DNA
for One-Namers

Topics

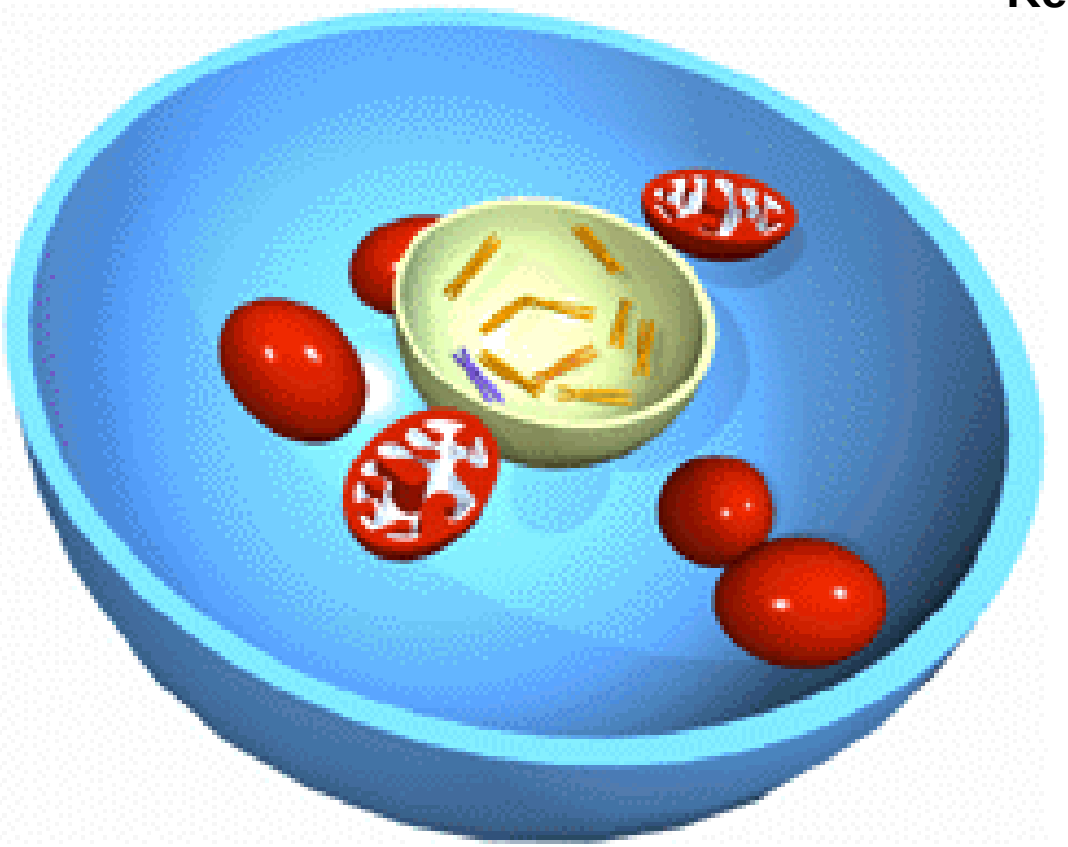
- What is DNA?
- Why (& Who) would you test?
- Selecting a Test lab.
- How do you test?
- What do the results look like?
- What do the results mean?
- What can you do with the results?
- One-Name DNA Strategies
- Further info

What is DNA?

- It’s an acronym for: Deoxyribonucleic Acid
- DNA is part of the make up of the Chromosomes and other material within cells
- It is responsible for making us what (rather than who) we are.

What is DNA?

- Cells contain 23 pairs of chromosomes, each containing DNA.
- An ‘Odd’ pair of Chromosomes, X & Y, determine the sex of an individual.
- Men have one of each.
- Women have two X chromosomes.
- Children inherit one X from their mother, and an X or a Y from their father.
- Thus Y DNA is only inherited in the Male line.



Key

Cell wall = Blue

Nucleus = Yellow

Chromosomes = Orange

Mitochondria = Red

Y-chromosome = Purple

What is DNA?

- It’s a long chain of chemicals in a particular sequence, some of which determine inherited qualities, and are used for genetic fingerprinting.
- Other sequences seem to have no particular value, and are often referred to as ‘Junk’ DNA.
- You could consider the former as words on a page, and the latter as the spaces in between.
- Places in the sequence where ‘useful’ junk DNA occurs are call Markers, and it is these that are useful for genealogy.

What is mitochondrial DNA?

- Besides the Chromosomes, there is other cell material called Mitochondrial DNA (mtDNA) which is passed from mother to child, irrespective of their sex. However, as only females pass on mtDNA, it is only useful for the female line, and is of little use to most One-Namers.

The value of Y-DNA

- Because Y-DNA is passed down the male line, it helps identify related males.
- However, two unrelated males *could* have similar Y-DNA at the Marker positions used.
- Because surnames are (generally) passed down the male line, a combination of Surname and matching Y-DNA is a very strong indicator of family relationships.

The Inheritance of Y-DNA

- Although passed from father to son, the process is not error free.
- At certain markers the Y-DNA occasionally mutates, each part is estimated to change once every 500 generations – that's about 12,000 years! However, that is only an average, and you *could* have several mutations in a few generations.

Why would you test?

- To determine if two men are related or not.
- To link two families when there is no paper trail.
- To confirm (or disprove) a researched Family Tree.
- To determine if different Surnames are actually Variants (or not).
- To guide future research.

Who would you Test?

- Distantly related people (as unexpected results for allegedly closely related people may cause unexpected problems….)
- Sample males from different Trees.
- Males who want to know which family they belong to (if any), and there is no paper trail.

What would you Test?

- There are now at least 67 Y-DNA Markers to select from.
- 12 Markers and below could lead to false assumptions. The now (in-)famous SYKES study used only 4 Markers….
- 24 and above are preferable.
- For my TOLL Study I’ve used 43 markers as my standard.

Selecting a Test lab

- Most testing labs can provide similar basic services.
- Visit their websites. Some provide additional services that may be of value to you, such as hosting and advertising your DNA based study.
- And some companies are clearly in it just for the cash….
- Check www.DNAandFamilyHistory.com for further information & 2004 prices.

How do you test?

- This is the simplest bit!
- Order a kit – they are usually free.
- Rub the sterile swab(s) on the inside of your cheek.
- Carefully pack in the container provided.
- Send it to the lab (with the test fee).
- Sit back and wait….

What do the results look like?

- What you get is a table with marker names and numbers.
- The numbers (generally) refer to the number of times the Junk DNA is repeated at the Marker site.

Full details for Record ID	VTDU2
Surname	Toll
No. of participants	1
Date created	5/6/2006

Haplogroup assignment: I1a - predicted

DYS19/394	DYS385a	DYS385b	DYS388	DYS389i	DYS389ii	DYS390	DYS391	DYS392	DYS393
14	13	14	14	12	29	22	10	11	13

DYS425	DYS426	DYS437	DYS438	DYS439	DYS441	DYS442	DYS444	DYS445	DYS446
	11	16	10	13	16	12	14	11	13

DYS447	DYS448	DYS449	DYS452	DYS454	DYS455	DYS456	DYS458	DYS459a	DYS459b
22	20	28	12	11	8	14	16	8	9

DYS460	DYS461	DYS462	DYS463	DYS464a	DYS464b	DYS464c	DYS464d	DYS570	DYS576
10	12	12	19	12	14	15	16		

DYS607	CDYa	CDYb	GATA A10	GATA C4/ DYS635	TAGA H4	GGAAT1B07	YCAIIa	YCAIIb	
			13	21	11	11	19	21	

What do the results mean?

- On their own, the results mean very little.
- From published data, it is sometimes possible to guesstimate the original source of your early male ancestors.
- Where the results become useful is when you have two or more to compare. You can then guesstimate the most recent common ancestor – if any.
- If you get a 22/24 to 24/24 match, and the same surname, you are almost certainly related.
- If you get a 12/24 match, you are almost certainly not related in a genealogically relevant timeframe. Suspect a different surname source or illegitimacy.

What can you do with the results?

- Not a lot…
- Compare them to others.
- Post them on a website, such as www.ybase.org

Customer Code	First Name	DYS19	DYS385a	DYS385b	DYS388	DYS389i	DYS389ii	DYS390	DYS391	DYS392	DYS393	DYS426	DYS437	DYS438	DYS439	DYS441	DYS442	DYS444	DYS445	DYS446	DYS447	DYS448	DYS449
RFA961 **	Ken	14	13	14	14	12	29	22	10	11	13	11	16	10	13	16	12	14	11	13	22	20	28
96AKC2	Robert D	14	11	15	12	12	28	24	11	13	13	12	15	12	11	13	13	13	12	13	26	19	28
49LPB5	George O	14	11	14	12	14	30	24	11	12	13	12	15	12	11	13	11	12	13	13	25	19	29

** = Admin
* = co-Admin

Customer Code	First Name	DYS452	DYS454	DYS455	DYS456	DYS458	DYS459a	DYS459b	DYS460	DYS461	DYS462	DYS463	DYS464a	DYS464b	DYS464c	DYS464d	GATAA10	GATAC4	TAGAH4	GGAAT1B07	YCAIIa	YCAIIb	HAPLO
RFA961 **	Ken	12	11	8	14	16	8	9	10	12	12	19	12	14	15	16	13	21	11	11	19	21	I 1a
96AKC2	Robert D	11	11	11	15	18	9	9	12	12	11	23	14	15	17	17	14	23	12	10	19	23	R 1b
49LPB5	George O	11	11	11	15	17	9	10	12	11	11	22	15	15	17	17	13	23	12	10	19	23	R 1b

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DNA Heritage Interpretation

There are some simple rules of thumb for considering participants to be related through a common ancestor:

At 23 markers; 21/23, 22/23 and 23/23 matches
At 33 markers; 30/33, 31/33, 32/33 and 33/33 matches
At 43 markers; 39/43, 40/43, 41/43, 42/43 and 43/43 matches.

It is risky to place too much emphasis on the time scales of when the most recent common ancestor actually lived based upon statistics. To do so provides false accuracy to the interpretation due to very large error margins in the statistical calculations. The paper and oral records are a far better guide where available.

When you do find many differences between presumed cousins which, according to the rules above, is on the boundary of relatedness (e.g., a 39/43 match), a 'bridge haplotype' can often be found. This is an individual with a haplotype in between the two cousins (e.g., a 41/43 match) that shares one or more of the mutations, thus connecting the cousins.

Haplogroup I1a

- Haplogroup I is a major lineage largely restricted to populations of Europe but where it is present at about 18%. Held up during the last ice-age within the Balkans, Haplogroup I spread outward but remains largely within the confines of Central Europe. Haplogroup I1b is the largest group, followed by I1a and I1c.

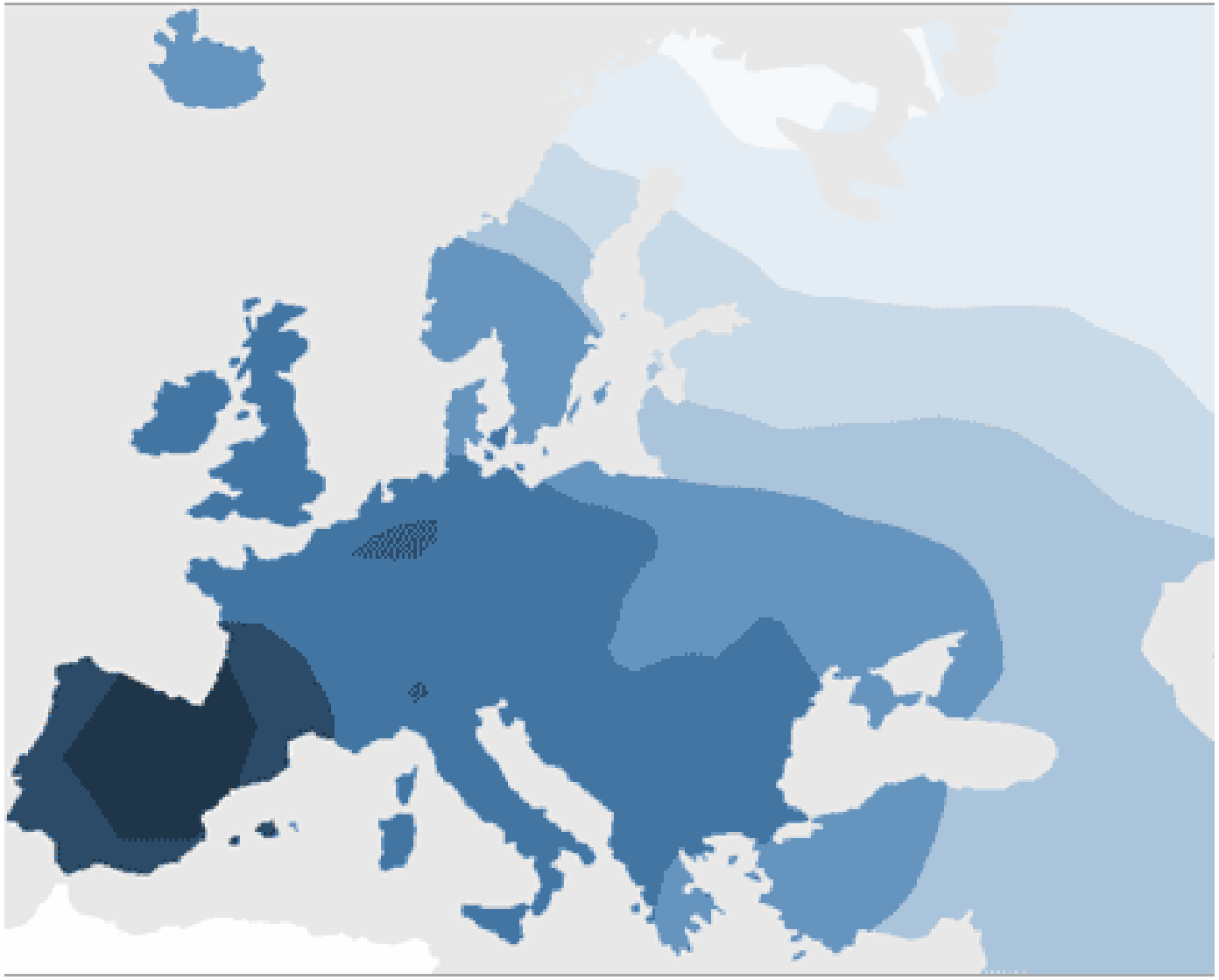
- Haplogroups I, I1, and I1a are nearly completely restricted to north-western Europe. These would most likely have been common within Viking populations. One lineage of this group extends down into central Europe.

Haplogroup R1b

During the last ice-age, one group of people took refuge in the Iberian Peninsula (Spain and Portugal). During this time, Haplogroup R1b established itself within the population.

When the ice receded about 10-12,000 years ago, these groups followed the food northward, therefore taking the Haplogroup to where we see it today, France, the UK, Ireland, the Netherlands, Belgium, Germany and of course Iberia.

:: Distribution of Haplogroup R1b within Europe



:: adapted from Cavalli-Sforza's 'first principal component' map

One-Name DNA Strategies

- Test distantly related males on the same Tree to validate existing research.
- Test males in previously unconnected Trees to determine if hunting for the elusive “missing link” is worthwhile.
- I have opted for the latter so far – and all 3 candidates are ‘unrelated’ – so no need to keep searching for a connection.

Further info

- Books:

  DNA for Family Historians – Alan Savin
  DNA and Family History – Chris Pomery
  Y: the Decent of Man – Steve Jones

- Vendors websites:

  www.familygenetics.co.uk Family Genetics
  www.dnaheritage.com DNA Heritage – has excellent tutorial.
  www.oxfordancestors.com Oxford Ancestors
  www.familyreeDNA.com Family Tree DNA - has excellent tutorial & marketing
  http://dnaconsultants.com DNA Consultants: 37 Marker $310
  www.genetree.com Gene Tree: $245 (24 markers?)
  www.smgf.org Sorenson Molecular Genealogy Foundation (+Relative Genetics)

- Other websites:

  www.DNAandFamilyhistory.com Chris Pomery's Vendor summary pages & links to various resources.
  www.DNAlist.net a list of DNA Studies, mainly at Family Tree DNA
  www.yhrd.org online results database
  www.ysearch.org list of surnames connected with a DNA study (Family Tree DNA)
  www.ybase.org list of DNA results, searchable by Surname.