Compare DNA Companies: 23andMe, AncestryDNA, FTDNA, My Heritage, and Living DNA

DNA Day at GFO on March 15, 2023

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Over the past 12 years, autosomal DNA testing has moved into a prominent role in genetic genealogy. 23andMe was the first company to offer autosomal DNA testing for genealogical purposes. Their Relative Finder feature (now renamed as DNA Relatives) was quite popular when it was introduced in 2009. This feature allows people to discover genetic cousins they likely had never been in contact with previously. In 2010 Family Tree DNA introduced an autosomal DNA test called Family Finder which is a competing product to 23andMe's test. In 2012 a third major autosomal DNA test called AncestryDNA was introduced by Ancestry.com. It has been quite popular due to the large size number of people who have taken this test and due to the availability of extensive pedigree charts for many of the people who have been tested by Ancestry.com. More recently MyHeritage and Living DNA have also developed sophisticated autosomal DNA products.

The exciting thing about autosomal DNA testing for genealogical purposes is that this type of testing can identify cousins that you have not previously known about. Many of these cousins are distantly related to you, but some may be closely related. If you carefully study the pedigree charts of your genetic cousins in some cases you can identify surnames or ancestors that you share in common with these matches. If you can identify specific DNA segments that you share in common with two or more people then careful review of those people's pedigree charts can potentially help you identify shared surnames that can help you break through genealogical brick walls.

There are currently five primary genetic genealogy companies that offer autosomal DNA testing for genealogical purposes: 23andMe, Family Tree DNA, Ancestry.com, My Heritage, and Living DNA. The tests offered by these companies are similar in that they all use "SNP chips" that test between 500,000 and 700,000 specific point mutations called SNPs (single nucleotide polymorphisms). All five companies provide you with a list of your closest matches in their databases. The number of matches that you will have depends on the number of people in the company's database, the number of people with your ancestral background who have been tested, and the criteria that the company sets for what constitutes a match.

I believe that it is reasonable for the serious genetic genealogist to test with all of the 5 major DNA testing companies. 23andMe and AncestryDNA require you to test directly with their product, but the other three companies allow you to upload a raw data file from a different company into their database. For a more comprehensive analysis of the differences between these three autosomal DNA tests I would suggest you consult the chart I created at http://www.isogg.org/wiki/Autosomal_DNA_testing_comparison_chart which compares the features of the five tests in some depth.

23andMe at www.23andMe.com is the first company to offer a product for genetic genealogists now over 12 years ago in 2009. Over 13,400,000 people have been tested by 23andMe. 23andMe uses a customized version of the Illumina Global Screening Array chip. This chip tests 630,132 autosomal SNPs, 16,530 X chromosome SNPs, 3733 Y chromosome SNPs and 4318 mitochondrial DNA SNPs. The Y chromosome SNPs and mtDNA SNPs allow 23andMe to predict your basic Y and mtDNA haplogroups. The price for their ancestry product

is $99.

23andMe provides a list of your closest 2000 matches found in its DNA Relatives feature. I recommend that all genetic genealogists opt in to open sharing, which allows you to readily see the matching segment data for your matches who have also opted into open sharing. The criteria for a match to appear in DNA Relatives is 9 cMs and 700 SNPs for the first half-identical region or 5 cMs and 700 SNPs with at least two half-identical regions being shared. You can download an aggregated CVS file that contains the matching segment data for all of your matches. If you are willing to pay an additional annual fee of $29, 23andMe will allow you to see your closest 4500 matches in their database. 23andMe also offers its In Common With feature, which allows you to choose one of your matches and then see who shares DNA in common with that person.

23andMe also offers Ancestry Composition, which provides a biogeographical ancestry analysis for 302 populations from around the world. Chromosome painting is an important part of this feature. This allows you to see which of your DNA segments are linked to specific populations. Some people will enjoy the Ancestry Timeline, which attempts to predict when autosomal DNA from specific populations was introduced into your family tree. 23andMe also provides a chromosome browser that it refers to as the Advance DNA comparison tool.

The primary pros of the 23andMe test include its relatively large database, its relatively accurate ethnicity estimates and chromosome painting feature with Ancestry Composition, the fact that matches can be compared to each other in the DNA comparison tool, and a highly functional In Common With feature. The primary cons of the 23andMe test include the fact that DNA Relatives caps matches at 2000 people which significantly limits the number of people in our match lists, the fact that relatively few family trees are available in its website, the fact that a lower percentage of testees are interested in genealogy as compared to some of the other companies and the fact that no e-mail addresses are provided for matches.

Family Tree DNA at www.familytreedna.com offers its autosomal test known as Family Finder. It provides a match list as well as a nice chromosome browser. There are multiple options provided to sort your matches in various ways. The criteria for a match to appear in Family Finder are 9 cMs and 500 SNPs for one half-identical region or 7.7 cMs and 500 SNPs for one segment AND the sum of all HIRs containing at least 500 SNPs and being 1 cM in length must be over 20 cMs. Family Finder provides an "in common with" feature known as the Matrix feature. FTDNA provides a biogeographical ancestry analysis called myOrigins which indicates what portions of your DNA came from 90 populations of the world. About 1,800,000 people have been tested by Family Finder or have imported their data into the database. FTDNA uses the Illumina GSA SNP chip which tests 610,832 autosomal SNPs and 16,244 X chromosome SNPs. The price for testing is currently $59 or you may pay $19 to transfer Ancestry.com data, MyHeritage data, Living DNA or 23andMe version 3, 4 or version 5 data into the Family Finder database.

The primary pros of the Family Finder test include the fact that e-mail addresses are provided for your matches, the fact that a nice chromosome browser is available that allows up to 7 comparisons at a time and the fact that all of the matching segment data is downloadable as a single CSV file. The primary cons of the Family Finder test include its smaller database relative to its competitors and the fact that its chromosome browser doesn't allow comparisons between matches.

Ancestry.com at www.ancestry.com offers its AncestryDNA test. Its Ethnicity Estimate

feature provides a biogeographical ancestry analysis for over 1800 regions of the world using over 40,000 reference samples. Ancestry.com provides a match list, but NO MATCHING SEGMENT DATA IS PROVIDED. The raw data files are phased before the comparisons are done which reduces the number of false positive matches that you get. A match must share at least 8 cMs with you to appear on your match list. Your match list can be sorted in various different ways. You can star specific matches or organize them into as many as 24 custom groups. Ancestry.com now separates your matches into those who are related on your paternal line and those who are related on your maternal line. Ancestry.com also provides a chromosome painting feature.

Ancestry.com offers a shared matches (in common with) feature. This feature allows you to see which of your matches share DNA in common with your other matches. The feature will only display people that Ancestry.com predicts are 4th cousins or more closely related to you (about 20 cMs). You can check for shared matches with anyone in your match list. This feature at least partially makes up for the lack of a chromosome browser for the AncestryDNA test. In February 2019 Ancestry.com announced its ThruLines feature which tells you if some of your matches are related to you on a specific ancestral line and also attempts to predict ancestors for you who don't currently appear in your family tree at Ancestry.com. Over 23,000,000 people have done the AncestryDNA test, which makes the AncestryDNA database the largest among all 5 of the major testing companies. Ancestry.com uses a custom Illumina OmniExpress SNP chip. This chip tests 637,639 autosomal SNPs, 28,892 X chromosome SNPs, 1691 Y chromosome SNPs, and 195 mitochondrial DNA SNPs. The current price is $99.

The primary pros of the AncestryDNA test include its large database, the fact that many family trees are readily available for review, a search function is available that you can use to search by ancestral surname and location and the ThruLines feature which at least some of the time correctly predicts new ancestors who don't currently appear in your family tree and also clusters your matches who share one or more ancestors with you. Ancestry.com's ethnicity estimates can be very helpful if large portions of your ancestry come from very specific regions of the world. The primary cons of the AncestryDNA test include the fact that NO MATCHING SEGMENT DATA IS PROVIDED and no e-mail addresses are provided for matches. ThruLines can incorrectly predict your ancestors and potential ancestors suggested by this feature need to be reviewed with considerable caution.

MyHeritage at www.myheritage.com offers a full featured test. Genetic matches are generated from phased data with imputation done if necessary. The threshold for a match is 8 cMs for the longest segment if that is the only segment shared and at least 6 cMs for shorter segments. The threshold is 12 cM for the first segment in people who have at least 50% Ashkenazi ancestry. Matches can be filtered by the amount of shared DNA, the number of shared segments, the largest segment, name, most recent matches, country, ancestral surnames, ethnicity, Theory of Family Relativity, Smart Matches, shared surname, and shared location. The matching segment data and match list is downloadable (under the 3 gray dots on the match list). A nice chromosome browser is also provided. The chromosome browser will display triangulated groups with 2, 4, 6, and 8 cM thresholds for the triangulated groups. MyHeritage utilized the software developed by Evert-Jan Blom to deliver an auto-clustering feature in late February 2019. The feature auto-clusters your top 100 matches in MyHeritage. MyHeritage introduced its Theory of Relativity feature in February 2019. This feature utilizes genealogical data from your family tree, your matches' family tree, the FamilySearch Family Tree, Geni.com,

and other family trees to display a plausible genealogical connection between your match and you.

MyHeritage provides a biogeographical ancestry analysis called Ethnicity Estimate which indicates what portions of your DNA came from 42 populations from around the world. MyHeritage also identifies 2114 genetic groups which are based on a reference set of 1.7 million DNA tests. MyHeritage recently introduced the cM Explainer tool, which allows you to predict your relationship to your matches based on the amount of shared DNA and the ages of your match and you. Over 6,500,000 people have been tested by MyHeritage or have imported their data into the database. MyHeritage uses the Illumina GSA chip for its test. The test reports 576,169 autosomal SNPs, 29,694 X chromosome SNPs and 3495 Y chromosome SNPs. The price for testing is currently $49. Uploads are accepted from all major companies (23andMe, Ancestry.com, Family Finder, and Living DNA).

The primary pros of the MyHeritage test include the fact that a significant percentage of matches have family trees available for review, excellent filters are available for matches, a very good chromosome browser is provided that shows triangulated groups, an auto-clustering tool is provided and the Theory of Family Relativity helps bridge gaps in pedigree charts. The primary cons of the MyHeritage test include the fact that no X chromosome browser is available (but promised), the ethnicity estimates still need some improvement, no chromosome painting is available and no e-mail addresses are provided for matches.

Living DNA at www.livingdna.com is the newest company to offer autosomal DNA testing for genetic genealogists. It first offered testing in September 2016. Living DNA previously used the Illumina GSA chip, but switched to the Affymetrix chip in October 2018. This chip tests 683,503 autosomal SNPs, 15,028 X chromosome SNPs, and an unknown number of Y chromosome SNPs and mitochondrial DNA SNPs. Living DNA's Ethnicity Estimate provides a biogeographical ancestry analysis indicating what portions of your DNA came from 150 populations from around the world. Living DNA currently offers the most accurate ethnicity estimates for people who have ancestry from England, Wales, and Scotland, providing a breakdown for 21 sub-regions within the United Kingdom. About 500,000 people have been tested by Living DNA or have imported their data into the database. A match list is provided for relatives who share at least 10.67 cMs with you. No chromosome browser is provided, but is being designed. Your autosomal and X chromosome data can be downloaded if you test at Living DNA. Only the mtDNA and Y chromosome SNPs that are positive can be downloaded. Uploads are accepted from all major companies (23andMe, Ancestry.com, Family Finder, and MyHeritage) for $39. The price for the Living DNA test is $79.

The primary pro of the Living DNA test is that it clearly provides the best and most detailed ethnicity estimates for England, Wales, and Scotland. The primary cons of the Living DNA test include the fact that a relatively small number of people are available for matching, no chromosome browser is available, no pedigree chart display is provided, the ethnicity estimates are not highly accurate outside the British Isles and no chromosome painting is available.

When you begin the process of doing autosomal testing, it makes sense to first test yourself and your parents, provided that they are still alive. If your parents aren't alive, then I recommend testing your spouse and at least one child, if you have any children. I also recommend that you test each and every one of your living biological aunts and uncles. Testing their spouses and at least one of their children if they have children is also helpful. It is then prudent to begin testing first and second cousins of your parents or you if they are available for

testing. As a general rule of thumb, you want to test the oldest living relatives on each side of the family. If you have a lot of first cousins then it may be best to test more of your second cousins rather than testing a large number of first cousins since the shared segments from second cousins allow you to map the segments on your chromosome map back one more generation than you can with first cousins. In some cases it may be reasonable to also test third or fourth cousins for purposes of chromosome mapping, assuming that you have finances that allow you to do that.

After you have tested with one or more of the 5 companies mentioned above, you will receive a list of names of people who share one or more matching segments (or half-identical regions) of DNA with you. Others will share an ancestor with you as many as 12 or more generations back in time, depending upon the situation. A portion of your matches who share relatively small matching segments with you (generally only those with matching segments less than 12 cMs) will not actually share any ancestors in common with you in the past 300-500 years, but will instead be false matches, generally referred to as matches who are identical by state. When two people share a matching segment that they both inherited from a shared ancestor that segment is said to be identical by descent (IBD). Most of the time when you share an IBD segment that is relatively short (under 10 cMs or so) with someone else you will have a challenging time figuring out the genealogical connection, unless both of you have highly accurate pedigree charts that go back 9 to 12 generations on all lines. Unfortunately, few people have pedigree charts that are that detailed. By mapping your chromosomes, you can narrow the hunt to the most recent common ancestor.

In summary, all of the major Autosomal DNA testing companies have features that benefit genetic genealogists. Testing with all of the testing companies or at least uploading your data into all of their databases is the best approach for the serious genealogist. The most cost effective approach is to test at Ancestry.com and 23andMe and then upload your 23andMe raw data file into FTDNA's Family Finder database, MyHeritage's database and Living DNA's database.