DNA Basics-Quick Start

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Basic Science

- DNA is RANDOM
- You receive one set of 22 chromosomes (autosomes) and 1 sex chromosome from each parent
- The sex, or chromosome #23, is either a Y or an X.
- Male is YX Female is XX
- To be MALE, you have a Y chromosome from your dad and an X chromosome from your mom.
- To be FEMALE, you do not have a Y chromosome, you inherited an X from your dad and an X from your mom.
- You only inherit 50% of each parent's DNA. (You do not inherit all of their DNA.)
- Siblings each inherit a different mix of DNA from each parent.
- Some of the DNA inherited by siblings is the same. Siblings share 32-54% of DNA.
- The parts of each parent's DNA that was not inherited by you or your siblings is lost.
- Diminishing DNA with each generation. On "average" you share 50% per parent (2), 25% per grandparent (4), 12.5% per great-grandparent (8) etc. until it washes out and you share no DNA with, about 8th-10th great grandparent.
- Limits of autosomal test is about 200-250 years from the age of test taker, 4th-6th great-grandparents.
- What you did not inherit…you cannot pass on.

AUTOSOMAL - atDNA:

- Standard test for all companies.
- Can test both male and females.
- The 22 non-sex determining chromosomes in pairs, one of each chromosome from your father, one of each from mother.

https://isogg.org/wiki/Autosomal_DNA_statistics

MITOCHONDRIAL – mtDNA

- Follows your direct maternal line for thousands of years back, mother to mother.
- Passes from mother only to both her male or female children.
- Test both males and females.
- Test at FTDNA.com at the **Full Sequence** level.

YDNA:

- Follows your direct paternal line, father to father for thousands of years virtually unchanged.
- Test MALES ONLY at FTDNA.com

- A **centiMorgan** (cM) is a unit used to measure genetic distance. It measures the length of the DNA.

- In general, the more centimorgans two people share, the more closely related they are.
- Every person has approximately 6,800 centiMorgans total of DNA. (About 3,400 cM from each parent)
- 7cM or smaller are usually false

- **Segment** -A shared DNA segment is **a chunk of genetic materiashared between two individuals**

- The length of a segment is reported in centimorgans.
- Often, sharing fewer, longer segments indicates a closer relationship.
- When looking at DNA matches, the "shared cM" is the total length of the DNA you share with a person.

MRCA = Most Recent Common Ancestor

TESTING STRATEGY: Who to test.

- Test yourself. Autosomal DNA is the standard of the testing companies.
- Test the oldest in "generation," then oldest in "age", both maternal and paternal.
  - i.e., two maternal uncles 18 years apart, go for the oldest
- Test ALL siblings.
- Test 1st – 3rd known cousins from both sides of the family. Testing 2nd cousins particularly helpful as they will share with you one set of common great-grandparents.
- Test the living relative that would further your research
  - i.e. female with no brothers, to substitute for father's Y DNA, test a paternal uncle or a paternal 1st cousin (same surname as your dad).

You will want to test ALL of your siblings.

- Gives access to the parts of the DNA you did not inherit that your sibling did.
- Your sibling and you will have matches that are the same, matches only you have and matches only the sibling has.
- Siblings share all the same ancestors.
- Sibling matches not in common with another sibling are still genetic cousins to all the siblings.
- You will want access to your siblings DNA results and that may mean paying for the test.

TESTING STARTEGY: Where to test.

- 5 major companies:
  - 23 & Me
  - FamilyTreeDNA (Where to test for YDNA and mitochondrial DNA)
  - AncestryDNA
  - MyHeritageDNA
  - LivingDNA
- https://isogg.org/wiki/Autosomal_DNA_testing_comparison_chart

MY SUGGESTED TESTING STRATEGY:

1. Test with Ancestry.com (autosomal)
2. After your results are returned, download your raw data from Ancestry to your computer. Prepare a folder ahead of time to drop it in.
3. Then upload that raw data file, for free, to FamilyTreeDNA and MyHeritageDNA and Living DNA. (nothing changes at Ancestry)
4. Consider uploading your raw data to GEDmatch.com – a repository, collects DNA from multiple testing companies
5. Cannot upload raw data to AncestryDNA or 23&Me.

What to do <u>while waiting</u> for your results:

1. Consider purchasing a genealogical software program that resides on your computer.
   - Family Tree Maker
   - Roots Magic
   - Legacy

2. Build a several generational family tree, (names, dates, places), including collateral relatives. (Spouses, sisters, brothers, and their children of your direct line.)

3. Identify and have ready a picture of yourself to add to your accounts.

4. Create folders in your e-mail account for DNA matches

What to do while waiting for your results:

5. Create a master form to log correspondence with matches for same ancestor but come from multiple companies. Include the MRCA, name of match, testing company, the lineage connection, dates of contact, e-mail address, notes…

6. Think about who you need to convince to take a DNA test that would help you further your research.

7. Make a **GEDCOM** - **GE**nealogical **D**ata **COM**munication of your tree to upload to your testing companies. A method of exchanging genealogical information of your family tree in a standard file format.

HOW TO DETERMINE DEGREE OF COUSINHOOD

MRCA (MostRecentCommonAncestor)

Shared Grandparents = 1st cousins

Thereafter, +1 to the number of greats

- Share Great grandparents, 1 great, so +1 = 2nd cousins
- Share GGG, 3 greats + 1 = 4th cousins
- (If 4th cousins you minus 1 to find shared ancestor)

COUSIN REMOVED:

- If there is no "removed" in your cousin relationship, you and your cousin are of the same generation.
- If your cousin in once "removed," they are one generation away from you. Either "back" from you, (of your parent's generation) or one generation ahead of you, (of your children's generation.)

AncestryDNA.com:

- On home page, check that your tree has been linked to your DNA. If not linked, click and follow the instructions.
- Next, click on 'DNA matches."
- At the top you will see "FILTERS". Chose "Groups" dropdown menu, then "create custom group+". Divide your family into groups, I'd suggest a group of your paternal grandparents' surnames and a group of your maternal grandparents' surname to start off. (example: Jones/Smith). Some use warm colors for maternal and cool colors for paternal.
- Identify close family matches and place into maternal or paternal group.
- Proceed to use "matches in common" to separate your maternal side from your paternal side.
- At top of Matches page, "FILTERS," click on "Common Ancestor". The matches that appear are ones that have a common ancestor on their tree that is on your tree.
- When satisfied that the match's lineage has proven to be correct (supporting documents), when asked if you know your match, agree and answer the questions presented.
- The more matches you can identify and indicate the relationship; the better Ancestry gets at providing "Common Ancestors".

Matches IN COMMON:

- You will have a list of matches, some from your maternal side and some from your paternal side. They do not come as identified by paternal or maternal.
- You want your matches into separate groups, a maternal group and a paternal group.
- You use "Matches in common" to separate maternal from paternal.

www.GEDmatch.com www.searchangels.org www.familytreedna.com www.isogg.org

https://thegeneticgenealogist.com/wp-content/uploads/2020/03/Shared-cM-Project-Relationship-Chart.png

https://dnapainter.com/tools/sharedcmv4

https://thegeneticgenealogist.com/2008/12/21/unlocking-the-genealogical-secrets-of-the-x-chromosome/