Autosomal DNA Testing for Beginners

Genetic Genealogy Ireland

20-22 October 2017

Basics of Autosomal DNA, interpreting results and how to get the most out of your DNA test

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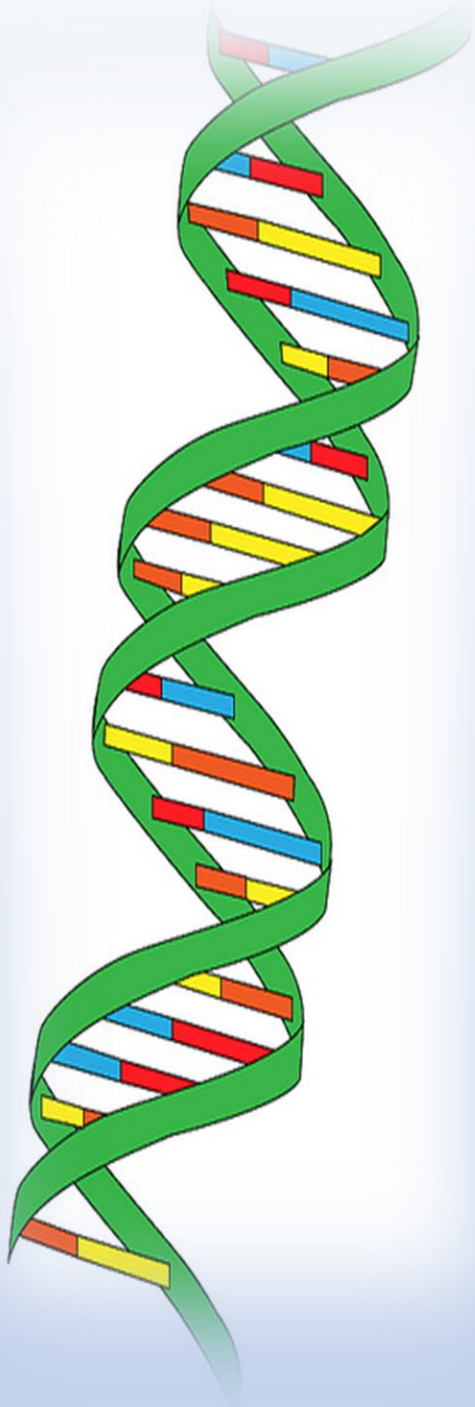


DNA Testing

Who am I?
Questions to the audience?

Warning:
You may find surprises
DNA testing is highly addictive!

Disclaimer:
I am not a scientist – my presentation is based on information I've learnt since testing over 2 years ago.

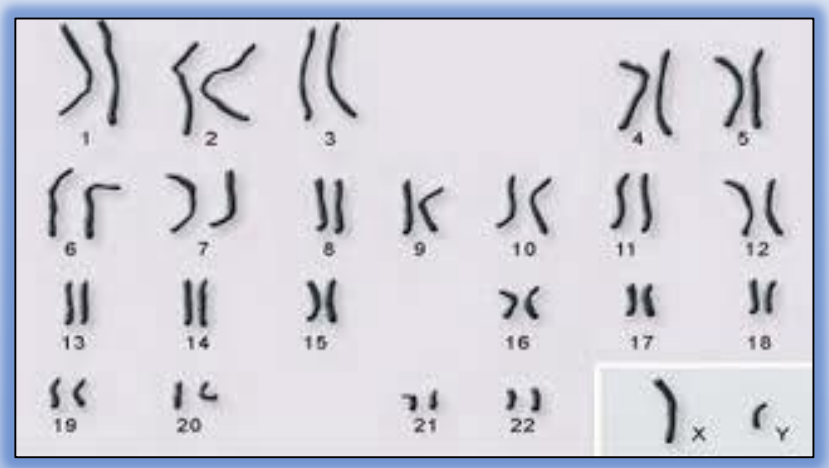
What is DNA?

Deoxyribonucleic Acid

DNA contains our "Genetic Code" and is in every cell in our bodies – it is inherited from our biological parents

We have 23 pairs of chromosomes (46 in total) – one set from our Mother, one set from our Father.

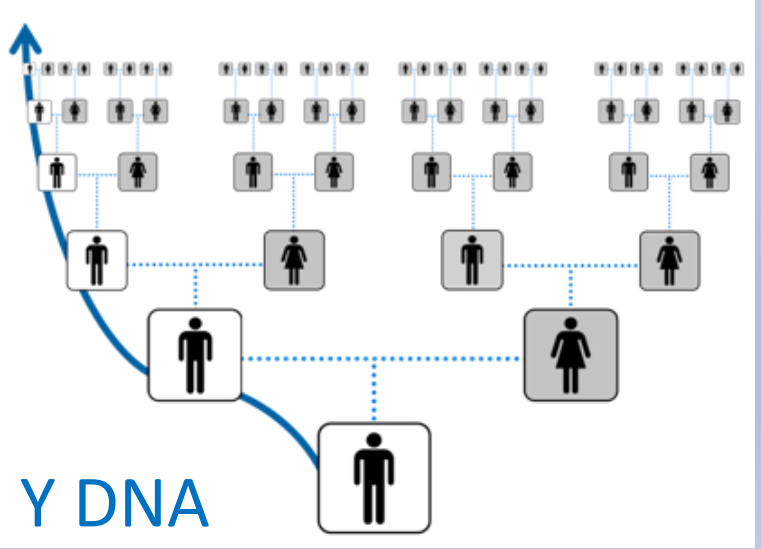
- Chromosomes 1-22 are called the autosomes
- Chromosomes 23 are sometimes called the sex chromosomes.



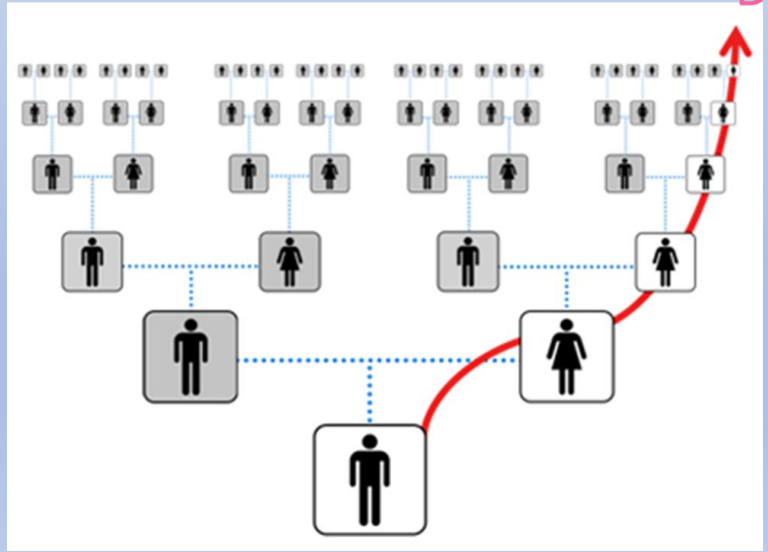
- ✓ A male has an X Chromosome from their mother and a Y Chromosome from their father (XY)
- ✓ A female has an X Chromosome from their mother and another X Chromosome from their father (XX)

Types of DNA Tests

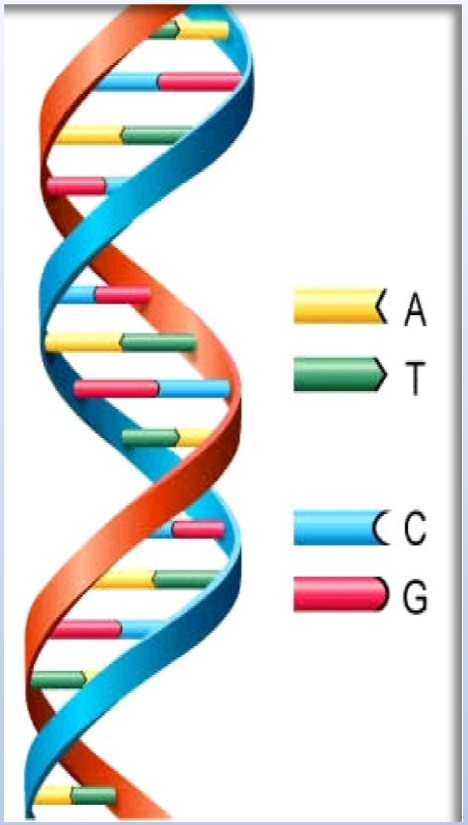
- Autosomal (atDNA) DNA on the chromosomes 1-22
  - Most useful for general genealogy purposes. Both maternal/paternal, for about 5-6 generations (ftDNA, Ancestry, 23andMe, MyHeritage)
- Y DNA (Y Chromosome) – or sometimes called chromosome 23 – fathers fathers fathers line, “deep ancestry” – most commonly tested at ftDNA
  - 2 types STR (markers) and SNP (SNP Packs / Big Y)
  - Provides a Haplogroup
- Mitochondrial (mtDNA) – mothers mothers mothers line – only passed down by mothers (but all children, boys & girls)
  - Not on chromosomes, but surrounds the nucleus of a cell, “deep ancestry”, most commonly tested at ftDNA
  - Provides a Haplogroup



mitochondrial DNA



How does an atDNA test work

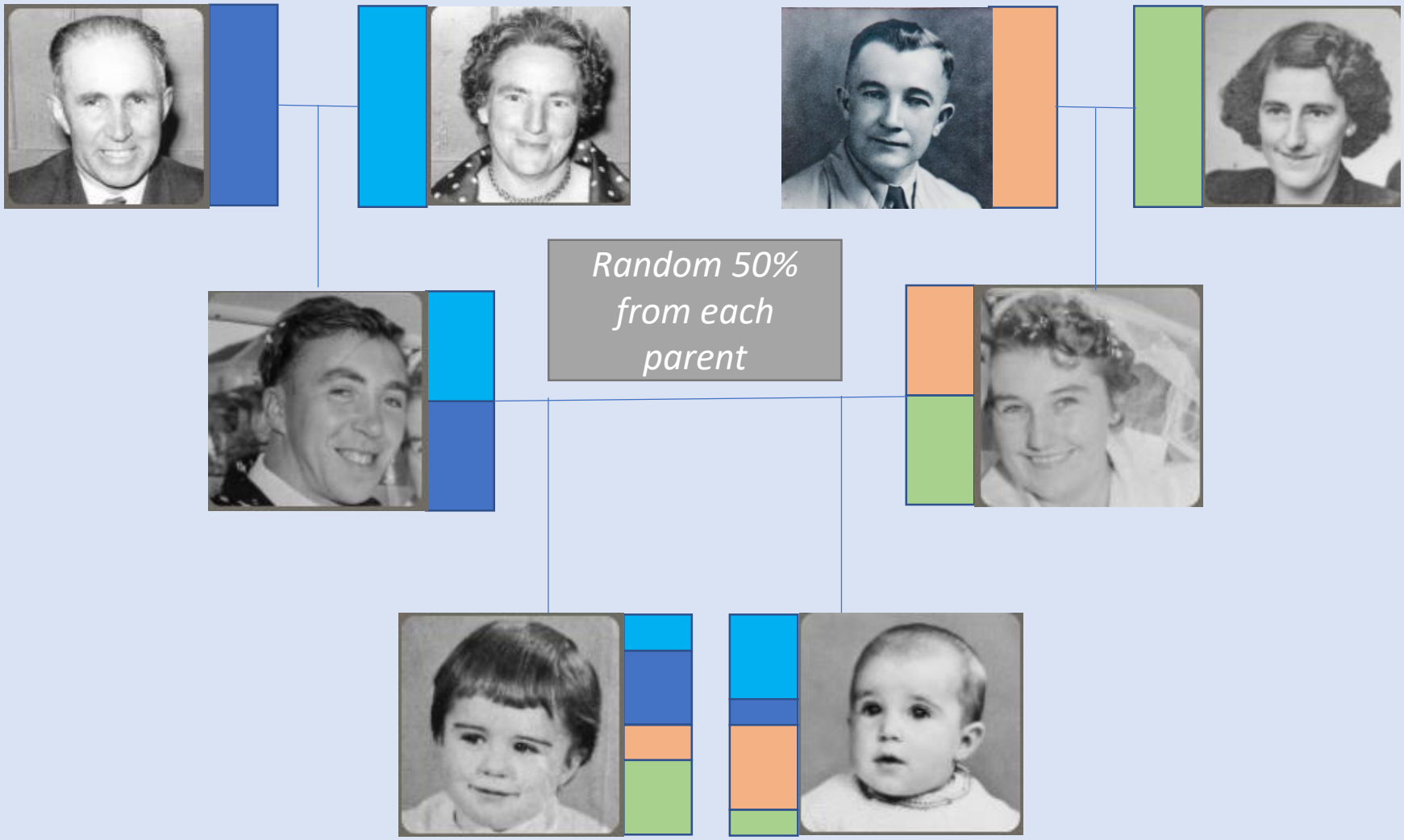


- Your saliva sample is sent to a lab for analysis
- The test locates specific areas of DNA throughout the 22 (44) autosomal chromosomes.
- At each of these locations the test works out what "code" you have – this can be an A, T, C, G. (Adenine, Thymine, Cytosine and Guanine)
- Your code is represented in a large text file – location name, code from your maternal and paternal chromosome (test can not work out which side)

rsid	chromosome	position	allele1	allele2
rs4477212	1	82154	T	T
rs3131972	1	752721	G	G
rs11240777	1	798959	G	G
rs6681049	1	800007	C	C
rs4970383	1	838555	A	C
rs4475691	1	846808	T	C

- If you have long segments of code in common with someone else, they are likely closely related to you.
- BUT there are rules (minimum segment length and amount of shared DNA)

How does DNA get inherited?

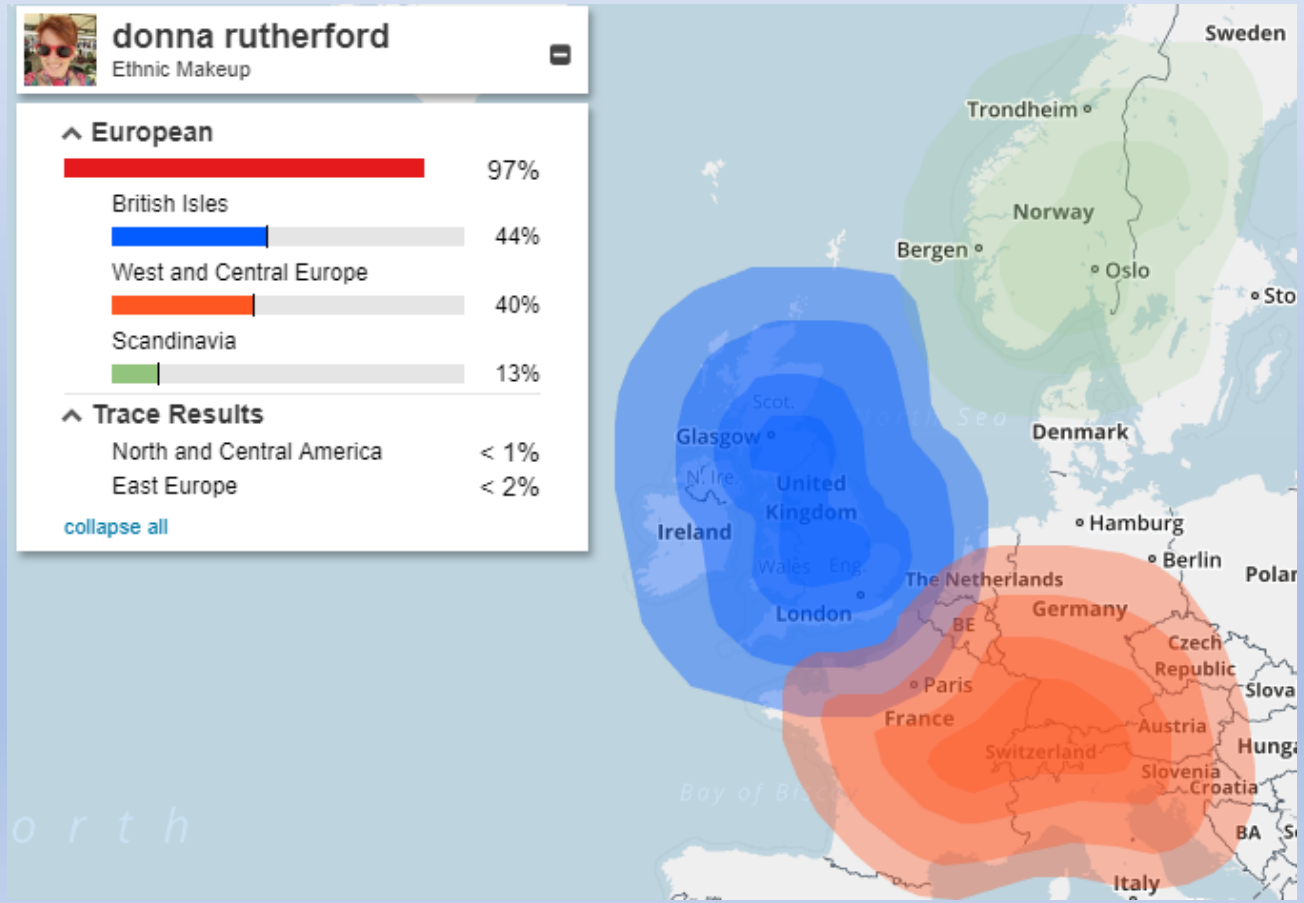


Ethnicity

- Finding your ethnicity from a DNA autosomal test
- These are all estimated by comparing your DNA to living people – modern populations who have proven ancestry is selected areas.

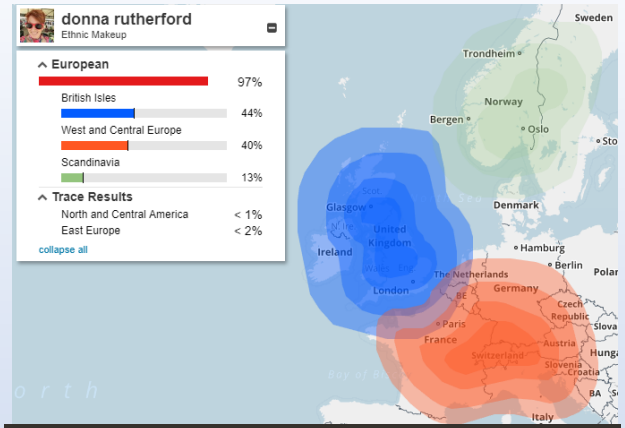
Questions most often asked
Which one is most accurate?
Which one is correct?

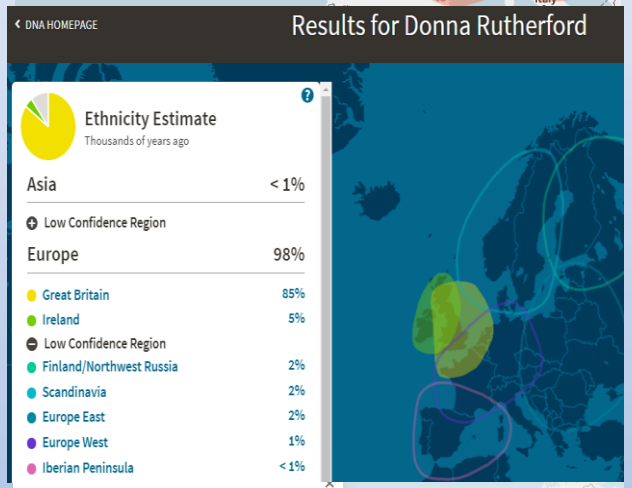
Answer: the one you like the best

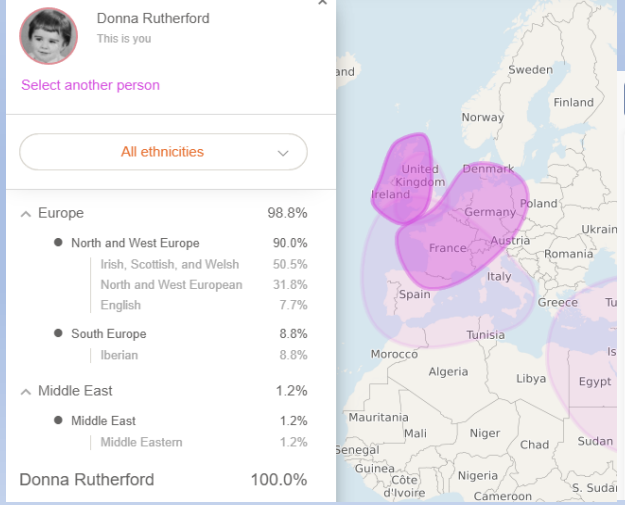


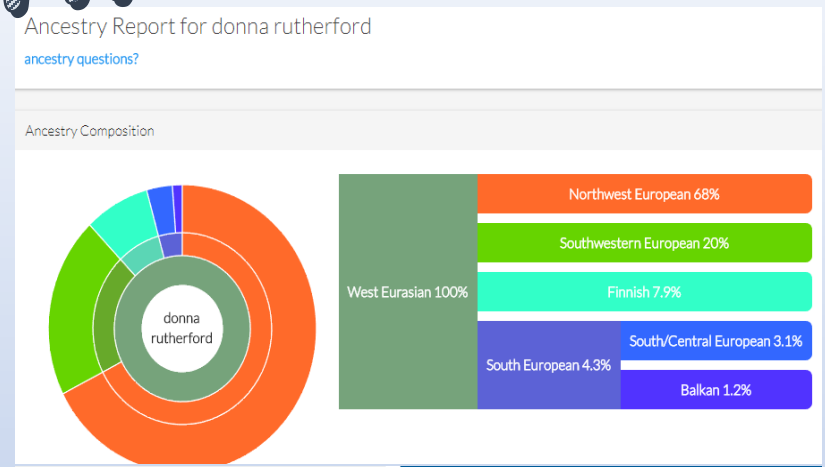
Who Am I?

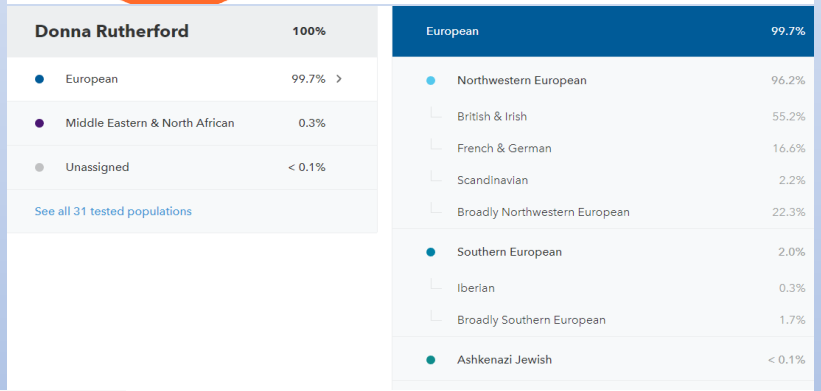
- ✓ ftDNA
- ✓ Ancestry
- ✓ My Heritage
- ✓ DNA.Land
- ✓ 23andMe
- ✓ Living DNA
- ✓ WeGene

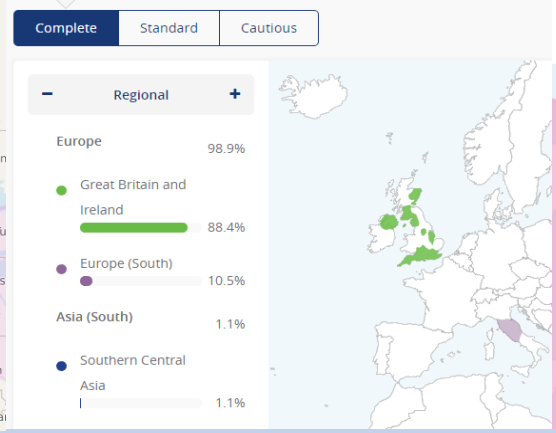


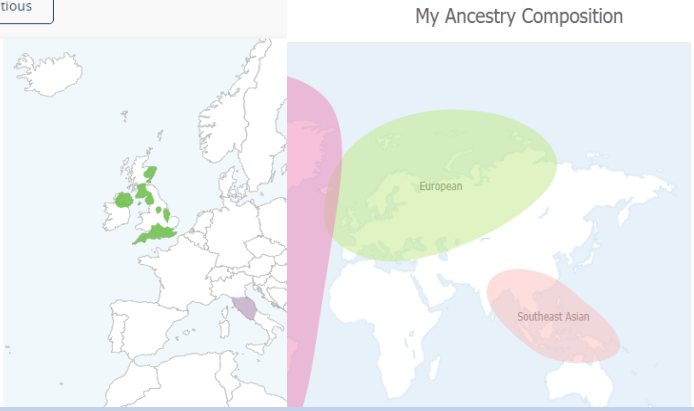








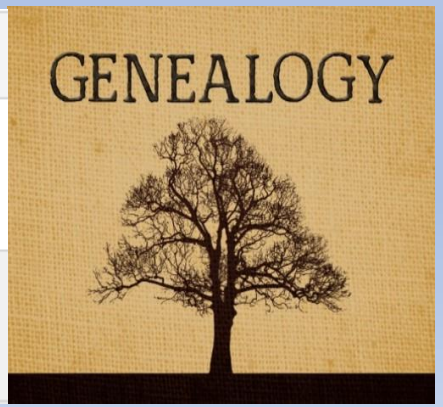




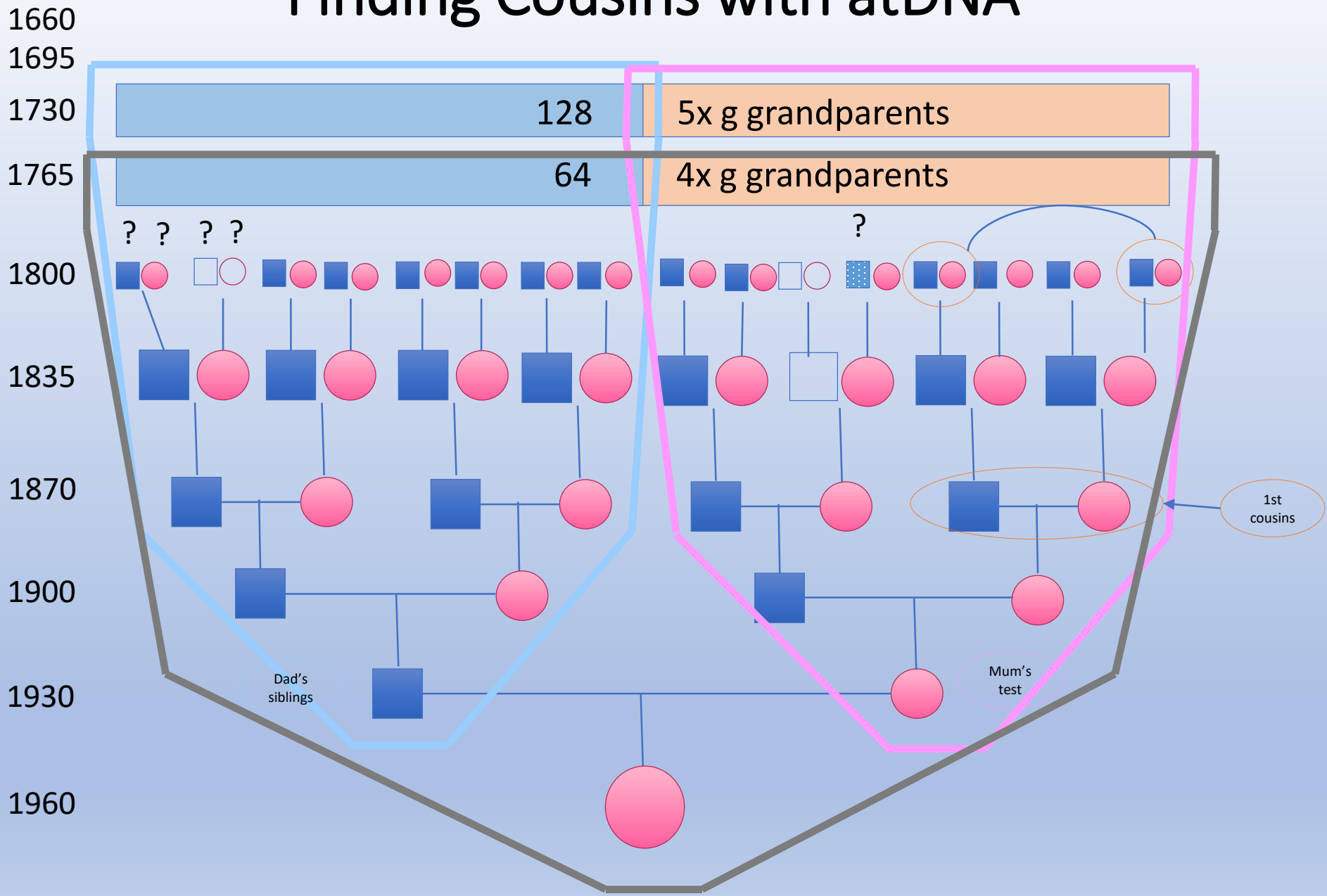
How can DNA help with Genealogy

- The DNA test and how it works
  - COMPARES you to other people: You are compared genetically to other people who have done the same (or similar) DNA.
    - You will get a long list of matches. Usually sorted by closest relationships at the top.
    - Most people get hundreds if not thousands of matches.
      - 2 ½ years ago when I did the test I counted my 4th cousins and closer at the site I first tested at:
        - Early 2015 – 32
        - Last week - 154
  - MEASURES the DNA you have in common: DNA you have in common with someone is measured in centiMorgans (cM). Sometimes it is written alongside the number of segments you share (and/or what chromosome the shared DNA is on).

Relationship Range	Shared Centimorgans	Longest Block
1st Cousin - 2nd Cousin	421	79
2nd Cousin - 3rd Cousin	155	39



Finding Cousins with atDNA



How much DNA do I share with my cousins

% shared	Total cM shared half-identical (or better)	Relationship
100% (Method I)/50% (Method II)	3400.00	Identical twins (monozygotic twins)
50%	3400.00	Parent/child
50% (Method I)/37.5% (Method II)	2550.00	Full siblings
25%	1700.00	Grandparent/grandchild, aunt-or-uncle/niece-or-nephew, half-siblings
25% (Method I)/23.4375% (Method II)	1593.75	Double first cousins
12.5%	850.00	First cousins, great-grandparent/great-grandchild, great-uncle or aunt/great-nephew or niece, half-uncle or aunt/half-nephew or niece
6.25%	425.00	First cousins once removed, half first cousins, great-great-grandparent/great-great-grandchild, great-great-aunt/uncle, half great-aunt/uncle
6.25%	425.00	Double second cousins
3.125%	212.50	Second cousins, first cousins twice removed, half first cousin once removed, half great-great-aunt/uncle, great-great-great-grandparent/great-great-great-grandchild
1.563%	106.25	Second cousins once removed, half second cousins, first cousin three times removed, half first cousin twice removed
0.781%	53.13	Third cousins, second cousins twice removed
0.391%	26.56	Third cousins once removed
0.195%	13.28	Fourth cousins, third cousins twice removed
0.0977%	6.64	Fourth cousins once removed. third cousins three times removed
0.0488%	3.32	Fifth cousins

However Fraternal twins are the same as Full Siblings (2 eggs)

If a pair of brothers marries a pair of sisters, their kids are not only **first cousins**, they're **double first cousins**

1st cousins share Grandparents

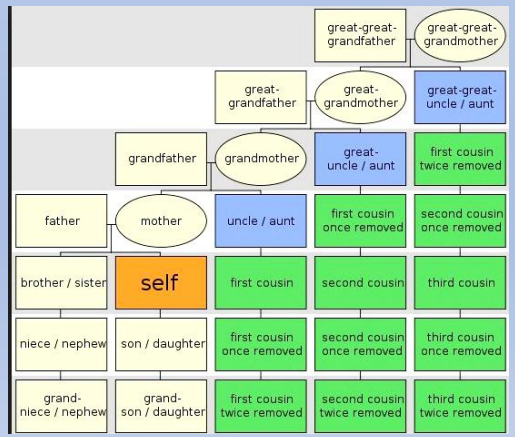
2nd cousins share Great Grandparents

3rd cousins share GG Grandparents

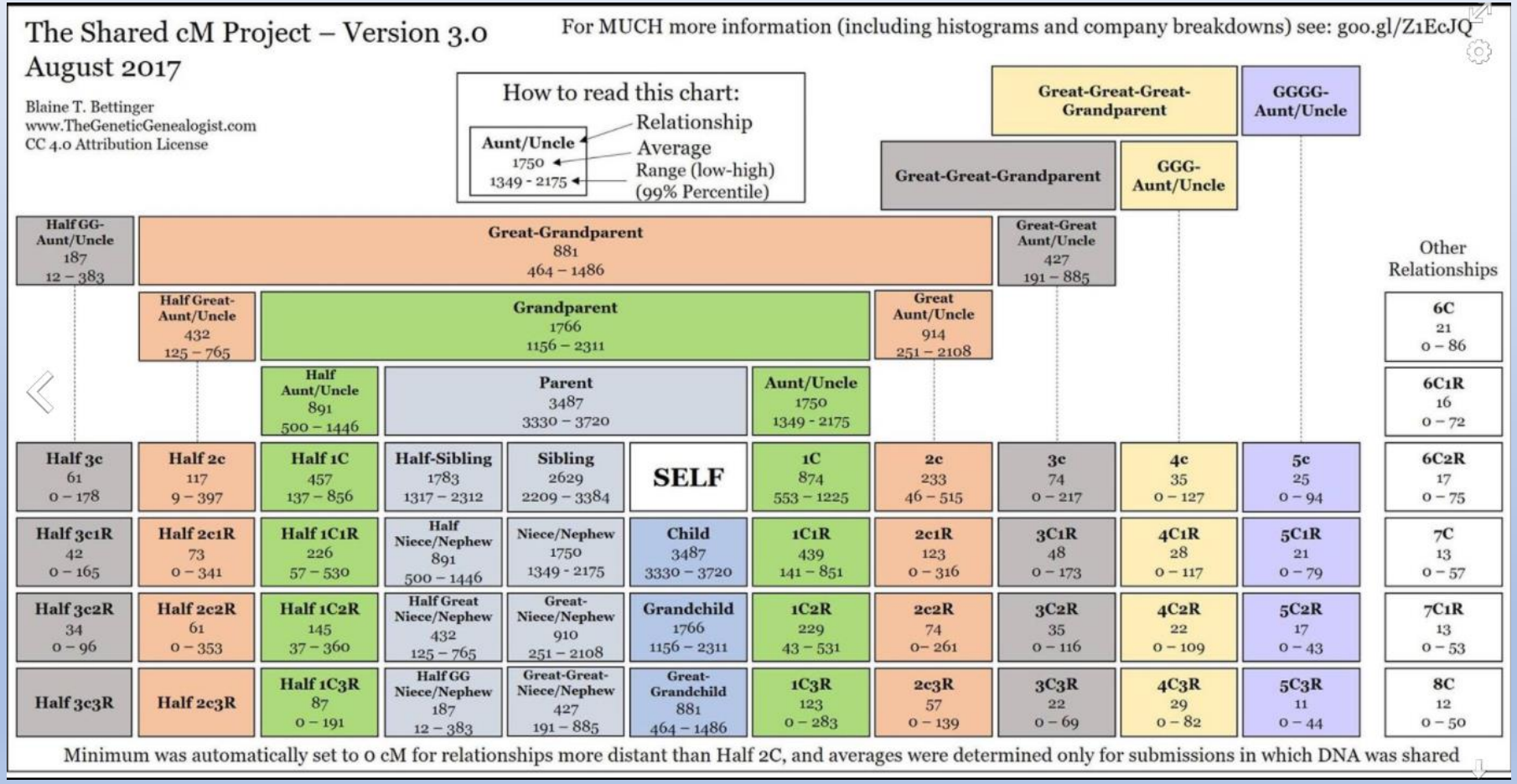
4th cousins share 3xG Grandparents

Fifth cousins share 4xG Grandparents

Removed = generation difference



Shared cM project



https://isogg.org/wiki/Autosomal_DNA_statistics

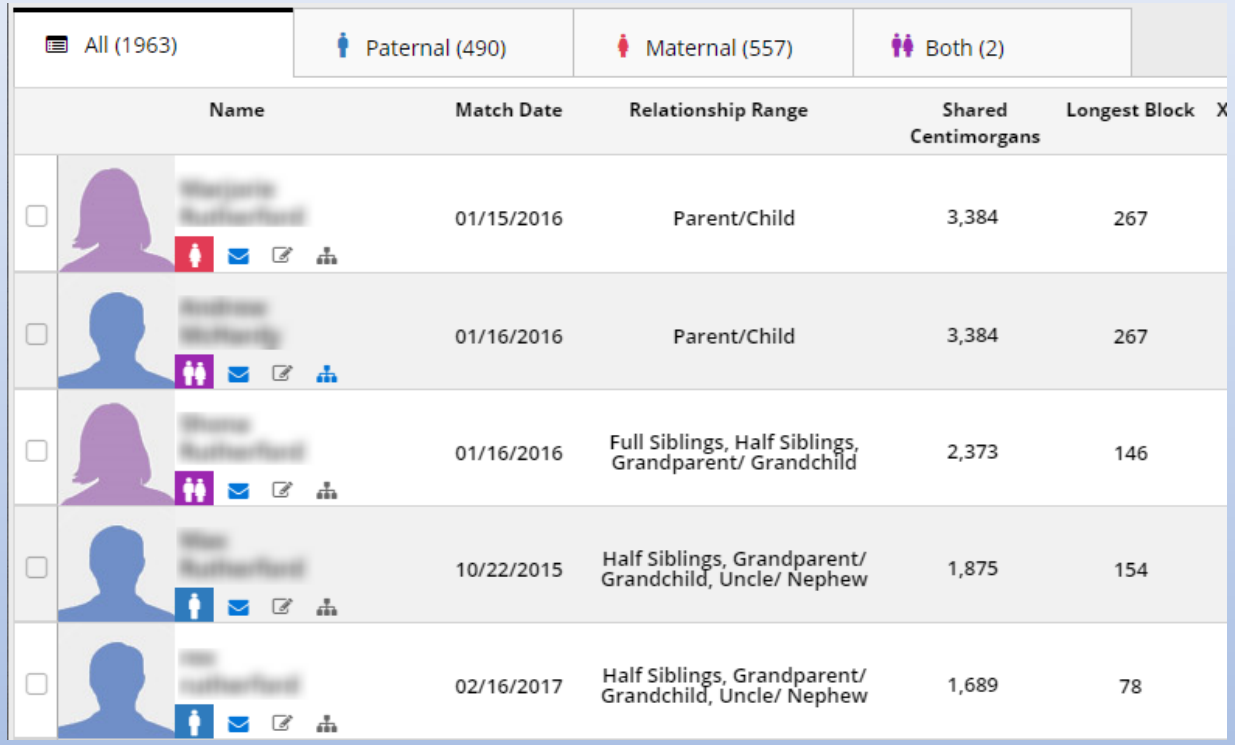
What can I do with my matches?

- Find biological family
- Contact newly found cousins
- Confirm your own traditional paper trail
- Breakdown your genealogical brick walls

DNA testing does not replace traditional genealogy, but complements it.

Matches

- The main autosomal test companies give you a list of DNA matches – “cousins”
- Usually these are listed with the closest matches at the top – self/twin, parent/child, full sibling, etc.
- How close a match is to you, depends on how many centimorgans (cM) you share. The more cM the closer the match



Selection Box

Paternal Maternal

Email

Notes

Family Tree

Name	Match Date	Relationship Range	Shared Centimorgans	Longest Block	X-Match	Linked Relationship	Ancestral Surnames
[redacted]	04/22/2016	Half Siblings, Grandparent/ Grandchild, Uncle/ Nephew	1,488	229	X-Match	Uncle	? / (NOT CONFIRMED) / Allenby / Answell / Bray / Brown / Castle / Croker / Davis /
[redacted]	05/08/2016	2nd Cousin - 3rd Cousin	155	39		2nd Cousin 1R	Answell / Brown / Crosse / Croker / Davis / Denigan / Dennigan / Denigan
[redacted]	07/17/2015	2nd Cousin - 4th Cousin	71	19			Berry (England/Canada) / Boyd (Ireland/Canada) /
[redacted]	05/02/2017	2nd Cousin - 4th Cousin	64	39			
[redacted]	03/28/2017	2nd Cousin - 4th Cousin	63	39			Nancy Matild / Andrew / Langenegger / Allen / Deeble / Deppen /
[redacted]	03/07/2017	3rd Cousin - 5th Cousin	63	15	X-Match		
[redacted]	02/28/2017	3rd Cousin - 5th Cousin	62	13			
[redacted]	05/18/2015	2nd Cousin - 4th Cousin	62	19			
[redacted]	07/14/2015	2nd Cousin - 4th Cousin	61	18			
[redacted]	02/13/2017	5th Cousin - Remote Cousin	59	8	X-Match		

Will I have a DNA match with all my cousins?

NO!

Relationship	23andMe	AncestryDNA	Family Tree DNA Family Finder
First cousins	100%	100%	100%
Second cousins	100%	100%	>99%
Third cousins	89.7%	98%	>90%
Fourth cousins	45.9%	71%	>50%
Fifth cousins	14.9%	32%	>10%
Sixth cousins	4.1%	11%	Remote (typically less than 2%)[2]
Seventh cousins	1.1	3.2%	
Eighth cousins	0.24	0.91%	
Ninth cousins	0.06%		
Tenth cousins	0.002%		

https://isogg.org/wiki/Cousin_statistics

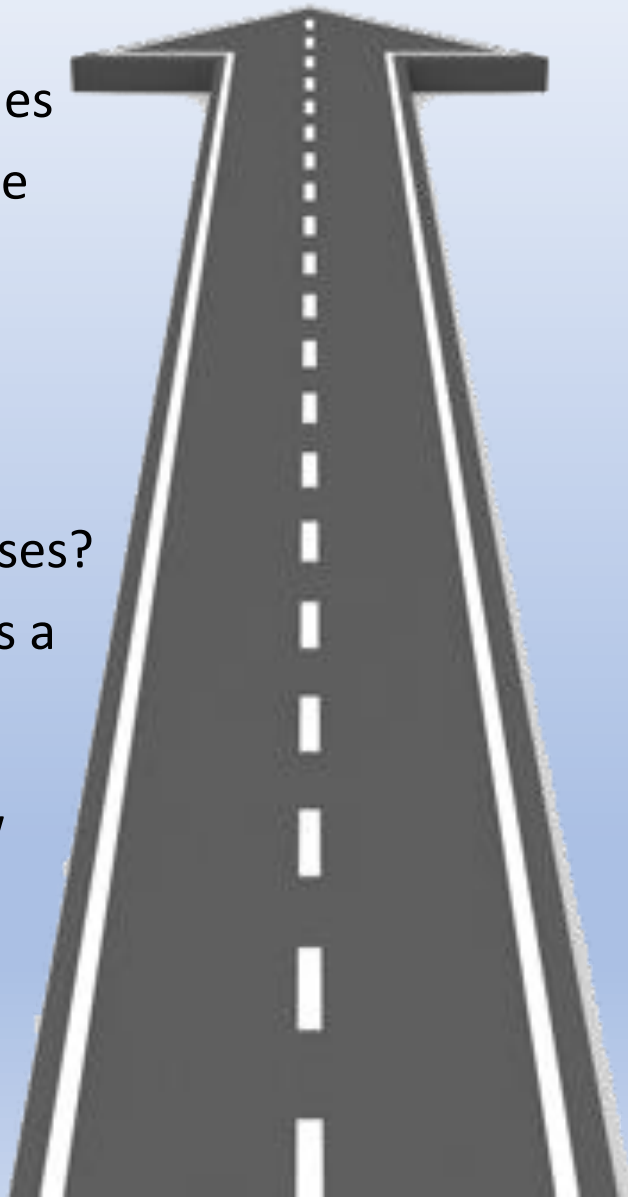
Identify and Verify the match

- Find the matches family tree – have they identified themselves on it, can you find locations or surnames in common.
- Open the profile of the match – do they have an email address, a profile name, a list of ancestors or names they have in their tree
- Contact the match. I like to keep contact very simple in the first instance – verify who you are messaging them about, ask them if they know their grandparents names, and/or if they have a family tree that you can access.
- Who else matches them – ICW (in common with) matches or shared matches

- **REMEMBER: <u>every test-taker has the right to privacy</u>**, ultimately a test taker should not take a DNA test if they do not wish to be identified, but there are ways to identify matches and continue your research without their involvement

Road to Success

- Spend time researching – identify and verify matches
- Learn about advanced matching tools (chromosome browsers, triangulation, etc)
- Surnames can be less important than locations
- Collaboration
  - Ask for common location, common surnames
- Uploading to other sites – are you in all the databases?
- Shared matches, ICW (In Common With) matches is a helpful way of working out which branch a match comes from.
- Test more relatives – test your older relatives NOW



Success Stories (My Experience)

Confirmed GG Grandmothers father (illegitimacy)

Found out my GGG Grandmother was a twin!

Confirmed who my mysterious GGG grandfather was

Found out my Dorset ancestors' siblings founded Newfoundland (mine were New Zealand settlers)

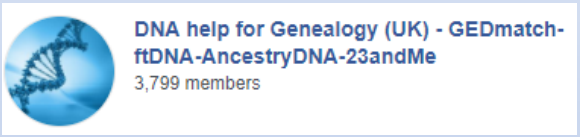
Found a 4th cousin in Alaska, and another in Texas

Still have many more mysteries to uncover, and many more stories to find

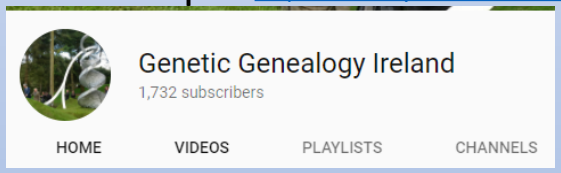
Where can I get help

- **ISOGG** wiki https://isogg.org/wiki/Wiki_Welcome_Page

- **Facebook** groups https://www.facebook.com/groups/AncestryUKDNA/



- **YouTube** videos
  - For example https://www.youtube.com/channel/UCHnW2NAfPIA2KUipZ_PlUlw



- **Testing Company** help pages
  - ftDNA (family tree DNA), Ancestry, 23andMe, My Heritage
  - https://www.familytreedna.com/learn/dna-basics/