

## GENETIC GENEALOGY NOTES

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DNA testing for genealogy is an Internet game. You test yourself and family members (as many cousins as possible), then contact matches via email to find those to whom you are related and see if they know more than you!

My preferred order of test companies:

#1 [Family Tree DNA](#), #2 [My Heritage](#), #3 [23andMe](#), #4 [AncestryDNA.com](#). I have tested with all of them.

Analysis sites: [GEDMatch.com](#), [Promethease.com](#)

**FTDNA** oldest company organized specifically for genetic genealogy in 2000 offers a full set of DNA tests. Only company to offer Y chromosome testing. Offers both STRs (pronounced "stirs") and SNPs (pronounced "snips"), for males only (Y-DNA 37 markers \$169; \$149 if ordered within a surname project). Mitochondrial DNA males and females (\$199) -- follows maternal line, but not very useful for genealogy in the past several hundred years. I do not recommend ordering mtDNA except in special cases. Over a million customers.

Autosomal DNA (atDNA \$79; on sale a few times a year \$59 or \$49) for males and females for comparisons with cousins up to 5th and beyond as well as close in family. FTDNA does their own lab work in-house, and they have excellent customer service and surname project administrators to help with analysis and understanding. They have good data analysis tools.

FTDNA isolates and stores one's DNA for 25 years. Tests and/or upgrades can be ordered without the need for another sample. Cheek swab is used.

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All the rest only offer Autosomal DNA.

**My Heritage**, an Israeli company, (contracts with FTDNA for the lab work) are late comers to the genetic genealogy game (atDNA only testing \$99 list price sales often at \$59 and sometimes \$49.). They are developing excellent data analysis tools, probably going to be better in the long run for atDNA than FTDNA. Also have extensive databases rivaling Ancestry.com. Probably best in the group at European DNA connections. They accept third party tests from other companies – the only company to do so. They have over 2.5 million customer tests; growing daily

**23andMe** primary focus is health testing (specialized autosomal with an emphasis on health related mutations), with genetic genealogy the poor redheaded step child, but they have fairly good analysis tools. \$99 Ancestry only (atDNA); \$199 health and ancestry (exactly the same chip and test; raw data will be the same.) They contract the lab work to Lab Corp of America. They do not do their own in-house testing. Near zero customer service. Good luck, if you want to contact them.

They trick customers into agreeing to "research" which means answering extensive health questionnaires so that they may anonymize your data and then sell it to drug and medical companies. This is where the big money is, btw, not genealogy. You pay for a test, answer their invasive questions, and they make a profit off of you and all the others who test with them.

They got their tail clipped by the FDA a couple of years ago and now they only offer a limited analysis of your health related genetic mutations. They are slightly better if you are working on European matches.

Spit is used as the DNA sample. They will store the isolated DNA for a short time, but only on request at the time of ordering. If you test an elder and then they die before other more definitive test become available, T.S.

**Ancestry.com** is the 800 lb gorilla (est >12.5 million), but autosomal DNA only; \$99 but occasionally on sale for \$79). They contract the lab work to Lab Corp of America. They do not do their own in-house testing. Zero customer service. No analysis tools. They tell you what they want you to know of your matches.

It is DNA dumbed down for the great unwashed. A lot of people test with them so it is worth doing just to get the exposure in their database. They do not store a DNA sample. I do not remember what their sample type is when I did it, but I think it is a cheek swab as well.

**GEDMatch.com** free third party data analysis and comparison site (est >2 million DNA profiles). Excellent analysis tools for comparing data uploaded by others from FTDNA, 23andMe, Ancestry.com, MyHeritage, etc. Subscription (single month \$10) for advanced "Tier 1" analysis tools. They are about to convert to Genesis database, which will be even more advanced in analysis and will accommodate stripped down datasets such as 23andMe v4. They also allow one to upload a GEDCOM file for automated matching with others.

**All test companies allow one to download their individual raw data. It is your data after all. It belongs to you. If you test with any of them, you should always access and download a copy of your raw data test file.**

**Promethease.com** a site where one can upload raw atDNA test data and do a medically relevant analysis for a \$10 fee. The results are quick (~10 minutes), but technical to read through. One's raw data SNP analysis is compared to the SNP database, [SNPedia](#). One can use data from most test companies and get a detailed health report, but one must do one's own interpretation.

Data are only stored for 45 days. SNPedia data changes all the time, so if interested in health results, one could do this test once a year for instance to keep up with latest findings in genetic research as it pertains to one's individual DNA. atDNA is not a comprehensive DNA health test as the 600,000+/- SNPs were prechosen for testing on dedicated SNP chips. This represents a minor fraction of an individual SNPs. Mutations can and do occur elsewhere that have critical health implications.

**Mutations** A SNP (single nucleotide polymorphism) is a point mutation in a DNA nucleic acid chain. Once these mutations occur they are usually passed on forever to successive generations. We each are born with about 3 million SNPs our parents did not have (out of a total of 3 billion nucleic acid bases in our autosome and sex chromosomes.) There are other types of mutations as well, but SNPs are one of the most studied.

STR (short tandem repeats; pronounced "stir") are what is measured and compared in Y-Chromosome testing by FTDNA. The number of repeats at various locations (12, 25, 37, 67, 111, or 500 marker sites called alleles) are compared with other men who have tested. Men can be broadly classified into families mutated from a common ancestor, called a HAPLOGROUP (haplo- Greek for "single"). And further subdivided by SNP mutations. STRs are used as a first cut Y test because they are likely to have mutated more recently, within genealogical time frames. It has been said that STRs are like street names, but SNPs are like house numbers in terms of specificity.

**Ethnicity** Many test companies push ethnicity tests. IMHO, these are worthless, as you will get a different analysis for every test company and **different analysis for siblings**. There is no standardization of how one's collection of SNPs is compared to population genetic databases and the best that one can do is to estimate tribal ethnicity (tribal is the right word, for geopolitical boundaries change in an eye blink compared to genetics) to about +/- 15%.

The reason that 23andMe and Ancestry promote this so hard is that most people think they understand ethnicity (they don't), and genetic genealogy is hard with a steep learning curve. These companies are about selling test and making profits, not worrying so much about your tribes.

If one is interested in this area, upload one's raw atDNA data to GEDMatch.com and play with some of their models (they have several to choose from), until you get results that meet your expectations or what you would prefer to believe.



**Triangulation** The atDNA test is run by chopping up the DNA sample and floating the chopped bits over a chip with specific matching sequences anchored on it. Your autosomal DNA consists of two strands – one from your mother and one from your father. The test cannot tell which came from which.

You will have matches on a given segment from both sides of your family. These can be distinguished by matching a third person, say a first cousin or some other known relative such you, the known relative and a third person all match one another on the same segment on the same Chromosome.  $A=B=C$ . Generally if your cousin, B, does not match the third party, C, on the same segment,  $B \neq C$ , then this is a hint that C must be on the other side of your family. Three party matches/mismatches is called triangulation. When you get into the DNA match data analysis, you will spend a great deal of time triangulating matches to learn as much as possible about the common ancestor, you share. GEDMatch.com has built in Tier 1 triangulation tools.

Family Tree DNA will begin to triangulate your matches once you have entered a family tree on their site and assigned known relatives. Ancestry.com uses a pseudo-phasing technique to roughly separate your paternal and maternal lines (works ~60-70% of the time.)

Triangulation can get involved. Endogamous groups (Jews, Amish, etc.) have many, many more matches than average owing to cousin intermarriages. Even if you only have Colonial ancestors, you can be related to a person on more than one ancestral lines. People who fail the  $A=B=C$  triangulation test may be correlated through other lines; these matches are said to be “in common with.” ICW is not necessarily the same as triangulated on specific segments on specific chromosomes.

**Not tested yet?** Here is what I recommend.

**Strategy 1.** Join a surname project and test males with FTDNA for Y-DNA 37 markers minimum 67 markers preferred. Test atDNA at Ancestry.com and/or 23andMe and then pay the small fee \$15 to transfer the raw data to also be in the FTDNA database. If female, test atDNA at FTDNA as well (for sample storage against future testing.)

**Strategy 2.** Join a surname project and test atDNA at FTDNA (for sample storage males and females). Wait for a \$59 sale; regular price \$79. Upload data to My Heritage and GEDMatch.com (free 3rd party data analysis site with excellent tools. With sample in storage other tests or upgrades can be ordered at any time. Test as many eldest relatives (parents, grandparents, aunts, uncles, cousins especially 1C and 2C) as possible.

**Strategy 3.** Test with every company atDNA for a central person, and Y-DNA (FTDNA as part of a surname project) as well, if for a male. Choose FTDNA and test siblings, parents, grandparents and all the rest. Upload all raw data to GEDMatch.com and MyHeritage.

This will get you in the game. It is a fishing expedition, for the raw data has little to no meaning. These test tell you to whom you are and are not related in the world of the living. It is up to you to figure out how.

Over history there are a lot of [NPEs](#) (viz., non-paternity events such as unrecorded adoptions, name changes, bastard children, etc.), so that one can have a different genetic line than one supposes.

**And there are two different family trees, a paper tree and a genetic tree. Go back enough generations (~6 or more) and there will be members of one's paper trees from which you, by the luck of the draw, inherit no significant stretches of DNA at all.**

There are several books ([Aulicino](#); [Bettinger](#)) and a lot of blogs to help with analyzing data and figuring out what matches mean. There is a site for [DNA newbies](#) and several for adoptees (Google others), which can help one to understand all of it. But in the end, it is an Internet game. You find to whom you are related and you contact them with what you know to see if they know more than you do. There are a lot of lazy people who will pay money for the test, but will not lift a finger beyond this to answer an email if that. Others are interested to a degree but expect you do all the heavy lifting for them. And then there is the occasional dedicated researcher, who can break down walls and offer new and exciting insights.

**The ISOGG (International Society Of Genetic Genealogists)** has excellent wikis as well as [a beginner's tutorial](#).

Blogs of note (bolded and larger text by WJF)

- **[DNA Explained](#), a blog by Roberta Estes**
- [Dr D Digs Up His Ancestors](#) A genealogy and genetic genealogy blog from ISOGG member Dave Dowell
- [Find lost Russian and Ukrainian Family](#) A blog by Vera Miller which includes stories of adoptee searches and advice on DNA testing for people searching for family in Russia and the Ukraine
- **[Genealem's Genetic Genealogy blog](#)** A blog from ISOGG member Emily Aulicino with lots of practical advice on the subject of DNA testing.
- [Genealogy Junkie](#) Sue Griffiths' genealogy blog. Sue was brought up in the UK but now lives in the US. Her blog focuses on both genealogy and genetic genealogy.

- [The Genetic Genealogist](#) ISOGG member Blaine Bettinger examines the intersection of traditional genealogical techniques and modern genetic research. The blog also explores the latest news and developments in the related field of personal genomics
- [GenGenAus](#) A blog from Cate Pearce focusing on genetic genealogy in Australia
- [Genomics Law Report](#) News and analysis from the intersection of genomics, personalized medicine and the law
- [Genie1](#) A blog from Louise Coakley, an Australian genetic genealogist, with lots of good material for beginners
- [Haplogroup](#) Rebekah Canada's genetic genealogy blog
- [Hawaiian DNA](#) A blog from Kalani Mondoy.
- [HUGO Matters](#) The official blog of the Human Genome Organisation
- [Kitty Cooper's blog](#) Musings on genealogy, genetics and gardening
- [The Legal Genealogist](#) A blog by Judy Russell which often includes posts on the subject of DNA testing
- [On-line Journal of Genetics and Genealogy](#), a blog by Steven Perkins
- [Our Genes blog](#) The official blog from the Africa Genome Education Institute
- [Tracing African Roots](#) A blog exploring DNA testing to identify African roots
- [Segmentology blog](#) A blog by Jim Bartlett focusing on autosomal DNA testing
- [Through the Trees](#) a blog by Shannon Christmas
- [World Families blog](#) by Terry Barton
- [Your Genetic Genealogist](#) A genetic genealogy blog by ISOGG member CeCe Moore "helping you to discover and understand the fascinating world of genetic genealogy".

## Company blogs

- [The Spittoon - the official 23andMe blog](#)
- [Ancestry.com blog](#)
- [Living DNA blog](#)
- [MyHeritage blog](#)

## DNA project blogs

- [The British Isles DNA Project blog](#)
- [The Y-DNA haplogroup J2 blog](#)
- [The mtDNA haplogroup U4 blog](#)
- [Scottish DNA Project](#)

Hope this helps, Walter J. Freeman, [sffwjf@gmail.com](mailto:sffwjf@gmail.com), 770-554-4625. Contact me by email if you want a Word copy of this document with active links.