DNA Problem Solving

By Sara Allen

Research your brick wall in all existing genealogical records first. After no success, try DNA testing. Use the 2 types of research in concert with one another. Successfully solving the problem should involve use of the Genealogical Proof Standard.

Research Plan for DNA Testing:

1. Identify your research problem
2. Summarize your genealogical research results
3. Choose most relevant DNA test/tests to order
4. Choose most relevant family member to test
5. Complete the rest of your family tree back to 4th great grandparents or farther, if possible

DNA test options

1. Autosomal DNA, inherited 50/50 from both father and mother, and from all ancestors going back to about 5-6 great grandparents (GGs)
2. Y Chromosome – inherited by males only, from their father; test of direct paternal line
3. Mitochondrial – inherited by males and females, only passed on by females, test of direct maternal line
4. X-DNA – included in autosomal test of both males and females

Test recommendations:

1. Always start with an autosomal test unless mystery person is 5-8th GG or farther back
   a. Recommended Autosomal testing path & evaluate after each step
      i. Start with largest testing database first. Right now, this is Ancestry DNA
      ii. Upload your raw data file to MyHeritage and FamilyTreeDNA – both accept uploads from other companies
      iii. Order 23andme
2. Y chromosome test may be relevant for some cases, but must find male relative on the correct Y chromosome inheritance path from mystery man
3. Mitochondrial DNA test may be relevant in fewer cases, but must find relative on the correct mtDNA inheritance path from mystery woman
4. X chromosome may be relevant in fewer cases. Will not be discussed in this program tonight

Who should you test?

1. For autosomal testing, test the closest living relative to the mystery person
2. Try to go back 1 or 2 generations further from yourself
   a. For example:
i. Test your parent, grandparent, aunt/uncle, great aunt/uncle, or first cousin of your parent

ii. This earlier generation will have more autosomal DNA than you do from the mystery ancestor

3. May need to test at all 4 autosomal testing companies

Autosomal test shortcomings:

1. Not useful after about 5th-8th great grandparents. Must use other tests for farther back mysteries.
2. Half-relationships, double relationships and endogamy make interpreting DNA results more difficult
3. Under-represented groups in testing databases include:
   a. Recent immigrants to US
   b. Non-Caucasian groups
   c. Natives of non-Western countries

Analyzing autosomal test results:

1) Sort matches out by known family lines, surnames
   a. Look at match list for known relatives, known surnames, pictures of matches that you recognize
   b. View match’s trees (linked and unlinked) looking for common ancestors or surnames, build trees for close matches without trees
   c. View common ancestor hints
   d. Use “shared matches” feature with known relatives to help you sort

2) At Ancestry DNA can create and sort matches into 24 color coded groups.
3) After sorting all matches to known family lines, there will be some unsorted matches who do not belong in any of your other groups.
   a. Probably belong to a mystery line in your family
   b. Sort into unknown groups of matches that are shared matches with each other and print out trees of these unknown matches
   c. Compare and contrast trees, looking for common ancestor couple or surnames
   d. Build trees for the common ancestor couple’s family & descendants
   e. Try to place your DNA matches on this tree.
   f. The higher the centimorgans shared by you and the match, the closer the relationship. This might help you to identify the correct branch of the family tree to look on.
      i. Use the Shared cM chart, DNA Detectives chart or DNA Painter Tools to analyze centimorgans
   g. Your mystery ancestor is probably a descendant of that common ancestor couple

4) Follow the same process for the next unknown match group
5) At some point, 2 of the unknown match groups should intersect with either a marriage or relationship ending in a child

Analyzing Y-chromosome DNA matches

1. Only utilize 37 marker matches and higher
2. If you have matches to your surname, sort and analyze matches
   a. Contact matches, view their tree, view earliest ancestor
   b. Determine immigrant ancestor or earliest ancestor shared by your match group
   c. Build a descendant tree for this man
   d. Try to place your matches on this tree
   e. Try to place your paternal ancestor on this tree
   f. Target test a male from a suspected connected family to prove or disprove your theory
   g. Do genealogy!!!!

At all points in search, DNA and more genealogical research may lead you in a new direction

1. Follow up on all leads
2. Revise theories as you go
3. Do more genealogical research!!!
4. Test hypothesis with Genealogical Proof Standard