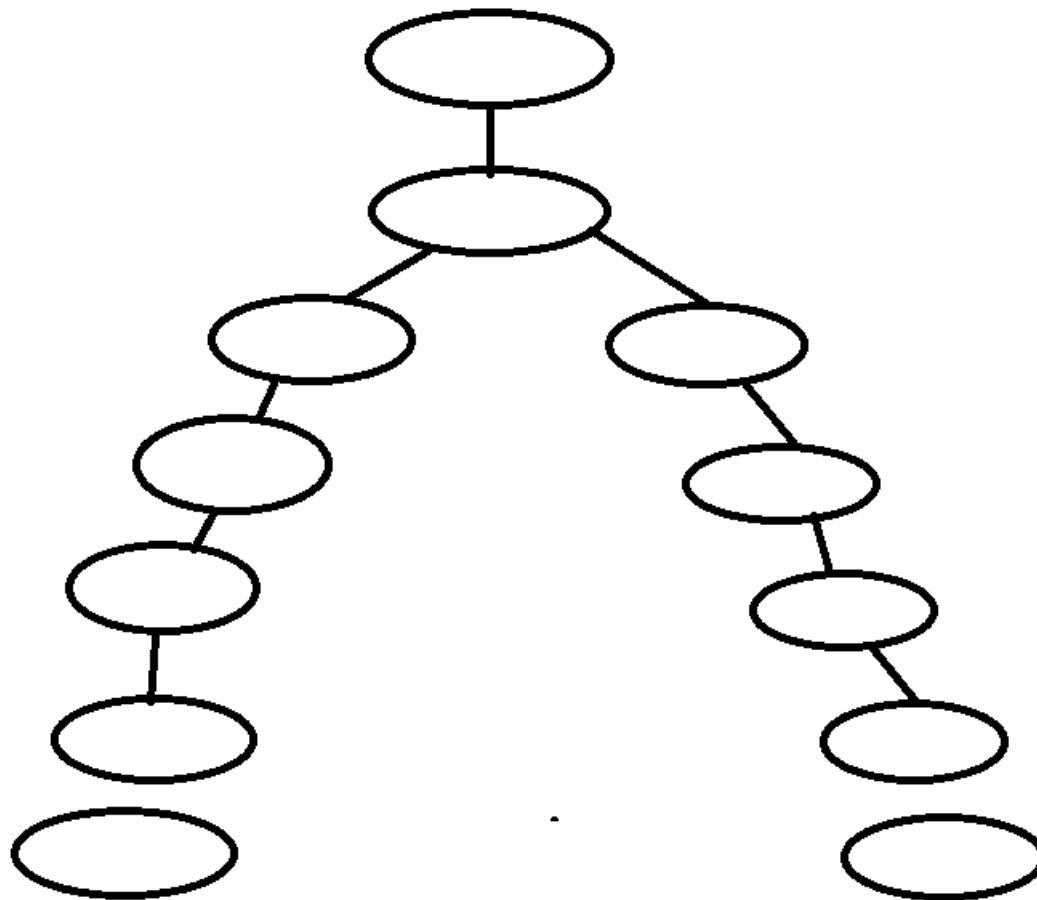
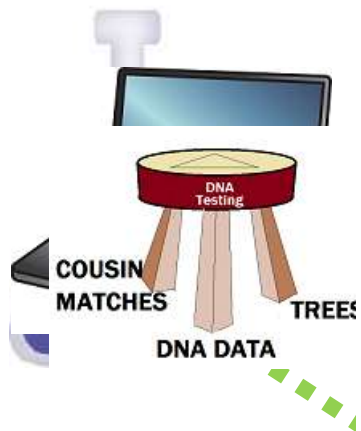
- THE NEXT STEP



**LET'S
TALK!**



BASIC COUSIN TREE



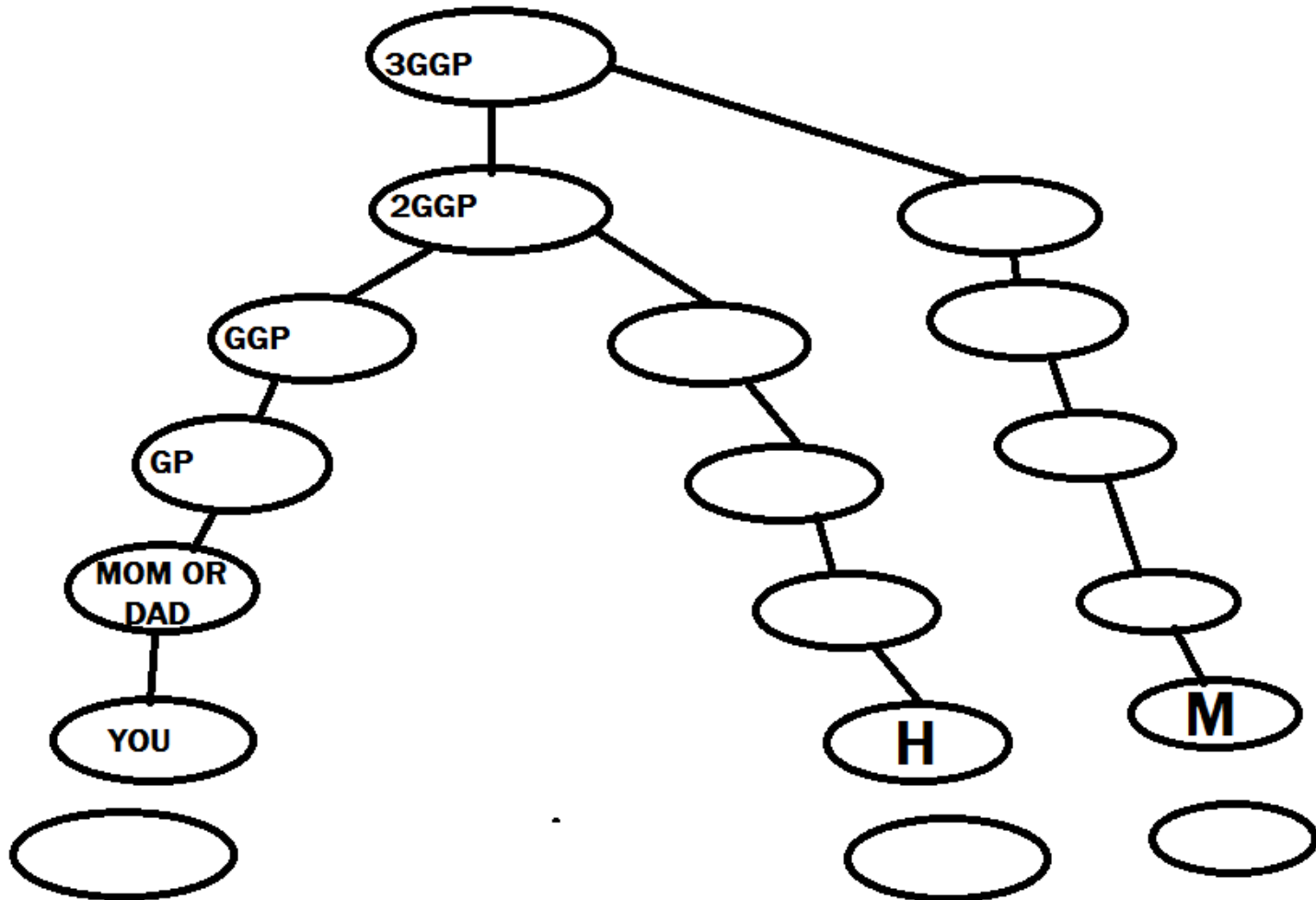
PLOTTING 3RD AND 4TH COUSINS



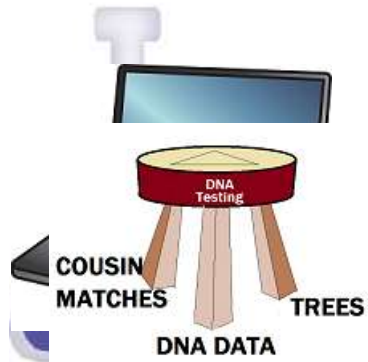
DNA Testing

COUSIN MATCHES

DNA DA

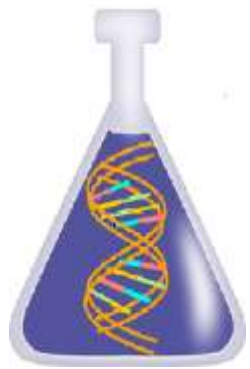


– THE NEXT STEP



**LET'S
TALK
AGAIN!**

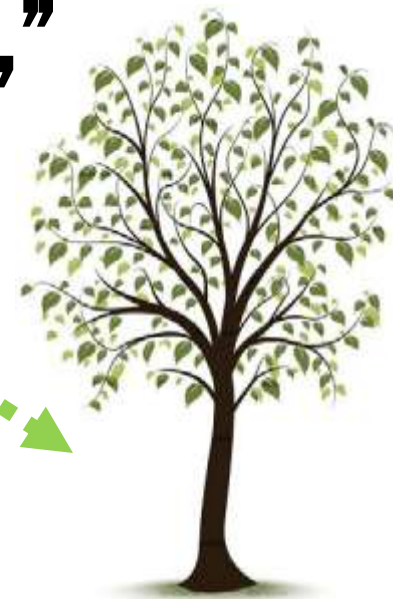




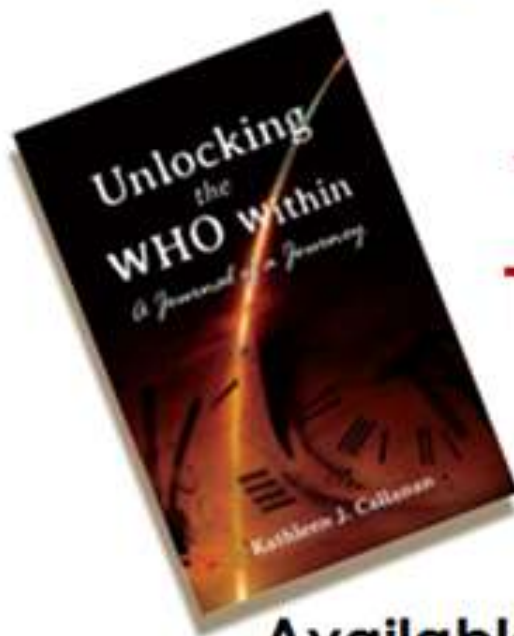
Our Mission:

**Start with “WHAT We Know”
and End with “WHO We Are.”**

**And, Discover
“WHERE We Have Been,”
finding new Cousins
along the Journey.**



Keep the Speaker Speaking!

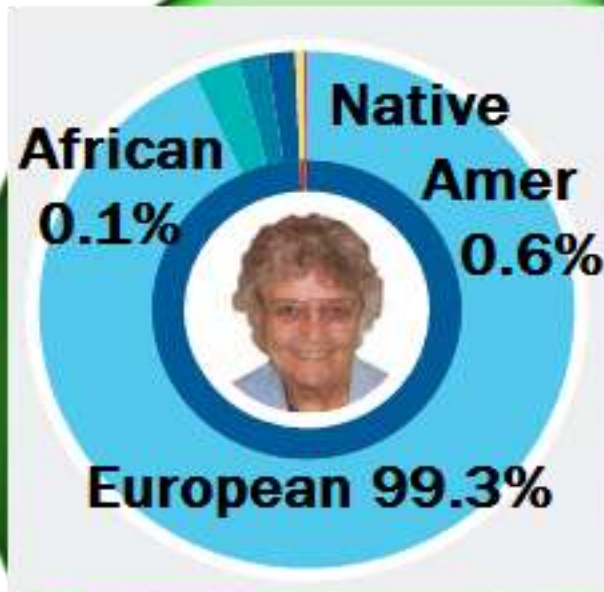


**Get
Yours
Today.**



Available at [Amazon.com](https://www.amazon.com)

Author: Kathleen J. Callanan



23andMe

AncestryDNA

British Isles 51%
Scandinavian 29%
West/Central Europe 20%

MyOrigins-FTDNA

43% Ireland
42% Great Britain
9 Other Regions



Dodecad-World9 for A655551,

Oracle 4 Estimates

3/29/17

Using 3 populations approximation:

1 50% Polish +25% S_Italian_Sicilian +25% Lithuanian @ 0.000000

Using 4 populations approximation:

1 Irish + S_Italian + Lithuanian + Belorussian @ 0.000000

2 Polish + Polish + S_Italian_Sicilian + Lithuanian @ 0.000000

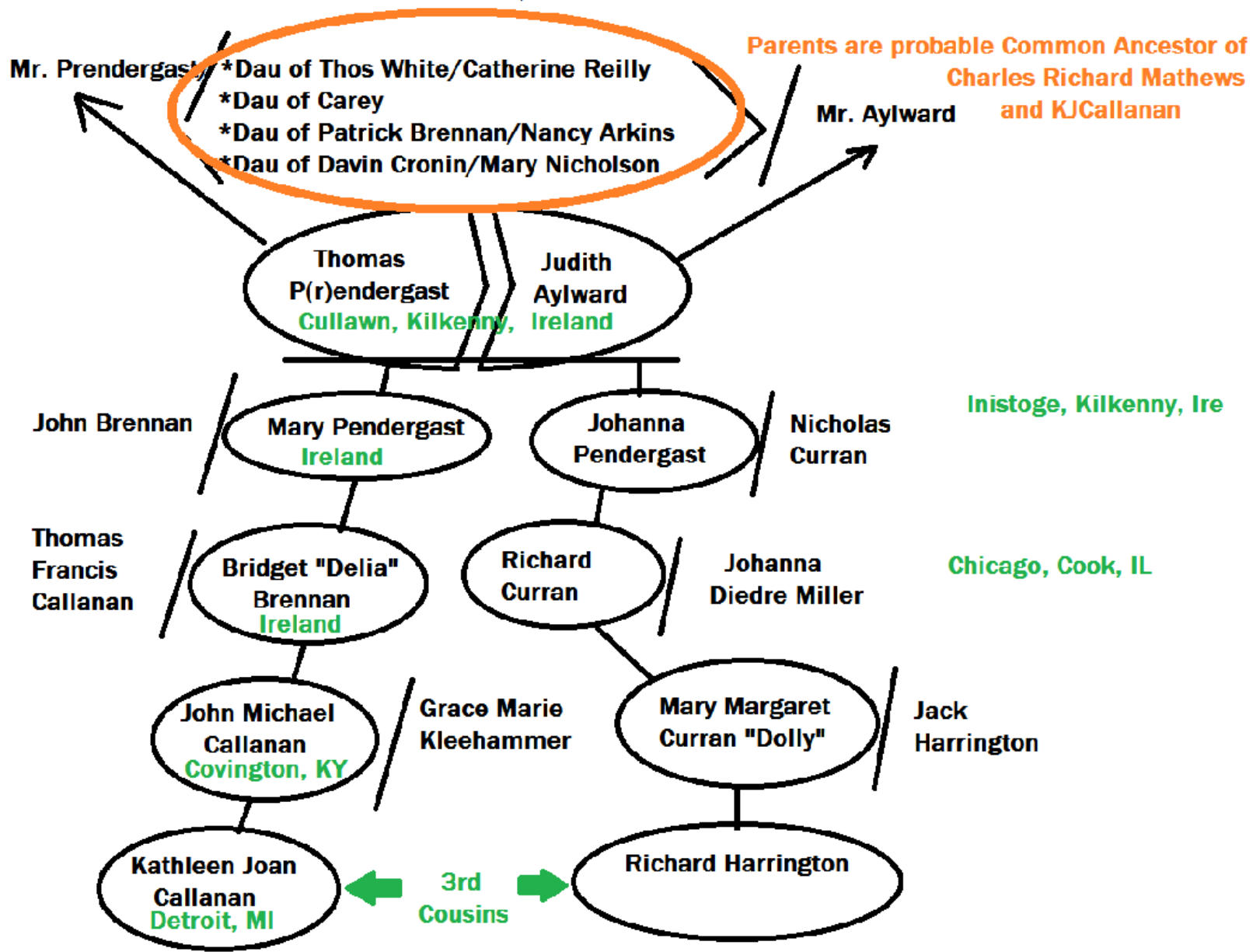
3 S_Italian_Sicilian + Lithuanian + Belorussian + Argyll @ 0.000000

4 Polish + Polish + Sicilian + Lithuanian @ 0.261657

5 S_Italian + Lithuanian + Belorussian + Argyll @ 0.263489



**COMMON ANCESTORS OF KATHLEEN JOAN CALLANAN AND CHARLES RICHARD MATHEWS
THIRD COUSINS, ONCE REMOVED**



MATCH THRESHOLDS

Minimum Percentage of Ethnicity = 7.0 cM

Chr.	Max cM.	Min %
1	284	2.4
2	269	2.9
3	223	3.1
4	214	3.2
5	204	3.4
6	192	3.6
7	187	3.6
8	168	4.2
9	166	4.7
10	181	3.6

Chr.	Max cM.	Min %
11	158	4.4
12	175	4.0
13	126	5.5
14	119	5.8
15	141	4.9
16	134	5.1
17	128	5.4
18	117	6.0
19	108	6.5
20	108	6.5
21	108	6.5
22	72	9.7