Situation

DNA testing has been widely used for decades in law enforcement circles to identify individuals and establish paternity. Recent technological advances in DNA testing have also sparked interest in using it as evidence for genealogical research. While an exciting option, certain criteria and conditions must be met with recognition of its limitations.

Background

Humans have 2 types of DNA (or deoxyribonucleic acid): cytoplasmic (found within the mitochondria of the cell) and nuclear (found in the nucleus of the cell).

Mitochondrial DNA consists of only one circular chromosome in the mitochondria lying within the cytoplasm outside the nucleus. For all practical purposes, maternal mt-DNA is passed from mother to daughter or son but only the daughter can transmit it to the next generation. All of the paternal mt-DNA is lost from father to son at the time of conception.

Nuclear DNA makes up the backbone of the 46 chromosomes within the nucleus. These chromosomes convey all of our genetic information for what we are, who we are, how we look and so forth.

Each person inherits 23 sets of chromosomes from the mother and 23 from the father. There are 44 chromosomes in Autosomal DNA (determines color, shape, form and function of the body) and one set (or pair) of Sex Chromosome DNA determining if we are to be a boy or a girl. A boy will inherit an X sex chromosome from his mother and a Y sex chromosome from his father ONLY, which determines maleness. A girl will inherit an X sex chromosome from her mother and an X sex chromosome from her father (either parent can give an X) that determines femaleness.

Before any DNA can be passed from parent to child it must be duplicated. Sometimes this duplication process makes mistakes called mutations. There is a 50:50 chance that a parent may pass this mutated DNA to their offspring but it is with 100% certainty that a male parent will pass the Y DNA (or gene) to his son with any mutations that may have occurred. For these reasons, it is simpler in determining which parent not only provided the Y chromosome but the
mutation as well. This makes Y DNA analysis more effective and more specific for genealogic analysis.

**Genealogical DNA Testing:**

DNA tests currently available consist of three main types:

1) Autosomal DNA is passed from both parents to each child. There are more than 500,000 markers out of nearly 3 billion available markers in this type of DNA found in the 22 pairs (or 44 chromosomes) in the nucleus. At this time, mainly generalizations can only be gleaned from this type of testing (your percentage ethnic makeup, probability of areas your ancestor inhabited, etc.) because of its vast complexity and current technological limitations hampering any pertinent genealogical value. This type of DNA study is deserving of close monitoring in the future. We still endorse this testing as we believe it will become more valuable with time; however, GSMD is choosing not to consider it for purposes of genealogical analysis.

2) Mitochondrial DNA (Mt-DNA) passes from the mother to each of her children but only daughters may pass it on. There are only 1150 markers out of a possible 16569 marker locations in 3 regions that can be tested: HVR1, HVR2 and the Coding Region. There are special challenges in Mt-DNA testing and interpretation, which GSMD continues to closely monitor. Currently, GSMD endorses mtDNA testing but will consider only full sequence mtDNA testing for purposes of genealogical analysis reserving the right to consider this type of DNA study on a case-by-case basis.

3) Y-DNA passes from father to son, has an available 12 of 111 marker locations depending on the company and accuracy desired. It is the most attractive test for genealogical purposes due to its lack of complexity, stability in transmission, and mutation rate. While the 37 marker Y DNA test is one of the best tests available, based on cost analysis and improved accuracy, GSMD still endorses the maximum marker testing for even better accuracy. This type of DNA testing lends itself the most to genealogical analysis at this point in time.

The complex nature of DNA combinations passed down through the generations to subsequent offspring results in a very complex process. Current technology limits any absolute proof of genealogy due to inherent reliability, interpretation and complexity in the analysis process. With such uncertainties, autosomal DNA and mitochondrial DNA testing alone does not provide sufficient evidence to draw concrete lineage relationships.

**General Society of Mayflower Descendants Application**

Due to the complexity of the DNA process mentioned, GSMD has developed specific guidelines for its use in the application process. GSMD chooses at this time to accept only Y DNA studies. The submission shall follow the specific guidelines laid out in this policy. The policy is subject to change due to but not limited to the following; changes in technology, scientific advances, GSMD policy changes and/or regulations. This policy will be reviewed at a minimum of every 3 years.
Conditions where DNA use may be considered

1. When direct evidence of a primary paper trail is insufficient Y DNA may help provide further proof.
   a. Y DNA supporting evidence must be provided from one or more established lines and one un-established line sharing a common ancestor
   b. Y DNA must be passed down through generations from unbroken male lines
   c. Y DNA must have no more than 0 - 2 mismatches between 2 or more males with 37 markers minimum. In some cases more advanced testing or marker upgrades to at least 67 markers may be required.
   d. Female applicants must show full traditional paper trail support from their male line being compared with an established male line. This must meet criteria established by the GSMD, Historian General’s office, and the Executive Committee all of which shall determine acceptability of submitted evidence and scientific data.

2. To assist in providing additional support of an established line.

GSMD Protocol for DNA Submission

To submit DNA evidence on a GSMD application, an applicant will have to meet all of the following criteria. These criteria acknowledge the current level of science and technology, respect GSMD’s existing standards in genealogical research, protect the reputation of verified lineages, address difficulties establishing generational links, allow the verification of an application without need for a degree in genetics, and allow for continued efficient operation of the Historian General’s office.

If an applicant feels a determination decision is in error, and feels it warrants further review, they may write a letter of appeal to the GSMD Historian General. The Historian General will review the documentation submitted along with other evidence and make a determination. Any decisions made by the GSMD Historian General or GSMD executive committee are final.

1. The applicant will have to submit full paper trail documentation on the application except for one unproven father-son link for which Y DNA is to be submitted.
   a. A minimum of 37 markers for YDNA will be accepted
   b. GSMD also endorses the maximum of 111 marker testing

2. The applicant will submit a certified copy of a DNA report from one of the recognized testing organizations approved by the GSMD executive committee.
   If the DNA report is incomplete, appears altered or the formatting appears inconsistent, it will not be considered

3. Where the applicant cannot prove the father-son link, one of the applicant’s tested males must have a lineage with a previously proven link between the same father and a different son.

4. This process cannot be used for new ancestors at this time because they would have no proven lineage with which to compare the Y DNA supported lineage.
5. The Y DNA test results will be submitted only as part of the genealogical analysis. The applicant should have conducted a reasonably exhaustive search to find direct paper trail evidence of the needed relationship. The applicant will have to list all search sites:
   a. A search of online sources only is NOT a reasonably exhaustive search.
   b. Traditional direct evidence of the generational link is always better and preferred to analysis with or without YDNA evidence

6. In the case of a female applicant, the surnames of the two tested males and the maiden name of the applicant or her mother will have to be the same except for obvious spelling aberrations.

7. One of the two males tested will have to be a close male relative of the applicant (father, brother, etc.). This man will then have the same direct lineage to the ancestor of the applicant. The applicant will have to submit results of this man’s YDNA and a document showing a connection to this man’s lineage

8. The second male tested will have to have a different, but still direct lineage link to the ancestor that has been previously proven by GSMD standards. This second male could be the brother, father, or grandfather of a previous applicant or any of their male offspring. The applicant will have to submit the following:
   a. Results of this second males YDNA testing
   b. Documentation linking him to this proven lineage
   c. A signed statement from this man acknowledging voluntary participation in the application process (this can be the most difficult and the most crucial criteria for this type of genealogical analysis)

9. Applicants with 2 submitted YDNA testing will have to have nearly identical results of at least 37 markers (if males were tested with less than 37 markers, they will have to upgrade).

Disclaimers

1) Science advances occur daily in the world today. This policy may be modified at any time due to technological advances or evidence interpretation during the application process.

2) DNA evidence considered today and rejected may in the future be reconsidered due to technological advances or changes. Conversely DNA evidence acceptable today in the confines of current science is subject to rejection in the future.

3) All material submitted to the GSMD must be in their original unaltered form/format with the application submitted. DNA evidence must have been submitted to a laboratory for testing acceptable to the GSMD. DNA tests requirements for consideration are determined by the GSMD and/or its partner DNA laboratories. The DNA laboratories must meet annual certification requirements as required by law or industry standards set forth by the Accredited Relationship (DNA) Testing Facilities (AABB).
4) DNA submitted to the GSMD will not be shared with outside organizations or placed in online accessible databases without written consent of submitters.

References