

RT7928 - Beyond Pie Charts: Using Y and Mitochondrial DNA Testing to Solve Genealogical Puzzles

- I. DNA – Where does it come from?
 - a. Y-DNA
 - i. Only males have the Y chromosome, and it is passed down from fathers to sons.
 - b. Mitochondrial DNA
 - i. Both males and females have mitochondrial DNA (mtDNA) but only females pass it on to their children.
- II. DNA Testing
 - a. Family Tree DNA uses buccal (inside of the mouth) swabs for our tests.
 - b. We store DNA samples in our in-house lab for future testing. This means you can order one type of test today, and if/when you decide to order another test, even in a few years from now, we will still have that DNA to test.
- III. Y-DNA
 - a. Only males have the Y chromosome
 - i. As it is passed in an unbroken direct line from father to son it traces the **direct paternal line** (father's father's father's etc.) with no influence from any mothers.
 - b. Haplogroups
 - i. The oldest evidence of humans is found in eastern Africa. As mankind spread from eastern Africa to cover the entire globe, each small group slowly developed mutations throughout the generations that distinguish one group from another. We call these migratory groups **Haplogroups**.
 - ii. Haplogroups have many subgroups, some are specific to individual family or clan lines, and this test can tell you how you fit within the overall migration of humanity.
 - c. Matches
 - i. STR markers – Short Tandem Repeat – Short sections of repeating DNA that we use to identify living people who share common paternal ancestry.
 - ii. Y-DNA tests compare specific markers on the Y chromosome to match you to living people in our database who share common **direct paternal ancestry** in the last 25 generations.
 - iii. There are different levels of Y-DNA tests. Picture Y-DNA as a puzzle with 111 pieces. Whatever level you test for, it looks at that number of pieces and compares them to another person's. The number of pieces you mismatch on is called the genetic distance. In general, the higher the genetic distance, the more distantly related you are to that person. For genealogical purposes, anything more than a genetic distance of 4 is generally not considered genealogically relevant, though there are exceptions.
 - iv. The more markers you test for, the more of a complete picture of the puzzle you see. The Y 37 level is a good place to start. If you have a lot of matches or need to confirm a relationship, you are able to upgrade for the difference in price between different levels without submitting a new DNA sample. An upgrade to a higher level will weed out distant relations to show those people sharing the most recent paternal ancestry with you.
- IV. mtDNA
 - a. Men and women both have mitochondrial DNA (mtDNA), but since only females pass it on to children, it is almost a mirror image of Y-DNA.

- i. Traces the **direct maternal line** (mother's mother's mother's etc.) with no influence from any fathers.
- b. Haplogroups
 - i. Traces the migration group, or haplogroup, of your direct maternal lineage out of Africa to all regions of the world.
- c. Matches
 - i. As there is much more mitochondrial DNA in your cells than autosomal or Y-DNA, it takes much longer to change. This means it connects you with living people in the database who share common maternal ancestors in the last **52 generations**.
 - ii. Also provides a genetic distance

V. Group Projects

- a. Family Tree DNA group projects are run by volunteers who are often experts in the particular topic they are studying. These look at a variety of genetic genealogy topics and can connect you with a community of genealogists all interested in the same topic. You can join a variety of projects for all your needs, and best of all, they are all free!
- b. Types of projects
 - i. Surname – Looks at a particular surname or related variants to see how various branches all connect. These projects typically focus on Y-DNA.
 - ii. Haplogroup – Look at deep anthropological questions of where a haplogroup or subgroup thereof originated from hundreds or thousands of years ago.
 - iii. Geographical – Looks at specific geographical regions to see how people living in that area connect.
 - iv. Lineage – As female lines often change surnames each generation, lineage projects focus on mtDNA to help get past maternal brick walls.

VI. Resources

- a. Family Tree DNA Learning Center - <https://www.familytreedna.com/learn/>
- b. International Society of Genetic Genealogists – <http://isogg.org>
- c. DNA Explained - <https://dna-explained.com/>
- d. Customer Support – (713) 868-1438 Monday thru Friday 9-4:30 CST