

# Genetic Genealogy: Here's What You Need To Know

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Many genealogists have hopped on the DNA testing bandwagon only to be faced with test results that they don't understand. Like any new toy, it just takes someone who knows how, to show you how! There are really only **THREE QUESTIONS** you ask (and answer!) in order to get started.

**FIRST:** Which test should I take?

**NEXT:** What will I get from the testing?

**FINALLY:** Will it help?

With that first question guiding us, let's go over some basic testing principles and the three main test types, what you receive, and determine if it will be useful to you in your genealogy.

All of the genetic genealogy tests are administered via the **regular mail**. The DNA test kit arrives in your mailbox with everything you need to collect the sample and return it back to the laboratory. The collection method is a cheek swab or a saliva sample- painless and simple to administer for most people.

Once the DNA sample is submitted to the laboratory for testing and it is processed, you get two different kinds of results from the testing company: ethnicity results describing your ancestral origins, and a list of individuals in the database who have some kind of genetic relationship to you. It is then your job to work with the other individuals in the database to use genetic and **TRADITIONAL** genealogical methods to figure out how you are related.

Test Type 1: YDNA

Only available at [www.FTDNA.com](http://www.FTDNA.com)

Test Type 2: mtDNA

The YDNA test can reveal information about your direct paternal line. Only males can take the test, so if you are a female, you will need to use your powers of persuasion to get a brother, father, uncle, or cousin to test for you.

The mtDNA test traces your mother's mother's mother's line. Both males and females can take this test to represent their own mtDNA lines.

With the YDNA and mtDNA tests, the ethnicity portion is called a haplogroup, or a deep ancestral group. It can act like a molecular GPS to help you determine the ancient origins of your direct paternal or maternal line. Most genealogists find this information interesting, but not particularly genealogically valuable without additional testing.



single lineages in your pedigree chart, atDNA can potentially provide information on anyone in your tree.

Autosomal DNA is currently limited in its genealogical reach as it can only help you back about 6 generations. We are limited to so few generations because of the way autosomal DNA is shuffled and halved at each generation. The figure on the right represents a possible way in which DNA is passed down in the pedigree of a family, resulting in diverse possibilities of inheritance due to chance.

The chart below helps to quantify these values.

In the circles with the percentages is identified the percentage amount of time that a testing company can accurately describe a particular relationship. So, while they can find your second cousin 99% of the time, only 50% of your fourth cousins will be found.

Start	parent	grandparent	1st great-grandparent	2nd great-grandparent	3rd great-grandparent	4th great-grandparent
parent	Sibling 50.000%	25.000%	12.500%	6.250%	3.125%	1.563%
grandparent	25.000%	1 <sup>st</sup> Cousin 12.500%	6.250%	3.125%	1.563%	0.781%
1st great-grandparent	12.500%	6.250%	2 <sup>nd</sup> Cousin 3.125%	1.563%	0.781%	0.391%
2nd great-grandparent	6.250%	3.125%	1.563%	3 <sup>rd</sup> Cousin 0.781%	0.391%	0.195%
3rd great-grandparent	3.125%	1.563%	0.781%	0.391%	4 <sup>th</sup> Cousin 0.195%	0.098%
4th great-grandparent	1.563%	0.781%	0.391%	0.195%	0.098%	5 <sup>th</sup> Cousin 0.049%
5th great-grandparent	0.781%	0.391%	0.195%	0.098%	0.049%	0.024%

## Take Home Message:

There are more relatives in the database who cannot be found with your test. If you test more people (siblings, cousins, etc.) then you increase your chances of finding all of your relatives.

## Identifying Best Matches

Most people have hundreds of matches to their autosomal DNA test results. The main problem is in identifying your BEST matches. There are two approaches to finding your best matches. The first is to fully investigate your closest genetic matches. The second is to use the filters and search tools provided by your testing company to identify those matches with shared genealogical elements.

## To Sum Up

### mtDNA

- Describes ONLY your direct maternal line.
- If you are ordering, consider the FMS test from Family Tree DNA.
- Anyone can be tested.
- Your maternal haplogroup can give you clues as to the origins of your maternal line.
- Your mtDNA profile is used to find matches in the database.

- Only EXACT matches should be considered further investigation (most of the time).

## **YDNA**

- Describes ONLY your direct paternal line.
- If you are ordering, consider the 37 or 67 marker test from Family Tree DNA.
- Only males can be tested.
- Your paternal haplogroup can give you clues as to the origins of your paternal line.
- Your YDNA profile is used to find matches in the database.
- Only matches with three or fewer differences (at the 37 or 67 marker level) should be considered further investigation (most of the time).
- You maximize the benefit of YDNA testing when you participate in a family surname project (do your homework!)

## **Autosomal DNA**

- Can potentially provide information about all of your ancestors back about 6 generations.
- If you are ordering, there are three companies to choose from (see below).
- Anyone can be tested. Capture the DNA of your oldest living relatives first.
- Your Admixture results can give you clues as to the origins of your family lines.
- All three major testing companies provide you with access to your genetic cousins.
- The best way to evaluate your matches for relatedness, when the traditional genealogical methods have been exhausted, is to find others with overlapping sections of DNA and then work together to identify a common ancestor.

## **Testing Companies**

As mentioned, there are four and a half major genetic genealogy testing companies. Only one, Family Tree DNA, offers YDNA and mtDNA testing. All others only offer autosomal (though 23andMe does provide limited YDNA and mtDNA information).

Each has its own niches, so you should investigate each company to help you determine which might be the best fit for you and your genetic genealogy needs.

Family Tree DNA: [www.ftdna.com](http://www.ftdna.com)

AncestryDNA: [www.dna.ancestry.com](http://www.dna.ancestry.com)

23andMe: [www.23andMe.com](http://www.23andMe.com)

MyHeritage.com

The National Geographic Project: <https://genographic.nationalgeographic.com>

For a great, general, and FREE genetic genealogy resource turn to [www.isogg.org/wiki](http://www.isogg.org/wiki).