

I've Had My DNA Tested... Now What?

by Mary Kathryn Kozy

Why genetic genealogy?

It can tell you:

- If you and another person are related /descended from the same individual
- If you and someone else with the same surname are related
- If your genealogical research is on the right track
- What area of the world your paternal and maternal lines come from, as well as giving you an idea of your ethnic origins

DNA and Y-chromosome basics:

- DNA (deoxyribonucleic acid) – double helix consisting of 23 pairs of chromosomes that can be found in the nucleus of every cell in the human body.
- 22 pairs of autosomes – a child receives half from their father and half from their mother.
- One pair of sex chromosomes – male has sex chromosomes XY and a female has sex chromosomes XX.
- The Y chromosome does not recombine when passed down, allowing segments to be passed from father to son virtually unchanged.
- Since the surname also follows the male line, these segments from two individuals can be compared in order to determine degrees of relatedness. Only males can take this test. Females can ask a father, brother, uncle or cousin to test.

Testing itself:

- Short Tandem Repeat (or STR) markers represent a change in the length of a segment of the chromosome made up of the four base proteins (A, C, G, and T). For example, at the GATA H4 marker, it can have 4-19 repeats of the sequence 'GATA.' This can help distinguish one line from another.
- Number of markers to test depends greatly on your research goals. In the case of Y-DNA testing, more markers is generally considered better.
- Who do I test? Again, this depends on your research goals. May have to climb back up your tree a ways and come down through direct male lines of descent.

Non-paternity events (NPEs) can be caused by the following:

- An extramarital affair
- A bride is pregnant w/child before marriage and groom is not the father
- An undocumented or unofficial adoption
- A son takes his stepfather's name
- Surname change or patronymic naming system
- Plain old bad data!

Haplogroup/deep clade testing:

- Determined with markers of Single Nucleotide Polymorphisms or SNPs (where one single base in a DNA strand gets switched for another, say a 'C' gets swapped out for a 'T' as a mutation). These unique mutations can be used to show where any one person fits on the human genetic migration trail.

Mitochondrial DNA (mtDNA) basics:

- The mitochondria functions as the powerhouse in every human cell.
- It contains its own DNA that does not recombine, and so it is passed down from a mother to her children.
- There are 16,569 nucleotides on each mtDNA and it contains two hypervariable regions (HVR1 & HVR2) that show much more variability.

Mitochondrial DNA (mtDNA) basics (continued):

- These regions (or the entire mtDNA sequence) are then compared to the Cambridge Reference Sequence or the Reconstructed Sapiens Reference Sequence.
- Females and males can test, but only females can pass this DNA on to their children.
- Full mtDNA genome sequence exact match gives you a 90% chance of a match in the last ~400 years.

What can I learn from mtDNA?

- Confirm research conclusions on your maternal line
- Prove that two women of unknown or uncertain parentage were siblings or that a woman was adopted into a family (she *doesn't* match)
- Figure out which daughters were born of which mothers in a family where a man had more than one wife
- Show which ethnic group a woman's line descends from

Autosomal testing:

- Within the past two years, FamilyTree DNA, 23andMe and now Ancestry.com are offering this type of test
- Tells you about those other 22 pairs of chromosomes and can help you fill in the blanks on the rest of your pedigree chart
- Generally can help you identify cousins back about 5 generations; some more distant
- Must try to discern which branch of the family you're related on, usually by comparing surnames/locations

REMEMBER:

- Most of the value of genetic genealogy (DNA testing for family history research purposes) is in the **comparison and matching** of your DNA results to others.
- Just because we have DNA testing does *not* mean we can throw exacting traditional research techniques out the window!
- Use the tools shown tonight to compare your DNA to that of others who have tested.

Want to learn more? Check out these Internet resources:

- International Society of Genetic Genealogy (www.isogg.com)
- DNA Testing Adviser (www.dna-testing-adviser.com)
- FamilyTree DNA (www.familytreedna.com)
- Genographic Project (genographic.nationalgeographic.com)
- Ancestry.com's DNA Testing ([Idna.ancestry.com](http://dna.ancestry.com))
- 23andMe (www.23andme.com)
- GeneBase blog (www.genebase.com/blog/)
- Who Do You Think You Are? (www.nbc.com/wdytya/)
- Finding Your Roots (www.pbs.org/wnet/finding-your-roots/) and Faces of America (www.pbs.org/wnet/facesofamerica/)

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