

Do Not Assume
What you should know about DNA testing for Genealogy
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Introduction

Between January 2015 and June 2019, I worked tables or booths on behalf of FamilyTreeDNA at more than 40 events around the country, from the colossal RootsTech to the intimate Cloud Family Association. While the level of awareness of DNA testing and the number of testers increased exponentially during that time, there are questions still asked at almost every event, the same questions customers ask daily in emails and phone calls. Most of them are addressed clearly in the FAQ sections of each DNA testing company but some aren't and for some reason, we often understand something better when it is explained to us by an actual person.

There are, in general, two categories of questions. 1.) Those asked before buying a test are generally questions aimed at making the right purchase, though some are for general information. 2.) Those asked after the results post. Those results may look nothing like they were expected to look or may appear not to support known family history or lore. In some cases, they may directly contradict it, or may reveal a family secret unknown to the tester or test manager.

Even if you know the answers to some or most of these questions, you may find this session useful in articulating that information when you are asked one of them.

1. Pre-purchase and pre-test questions

a. What about privacy? How is my privacy protected?

- i. Each company has a privacy policy. They are generally long and often boring, but if you are truly concerned with privacy, the best place to start is with what the written company policy is and ask questions if your concerns are not addressed in those policies.
- ii. Note that commercial databases are generally not publicly accessible. You must be a tester, manage a kit for someone, or have sign-in credentials shared with you to access individual results, unless you are a group project administrator with FamilyTreeDNA, then you have various levels of access to various kits in your project.
- iii. Group projects may have public pages.
 1. FamilyTreeDNA includes opt-in to sharing on the group page as default setting. You may change this setting so that your results do not show on the public page but in doing so, you are limiting the effectiveness of your group membership.
 2. Some organizations or family groups maintain their own sites and may share information on them that is not monitored by any of the companies. If the page is listed as containing information from an FTDNA group project, then FTDNA
- iv. Companies must cooperate with law enforcement just as any other business or individual would when presented with warrants.

- v. At FamilyTreeDNA, law enforcement sees only the closest matches and even then, they only see what another match would see. There is no such thing as browsing the database.
- vi. All companies comply with GDPR, including the right to be forgotten.
- vii. You can request to have your results deleted and sample destroyed.
- viii. Your DNA ultimately belongs to YOU and your legal heirs.

b. How did you get my ancestors' DNA?

- i. Only a few samples are from exhumed remains because it is difficult to get permissions for exhumation, there is no guarantee DNA recovered can be sequenced, and exhumation and extraction are expensive.
- ii. In most cases, the DNA comes from you and your genetic relatives who carry the DNA of your ancestors.

c. What are the differences between all these tests?

- i. Y-DNA - Follows the direct paternal line...father's father's father's line, giving insight into father's genetic surname, paternal origins. Only men can test since only men have a Y chromosome.
- ii. Mitochondrial DNA - Follows the direct maternal line...the mother's mother's mother's line giving insight into mother's direct maternal ancestral origins. Both men and women can test. Everyone has mitochondrial DNA inherited from their mothers. Men do not pass mtDNA to their children.
- iii. Autosomal DNA – The DNA inherited from both parents, 50% from each parent, made up of the randomly-recombined DNA each parent inherited from his or her parents. Reveals matches sharing ancestors in approximately last 5-6 generations, gives estimate of ancestral origins of ancestors along all lines. Both men and women can test as everyone has autosomal DNA.
- iv. X-DNA - Men have one X chromosome inherited from their mothers. Women have two, one from their mothers, one from their fathers. Has a distinct inheritance pattern that requires work to determine which from ancestors the DNA is inherited. X-DNA is tested as part of the autosomal test despite being one of the sex chromosomes.

d. How many generations does this test go back?

- i. Mitochondrial DNA matches can be as closely related as a parent or sibling or as distant as 52 or more generations.
- ii. Y-DNA STR matches can be as closely related as a parent or siblings, or as distant as 25 or more generations. SNP matches can be even more remote than that.
- iii. Autosomal DNA – five to six generations with confidence. Some matches may be confirmed as being from beyond that time frame.

e. What are the differences between the companies?

- i. Autosomal testing companies include 23andMe, AncestryDNA, FamilyTreeDNA, LivingDNA, and My Heritage, and to a lesser extent National Geographic's Genographic Project. GEDMatch is a third-party database.
- ii. Y-DNA testing companies include FamilyTreeDNA, Full Genomes Corporation, and YSEQ. 23andMe, Living DNA and the Genographic Project provide Y and mtDNA haplogroups that may or may not be complete. Yfull provides analysis for Y testing. Only FTDNA has a matching database.
- iii. Mitochondrial DNA can be tested with FamilyTreeDNA, YSEQ, and with the full genome test at Full Genomes Corp. Only FTDNA has a matching database.

2. Post-testing and post-results questions

a. Why do tests fail?

- i. Contaminated samples - can happen a variety of ways. Dentures and denture cream kill DNA. Not waiting long enough after eating or drinking, not waiting long enough after smoking are a few.
- ii. Degraded sample - samples degrade over time. The rate of decline varies from sample to sample, in part depending on the quality of the original sample.
- iii. Stem cell therapy – introducing stem cells from another person also introduces that person's DNA, and tests are not able to separate the two.
- iv. Bone marrow transplant – like stem cell therapy, introducing another person's DNA confuses the test process.
- v. Not enough of specific DNA type available in sample. When the person does not swab thoroughly enough or their saliva is diluted for whatever reason, the DNA strands may not be long enough to produce results sufficient to pass quality control (QC).

b. Why don't my ethnicity results reflect more of my known ancestry?

- i. Results are estimates, not an exact science yet.
- ii. Results compare your DNA against a limited number of specific reference populations. Each company's references and comparison algorithm are different.
- iii. You inherited 50% of your DNA from each parent, who only inherited 50% of his or her DNA, randomly recombined, from each of your grandparents. Populations do not pass down in set ratios, so you may inherit unequal proportions which means perhaps not inheriting some at all.
- iv. Just because your ancestors lived in, or were born in, a specific place, doesn't mean their ancestors were from there. Migration patterns were broad and not confined to geopolitical borders. Nationality is different from ethnicity.
- v. Perhaps you had an unexpected ancestor or two. An ancestor not on record as having been the parent of the ancestor you know. Unrecorded adoptions, illegitimate births, widows remarrying and children growing up with that husband's surname can lay false trails for ethnicity.

c. Why don't I recognize any of these match names?

- i. mtDNA matches can be quite distant, but even closer matches may not have recognizable names since surnames pass from father to son, and women may change their surnames several times if they marry more than once.
- ii. Y-DNA matches may be from the time before surnames were commonly used, or they may be from cultures that used patronymic naming systems so the names may change with each generation. There may not be testers from your surname who have tested yet, or there could be an NPE (not the parent expected.)
- iii. Autosomal DNA matches come from not just the descendants of your direct lines, but of their siblings.

d. Why don't I see my brother/father as a match?

- i. Each company maintains its own database, so testing at one company will not give you matches from another.
- ii. If you tested mtDNA or autosomal DNA (Family Finder), but your relative tested Y-DNA, you won't show as matches because the test types are completely different, and the comparative databases are separate.

- iii. If you both did the same test, but do not match, there could be a lab error, or there could be a previously unrevealed adoption or other circumstance of birth. Have the company check the results before panicking. No lab is perfect. Errors can happen anywhere. Still, many people have discovered that what they thought they knew about their heritage is not 100% accurate, so be prepared for that eventuality.
- e. I got my results, but what do they mean? What do I do with them?**
- i. Educate yourself by reading books and blogs, watching presentations, and participating in DNA Special Interest Groups (SIGs).
 - ii. Join one or more group project and actively participate. Make sure if you've tested Y or mtDNA you join a haplogroup project and look for a geographic project that works for you.
 - iii. Attend conferences like this one and choose DNA topics.
- f. What happens to my DNA test when I die?**
- i. Tests results are heritable and should be treated as any other asset in your estate planning.
 - ii. While FTDNA provides a place to list a beneficiary, when it comes down to it, unless you list your tests in your will, the executor of your estate, or personal representative, has control over who accesses the information, just like with everything else in your estate.
 - iii. To assume control of your test, in general, person would need to prove you are indeed dead, that they are either the executor of your estate or the personal representative, or provide a court document naming the executor, along with a note from the executor granting access.

3. Resources

- a. FamilyTreeDNA Learning Center <https://www.familytreedna.com/learn/>
- b. National Center for Biotechnology Information (<http://www.ncbi.nlm.nih.gov/>)
- c. International Society of Genetic Genealogy (ISOGG) Wiki (<https://isogg.org/wiki>)
- d. DNAeXplained – Genetic Genealogy blog by Roberta Estes (<http://dna-explained.com>)
- e. The Genetic Genealogist blog by Blaine Bettinger (<http://thegeneticgenealogist.com>).
- f. DNA and Family Tree Research blog by Maurice Gleeson, especially downloads page (<http://dnaandfamilytreeresearch.blogspot.com/p/presentations-downloads.html>)
- g. FamilyTreeDNA Legal page <https://www.familytreedna.com/legal>
- h. Ancestry.com Privacy policy <https://www.ancestry.com/cs/privacyphilosophy>
- i. 23andMe Privacy Center <https://www.23andme.com/privacy/>
- j. MyHeritage Privacy policy https://www.myheritage.com/FP/Company/popup.php?p=privacy_policy
- k. LivingDNA Privacy Centre <https://livingdna.com/privacy-centre>
- l. Full Genomes Privacy Policy <https://www.fullgenomes.com/privacy-policy/>
- m. YSEQ Privacy Notice <https://www.yseq.net/privacy.php>
- n. Yfull Privacy Policy and Terms and Conditions <https://www.yfull.com/terms/>
- o. GEDMatch Site policy <https://www.gedmatch.com/tos.htm>