









## **Genetic Genealogy for Beginners: DNA is the “Gene” in Genealogy**

*Presented By*  
*Elise Friedman, Relative Roots*  
[www.relativeroots.net](http://www.relativeroots.net)



What is Genetic Genealogy? What tests are available and which one should I order? Do I need to be a geneticist to understand my results? If you're a complete beginner to Genetic Genealogy and want the answers to these questions and more, this webinar is for you! Learn about the history of genetic genealogy, be introduced to DNA basics and inheritance, learn about the different types of DNA tests available for genealogy, and learn about resources that will help you make the most of your Genetic Genealogy experience. Focus will be on the tests offered by [Family Tree DNA](http://FamilyTreeDNA.com).

### **What Is Genetic Genealogy?**

DNA is the “gene” in genealogy. We all share some amount of DNA with our ancestors and relatives. Genetic Genealogy is a cutting-edge tool that uses advances in DNA testing technology to enable genealogists to supplement their traditional genealogy research. It can:

-  Supplement traditional genealogy research and break through paper-trail brick walls.
-  Determine if same-surname men descend from a common patriarch.
-  Identify different-surname men who are related on the direct paternal line.
-  Identify cousins on your direct maternal line.
-  Determine your paternal and maternal haplogroups and learn about their ancient origins and migrations.
-  Discover previously-unknown cousins on any line of your ancestry.

### **What Genetic Genealogy *Is Not***

-  Not a magic bullet – one test won't reveal your entire family tree.
-  No health or medical information in traditional genetic genealogy.

### **DNA Collection**

DNA collection is simple and painless – Family Tree DNA will mail you a collection kit containing three (3) cheek swabs, you'll do the swabs in the privacy of your own home, mail the completed kit back, and the lab does the rest!



## How Genetic Genealogy Began

1997: Geneticists Michael Hammer and Karl Skorecki used DNA testing to determine if Jewish men with a tradition of Cohen ancestry (Jewish priests – direct patrilineal descendants from Aaron) shared a common Y chromosome signature.

1999: Entrepreneur and genealogist Bennett Greenspan contacted Michael Hammer to inquire about using Y chromosome testing for genealogy – if it worked for the Jewish priests, why not others!

April 2000: After many discussions, a business plan, a proof of concept and more... Family Tree DNA was launched as the first commercial provider of DNA testing for genealogy.

## DNA Basics

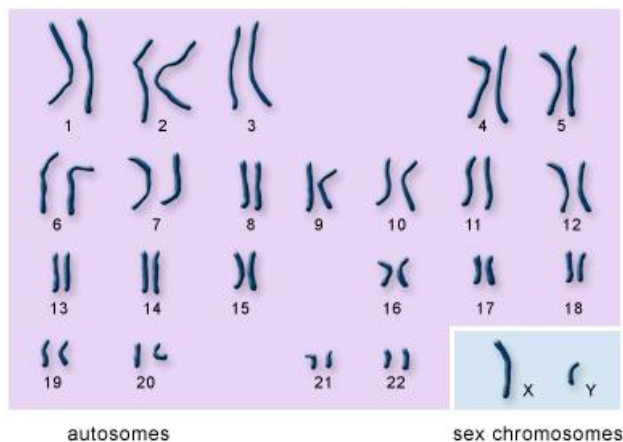
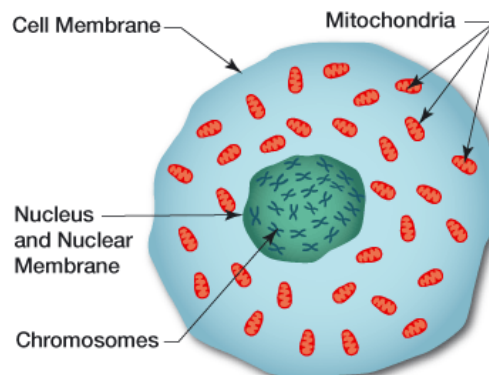
Every cell in our body contains DNA. Our DNA consists of:

46 chromosomes (23 pair)

22 pair = autosomal chromosomes, or autosomes

1 pair = sex chromosomes (X,Y)

Mitochondrial DNA (mtDNA)



U.S. National Library of Medicine

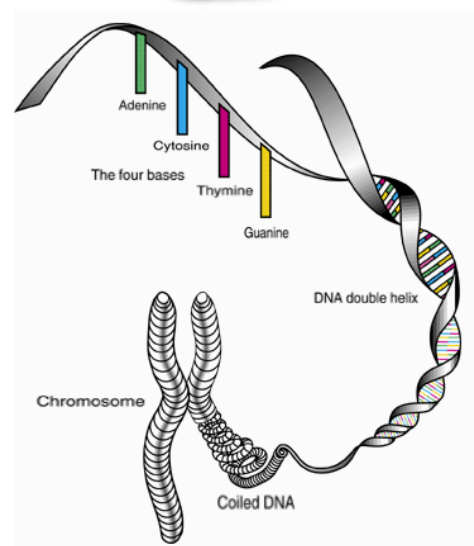
**DNA is made up of 4 bases:**

Adenine

Cytosine

Thymine

Guanine



## DNA Inheritance Basics

We each inherit approximately 50% of our DNA from each parent.

Some of our DNA is passed down from our mother or father completely in-tact, while other parts of our DNA are a combination of each parents' DNA.

**Y chromosome:** Inherited by men only, via their direct paternal line (father's father's father, etc)




**X chromosome:** Men inherit one from their mother only; women inherit one from each parent.

**Mitochondrial DNA:** Inherited by both men and women, via their direct maternal line (mother's mother's mother, etc)

**Autosomes:** Both men and women inherit one of each of the 22 pair of autosomes from each parent.

## Types of Genealogy Tests





There are three (3) major types of DNA tests commonly offered for genealogy:

-  Y Chromosome
-  Mitochondrial DNA
-  Autosomal DNA

### Y Chromosome (Y-DNA)

Y-DNA testing focuses on the direct paternal line – ie, the father’s father’s father, etc. Only men can take this test; women do not have a Y chromosome. However, women can ask a male relative who represents the surname line that she’s interested in to take a Y-DNA test.

#### Highlights of Y-DNA testing:



-  Most often used for determining whether men with the same surname descend from a common patriarch. In support of this goal, major genetic genealogy companies host surname projects that are run by volunteers interested in the genealogy of a particular surname.
-  Can also identify a direct paternal connection between men with different surnames. Very useful for adoptees, people from populations that haven’t had inherited surnames for more than a couple hundred years, and families whose biological paternal line has a break in the surname inheritance due to adoption, deliberate surname changes, misattributed paternity, etc.
-  Can suggest geographic and deep ancestral origins, such as Native American, Cohanim, Western European or African origins – all on the direct paternal line.
-  Reported as a series of Y chromosome marker values (alleles), which are compared against other customers’ results to determine if there’s a match.

#### Sample Raw Results:

PANEL 1 (1-12)												
Locus	1	2	3	4	5	6	7	8	9	10	11	12
DYS#	393	390	19*	391	385a	385b	426	388	439	389-1	392	389-2***
Alleles	12	23	14	10	13	17	11	16	11	13	11	30

Family Tree DNA will compare your “alleles” with the results of other customers in the Family Tree DNA database and provide you with a list of names and email addresses of your matches. You can then contact your matches and compare your family trees!

#### How Many Markers?

-  Family Tree DNA offers 12, 25, 37, 67 and 111-marker tests.
-  The more markers tested and compared, the more confident you can be that your match is recently related. At least 37 markers is best for genealogical purposes. For example:
  - An exact 12-marker match gives a 90% chance of two people sharing a common ancestor within 1 to 23 generations,
  - An exact 37-marker match gives a 90% chance of two people sharing a common ancestor within 1 to 5 generations.

## Mitochondrial DNA (mtDNA)

mtDNA testing focuses on the direct maternal line – ie, a mother’s mother’s mother, etc. Both men and women can take this test and be compared to each other.

### Highlights of mtDNA testing:

- Verify if two people are related via a direct maternal line.
- Can suggest geographic and deep ancestral origins, such as Native American, Western European and African origins – all on the direct maternal line.
- Reported as differences from the Cambridge Reference Sequence (CRS), which are compared against other customers to determine if there’s a match.

### Sample Raw Results:

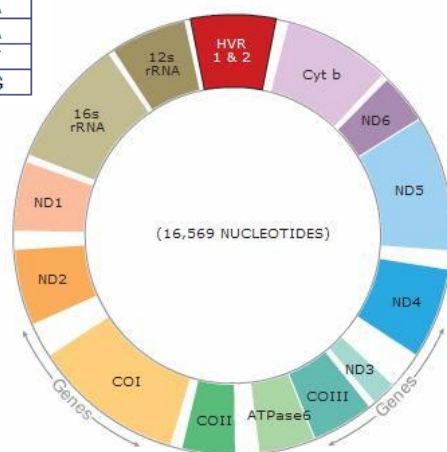
#### Haplogroup - K1a1b1a

HVR1 differences from CRS			HVR2 differences from CRS			CR differences from CRS		
16224C	16234T	16311C	73G	114T	263G	750G	1189C	1438G
16519C			315.1C	497T		1811G	2706G	3480G
						4769G	7028T	8860G
						9055A	9698C	10398G
						10550G	10978G	11299C
						11467G	11470G	11719A
						11914A	12308G	12372A
						12954C	14167T	14766T
						14798C	15326G	15924G

HVR1 = Hyper Variable Region 1

HVR2 = Hyper Variable Region 2

CR = Coding Region (everything except HVR1 and HVR2)



### Which Test Level?

Family Tree DNA offers three (3) mtDNA tests:

- mtDNA (Basic) – HVR1
- mtDNAPlus – HVR1 and HVR2
- mtFullSequence – Entire mtDNA (HVR1, HVR2, CR)

The higher the level you test and match someone on, the more confident you can be that your match is recently related:

- An exact match on mtDNA (Basic) gives a 50% chance of sharing a common ancestor within 52 generations
- An exact match on mtDNAPlus gives a 50% chance of sharing a common ancestor within 28 generations.
- An exact match on mtFullSequence gives a 50% chance of sharing a common ancestor within 5 generations.

## Autosomal DNA (Family Finder)

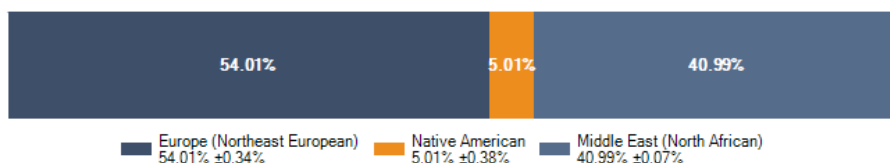
Autosomal testing extends the power of genetic genealogy to all ancestral lines rather than only a direct paternal or direct maternal line. Both men and women can take this test and be compared to each other.

### Highlights of Autosomal testing:

- Discover connections to descendants of your sixteen (16) great-grandparents.
- Determine degree of relationship with matches
- Great test for adoptees to discover their ancestry and clues to their birth parents' families
- Includes Population Finder, which determines the percentages of different ancestries that comprise your genetics.







### Family Finder Tools

- Matches: Provides match name, email address, suggested relationship, relationship range, length of matching DNA segments, ability to assign relationships for known relatives, ancestral surnames (if provided by match), gedcom (if provided by match), notes page to record info about the match.
- Chromosome Browser: Graphical view of matching segments
- Population Finder: Percentages of different ancestries that comprise your genetics.
- Download Raw Data



## Making the Most of Your Genetic Genealogy Experience

Receiving, reading and understanding your results shouldn't be the end of your genetic genealogy journey. Here are some ways you can make the most of this experience:

-  **Share.** Your myFTDNA account has fields to enter your Most Distant Known Ancestor's (MDKA) name and location, as well as all the surnames in your ancestry. You can also upload a GEDCOM of your family tree. Entering all this information will enable your matches to learn something about your genealogy before they even contact you.
-  **Communicate.** Don't be afraid to email your matches, and definitely respond to emails that you receive from your matches! All customers can choose whether to sign the green release form that Family Tree DNA provided with your swab kit, which gives FTDNA permission to provide their name and email address to matches. So everyone who you see on your Matches page has signed this form and given permission.
-  **Participate.** Family Tree DNA has over 6,000 different projects which focus on surname, geography, heritage or haplogroups. Projects are all run by volunteer administrators and are free to join. Joining projects is the best way to stay informed about news related to the topic of the project, and you have the added benefit of getting support and assistance from your project administrator. Also, Y-DNA tests ordered through a project are always discounted from Family Tree DNA's retail prices.
-  **Be Proactive.** No project for your surname yet? Start one and recruit other people with your surname to get tested. You don't have to be an expert on genetic genealogy to start a project.
-  **Learn.** Keep learning about genetic genealogy by attending Relative Roots Webinars, visiting the International Society of Genetic Genealogy website, and joining discussion forums and email lists that discuss genetic genealogy. Project administrators are also invited once a year to attend a conference hosted by Family Tree DNA in Houston.
-  **Test More.** Upgrading existing tests, ordering new types of tests, and/or testing other family members all have the potential to enhance your Genetic Genealogy experience. Higher level tests refine results, each type of test has a different purpose, and testing other family members may help you target a specific ancestor that your own results do not.

## Websites



### Relative Roots

- <http://www.relativeroots.net>
- <http://www.relativeroots.net/webinars/>
- <http://www.relativeroots.net/blog/>
- <http://www.facebook.com/RelativeRoots>
- <http://www.twitter.com/RelativeRoots>



### Family Tree DNA

- <http://www.familytreedna.com/>
- <http://www.familytreedna.com/faq/>
- <http://www.facebook.com/FamilyTreeDNA>



### International Society of Genetic Genealogy (ISOGG) – it's free to join!

- <http://www.isogg.org>



### Genetic genealogy mailing lists and discussion forums:

- <http://forums.familytreedna.com>
- <http://www.yahoo.com/group/ISOGG>
- <http://www.yahoo.com/group/DNA-Newbie>
- <http://www.dna-forums.org>
- <http://lyris.jewishgen.org/ListManager> (JewishGen)
- <http://lists.rootsweb.ancestry.com/index/other/DNA/GENEALOGY-DNA.html>

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