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



Donna Rutherford



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.

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\$ \$ 19	14		7 Å 21)] 22)	, ζ,

- ✓ 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 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
 mitochondrial
 - Provides a Haplogroup



How does an atDNA test work

- Your saliva sample is sent to a lab for analysis
- The test locates <u>specific</u> 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)				_	
which side)	rsid cl	nromosome	positio	on al	lele1 allele2
	rs4477212	1	82154	Т	Т
	rs3131972	1	752721	G	G
	rs1124077	71	798959	G	G
	rs6681049	1	800007	С	C
	rs4970383	1	838555	Α	C
	rs4475691	1	846808	Т	С



- 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

European

collapse all

• 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







My Ancestry Composition



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	GENEALOGY
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)	However Fraternal twins are the same as Full Siblings (2 eggs)
	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	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	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	Removed = generation difference
2nd cousins share Great Grandparents	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	grad grad - generation difference grad grad - grad
	1.563%	106.25	Second cousins once removed, half second cousins, first cousin three times removed, half first cousin twice removed	great- grandfather grandmother great- uncle / aunt grandfather great- grandmother grandmother grand
3 rd cousins share GG Grandparents	0.781%	53.13	Third cousins, second cousins twice removed	grandadiar grandidular uncle / aunt twice removed
Grandparents	0.391%	26.56	Third cousins once removed	father mother uncle / aunt first cousin once removed once removed
4th cousins share 3xG Grandparents	0.195%	13.28	Fourth cousins, third cousins twice removed	brother / sister Self first cousin second cousin third cousin
	0.0977%	6.64	Fourth cousins once removed. third cousins three times removed	niece / nephew son / daughter first cousin once removed once removed once removed
Fifth cousins share 4xG Grandparents	0.0488%	3.32	Fifth cousins	grand- niece / nephew grand- twice removed twice removed twice removed twice removed

Shared cM project

August 2 Blaine T. Betting www.TheGenetic CC 4.0 Attribution	er Genealogist.com			How to read	this chart: Relationship Average		[Great-Gre Grandj	parent	GGGG- Aunt/Uncle	
	1750 ← Range (low-high) 1349 - 2175 ← (99% Percentile)					Great-Great-	Grandparent	GGG- Aunt/Uncle			
Half GG- Aunt/Uncle 187 12 - 383			Gı	reat-Grandpare 881 464 – 1486	nt			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
\ll		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	5 c 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	7 C1R 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 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

All (1963)	🛉 Paternal (490)	🕴 Maternal (557)	👬 Both (2)	
Name	Match Date	Relationship Range	Shared Centimorgans	Longest Block X
	01/15/2016	Parent/Child	3,384	267
	01/16/2016	Parent/Child	3,384	267
	01/16/2016	Full Siblings, Half Siblings, Grandparent/ Grandchild	2,373	146
	10/22/2015	Half Siblings, Grandparent Grandchild, Uncle/ Nephev	:/ 1,875 N 1,875	154
	02/16/2017	Half Siblings, Grandparent Grandchild, Uncle/ Nephev	:/ 1,689 N 1,689	78

Selection Box	Paternal Maternal	Email	Family T	Ггее						
			04/22/2016	Half Siblings, Grandparent/ Grandchild, Uncle/ Nephew	1,488	229	X-Match	Uncle	? / (NOT CONFIRMED) / Allenby / Answell / Bray / Brown / Castle / Croker / Davis /	0
	Name		Match Date	Relationship Range	Shared Centimorgans	Longest Block	X-Match	Linked Relationshi	p Ancestral Surnames	5
		s 3 🛔	05/08/2016	2nd Cousin - 3rd Cousin	155	39		2nd Cousin 1R	Answell / Brown / Crosse / Croker / Davis / Denigan / Dennigan / Denigan	0
	2	s & #	07/17/2015	2nd Cousin - 4th Cousin	71	19		2 +	Berry (England/Canada) / Boyd (Ireland/Canada) /	0
O		s 6 Å	05/02/2017	2nd Cousin - 4th Cousin	64	39		2 +		0
	A.,	s 🕼 🛔	03/28/2017	2nd Cousin - 4th Cousin	63	39		& +	Nancy Matild / Andrew / Langenegger / Allen / Deeble / Deppen /	C
0	2.	s & #	03/07/2017	3rd Cousin - 5th Cousin	63	15	X-Match	R +		0
	2.	s 6 Å	02/28/2017	3rd Cousin - 5th Cousin	62	13		& +		0
D	2	s 🕫 🛔	05/18/2015	2nd Cousin - 4th Cousin	62	19		R +		0
			07/14/2015	2nd Cousin - 4th Cousin	61	18		2 +		0
0		3 ф	02/13/2017	5th Cousin - Remote Cousin	59	8	X-Match	& +		0

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 ter myste ter mys tery

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

Where can I get help

• ISOGG wiki <u>https://isogg.org/wiki/Wiki_Welcome_Page</u>



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



DNA help for Genealogy (UK) - GEDmatchftDNA-AncestryDNA-23andMe 3.799 members

YouTube videos

For example <u>https://www.youtube.com/channel/UCHnW2NAfPIA2KUipZ_PIUlw</u> •



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VIDEOS

PLAYLISTS CHANNELS

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

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