# Behind The Brick Wall: Solving Research Problems with DNA

## Black History Month

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***Four Types of DNA***

- *Y-Chromosome DNA*: DNA packaged in the Y-chromosome and passed from father to son; only males possess Y chromosomes, facilitating direct male-line ancestor research.
    - Test with FamilyTreeDNA.com: Y-DNA37 ($119). Identify the closest Y-DNA matches.
    - Collect and compare the matches' family trees to determine the most recent common ancestor on the direct paternal (all male) line.
    - The results of Y-DNA haplogroup testing can help determine the geographic origin of one's paternal line.

- *Mitochondrial DNA*: DNA from the mitochondria passed from mother to child; only females can pass on mitochondrial DNA. This type of DNA facilitates direct female-line ancestor research.
    - Test with FamilyTreeDNA.com: full mitochondrial sequence ($159)
    - Identify the closest mtDNA matches and collect and compare their family trees to determine the most recent common ancestor on the direct maternal (all female) line.
    - Since mitochondrial DNA mutates very slowly, the most recent common ancestor for two individuals with identical mitochondrial DNA could have been born over 1000 years ago, beyond the scope of genealogical record-keeping for most families.

    - This type of DNA is most informative for determining where one's maternal line originated.

- *Autosomal DNA*: DNA on chromosomes 1-22 inherited from all ancestors. This type of DNA is the workhorse of genetic genealogy, answering a multitude of questions. Test with AncestryDNA.com ($99), 23andMe.com (Ancestry-Only $99), and MyHeritage DNA ($89). Then, upload your raw DNA data file from AncestryDNA to Family Tree DNA's Family Finder ($0-$19 – FamilyTreeDNA.com), GEDMatch.com (free, but donation recommended), and Living DNA. Use all of the available databases and make more discoveries faster. You can also test directly with each company.

- *X-Chromosome DNA*: DNA on the X chromosome with a specific inheritance pattern; males receive X-chromosome DNA only from their mothers, while females inherit X-chromosomes from each of their parents. The distinct inheritance pattern can assist with determining relationships to unknown DNA relatives with whom you share X-chromosome DNA. 23andMe and Family Tree DNA's Family Finder include X-chromosome DNA matches with their results.

Genetic genealogy is a dynamic field that requires constant study. Consult the following resources:

Books
- Emily Aulicino's *Genetic Genealogy: The Basics and Beyond*
- Dave Dowell's *NextGen Genealogy: The DNA Connection*
- Blaine Bettinger's *The Family Tree Guide to DNA Testing and Genetic Genealogy*
- Blaine Bettinger and Debbie Parker Wayne's *Genetic Genealogy in Practice*
- Debbie Parker Wayne et al: *Advanced Genetic Genealogy: Techniques and Case Studies*

Genetic Genealogy Blogs
- The Genetic Genealogist http://thegeneticgenealogist.com/
- Your Genetic Genealogist http://www.yourgeneticgenealogist.com/
- Through The Trees Blog http:throughthetreesblog.tumblr.com

Autosomal DNA Test Strategy:

1. Test with AncestryDNA, 23andMe, and MyHeritage DNA
2. Upon receiving AncestryDNA results, transfer the raw DNA data file and the family tree file to the following sites:
    a. GEDmatch: https://gedmatch.com/
    b. Family Tree DNA's Family Finder: https://www.familytreedna.com/autosomal-transfer
    c. Living DNA: https://livingDNA.com
3. Collect and compare family trees to determine relationships with matches starting with the closest matches.
4. Annotate each match's DNA profile with the names of the common ancestors, links to family trees, and any evidence that emerged from your research of the match.
5. Contact the match to notify them about your shared lineage and to invite them to transfer their raw DNA data file and family tree file to GEDmatch.
6. Review the shared matches (also known as Relatives in Common) for each match and repeat steps 3, 4, and 5.
7. Share match lists with your AncestryDNA matches.
8. Use DNA Painter's What Are The Odds feature to build and test relationship hypotheses: https://dnapainter.com/tools/probability

**Steps for Success**

*Build a robust online family tree*

- Use Ancestry.com, Rootsweb.com, and FamilySearch.org to research your lineage and make your research available to your DNA matches.

*Compare pedigrees with matches*

- Compare family trees with each match to identify common ancestors.
- One of the common ancestors identified may be the ancestor who passed down the shared DNA.

*Strategically test relatives*

- Testing as many relatives as possible, especially the oldest living generations, delivers many more valuable genealogical data points. The most important relatives to test:

| **Relative to Test** | **Alternative** | **Second Alternative** |
|---|---|---|
| Your parents | Your uncle or aunt | Your siblings |
| Your grandparents | Your granduncle or grandaunt | Your 1st cousins |
| Your great-grandparents | Your great-granduncle or great-grandaunt | Your 2nd cousins |
| Your great-great-grandparents | Your great-great-granduncle or great-great-grandaunt | Your 3rd cousins |